Interim Report

Evaluation of HUD's Rental Assistance Demonstration (RAD)

U.S. Department of Housing and Urban Development | Office of Policy Development and Research

Interim Report

Evaluation of HUD's Rental Assistance Demonstration

Prepared for
U.S. Department of Housing and Urban Development

Prepared by
Econometrica, Inc.

September 2016

Acknowledgments

The authors of this report acknowledge a debt of gratitude to others who have made significant contributions to this study. In particular, we thank the staff of the many public housing authorities that responded to the web survey, participated in interviews, and enabled the physical condition assessments prepared for this study. Without their support and the insights they provided this study would have been far less informative.

We thank Judson James, Nathan Bossie, and Paul Joice of the U.S. Department of Housing and Urban Development (HUD), Office of Policy Development and Research (PD&R) for the guidance, feedback, and assistance they provided on all aspects of this study. We also thank Carol Star, in the PD&R Office of Research and Evaluation for supporting and guiding this research effort.

We appreciate the assistance we received from William Lavy and the Rental Assistance Demonstration staff in HUD's Office of Public and Indian Housing and from Lynn Rodgers of PD&R, both of whom provided much of the needed information for this study.

Disclaimer

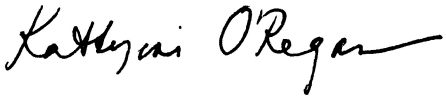
The contents of this report are the views of the contractor and do not necessarily reflect the views or policies of the U.S. Department of Housing and Urban Development or the U.S. government.

Foreword

Public housing agencies (PHAs) have struggled heroically to maintain the country's 1.1 million public housing units, but the backlog of capital needs has grown to $26 billion, and there is little hope today that federal resources will rise to meet it. Congress authorized the Rental Assistance Demonstration (RAD) in 2012 to meet this funding challenge. RAD enables PHAs to convert public housing properties to project-based Section 8 contracts and, in so doing, permit an infusion of private capital to address the project's repair and rehabilitation needs and to put the property on a path of financial stability over the long term. RAD makes it easier for PHAs to leverage additional funding sources, such as low-income housing tax credits and private mortgage debt.

This interim report provides insight into how RAD is being implemented across the country. The program is extremely popular. More than 400 PHAs have submitted more than 1,000 applications for project conversion. HUD has already reached the cap set by Congress of 185,000 units that may be converted, and other projects are waiting for the cap to be lifted. This report explores why participating PHAs are eager to implement RAD, why others have chosen not to pursue it, the kinds of properties that are making it more quickly to closing, and how rehabilitation and in some cases entirely new construction are being financed.

So far, RAD has been extremely successful in attracting capital to help stabilize affordable housing developments. As of October 2015, 185 public housing developments had completed the conversion process. They raised a total of $2.5 billion in funding, of which $2.25 billion came from sources external to the PHAs, for a leverage ratio of nearly 9:1. RAD appears to strengthen the long-term financial stability of converting properties, including those conducting nonfinancial deals that do not access external capital. Many important questions remain, however, regarding RAD's potential to meet the long-term challenge to preserve, improve, and stabilize public housing. The second phase of this evaluation will examine precisely how RAD impacts the physical and financial condition of properties being converted and how project residents are affected. The final report is expected to be published by December 2018.



Katherine M. O'Regan
Assistant Secretary for Policy Development & Research
Department of Housing and Urban Development

Contents

List of Tables

List of Figures

Executive Summary

The U.S. Department of Housing and Urban Development (HUD), Office of Policy Development and Research, contracted with Econometrica, Inc., in December 2013 to undertake a multiyear evaluation of HUD's Rental Assistance Demonstration (RAD) program. For the past 20 months, Econometrica and its subcontractors, the Urban Institute and EMG Corporation, have been in the midst of this evaluation. The team has spoken with nearly100 staff members from dozens of public housing authorities (PHAs), including those that have chosen to participate in RAD and others that have decided not to participate, at least for the time being. In discussions with PHA officials, our research team learned about their experiences with the RAD program, how well it has worked, what the results have been thus far, and their expectations about the program's long-run impact. Our team also learned about the challenges of using RAD and why PHAs that have not used RAD might see it as a less attractive option compared with other public housing financing alternatives. In addition, our team gathered and analyzed information from HUD staff responsible for overseeing or managing the RAD program, conducted physical assessments of public housing projects, spoke with financial institutions that provide outside capital to RAD projects, and consulted with mixed-finance advisors on the intricacies of the financing sources that the RAD program can bring to the table.

This Interim Report represents a midterm examination of the ongoing evaluation and takes stock of the RAD program's achievements to date. It summarizes our preliminary findings on the following questions.

- For RAD projects that made it to closing, what were common sources of capital leveraged? How much external capital was leveraged? What was it about the RAD program that brought those capital sources to the table? Did different financing strategies produce varied levels of success?
- What was the experience of PHAs in obtaining external capital? Was the experience of obtaining external capital different based on the choice of project-based voucher (PBV) or project-based rental assistance (PBRA) contracts or on the particulars of the PHA? Did PHA size and experience with mixed-finance housing play any factor in obtaining external capital?
- Why did some PHAs choose to participate in RAD? What types of projects did they propose for conversion? What factors led those PHAs to propose specific properties for RAD conversion?
- What other programs (and forms of financing) do PHAs view as alternatives to RAD? What factors influence them to choose one rather than the other?
- For PHAs that chose not to participate in RAD, what influenced that decision?
- What factors prevented PHAs from making it to closing?

It is too early in the program to evaluate the full impact of RAD on participating projects, because few projects have had enough time to complete the redevelopment work that is central to the design of RAD. Evaluation of the full impact of RAD, including the impact on the physical

and financial condition of projects that converted to RAD and, importantly, the impact on the residents of those projects, will be the focus of the Final Report, which is due to be released about 3 years from the date of this Interim Report.

ES.1. Overview of RAD Program

The RAD program was established under the Consolidated and Further Continuing Appropriations Act of 2012[1] to stem the potential loss of public housing and other subsidized housing units due to the growing backlog of unfunded capital needs. Its fundamental feature is the conversion of public housing properties to **project-based Section 8** contracts. Congress authorized the RAD program without providing additional appropriations for public housing or project-based Section 8. As a result, HUD is establishing Section 8 contract rents based on the Operating Fund subsidy, pro-rata shares of the PHA's Capital Fund grant, and tenant rents that the property had been receiving in the public housing program. Following conversion, HUD provides funding to the property through Section 8 Housing Assistance Payment (HAP) subsidy rather than through the public housing Operating Fund and Capital Fund.[2] The expectation is that, by providing a predictable, long-term annual funding stream, PHAs can use these Section 8 contracts to achieve the RAD program's four overarching goals without increasing the cost to the federal government.

1. Preserving affordable housing, which has been neglected for many years because of the chronic insufficiency of appropriated resources in public housing programs.
2. Attracting outside sources of (private and public) financing to leverage PHAs' limited internal resources and better meet projects' immediate and long-term capital needs.
3. Minimizing adverse impacts on existing residents by offering them rights of return and other tenant protections.
4. Improving housing quality for residents by financing the cost of rehabilitation and putting the management and maintenance of affordable housing on a more stable basis.

The RAD program consists of two components. The first component, **Public Housing & Section 8 Mod Rehab Housing,** allows up to 185,000 units (the original cap was 60,000 units) of public housing and Section 8 moderate rehabilitation (Mod Rehab) properties to convert to project-based Section 8 HAP contracts following an application and review process.[3] The second component, which is not part of this evaluation, allows Rent Supplement, Rental Assistance

[1] Pub. L. 112–55.

[2] The initial RAD contract rents are established by adding together the current public housing operating subsidy, current capital funding, and tenant contributions so that the total subsidy cost is the same after conversion to RAD as it was before conversion.

[3] The cap applies to both the first and second components. When the cap was lifted, all Mod Rehab conversions were moved to the second component. Only 682 out of 185,000 units have been for Mod Rehab projects in the second component. On June 15, 2015, HUD published a revised RAD notice (HUD, 2015a). This notice allows Mod Rehab Single-Room Occupancy projects that were funded under the McKinney-Vento Homeless Assistance Act of 1987 (Pub. L. 100–77) to convert to project-based Section 8 contracts under RAD.

Payment, and Mod Rehab properties to convert their tenant-based vouchers to project-based Section 8 assistance.

Participation in RAD is voluntary for PHAs. Properties that convert to RAD are subject to long-term Section 8 rental assistance contracts and use restrictions. RAD contracts also require properties to be owned or controlled by public or nonprofit entities, except in the event that low-income housing tax credits (LIHTCs) are used. RAD projects financed with LIHTC equity will continue to be owned by a public-interest entity. Protections were put in place to ensure that current residents benefit from the RAD conversion. Residents have the right to be engaged by the PHA, through notification and consultation, during the conversion process. Residents also have the right to return to their existing properties in the event of their relocation during rehabilitation or construction.

The Section 8 subsidy under RAD is based on the total amount of the operating fund and capital fund subsidies that a property receives under the public housing program plus the operating cost adjustment factor (OCAF).[4] Because the Section 8 HAP contract provides these subsidies over the term of the contract, which can be 15 or 20 years plus automatic renewal, PHAs can leverage this long-term cashflow to finance debt. They can use this debt plus "other sources" of funds to recapitalize and renovate or redevelop their projects.

The various financing options under RAD include—

- Debt financing at a fixed rate and term through public or private lenders, including construction loans, permanent loans, first liens, and second loans.
- Federal Housing Administration (FHA)-insured mortgage loan financing, including risk-sharing programs offered through state agencies, Fannie Mae, or Freddie Mac.
- Four percent and 9 percent LIHTCs.[5]
- Operating reserves, consisting of the cumulative balance of operating subsidies and other receipts less project operating expenses.
- Replacement Housing Factor (RHF) funds, Demolition and Disposition Transitional Funding, and/or unobligated capital funds that are part of a PHA's available public housing funding.
- Grant funds and soft loans that do not require repayments, which could be provided out of Community Development Block Grant funds; Choice Neighborhoods Implementation (CNI) monies; HOME Investment Partnerships Program (HOME) grants; Affordable

[4] The Section 8 subsidy *plus* the tenant payment equals the contract rent under the HAP contract. Contract rent plus utility allowances (if tenants pay utilities) equals the gross rent. The OCAF funds inflation in the out years.

[5] LIHTCs are dollar-for-dollar tax credits for affordable housing investments, administered by the Internal Revenue Service. They provide funding for the development costs of low-income housing by allowing investors to take a federal tax credit over a 10-year period equal to a percentage of the present value of the cost incurred for development of the low-income units in a rental housing project. Projects for new construction and rehabilitation, if not funded by tax-exempt bonds, can receive a maximum annual tax credit allocation of 9 percent of the project's eligible basis, which consists of building acquisition costs plus construction and other construction-related costs. The cost of acquiring an existing building (but not the land), and projects financed with tax-exempt bonds, are eligible for a credit of 4 percent annually.

Housing Program (AHP) grants; and loans available from Federal Home Loan Banks, state and local grants, and grants from private philanthropies.

- "Seller" or "take-back" financing, used in some LIHTC transactions when the as-is value of the property increases the basis for determining the amount of qualified tax credits.
- Deferred developer fees, which are the portion of the fees to the developer that are not payable before occupancy.

Depending on how much financing they can raise and the capital needs of their projects, PHAs can pursue different conversion strategies for their projects, such as—

- **Capital repairs.** If the capital needs of the project are moderate to substantial and they can be addressed through rehabilitation, the PHA may propose to keep the project and invest in repairs and upgrades. These types of conversions usually require some external financing.
- **Demolition and new construction.** When the capital needs are extensive or the project has other deficiencies that cannot be corrected, the PHA may propose to demolish the existing project and replace it with a newly built project. These types of conversions usually require the most external financing.
- **Conversion to achieve financial stability.** When the financial analysis demonstrates that the post-RAD-conversion property will accumulate a sufficient amount of reserves to meet the capital needs of the project, the PHA can complete the RAD conversion without external financing. Under this option, PHAs would use RAD to place the property on a stable financial footing and ensure long-term affordability.
- **Transfer of rental assistance.** When the RAD conversion would not provide enough capital funding to demolish and rebuild a property, PHAs can propose to apply for RAD for a given property and then transfer the RAD vouchers to a different project that meets HUD's Site and Neighborhood Standards.

The following paragraphs describe the stages of the RAD application, approval, and closing process.

- **Preapplication.** Before applying for RAD, a PHA must plan out its projects and make some fundamental choices about how to structure them. The PHA basically has to determine its goals for the RAD conversion, what resources are necessary and available to meet its goals, and what projects it wants to convert. The PHA should also assess its funding needs and funding sources to determine whether the RAD conversion will leverage enough funding to preserve the converted units. At this stage, the PHA will decide whether to pursue PBV or PBRA contracts.
- **RAD application process.** During the application process, the PHA refines its proposed RAD project(s) and engages with stakeholders, such as lenders and residents. The RAD application includes financial pro formas and an initial financing plan, if applicable. The PHA must show that the RAD conversion is viable, given the proposed funding sources, expected contract rents, any debt service, and required reserves. HUD reviews the application materials to decide whether the proposal is sound enough to receive a conditional Commitment to Enter into a Housing Assistance Payment Contract (CHAP).

After CHAP award, the PHA is required to provide a Physical Condition Assessment (PCA) that describes in detail the current and future capital needs of the proposed units and buildings.

- **RAD conversion process.** A successful RAD applicant that has received a CHAP will then finalize financing and complete administrative changes necessary to conclude the conversion to PBV or PBRA. The RAD project is considered closed when the Section 8 HAP contract has been signed and financial documents have been executed. At that point, the project is no longer "public housing"; rather, it has converted to Section 8 assisted housing. HUD has developed a RAD conversion schedule designed to complete closing and issue a HAP within 1 year of receipt of the CHAP award. Although the thoroughness and detail of the RAD application support a rapid closing, the complexity of many RAD projects can lead to delays in closing (some independent of HUD or the PHA, such as an unexpected delay in receiving a LIHTC award). On average, RAD projects have taken about 16 months to close from the date of CHAP award. The shortest closing period was 3.5 months, and the longest was 33.3 months.[6]

After the RAD project has closed, the PHA can begin RAD-related construction (if applicable) in accordance with its resident relocation plan. Following the terms of the HAP contract, payments to the PHA will shift from the capital and operating fund accounts to either the PBV or PBRA account. The PHA or ownership entity is responsible for completing any construction activities; conforming to the requirements of other funding sources; making any debt payments on the terms prescribed in the loan agreements; making sure tenants understand and receive the rights due under RAD, including the right to return; and preserving the converted units as affordable housing.

ES.2. Summary of RAD Program Results to Date

The first offering for PHAs to apply for the RAD program was from September 24, 2012, through October 24, 2012. HUD reached the RAD statutory cap of 60,000 units in October 2013. Then, in early 2015, Congress authorized an increase in the size of the RAD cap to 185,000 units. As of August 2015, PHAs from across the country had submitted 1,256 applications to RAD to convert projects from public housing to project-based Section 8 rental assistance. HUD received RAD applications from all regions of the country. Applicants proposed a variety of financing mechanisms, including FHA mortgage insurance, conventional debt, 4-percent and 9-percent LIHTC equity, public housing capital funds, RHF funds and operating reserve funds, and other sources. This report analyzed these applications to understand the types of projects proposed for RAD and the factors used by PHAs in choosing particular projects for RAD (see chapter 4).

Through mid-October 2015, 966 RAD projects had active CHAPs. These CHAPs proposed to raise about $8.0 billion in capital funding to rehabilitate and convert 111,598 units of housing to project-based Section 8.[7] External sources of funding included first mortgage debt for about $2.3

[6] Based on 185 closed public housing projects through mid-October 2015.
[7] These 111,598 units were the number of Annual Contributions Contract (ACC) units that would be subsidized by the HAP contract after conversion. Projects could include unsubsidized units in addition to the subsidized units. The

billion (28.3 percent); tax credit equity for about $3.1 billion (38.0 percent), split between 9-percent LIHTC ($1 billion) and 4-percent LIHTC ($2.1 billion); and other public, private, nonprofit, and local sources of funding for about $2.3 billion (28.2 percent). Public housing funding sources, including operating reserves, capital funds, and replacement housing funds, accounted for $445 million (5.5 percent) of the total proposed funding.

When a project closes, its financing information is updated to reflect any changes in the PHA's financial plan. This updated information may differ from the information in the RAD application. Through mid-October 2015, 189 RAD transactions had closed; of those, 185 transactions were converted public housing projects.[8] Through these 185 transactions, PHAs converted 19,255 public housing units to project-based Section 8 HAP contracts. They raised $2.5 billion in funding, of which $250 million came from public housing sources, for an adjusted leverage ratio of 8.91:1. This report relied on this population of closed transactions to analyze other program impacts in addition to leverage, such as factors associated with the likelihood that a project would close within a reasonable amount of time (see chapter 3). The four case studies analyzed to illustrate specific financing strategies were taken from the population of closed transactions (see chapter 7). These 185 transactions included a proposed $1.2 billion in new construction, rehabilitation, and repairs, or an average of $60,877 in construction costs per converted unit.[9]

After a CHAP is issued, the PHA may withdraw from RAD or HUD may revoke the CHAP if it deems the project is unlikely to meet its financial and conversion commitments. In either case, HUD will make those RAD units available to the next project on the waiting list. As of the end of August 2015, 113 CHAPs had been withdrawn by the PHA or revoked by HUD. This report relied on this population to analyze factors associated with projects that were withdrawn or had their CHAPs revoked (see chapter 5).

ES.3. Summary of Methodology

Our research team employed the following methodology for the Interim Report phase of this study.

- Our researchers analyzed basic information provided by HUD on RAD projects, including project characteristics, capital needs, and funding sources, and also analyzed administrative data on non-RAD public housing projects that our analysts used for comparison purposes.
- For more indepth study, our statisticians selected a sample of 24 RAD and 48 non-RAD projects by matching the RAD and non-RAD samples by their characteristics. This sampling methodology helped manage the high cost of collecting primary data and minimized the overall burden on PHAs.

total units—subsidized and unsubsidized—could benefit from the proposed financing and construction. HUD was unable to provide information on the number of unsubsidized units in these projects.

[8] Most of the RAD projects in our sample (22 out of 24) are included in this population of 185 closed transactions.

[9] Construction costs are always less than the total amount of capital financing, because the latter has to cover fees, reserves, interest, and other soft costs in addition to construction costs. For these closed transactions, the total financing per unit of converted housing is $128,610.

- Our survey staff launched a web survey that they sent to the 23 PHAs represented in our sample of 24 RAD projects and 44 PHAs represented in our sample of 48 non-RAD projects to capture their knowledge, views, and experiences with the RAD program and to further explore issues related to implementation of the RAD program. Survey responses were received from 21 of the RAD PHAs and 38 of the non-RAD PHAs.
- Our staff held telephone interviews with those PHAs that responded to our web survey to provide more detail on answers provided in the web survey. Interviews were conducted with 17 of the RAD PHAs and 34 of the non-RAD PHAs.
- Our staff also conducted interviews with seven additional PHAs that had applied to the RAD program but later dropped out due to having their CHAP withdrawn or revoked, to understand the reasons that led to that outcome.
- Our financial experts spoke with several financial institutions and advisors on their experience with the RAD program to ascertain if any barriers prevent PHAs from accessing particular capital sources.
- Our physical inspection subcontractor visited non-RAD sample sites and prepared PCAs, as needed, which our analysts could compare with the physical condition data submitted by PHAs in their RAD applications. In total, they obtained 38 PCAs from our non-RAD sample. For the RAD sample, HUD provided 24 PCAs.
- Our financial analysts prepared case studies of four RAD projects to model realistic financing alternatives without RAD and compare the results with the project's expected financial performance with RAD, assuming no change in the proposed scope of development. These case studies included three financial and one nonfinancial transaction.

ES.4. Summary of Findings and Conclusions

The following sections summarize the main findings and conclusions of our evaluation of the RAD program to date.

ES.4.1. Common Sources of Capital

The RAD program enables PHAs to draw on an array of external financing sources for project capital funding, including mortgage debt, tax credits, and other loans and grants. These outside sources augment their limited internal resources. The 185 conversions that we studied raised about $2,476 million in total financing, of which—[10]

- The greatest portion—around $977 million—came from private investors in LIHTC equity (39.4 percent). It includes $502.9 million (20.3 percent) from 4-percent LIHTC investors and $473.8 million (19.1 percent) from 9-percent LIHTC investors.

[10] These amounts do not match the amounts reported by HUD because of adjustments made to disaggregate other sources into other categories, including other third-party debt, seller or take-back financing, PHA resources, and "other," which consists mostly of grants and deferred developer fees.

- The second largest portion—around $686 million (27.6 percent)—came from soft money sources. Such sources include $398.8 million (16.1 percent) from seller or take-back financing and $287.2 million (11.6 percent) from other sources. Seller or take-back financing represents the as-is value of the property contributed by PHAs to the tax credit entity in LIHTC transactions. Other sources consist of HOME, AHP, and other grants; deferred developer fees; and other types of "gap" financing.
- The third largest portion—around $563.8 million (22.7 percent)—came from lenders. It includes $471.6 million (19.0 percent) for first mortgage financing (65 percent conventional and 35 percent with FHA insurance) and $92.3 million (3.7 percent) from other third-party debt. Other third-party debt consists of subordinate loans, infrastructure loans, construction loans, HOME loans, AHP loans, CNI loans, and other loans.
- The smallest financing category—around $249.9 million (10.1 percent)—came from the PHA's own resources. These resources include operating reserves, capital funds, RHF funds, cash on hand, funds from operations, transfers from other RAD projects, and other funds.

ES.4.2. Use and Risks of Leverage

For the closed RAD transactions examined in this study, PHAs achieved an overall average adjusted leverage ratio of 8.91:1, measured as the ratio of external sources of financing provided by creditors and LIHTC investors to internal sources of financing provided through public housing programs.[11] Closed RAD projects have wide variation in leverage ratios. About one-third of the 185 projects had no leverage (because they did not raise external funding), whereas about one-fifth of the projects had a leverage ratio of more than 100:1.

High leverage ratios show that the PHAs are enhancing returns on their own resources. Are they also taking on too much risk? For the RAD program, many external capital sources do not increase the **financial risk** of a project because they do not require repayment or they allow for flexible repayment terms. To assess the riskiness of RAD project financing, a better metric than overall leverage is leverage from debt, which has a modest level of risk. Moreover, because mortgage debt is underwritten with strict debt service coverage (DSC) ratios, it is unlikely that RAD projects would assume greater mortgage default risk than the average affordable rental housing property taking out an FHA-insured or conventional loan.

Based on these adjusted results, our analysis found that, for the 185 closed RAD public housing transactions in this study, PHAs contributed $250 million (about 50 percent more than reported) and raised an additional $2,227 million in external funds, for an overall adjusted leverage ratio of 8.91:1. This ratio means that for every $1 invested by the PHAs in their RAD projects, private and public external sources invested an additional $8.91. Leverage ratios are calculated based on the total project financing, which could include funds for non-RAD units.

[11] The leverage ratio for the RAD program is calculated in the same way that HUD calculates the leverage for its other mixed-finance programs: (total financing resources–public housing resources)/public housing resources. In its other mixed-finance programs, such as HOPE VI, HUD does not consider seller or take-back financing to be a PHA resource. If seller or take-back financing were treated as a PHA resource, the leverage ratio for these 185 closed RAD public housing projects would be 2.6:1. The leverage ratio for all other external sources of financing excluding seller or take-back financing as an external or internal source would be 7.31:1.

Closed RAD projects have wide variation in leverage ratios. Of the 185 projects, 62 (33.5 percent, or about one-third) had no leverage, and 35 (18.9 percent) had a leverage ratio of more than 100:1. Projects with extremely high leverage ratios contributed little to no financing from their own resources. The amount of leverage a project used depended on the development scope of the project. New construction projects had the highest adjusted average leverage ratio at 19.21:1. Projects that simply converted to Section 8 had an average adjusted leverage ratio of only 3.13:1.

Do high leverage ratios indicate that RAD projects are taking on too much risk? For the RAD program, many capital sources do not increase the financial risk of a project, defined as the probability that a project will become insolvent (debt exceeds asset value). These capital sources do not add to a project's ***financial risk*** because they do not require repayment, they allow for flexible repayment terms, or they place the greater part of the risks on other parties. Such sources, however, do carry other risks, such as ***compliance risk.*** For instance, in the LIHTC program, tax credits can be canceled and recaptured if the project fails to comply with the requirement to use the housing to support income-eligible tenants. This risk usually impacts private investors and guarantors, which are usually developers, rather than PHAs and their projects. To more clearly understand the risk to PHAs from the use of LIHTC equity, however, one would have to examine the actual financing documents in each case.

To assess the financial risk of RAD project financing strategies, a useful metric is the amount of total debt (mortgage loans plus third-party financing) used for project financing. Because mortgage debt is underwritten with loan-to-value and DSC ratios, RAD projects would be assuming as much mortgage default risk as allowed in FHA-insured or conventional affordable housing mortgage loans. The default risk of these programs would provide a useful benchmark for assessing this type of risk for RAD projects that borrow funds. With the addition of third-party debt financing, individual projects could be taking on more risk than those standards assume. This area is worthy of further exploration.

ES.4.3. Factors That Attract External Capital Sources to RAD

RAD provides flexibility for PHAs to access a wide range of capital sources, including private debt, equity from the tax credit program, grant funding, and deferred developer fees. Some of this flexibility can be found in other HUD programs, such as the Capital Fund Financing Program (CFFP), but currently RAD offers PHAs the widest range of options for financially restructuring and repositioning public housing. In addition, RAD offers PHAs one source of financing that is unique to RAD and new to public housing—project-based mortgage debt. Under RAD, PHAs can mortgage their public housing projects to raise debt.[12] The long-term Section 8 contract under RAD provides those projects with a stable and predictable revenue stream that is essential to meeting the underwriting requirements of the lenders who provide that debt. Our survey and interview results show that the lending community has not been an obstacle to PHAs in accessing project debt. On the contrary, PHAs that borrowed for their RAD projects reported that their lenders evinced a high level of interest and were "on board from the start." Also, if they

[12] PHAs can raise debt through the CFFP, but that debt is backed by future capital fund payments to the PHA. It does not involve mortgaging individual public housing projects. CFFP debt also has a much lower DSC ratio compared with project debt. The annual debt service payment cannot exceed 33 percent of the annual capital fund amount in the CFFP program, which is equal to a DSC ratio of 3.03, compared with a typical DSC ratio of 1.20 or lower for project mortgage debt under RAD.

choose, PHAs can restructure property ownership under RAD to attract private investors through the tax credit program. LIHTC equity has been a major source of financing for RAD projects, although it is not unique to the RAD program and is used in other mixed-finance transactions.

The total financing need of a project is related to the project's use of different sources of financing. The simplest RAD projects, which merely convert public housing into project-based Section 8 housing, have minimal immediate financial needs. Many PHAs can absorb those needs using their internal resources. Projects that involve modest rehabilitation have greater financial needs. To meet those needs, PHAs turn to external sources, usually a first mortgage if the project can support it. If a mortgage is insufficient, for instance, because the property hits its debt capacity limit given its Section 8 rents and projected operating costs, the PHA will add other debt that has more favorable repayment terms and other soft funding sources, such as grants. As the developmental complexity of the project increases, the PHA will add tax credits to all other sources. Projects with the greatest need will tend to use tax credits the most. Although 9-percent LIHTC financing offers a deeper subsidy than 4-percent LIHTC financing, and for that reason is more valuable, it is awarded on a competitive basis. In addition, 9-percent LIHTC financing has a cap on the amount of credits per project in many states, but 4-percent LIHTC financing does not. As a result, PHAs with larger projects, like large PHAs, will tend to use proportionately more 4-percent LIHTC credits compared with 9-percent LIHTC credits.

ES.4.4. Effect of Project Financing Strategy on Project Success

For this report, project success is defined as successful completion of the closing process and conversion from public housing to Section 8. Our research team analyzed the financing strategies of RAD projects that had received their CHAP awards by the end of 2013. Comparing those that had closed through the middle of October 2015 with those that had not closed by that date and using multivariate logit regression, our team found that choice of financing strategy does have an impact on closing.[13] In particular, projects that include first mortgage debt financing or 4-percent LIHTC equity (which have long closing timelines to begin with) were less likely to reach closing in a reasonable period of time, whereas projects with 9-percent LIHTC equity were more likely to reach closing in a timely manner. The explanation for the negative impact of first mortgage debt financing or 4-percent LIHTC equity on timely project closing probably lies in the added difficulty of meeting closing requirements for these financing sources. In the Revised RAD Notice that outlined closing timelines, HUD has taken these differences into account. The effect of 9-percent LIHTC equity financing on increasing the likelihood that a project would close on time could reflect the selectiveness of that program, which could favor projects that are more likely to succeed, and could reflect its stricter deadlines, which require more careful management of the transaction and could deter inexperienced PHAs from using it.

ES.4.5. Impact of Choosing PBRA or PBV

PBV contracts may have a shorter contract period than PBRA contracts because PBVs are automatically set at 15 years and PBRA at 20 years, with renewals. The actual term of both types

[13] Other factors found to have a significant effect on reducing the likelihood that a project would close on time include (1) lower physical inspection scores, (2) participation in a portfolio application, and (3) use of PBRA rather than PBV contracts. Our analysis did not find a significant effect for PHA size; other characteristics of the property, its tenants, or the neighborhood in which it is located; or other aspects of the project's conversion and financing plan.

of contracts may be similar, however, because the PHA, which issues the HAP contract, can extend the initial term of a PBV contract to 20 years. To the extent that they have shorter time periods, the use of such PBV contracts would tend to reduce a project's **capacity** to take on debt; that is, the amount of debt it could carry. Our analysis of closed projects found that those projects that are converting to PBVs used less first mortgage financing ***as a percentage*** of their total financing than did projects converting to PBRA, even though the ***dollar amount*** of first mortgage financing per project was higher for PBV conversions than for PBRA conversions. Conversion to PBV, however, does not appear to reduce a project's **access** to debt financing. The lenders that our financial experts spoke with said that PBV contracts provide sufficient security to lend against, in spite of any out-year uncertainty. Our conclusion is that choosing PBV rather than PBRA does not appear to have an impact on access to credit and has an unclear impact on the amount of credit a project assumes.

ES.4.6. Impact of PHA Size and Experience With Mixed-Finance Housing on Success in Obtaining External Capital

An examination of closed transactions shows that PHA size appears to affect a project's success at receiving external capital. Smaller PHAs account for the lowest portion of the total amount of financing raised by closed RAD transactions compared with their proportion of projects and units. Large PHAs account for the largest portion of financing under RAD compared with their proportion of projects and units. This result could be due to smaller PHAs' relative inexperience with mixed financing and large PHAs' relatively greater experience with mixed financing.

Given the small size of our respondent sample, our report cannot be entirely conclusive about how a PHA's previous borrowing experience affects its ability to obtain external financing. Although mixed-finance housing experience is not a prerequisite for RAD conversions, it does help. PHAs frequently pointed to the need for technical assistance with these projects. The reason such experience is not a prerequisite is that, in many cases, PHAs are able to use outside consultants to advise them. Outside consultants can be expensive, however, and small PHAs may be unable or unwilling to make that upfront investment.

In addition, our research found that large PHAs tend to use less 9-percent LIHTC financing than do small or medium PHAs. This finding could reflect the fact that 9-percent LIHTC financing has a cap on the amount of credits per project and that it is much less competitive to obtain credits through the 4-percent LIHTC program. Because large PHAs tend to have very large projects, they may tend to use the 4-percent LIHTC program more than the 9-percent LIHTC program and to use more of other sources, such as grants, in addition to or in lieu of tax credits.

ES.4.7. Reasons Why PHAs Participated in RAD

The PHAs that spoke with us for this study revealed two underlying motivations for participating in the RAD program: (1) to remove their properties from the statutory and regulatory control of the public housing program and (2) to move those properties into the Section 8 program. Often, PHAs cited both motivations when they described their reasons for participating in RAD. These PHAs describe RAD as enabling them to meet the significant capital needs of their public housing projects, which they have been unable to do under current public housing programs because of the downward trend in public housing funding. For some, it also offered relief from what they perceived as the burden of managing their properties as public housing. Several PHAs said that Section 8 offered "an opportunity to streamline their operations," by enabling them to

consolidate their assets into a single housing subsidy program, while providing more stable project financing and better capital budget planning. For these PHAs, the long-term predictability of a Section 8 HAP contract would better enable them to plan for a project's future capital needs, in contrast with public housing's annual funding. Conversion to Section 8 also gave some PHAs the opportunity to capitalize on their existing capacity and experience with Section 8 program administration.

ES.4.8. Types of Projects Proposed for Conversion

PHAs chose a variety of projects for the RAD program—projects in poor physical condition with significant capital needs; projects in good physical condition with no capital needs; projects in stable neighborhoods; and projects in neighborhoods suffering from high levels of poverty, overcrowding, and rent burden. While acknowledging this variety in the types of projects that PHAs submit to RAD, our analysis of the RAD versus the non-RAD population of projects showed that they use certain selection criteria.

We found that PHAs are not necessarily proposing their neediest projects for RAD conversion. Instead, they are using RAD to convert projects across their portfolios with a wide range of capital needs, including projects with no capital needs. Many closed RAD projects are conversions to Section 8 that require no rehabilitation or new construction. Of the 185 closed transactions, 34 (18.4 percent) had no plans to use their financing to fund any rehabilitation or construction and raised little financing—$66.8 million, or 2.7 percent of the total financing for all closed transactions.

Our analysis of interviews with the PHAs that submitted RAD projects found that PHAs review the properties in their portfolios before deciding which ones to submit to RAD or even whether to submit any to RAD. In making their selection, most PHAs indicated that a project's capital needs are an important consideration when a PHA selects a property for RAD conversion; however, this consideration can work in either direction. Most PHAs said they choose projects because they have significant capital needs and plan to use RAD to finance those needs. A large number of the RAD PHAs that responded to our survey thought that some or all of the units in the projects they proposed for RAD conversion were in urgent need of rehabilitation.

Other PHAs, however, said they choose projects for RAD that lack significant capital needs because they are easier to close. These PHAs said they were interested in converting to Section 8 for the sake of better long-run project management. Some PHAs also said RAD could improve their overall administrative efficiency by putting all housing assets under a single subsidy program.

PHAs said they also consider the potential financing challenges in choosing a project for RAD. They take into account what financing strategies are likely to be workable, including how much debt the project can carry given its contract rents under Section 8, whether they need 4-percent or 9-percent LIHTC equity, and their prospects for obtaining LIHTC financing. This consideration could result in PHAs rejecting projects with greater capital needs because of the difficulty in meeting their financing challenges.

Projects in RAD are significantly different from other public housing projects. Our research team conducted a multivariate logit regression analysis of all RAD versus all non-RAD projects to identify these differences. One key difference revealed in this analysis is PHA size. Projects

owned by medium and large PHAs are more likely to be in RAD, and projects owned by small PHAs are less likely to be in RAD. This finding reflects the lower rate of participation of small PHAs in the RAD program and the smaller size of their portfolios. The lower participation of small PHAs could be because of their relative lack of capacity and mixed-finance experience, the characteristics of their housing portfolio, or other factors. One consequence of this varied participation rate is that the types of projects submitted to RAD are likely to represent the portfolios of large and medium PHAs rather than small PHAs.

A second area of difference between RAD and non-RAD projects is the greater financial feasibility of RAD projects. Our analysis of RAD applications demonstrates that projects are more likely to be in RAD if they have higher per-unit operating subsidies and lower per-unit expenses. Operating subsidies, which are about 2.5 times larger than capital fund subsidies, are an important factor in determining RAD contract rents. Contract rent minus expenses determines project net operating income (NOI) and hence how much debt financing would be feasible. For RAD projects to succeed, the Section 8 program has to pay rent levels that support project costs, including the cost of repaying project debt. Several PHAs we spoke with mentioned the importance of RAD rents in their decision to apply to RAD. The higher operating subsidies and lower expenses for RAD projects could reflect their importance in project feasibility. Further study of the choices PHAs make when selecting particular projects for RAD found these same factors to be statistically significant.

Our regression analysis also found statistically significant differences between RAD and non-RAD projects in other characteristics. Projects in RAD tend to have tenants with lower median household incomes and a greater mix of large-size units (as measured by the percentage of one- or two-bedroom units). They also tend to be located in metropolitan areas and in neighborhoods with lower rates of poverty (percentage of households living below the poverty threshold), greater rates of housing cost burden (percentage of income devoted to housing and utility expenses), and higher rates of overcrowding (percentage of households living in housing with more than one person per room). These findings suggest that RAD is serving public housing projects that demonstrate a greater housing need—tenants with larger families and lower incomes living in urban areas that are overcrowded and have high rents relative to incomes. At the same time, RAD is less likely to meet the housing needs of projects in higher-poverty neighborhoods. The results of our analysis of the types of projects likely to be in RAD could reflect the composition of the public housing portfolios of the PHAs that elect to take part in RAD, mainly medium and large PHAs, or the impact of the factors that participating PHAs use in selecting projects for RAD.

To test for project-selection factors, we performed a second logit regression analysis that limited the comparison of RAD and non-RAD projects to PHAs that had both types of projects in their portfolios (that is, at least one RAD project and at least one non-RAD project). By narrowing the analysis to mixed-portfolio PHAs, this approach concentrated on the choices made by PHAs that still had room for choice. This analysis found that large PHAs were more likely to participate in RAD than small and medium PHAs. Even though large PHAs tended to submit RAD applications for a smaller percentage of their projects, they submitted a larger number of projects. Accordingly, large PHAs have a higher representation in RAD (more RAD projects as a percentage of all RAD projects), and their projects comprise a larger portion of RAD projects, even though they tend to select fewer of their projects for RAD.

The second multivariate regression analysis also found that mixed-portfolio PHAs tend to choose projects for RAD that have higher operating subsidies and lower current expenses, which is consistent with the result of comparing all RAD and all non-RAD projects. This finding suggests that PHAs choose projects for RAD on the basis of projects' relative financial feasibility. It confirms our finding from interviews with PHAs that financial feasibility is an important consideration in a PHA's decision regarding whether to submit a project to RAD.

Finally, the second regression analysis found that mixed-portfolio PHAs tend to choose smaller projects (fewer Annual Contributions Contract units) and projects with lower tenant incomes that are located in neighborhoods with lower poverty rates and greater overcrowding. The tendency for choosing smaller projects could be due to the greater challenges of converting large projects, which have more tenants to relocate and greater rehabilitation needs to finance, or it could be due to some other explanation. The tendency for choosing projects with lower tenant incomes and greater neighborhood overcrowding could indicate that PHAs are selecting projects for RAD based on the demand for affordable housing. The tendency for choosing projects with lower poverty rates could reflect a preference for projects in more stable neighborhoods. In their interviews, PHAs confirmed that they evaluate the relative advantages of the neighborhood in which the project is located when they decide which projects to apply for RAD conversion. They recognize the importance of housing demand and neighborhood stability in the decision regarding whether to pursue RAD. As one PHA said, they "determined [if the current location] would be a good place to invest resources in preserving affordable housing, and that would support sustainable redevelopment by enabling the property to maintain a high occupancy rate." It is also possible that some other factor is affecting this result. The next phase of this study will explore these selection factors in more detail.

ES.4.9. Reasons PHAs Chose RAD Rather Than Alternative Financing Options

PHAs are well aware of the array of options offered by HUD to help PHAs meet the capital needs of their public housing. Like RAD, some of these options, such as the CFFP, allow PHAs to borrow against future cashflows or access LIHTC financing to fund renovation and new construction. Given the similarities between RAD and alternative financing programs, how do PHAs decide which one to use? In interviews with participating RAD PHAs, our staff asked how RAD compares with other public housing programs that provide capital financing, what the advantages and disadvantages of RAD are, whether they would use RAD again, and whether they would recommend RAD to other PHAs. Through their answers the participating RAD PHAs identified the following five factors that influence PHAs' choice of RAD rather than other capital financing options.

1. **Relative ease of use.** Although opinion was divided regarding how easy it was to use RAD, this topic invited so much discussion that it is clearly an important factor for PHAs in their decision about which financing program to use. HUD has made a major investment in the RAD program, with the development of explanatory materials, guides, webinars, tools, and templates and with the recruitment and training of staff. This infrastructure likely made RAD easier to use. RAD, however, was a startup program and, as such, suffered from changes in direction and guidance that could cause confusion and influence PHAs to choose a more stable alternative financing program.
2. **Technical capacity.** PHAs recognized that they needed adequate technical capacity to successfully participate in the RAD program. In particular, they thought they needed the capacity to develop a viable RAD application, work with HUD to obtain

CHAP approval of their conversion strategy, secure legal support to complete the closing process, find financing sources and negotiate complicated financing requirements, line up one or more capable developers, manage tenant relocation, oversee contractors in the performance of the required rehabilitation or construction work, and provide for the long-term management of the property under the HAP contract. Many PHAs hired outside consultants to enhance their capacity to meet all the requirements of RAD.

3. **Perception of Section 8.** Overall, the RAD PHAs that agreed to be interviewed saw the advantages of Section 8 compared with other financing alternatives as one feature of RAD that made it more attractive. In the view of one PHA, RAD provides "the ability to maintain units as low-income housing … [and] to leverage the subsidy coming in to renovate and rehabilitate the properties. [We] did not have the ability to do that with the capital fund and operating fund." PHAs were pleased with Section 8 for giving them the ability to borrow against a property to finance immediate and longer-term capital needs and improvements. In addition, they appreciated Section 8 because it enabled them to use project resources more efficiently by managing their property according to commercial methods, such as building up project reserves to cover future capital needs. Some PHAs also perceived the benefit of simplifying their internal operations by consolidating their assets into a single program—Section 8—with simpler reporting requirements than public housing's requirements. PHAs also liked that Section 8 allowed them to engage in more predictable long-term project planning, because the Section 8 subsidy contract offers a long-term and more reliable revenue stream. Finally, some PHAs also thought that Section 8 offers tenants more affordable housing options, such as housing choice vouchers, which tenants value. Although most PHAs that were interviewed were pleased with the level of support their project received through Section 8, some PHAs mentioned that Section 8 rents were lower than they expected. Insufficient Section 8 rents seemed to be a more serious problem in higher rent markets.

4. **Access to capital.** Few of the respondents to our web survey appeared to be disappointed with the amount of funding they have been able to raise through RAD. Most respondents think RAD met their funding expectations and think that the funding they received under RAD exceeded their expectations. On the other hand, although some of the PHAs that spoke with us think they have obtained more funding under RAD than they could have obtained through other programs, more think RAD provides the same amount of funding as they could get elsewhere, and some think they are getting less financing from RAD than they could through other means. These views reflect the wide range of reasons that PHAs have for applying for RAD, aside from gaining access to more capital funds. These reasons include the ability to take advantage of better planning and asset management opportunities under Section 8. They also reflect the range of conversion options being pursued by our PHAs, not all of which proposed to raise large amounts of capital financing for their projects. Finally, this view could reflect the sense of some PHAs that their RAD contract rents are too low.

5. **Large-scale conversions.** Some PHAs mentioned that a major advantage of choosing RAD rather than alternative programs was that RAD gave them the ability for large-

scale conversions. Several PHAs submitted multiple RAD applications and received multiple CHAPs, or received "portfolio awards," which are single awards to convert multiple projects to RAD. The goal of these PHAs was to use the RAD program to convert as much of their public housing to Section 8 as they could.

The PHAs that spoke with us claimed to have prepared a feasibility analysis for their projects before they submitted a RAD application. Several noted that HUD provides a useful financial tool for this purpose. This financial analysis helped them determine up front whether their projects would benefit from RAD. Consultants who advise PHAs on their RAD applications confirmed that this type of comparative financial analysis is typically performed and is a key factor in a PHA's decision regarding whether to apply for RAD. In the case studies of four RAD applications, our financial analysts modeled alternatives to RAD and concluded that, for those cases, RAD offered those projects greater capital financing and/or greater financial stability through long-run positive cashflow.

ES.4.10. Reasons Why PHAs Chose Not To Participate in RAD

In general, the 34 PHAs that spoke with us about not participating in RAD offered three reasons for not participating.

1. **No capital needs.** Several PHAs mentioned that they did not apply for RAD because they had no need for capital improvements. In this view, the primary purpose of RAD is to fund capital improvements, and, because their projects were in good physical condition, they did not believe RAD was necessary.
2. **Lack of capacity.** Some of the PHAs we interviewed explained that they did not have the administrative capacity to take on a RAD project at this time because they either were a small PHA, were short staffed, had new and inexperienced staff, or were currently preoccupied with other matters.
3. **Insufficient benefits of the RAD program.** The perceived lack of benefits of the RAD program provoked the most discussion among the PHAs that were interviewed. To one degree or another, they thought that RAD did not benefit the PHA, their housing stock, or their tenants for the following reasons.
    - Understanding that it has high startup or transaction costs.
    - Perception that it does not work in small towns and rural areas because of lack of investor interest in those areas.
    - Expectation that it would not enable their projects to generate enough capital because their rents are too low.
    - Skepticism that Section 8 subsidies would continue to be funded over the long term.
    - Worry that the use of debt financing could hurt the viability of their projects.
    - Concern that RAD would threaten their ongoing operation and mission as a PHA by eroding their tenant base or undermining their control over their housing.
    - Impression that the use of tax credits would change project ownership and weaken the PHA's control.

ES.4.11. Reasons RAD Projects Dropped Out

Our interviewees identified two principal reasons for the withdrawal of their projects from the RAD process: (1) unworkable milestones and (2) inadequate preparation. Many thought that the milestones that HUD established for the conversion process, especially the 180-day financial plan milestone, were too aggressive, and they did not have enough time to complete their financing requirements in time to qualify for a RAD Conversion Commitment. Some PHAs also said they had applied to RAD before they were certain their project would be financially feasible because of the rush to get applications in before the cap limit was reached. They think that permanent authorization of the RAD program would enable HUD to accommodate a more flexible closing schedule and would give PHAs less incentive to submit projects prematurely.

Our statistical analysis of projects that withdrew from RAD provides a complementary perspective on this question. We found several significant effects from the proposed RAD financing strategy. Projects are more likely to have their CHAPs withdrawn or revoked if they have lower total financing needs per unit, use more first mortgage debt, use more 4-percent LIHTC equity, and use more 9-percent LIHTC equity.[14] To encapsulate these findings, one could say that projects are more vulnerable to dropping out of RAD if they are more reliant on external sources of financing with complicated review and approval requirements and are lower priorities to the PHA and possibly other parties (serving fewer special-needs populations and with lower total financing needs).

ES.5. Overall Assessment

As a pilot program, RAD aims to demonstrate whether the conversion of public housing projects (and eligible assisted housing projects) to project-based Section 8 enables PHAs to preserve and improve that housing better than other financing alternatives so that properties remain affordable and in good condition with minimal impact on tenants. It is too soon to evaluate the RAD program on all these measures, because few projects have completed the rehabilitation necessary to preserve and improve their physical and financial condition. The evaluation of RAD's ultimate impact will be undertaken in a subsequent report. Instead, this Interim Report focuses on the more immediate impacts of RAD—its rates of participation by PHA and by project, the amount of financing it has raised in total and by source, and the program's level of success at converting projects and closing transactions.

Three indicators of the program's initial success are (1) the volume of applications it has processed, (2) the amount of financing it has raised so far, and (3) the number of transactions that have closed. Since its start in 2013, RAD has received and processed 1,256 RAD applications from 423 PHAs around the country for 1,078 unique public housing developments. This level of participation represents 14 percent of all PHAs and more than 15 percent of all public housing projects. During this same period, RAD closed on 185 public housing transactions, serving

[14] We found some effects for a few project characteristics, including project inspection score and project size (based on ACC units), but the effect was not robust across regression equations. The most consistent project characteristic to have an effect was the proportion of elderly tenant households. A project is more likely to have its CHAP withdrawn or revoked if it has a lower proportion of elderly tenants. Other variables, including PHA size, choice of PBV or PBRA, and neighborhood characteristics, did not have a statistically significant effect on the probability that a project would have its CHAP withdrawn or revoked.

19,255 households, which is about 1.8 percent of all households living in public housing. In total, the 185 closed RAD transactions have raised nearly $2.5 billion in financing to pay for an estimated $1.2 billion in hard construction costs. By these measures, RAD has demonstrated "proof of concept"—PHAs are willing and able to convert public housing to Section 8 contracts that they can leverage for project debt financing.

Although participation in RAD has been strong, it is also skewed. This skewness affects how the potential impacts of the program will be distributed. In particular, small PHAs have a lower rate of participation and smaller project portfolios. As a result, projects owned by small PHAs are relatively underrepresented and projects owned by medium and large PHAs are relatively overrepresented. In addition, the types of projects that PHAs submit to RAD are more likely to be located in nonrural areas, possibly because of the underparticipation of small PHAs. This result means that rural areas possibly are being underserved by RAD, as several PHAs mentioned.

RAD projects also are more likely to be in neighborhoods exhibiting greater housing needs through higher housing cost burden and overcrowding and also relative stability through lower levels of poverty; however, we could find no relationship between participation in RAD and the condition of housing as measured by physical inspection score. This finding could be the result of the weakness of the physical inspection score in capturing the capital needs of public housing projects. It also could be because of the mixed criteria that PHAs say they use in selecting projects for RAD. Some PHAs say they prefer projects with greater capital needs, whereas others say they prefer projects with fewer capital needs. In our study of a sample of RAD and non-RAD projects, we found no statistical difference in the total capital needs between RAD and non-RAD projects over a 20-year period.

The most significant finding is that RAD projects are more likely to have higher per-unit operating subsidies and lower per-unit expenses. Higher subsidies tend to equate to higher Section 8 contract rents under the RAD program. Higher rents and lower expenses would increase NOI and hence borrowing capacity. These results concur with the comments made by PHAs that RAD works better in areas where rents are high enough to finance capital needs.

In selecting projects for RAD, PHAs are more likely to choose projects located in areas with less poverty, possibly because of their greater neighborhood stability, which some PHAs mentioned as a factor in their selection. They also are more likely to choose projects in areas with greater overcrowding and they prefer projects that have higher operating subsidies and lower expenses, both of which would tend to make RAD conversion a more feasible option for financing capital improvements.

The latter finding tends to support the PHAs' contention that PHAs evaluate projects for their financial feasibility in deciding whether to submit them to RAD. If these results are valid, it would mean that PHAs are using a rational project-selection process for RAD. This process, however, appears to leave a segment of the public housing program—projects with low potential contract rents located in nonurban areas—relatively underserved. Several PHAs recommended that HUD consider additional subsidies for projects with low Section 8 contract rents.

Our analysis found that the RAD program enables PHAs to leverage substantial amounts of external financial resources to improve the physical and financial condition of their projects. The bulk of their financing ($2.2 billion, or 90 percent) came from external sources. RAD is particularly successful at enabling projects to borrow against their long-term Section 8 contracts. Borrowing accounts for a large part of total funds ($564 million, or 22.7 percent) for closed transactions. This borrowing is attributable to the effectiveness of the Section 8 contract and other aspects of the RAD program in raising capital. PHAs with RAD projects that wanted to borrow say they had no difficulty in finding a lender willing to lend. Lenders with RAD lending experience say RAD projects are able to meet their lending requirements and are no more difficult to finance than other affordable housing projects they have lent to.

Tax credits are another large source of funds (39.4 percent) for closed RAD projects. Nationwide, most affordable housing is financed with tax credits. Other large sources include seller or take-back financing (16.1 percent), which is related to tax credits, and gap financing (11.6 percent), which includes grants, soft loans, and deferred fees. HUD typically treats seller or take-back financing as an external source of financing in mixed-finance transactions, even though the note is held by the PHA in exchange for the as-is value of its contributed improvements.

The average leverage ratio of external funding to internal funding for all closed RAD transactions was 8.91:1. The RAD transactions have a wide range of leverage, from 0 (no external funding) to more than 100 (very little or no internal funding), with leverage tending to increase as the scope of planned development increases. Some PHAs used RAD simply to convert their projects to Section 8. Their interest is in the long-term benefit of stable project funding, which Section 8 contracts offer. These RAD projects—about one-third of all closed projects—represented nonfinancial transactions. Most participating PHAs, by contrast, used RAD to address the immediate capital needs of their projects and provide for their long-term capital needs as well. They tended to use mortgage debt and gap financing if they had significant rehabilitation costs. As the scope of project development increased, however, they tended to rely more on tax credits, with new construction projects using the most of those financing sources.

RAD's success at raising external financing also presents the programs with potential risks that must be managed. Our analysis of RAD transactions showed that the choice of financing source affects project closing and long-term risks. The planned use of more complex financing strategies, such as 4-percent LIHTC equity and mortgage debt, increases the likelihood that a project will take longer to close or will drop out. These outcomes probably reflect the longer timelines and greater complications for mortgage and tax credit transactions, although other reasons could be involved. Use of 9-percent LIHTC equity does not have the same effect, possibly because that program has stringent milestones that users are constrained to follow or because the program may attract projects that can meet those milestones because of self-selection bias.

Different sources of financing have different risk profiles. Mortgage debt carries the financial risk that a project could default and be foreclosed on. The LIHTC and grant programs carry compliance risk that funds could be recaptured and canceled if a project fails to comply with the prescribed affordable housing requirements. These risks and how they are being managed need to be better understood. The next phase of our study will focus on these risks and their management, along with the program's impact on the physical and financial condition of housing and the tenants residing in that housing.

1. Introduction

The Rental Assistance Demonstration (RAD) was established under the Consolidated and Further Continuing Appropriations Act of 2012[15] to provide public housing authorities (PHAs) with new options for preserving public housing, by converting their public housing projects to the U.S. Department of Housing and Urban Development's (HUD's) project-based Section 8 assisted housing platform. The primary intent is for PHAs to use long-term project-based Section 8 contracts to leverage external capital for preserving their low-income housing assets while protecting existing residents. In authorizing RAD, Congress added a requirement that HUD report on the program's impact on (1) the preservation and improvement of former public housing units, (2) the amount of external capital leveraged as a result of RAD conversion, and (3) the effect of conversion on residents. This report is the first step in that evaluation process.

1.1. Overview of Evaluation

The approach to this independent evaluation includes an analysis of HUD administrative data, RAD application information, and project financial statements; a web survey of a sample of 24 RAD properties and 48 similar non-RAD properties; assessments of the properties' physical and financial condition; telephone interviews with PHA managers, lenders, RAD program staff, and other stakeholders; and a survey of tenant households in the RAD properties selected for study.

This Interim Report is being issued near the start of the third year of the 5-year study. It covers the first stage of the longer evaluation of the impact of RAD as required by Congress. It focuses on the implementation of RAD, such as why some PHAs chose to participate in RAD and other PHAs chose not to participate in RAD. Drawing on a sample of participating and nonparticipating PHAs, it reports on how RAD participants compare and contrast with nonparticipants in terms of their objective characteristics and subjective experiences. In particular, the Interim Report identifies the perceived benefits and challenges of the RAD program from the viewpoint of PHAs that have participated in the program and those that have not. In addition, it provides a discussion of "lessons learned" in the implementation of RAD—which implementation practices have proven to be successful from the PHAs' perspective and which have not.

As such, this Interim Report is not a complete evaluation of RAD. More time is needed before the impact of RAD can be reported. This Interim Report thus provides information on the implementation of RAD to date.[16] Larger questions that relate to the impact on properties' physical and financial condition and the impact on tenants will be addressed in subsequent reports.

When completed, the final evaluation will respond to the congressional requirement that HUD report on the impact of RAD by (1) measuring how the physical conditions and capital needs of RAD study projects changed as a result of conversion and comparing those measures to non-RAD comparison projects; (2) examining the long-term financial viability of converted housing projects compared with that of non-RAD comparison projects, including the former's use of external financing; and (3) assessing tenants' use of Section 8 options and their relocation

[15] Pub. L. 112–55.

[16] Also see Econometrica, Inc. (2014).

experience. In particular, the longer-term evaluation of the RAD program will attempt to demonstrate whether RAD has achieved its objectives to—

- Provide a stable, long-term form of public support for affordable housing by using project-based Section 8 Housing Assistance Payment (HAP) contracts (whether project-based voucher [PBV] or project-based rental assistance [PBRA]).
- Enable affordable housing properties to gain additional access to external capital by converting public housing to Section 8 HAP contracts.
- Cover the long-term capital needs of the converted properties by combining stable public funding and flexible private capital.
- Preserve affordable housing, meet the needs of low-income residents, and maintain public ownership or control by means of long-term, renewable contracts and coterminous use agreements.

1.2. RAD Program Overview

The RAD program was established under the Consolidated and Further Continuing Appropriations Act of 2012 to stem the potential loss of public housing and other subsidized housing units due to the growing backlog of unfunded capital needs. The program converts public housing properties to one of two different forms of project-based Section 8 HAP contracts[17]—either PBV[18] or PBRA[19]—giving PHAs more flexibility to access private and public funding sources and to augment insufficient direct appropriations.[20] The expectation is that by providing a predictable, long-term annual funding stream, Section 8 HAP contracts can be used by PHAs to leverage external sources of capital (private and public) to pay for the rehabilitation costs of RAD projects. RAD also supports the goals and objectives of HUD's *Strategic Plan,* including providing affordable rental opportunities, improving the quality of affordable housing, and expanding families' choices of affordable rental homes located in a broad range of communities.

[17] A HAP contract is the legal agreement between the project's ownership entity and either HUD or the PHA that manages the vouchers. The HAP contract specifies the number and bedroom count of units covered at the property and the terms and procedures by which subsidy payments are made to the property.

[18] PBVs are Section 8 vouchers that are attached to specific housing units and administered as part of a PHA's Housing Choice Voucher (HCV) program. Under the PBV program, a PHA enters into an assistance contract with the project owner for a specified number of units and for a specified length of time. The project owner could be the PHA or a limited liability company. The PHA refers families to the project owner to fill project vacancies. Because PBV assistance is tied to the unit, when a family moves from the project-based unit, the assistance remains with the unit. By contrast, HCV assistance is portable and can be used at any qualified available unit in the PHA's jurisdiction.

[19] PBRA contracts are also attached to specific housing units. However, the contract is directly between HUD and the project owner; the PHA is not a party to the contract unless the PHA is the project owner or a member of the project ownership entity.

[20] For RAD conversions, the HAP for PBV is typically a 15-year contract and the HAP for PBRA is typically a 20-year contract, although PHAs can extend the PBV contract term up to 20 years. In addition to having long-term funding commitments from HUD, these contracts receive an operating cost adjustment factor (OCAF), which is a percentage increase in contract rents applied on a yearly basis, as established by HUD and published in the Federal Register. HAPs for both PBV and PBRA conversions also have a required renewal at contract expiration.

The RAD program encompasses a wide range of options and mechanisms for PHAs to preserve and rehabilitate their affordable housing stock. The remainder of this section describes the RAD program in general terms, including a summary of the program, how RAD works for PHAs, how PHAs use RAD to reposition their properties, and an overview of the RAD application and approval processes. Most RAD projects include outside financing and construction work and thus require a series of reviews and approvals by several entities including the PHA's board of directors, lenders, developers, and HUD. This section presents a common understanding of the RAD process and highlights some of the standard approaches and conversion steps; it does not cover all possible approaches, nor describe all the possible exceptions and interpretations of the program requirements.[21]

Results to date for the RAD program are presented in chapter 2. HUD also provides updates and case studies on the RAD web page. Note that some of the RAD program characteristics and conversion mechanisms are explicit in the data (for example, whether low-income housing tax credits [LIHTCs] are proposed), but others can be only inferred (for example, conversion without rehab/construction). This Interim Report includes an indepth review and discussion of a sample of 24 RAD projects, using data collected for this purpose, and a summary discussion and review of the entire RAD program. The latter is based on current RAD application and status data provided by HUD, not on close examination of every RAD application, Commitment to Enter into a Housing Assistance Payment Contract (CHAP), or RAD Conversion Commitment (RCC).

1.2.1. Summary of the RAD Program

Congress authorized the RAD program without providing additional appropriations for public housing or project-based Section 8. As a result, HUD is establishing Section 8 contract rents based on the Operating Fund subsidy, pro-rata shares of the PHA's Capital Fund grant, and tenant rents that the property had been receiving in the public housing program. Following conversion, HUD provides funding to the property through Section 8 HAP subsidy rather than through the public housing Operating Fund and Capital Fund.[22] This lack of incremental funds for RAD is consistent with the program's design, which is to provide a sustainable form of affordable housing by enabling public housing properties to access more flexible private funding sources to cover the immediate and long-term capital needs of the properties converted to Section 8 under RAD. As a pilot program, RAD aims to test whether the conversion of public housing and eligible assisted housing projects to project-based Section 8 enables PHAs to preserve and improve that housing better than other financing alternatives so that properties remain affordable and in good condition, tenant rights are protected, opportunity for mobility is enhanced, and public or nonprofit ownership or control is maintained.

[21] For an indepth understanding of the RAD program, consult the resources provided by HUD on the RAD web page (http://portal.hud.gov/hudportal/HUD?src=/RAD), particularly the revised RAD notice and the "Conversion Guide for Public Housing Agencies," and the information available on the HUD Exchange (https://www.hudexchange.info/programs/rad/).

[22] The initial RAD contract rents are established by adding together the current public housing operating subsidy, current capital funding, and tenant contributions so that the total subsidy cost is the same after conversion to RAD as it was before conversion. Future subsidies through the project-based Section 8 HAP contracts are funded by a transfer from the HUD Section 9 public housing budget to the HUD Section 8 budget.

Section 8 rental assistance was authorized by the Housing and Community Development Act of 1974.[23] Project-based Section 8 is administered by the Office of Housing. It differs from tenant-based Section 8 in that the assistance is tied to a designated housing project rather than an individual, and therefore is not portable. Under the project-based Section 8 program, HUD enters into HAP contracts with property owners to provide rental assistance for a fixed period of time for low-income families. Property owners, or sponsors, are private and include profit-motivated and nonprofit or cooperative organizations. When a PHA converts a public housing project to project-based Section 8 under RAD, the project receives its federal funding through the HAP contract. RAD contract rents, as established in the Section 8 HAP contract, are based on the sum of the capital fund subsidy attributable to the project plus the operating subsidy and the tenant payment.[24]

Extremely low-income and very low-income families whose incomes do not exceed 50 percent of the median income for the area are eligible to occupy project-based Section 8 assisted units, although a limited number of units may be rented to low-income families whose incomes are between 50 percent and 80 percent of Area Median Income. Eligible tenants pay the highest of 30 percent of adjusted income, 10 percent of gross income, the portion of welfare assistance designated for housing, or the minimum rent established by HUD. The project-based Section 8 rental assistance payment to the project owner through the HAP contract makes up the difference between tenant payments and the approved rents for the project.

The RAD program consists of two components. The first component, **Public Housing & Section 8 Mod Rehab Housing (excluding Single-Room Occupancy dwellings),** allows up to 185,000 units (the original cap was 60,000 units) of public housing and Section 8 moderate rehabilitation (Mod Rehab) properties to convert to project-based Section 8 HAP contracts following an application and review process.[25] The second component, **Rent Supp, RAP, and Section 8 Mod Rehab Housing** (which is not part of this evaluation), allows Rent Supplement (Rent Supp), RAP, and Mod Rehab properties to convert their tenant-based vouchers, which are issued upon contract expiration or termination, to project-based Section 8 assistance. This evaluation focuses exclusively on the impacts of the conversion of public housing units under RAD.

Participation in RAD is voluntary and determined by the PHA. Properties that convert to project-based Section 8 assistance are subject to long-term rental assistance contracts and use restrictions that survive any disposition of the property, including foreclosure or bankruptcy. RAD contracts also require properties to be owned or controlled by public or nonprofit entities, except in the event that LIHTCs are used. LIHTC projects receive funding from private investors, who use tax credits to generate a return on their investment in the LIHTC project. To receive this private equity investment, the RAD LIHTC project will be owned by a limited liability company that may include the PHA as the controlling member and private investors as noncontrolling members.

[23] Pub. L. 93–383.

[24] Gross rent includes contract rent + utilities allowance if the tenant pays utility costs.

[25] This evaluation focuses on public housing units. Mod Rehab projects, covering 410 units, converted to RAD under the first component and will not be examined in this report. Since the cap was raised, 682 units of Mod Rehab have converted to RAD under the second component.

LIHTCs are dollar-for-dollar tax credits for affordable housing investments. The LIHTC program was created under the Tax Reform Act of 1986[26] and is administered by the Internal Revenue Service (IRS). This program gives state and local LIHTC-allocating agencies the equivalent of nearly $8 billion in annual budget authority to issue tax credits for the acquisition, rehabilitation, or new construction of rental housing targeted to lower-income households.[27] The LIHTC program provides funding for the development costs of low-income housing by allowing investors to take a federal tax credit during a 10-year period equal to a percentage of the present value of the cost incurred for development of the low-income units in a rental housing project.[28] Most affordable rental housing created in the United States today is financed with LIHTC equity. From that perspective, the use of LIHTC equity as a source of financing for the rehabilitation and construction of RAD projects means that the RAD program is following the industry norm for affordable housing finance.

Protections were put in place during the design of the RAD program to ensure that current residents benefit from the RAD conversion. As part of these protections, RAD requires that PHAs adhere to the following guidelines.

- PHAs must engage with residents at various stages of the conversion process, including preapplication.
- Tenants cannot be rescreened as properties convert assistance.
- Tenants will continue to pay no more than 30 percent of their adjusted income, but tenants that were paying less than 30 percent of their adjusted income may have their rent increased, although the increase can be phased in over 3 or 5 years depending on the amount of the increase.
- All residents must be offered a right to return to properties in the event that they must be temporarily relocated to facilitate rehabilitation or construction.

[26] Pub. L. 99–514.

[27] An average of more than 1,450 projects and 110,000 units were placed in service in each year of the 1995-to-2003 period, according to HUD's National Low-Income Housing Tax Credit (LIHTC) Database (see http://www.huduser.gov/portal/datasets/lihtc/tables9513.pdf).

[28] Projects for (1) new construction and (2) rehabilitation of an existing building, if not funded by tax-exempt bonds, can receive a maximum annual tax credit allocation of 9 percent of the project's eligible basis, which consists of building acquisition costs plus construction and other construction-related costs. The cost of acquiring an existing building (but not the land), and projects financed with tax-exempt bonds, are eligible for a credit of 4 percent annually. After obtaining an allocation of tax credits, the developer will complete the project, certify its cost, and rent it to low-income tenants. Each state receives a fixed allocation of tax credits based on its population, or a minimum amount set by the U.S. Department of the Treasury for smaller jurisdictions. To obtain an LIHTC allocation, the developer, which could be the PHA in the case of a RAD project (or a developer partner selected by the PHA), will propose a project to the agency responsible for administering LIHTCs in the jurisdiction where the project is located. The allocating agency has wide discretion in designing the competition for 9-percent credits, which are in high demand, and setting minimum requirements for 4-percent credits, which are received of right when projects receive tax-exempt bond financing through the agency. The credits are usually awarded to projects in one or more "allocation rounds" held each year on a competitive basis. The project owner must agree to comply with IRS regulations and maintain an agreed-upon percentage of low-income units in a Land Use Restriction Agreement, which is recorded. Noncompliance can lead to recapture of credits as well as the inability to take future credits.

- Once assisted under the Section 8 program, residents maintain most of the same rights they had as public housing residents, plus one significant new right that does not exist in the public housing program: all properties that convert assistance must provide residents the choice to move with continuing tenant-based rental assistance within a reasonable time after conversion, which is within 1 year if the project converts to PBV and within 2 years if the project converts to PBRA.[29]

PHAs that apply to RAD are allowed to use a wide range of options, many of them commonly available in the affordable housing industry, to finance rehabilitation of their projects, and they also are encouraged to explore new alternatives. Examples of possible financing options include—

- Mortgage debt financing at a fixed rate and for a fixed term through public or private lenders.
- Federal Housing Administration (FHA)-insured mortgage loan financing,[30] including risk-sharing programs offered through state agencies, Fannie Mae, or Freddie Mac.
- LIHTCs—4-percent or 9-percent—which provide a tax credit that private investors earn in return for providing funds to build or renovate low-income housing.
- Public Housing Operating Reserves, which are surplus funds accumulated through operation of public housing.
- Replacement Housing Factor (RHF) funds, Demolition and Disposition Transitional Funding (DDTF),[31] and/or unobligated capital funds that are part of a PHA's available public housing funding.
- Other public housing funds, including cash on hand and proceeds from disposition of public housing properties.
- Different forms of grant funding, including HOME Investment Partnerships Program, Community Development Block Grant, and Affordable Housing Program grants through the Federal Home Loan Banks.
- Other forms of debt, including "soft" loans or "cashflow" loans, usually provided by the PHA.

[29] A limited number of good-cause exceptions exist for PHAs with insufficient vouchers to support this housing option.

[30] HUD's Office of Multifamily Housing Programs offers insurance through FHA for multifamily loans originated by FHA-approved lenders for construction, substantial rehabilitation, and acquisition and refinancing of nonluxury apartments. If the scope of required property repairs indicates that "substantial rehabilitation" is needed, the appropriate FHA-insured financing would be Section 221(d)(4) of the National Housing Act of 1934 (Pub. L. 84–345). FHA's Section 221(d)(4) program provides a combined construction and permanent loan under one commitment for mortgage insurance and permits extensive rehabilitation. For less extensive repairs, FHA's 223(f) program is more appropriate.

[31] RHF and DDTF are used interchangeably in this report, because RHF is transitioning to DDTF and, in the future, will be collectively referred to as DDTF. Some RAD projects have used RHF funds, which are provided in two 5-year increments. More recent RAD projects will be able to use only DDTF from the outset.

- Deferred developer fees, which are the portion of the developer fee that is not payable before occupancy.

The first offering for PHAs to apply for the RAD program was from September 24, 2012, through October 24, 2012. HUD reached the RAD statutory cap of 60,000 units in October 2013. At that point, HUD continued to accept RAD applications and placed them on a waiting list. Then in early 2015, Congress authorized an increase in the size of the RAD cap to 185,000 units. HUD announced that waitlisted RAD applications would move forward beginning in February 2015.

1.2.2. How RAD Works for PHAs

The RAD program is simple in concept but can be complicated to understand and execute. Through RAD, Congress has authorized HUD to convert public housing properties from conventional public housing support, with traditional capital fund subsidies and operating fund subsidies, to an assisted housing approach that uses Section 8 PBV or PBRA as the long-term source of federal project subsidy.[32] The ongoing Section 8 subsidy to the properties is calculated based on the total amount of the two subsidies that the public housing program provides to each property. HUD provides no additional subsidy dollars to projects under RAD; however, by leveraging their projects' PBV or PBRA subsidies after conversion, PHAs are able to finance debt and—in combination with other external funds, which could include grants and LIHTCs—other internal resources contributed by the PHA, such as through soft loans, to recapitalize and renovate or redevelop their projects.

The following key features of the program account for how RAD could change the traditional public housing operating and financing model and how it would expand the avenues for redevelopment of public housing units.[33]

- Under RAD, the Declaration of Trust (which by and large prohibits or makes it extremely difficult to borrow against a public housing property) is removed and replaced with a RAD Use Agreement that restricts the property's use to the same purposes (serving low-income households in need of permanently affordable housing) while permitting the property to serve as security for debt, which the Declaration of Trust did not explicitly allow.
- RAD takes the capital fund subsidy attributable to a project and adds it to the operating subsidy to arrive at the Section 8 HAP payment. This process increases the operating subsidy for the average project by about $1,500 per unit per year—which the PHA can use to support project debt or to contribute to a capital replacement reserve.
- In public housing, most projects have a large and growing backlog of unmet capital needs, and PHAs are not receiving enough capital funds annually to fully address those

[32] PBV and PBRA are the two streams of funding provided to PHAs that assist with making capital improvements and subsidize the management operations, respectively, of public housing units. Capital funding is allocated based on the age, size, and estimated capital needs of each property; operating funds are based on the PHA's approved budget, less the amount paid by the tenants.

[33] The Interim Report has been able to analyze the impact of RAD on project financing. Other impacts, such as the cost savings from energy-conservation improvements and more efficient management practices, will be studied in the Final Report.

needs.[34] By facilitating borrowing against the property and providing a subsidy stream to finance the upgrade or redevelopment of the property, supported by the Section 8 contract rents and other leveraged funding sources, RAD can address that backlog of unmet capital needs. By enabling PHAs to address unmet capital needs, RAD allows PHAs to reduce their use of stopgap measures and to shift more project resources to preventive maintenance. This increase in preventive maintenance would generate additional savings in the project's operating budget. These savings could be used to support more debt for capital investment or to build up additional reserves to address future capital improvement and replacement needs.

- Project recapitalization through RAD also provides PHAs with the funds to invest in more energy conservation measures, such as water-saving devices, low-energy lighting systems, energy-efficient appliances, Energy Star-rated windows, and solar water heating. These investments could help reduce utility costs, which constitute about 22 percent of public housing operating costs (Harvard University Graduate School of Design, 2003).
- The RAD program helps provide a project with a steady, bankable revenue stream through a long-term Section 8 HAP contract that not only locks in current levels of project subsidies (from the capital and operating funds) but also includes a built-in annual operating cost adjustment factor (OCAF) that helps address inflation.
- By enabling conversion to project-based assistance, RAD is consistent with the project-based management approach commonly used in the multifamily affordable housing sector. Under RAD, a PHA may choose to continue to own and operate the property after conversion, work with a development partner (including nonprofit housing developers), or form an independent entity controlled by the PHA to manage the property. The finances of each project are independent of other projects in the PHA's portfolio, which may lead to more efficient management practices.
- The RAD program facilitates and encourages the leveraging of limited HUD capital funding with "other sources" of capital financing, including private-sector debt, LIHTCs, soft loans and grants, local funding, and (where projects qualify) Historic Tax Credits.

1.2.3. How PHAs Use RAD To Reposition Their Properties

The RAD program is not prescriptive in its approach to the conversion of each property. Rather, it requires that the PHA demonstrate an approach that provides for the preservation of the property for the life of the Section 8 HAP contract, which could be for either 15 or 20 years. The PHA must also present an independent Physical Condition Assessment (PCA) that shows the total capital needs over the life of the HAP contract.[35]

[34] Abt Associates Inc. (2010) estimated that the public housing stock had a backlog of nearly $26 billion in unmet physical needs. Furthermore, the study estimated that approximately $3.4 billion would be required to keep pace with the portfolio's annually accruing needs. For fiscal year 2013, PHAs received only about one-half of the funding necessary to keep pace with the accrual of physical needs of their properties using the Abt study estimate.

[35] A PCA will be required on any units except those replaced with new construction. When replacing existing units with new construction, the replacement reserve deposit for those units shall not be less than FHA standards.

Before conversion, a public housing property with an approved RAD Application is governed by a CHAP, a document that lists the contract rents for each bedroom size and any utility allowance by bedroom size.[36] The CHAP also lists a series of RAD milestones, such as assembling a development team, determining whether to pursue PBV or PBRA conversion,[37] and completing the RAD Financing Plan. These milestones are intended to keep a project moving toward closing. The CHAP gives the PHA access to a variety of approaches for the RAD conversion, such as—

- **Capital repairs with debt only.** If the financial analysis demonstrates that the project can support the proposed amount of debt while meeting the capital needs determined by the PCA, then a PHA can pursue a debt-only RAD conversion. The debt can be either conventional or FHA-insured.
- **Capital repairs, or demolition and new construction, with debt and tax credit equity.** If debt alone is insufficient to meet the capital needs or if the PHA is pursuing extensive rehabilitation or redevelopment, the PHA's approach can include tax credit equity through either tax-exempt financing and 4-percent LIHTC or competitive 9-percent LIHTC.
- **Conversion to achieve financial stability.** When the financial analysis demonstrates that the post-RAD-conversion property will accumulate a sufficient amount of reserves to meet the capital needs of the project as determined by the PCA, the PHA can complete the RAD conversion without using debt financing or tax credit equity. Debt financing has to be repaid out of project dollars. Tax credit equity may be difficult to obtain and, once obtained, has long-term compliance requirements to which the project must adhere. Thus, this option is important for properties that have recently undergone repairs but are at risk of falling into disrepair without a commitment of ongoing resources for future capital repairs and replacement. RAD provides an option to place the property on a stable financial footing to ensure long-term affordability.
- **Transfer of rental assistance.** PHAs can propose to apply for RAD for a given property and then transfer those RAD vouchers to a different project. This option is important for properties that are not appropriately situated today. An example is a project located in a 100-year flood plain, in which the RAD conversion would not provide enough capital funding to elevate the units above the flood plain or to demolish and rebuild the property in a different location. In this case, the PHA can acquire and rehabilitate an existing property that meets HUD's Site and Neighborhood Standards and then transfer the RAD vouchers to that property.

1.2.4. RAD Application and Approval Processes

Although the general RAD application and approval steps have not changed significantly since the RAD program began, both specific details of these processes and HUD's approach to supporting RAD applicants have changed as the RAD program has evolved. Specifically,

[36] HUD calculated initial contract rents for every public housing project based on each project's subsidy under the public housing program, adjusted by the OCAF and subject to rent caps in the PBV and PBRA programs.
[37] The choice between PBV and PBRA depends on numerous factors specific to the PHA and to the property. Byrne (2013) included a list of 15 factors to consider in choosing PBV or PBRA.

Congress raised the unit cap for RAD from 60,000 to 185,000, which led HUD to issue a large number of CHAPs at one time. As a result, too many CHAPs were active for HUD to provide active support to all RAD projects. HUD still provides extensive assistance, but PHAs must request such assistance. HUD also made significant revisions to the RAD Notice on two occasions (July 2013 and June 2015), both times modifying the scope of activities allowed under RAD and program requirements.[38]

The sample of 24 RAD projects examined as part of this evaluation (see Section 1.4.4) all received CHAPs under the original 60,000-unit cap. As of this report, 22 of the 24 projects had closed. Those that closed before the June 2015 revisions to the RAD notice are governed by the original or first revision of the RAD Notice. The impact of changes in HUD's management of active CHAPs, assistance to PHAs, and the June 2015 revisions to the RAD Notice are beyond the scope of this Interim Report and will be addressed in the Final Report.

In addition to the general description that follows and more detailed explanations provided in the *RAD Conversion Guide* and the *Welcome Guide for New Awardees*, HUD has published numerous RAD case studies that can provide additional insight on the scope of RAD projects, the application process, and the conversion process. These case studies are available at http://portal.hud.gov/hudportal/HUD?src=/RAD/news/case-studies.

1.2.4.1. Preapplication

Before applying for RAD, a PHA must plan its projects and make some fundamental choices in how to structure them. The PHA has to determine its goals for the RAD conversion and what resources are necessary and available to meet its goals. The planning begins with identifying projects for conversion, which includes considering whether to convert some or all of the PHA's portfolio (a "portfolio application") and whether the PHA would like to proceed with conversion in phases (a "multiphase application"). A multiphase application involves converting an initial portion of a project in the first phase and then converting the remainder of the project in later phases.

The PHA should also assess its funding needs and funding sources to determine whether the RAD conversion will leverage enough funding to preserve the converted units. The PHA will need to consider requirements, competitiveness, and timelines for other funding sources, most notably LIHTCs, which are often competitive and have an award cycle that needs to be synchronized with the RAD process to avoid delays. The PHA should also think about contingencies in case an application for a specific project is waitlisted or a funding source falls through.

Finally, the PHA will have to consider the future of converted units in terms of RAD and Section 8. The PHA will need to choose between PBV and PBRA, consider future capital needs and how those will be addressed, and determine how it will manage the new vouchers. The PHA will also

[38] All RAD projects that have not closed by the effective date of a revision to the RAD notice are governed by the terms of the revised RAD notice. HUD can make an exception for RAD projects that close shortly after a revision becomes effective, particularly if complying with the revised RAD notice would lead to a significant delay in closing or cancellation of the RAD project.

need to consider the impact of conversion and any construction or replacement on current and future residents.

HUD provides numerous resources and guidance to help PHAs think through potential RAD conversions. Required materials, including the RAD application, the PCA, and the RAD financing plan, are also planning tools. For example, PHAs can use these materials to find out contract rents for converted units, identify medium- and long-term capital needs, and calculate debt and reserve payments.

1.2.4.2. RAD Application Process

The RAD application process is the stage during which the PHA submits a RAD application and HUD reviews and decides whether to accept or reject it. If HUD accepts the application, HUD can either approve a CHAP or put the application on the waitlist. During this process, the PHA refines its proposed RAD project(s) and engages with stakeholders such as lenders and residents. The RAD application and supporting materials should be comprehensive enough to demonstrate to HUD that the project will be viable after conversion.

The PHA must receive permission to submit a RAD application from its board of directors. In addition, it must hold two resident meetings at each project included in a RAD application. The PHA must present evidence that proposed funding sources are amenable to being included in the RAD transaction (for example, for LIHTCs, a letter from the issuing agency indicating that the proposed RAD project will score well in its competitive process).

The RAD application includes financial pro formas and an initial financing plan, so the PHA must show that the RAD conversion is viable given the proposed funding sources, expected contract rents, any debt service, and required reserves. The RAD application may be accompanied by a PCA, or a Capital Needs Assessment (CNA), that describes the current and future capital needs of the proposed units and buildings, or the PCA or CNA may be provided at a later stage.[39] In either case, the application package should address how the PHA plans on meeting the urgent and future capital needs of the project through conversion. The application should also include a copy of tenant questions about the proposed RAD conversion and the PHA's responses to those questions.

Upon receipt of a RAD application, the RAD program staff review the application materials. They check that all required documents and signatures are included, the financing plan is sound, the PHA has a plan to reduce resident impact and/or ensure choice-mobility, and capital needs are addressed. The RAD program staff will then decide whether to request clarifications or changes, reject, or accept the application. If the application is accepted, the RAD program staff will issue a CHAP or place the application on a waitlist due to the cap on RAD units.

1.2.4.3. RAD Conversion Process

A successful RAD applicant that has received a CHAP will then navigate through the RAD conversion process. This process is a series of milestones that includes finalizing financing and completing administrative changes necessary to complete the conversion to PBV or PBRA. HUD

[39] RAD projects that propose replacement of all units with new construction or conversion of units in buildings constructed within the previous 5 years are exempt from the PCA requirement.

has developed a RAD conversion schedule designed to complete closing and issue a HAP within 1 year of receipt of the CHAP award. The thoroughness and detail of the RAD application support a rapid closing, however, the complexity of many RAD projects can lead to delays, some of which are independent of HUD or the PHA, such as an unexpected delay in receiving an LIHTC award.

Following HUD's schedule, as described in detail in the RAD Notice, the PHA has three major document milestones and two major administrative milestones. Within 180 days of the CHAP award, the PHA should submit a final financing plan that includes firm commitments for financing from all sources, a final sources and uses of funds table, and other associated documents (for example, environmental reviews, if applicable). After HUD approves the financing plan, the PHA will begin preparing the RCC.

The RCC should be completed within 60 days of the financing plan. The RCC contains final versions of all applicable agreements, including the unexecuted HAP. It is extremely difficult for the PHA or other stakeholders to make changes to the scope of the RAD project after the RCC is completed.

The RAD project should close and a HAP contract should be executed within 60 days of RCC completion. Typically any delays at this point in the conversion process revolve around finalization of financial arrangements and the timing of funding awards. In some cases closing occurs within a week of the RCC, but in other cases a significant (3+ month) gap can occur between the RCC and closing.

As an administrative function, the PHA must amend its annual and 5-year plans to reflect the proposed RAD conversion. It must also request that the converted units be removed from the Office of Public and Indian Housing (PIH) Information Center (PIC).

1.2.4.4. After RAD Project Closes

After the RAD project closes, the HAP is executed and the RAD program staff are no longer involved. The PHA can begin RAD-related construction (if applicable) after closing and in accordance with its resident relocation plan. Following the terms of the HAP, payments to the PHA will shift from the capital and operating fund accounts to either PBV or PBRA accounts. The PHA or ownership entity is responsible for completing any construction activities, conforming to the requirements of other funding sources, making any debt payments on the terms prescribed in loan agreements, and preserving the converted units as affordable housing.

1.3. Key Research Questions

This Interim Report addresses the following research questions. These questions are divided into two parts: (1) questions on the physical and financial condition of RAD versus non-RAD projects and (2) the impact of RAD and questions on the implementation of RAD, including the experiences of RAD projects and the reasons why non-RAD projects chose not to participate.

1.3.1. Questions on the Physical and Financial Condition of RAD Study Projects and Non-RAD Comparison Projects

- For RAD projects that made it to closing—

  - What were common sources of capital leveraged?
  - How much external capital was leveraged?
  - What was it about the RAD program that brought those capital sources to the table?
  - Did different financing strategies produce varied levels of success?
- What was the experience of PHAs in obtaining external capital?
  - Was the experience of obtaining external capital different based on the choice of PBRA or PBV or on the particulars of the PHA?
  - Did PHA size and experience with mixed-finance housing play any factor in obtaining external capital?

1.3.2. Questions on the Implementation of RAD

- Why did PHAs choose to participate in RAD?
  - What types of projects did they propose for conversion?
  - What factors led PHAs to propose specific properties for RAD conversion?
- What other programs (and forms of financing) do PHAs view as alternatives to RAD?
  - What factors influence them to choose one rather than the other?
- For PHAs that chose not to participate in RAD, what influenced that decision?
- What factors prevented RAD projects from making it to closing?

1.4. Methodology

This section discusses the methodology used for performing the first phase of the evaluation of the RAD program.

1.4.1. Overview of Approach

Our methodology for the RAD evaluation involves several steps, some of which our team completed for this Interim Report and some of which our team will undertake later for the Final Report. Our evaluation started with collecting and analyzing HUD data on all RAD and non-RAD projects, and later on a sample of 24 RAD and 48 non-RAD projects. Our statisticians used this sampling approach to enable us to gather more indepth information about representative projects while controlling the high cost of this step of our data collection.

For the non-RAD projects in our sample, the research team supplemented HUD's administrative data by collecting data on projects' physical and financial condition when the data were not already available. Some of these supplemental data have been collected, but additional data will need to be collected and analyzed for the Final Report. Also, our team has been collecting indepth primary data on PHAs and projects by developing a web survey and conducting followup interviews with the PHAs in our RAD and non-RAD samples to capture their views and experiences with RAD and, where applicable, their reasons for not applying for RAD. For the Final Report, our researchers will collect data on projects' physical and financial condition after the projects have completed

conversion, construction, and/or rehabilitation. In the meantime, for the Interim Report our financial analysts have developed realistic scenarios that illustrate how RAD affects a project's ability to meet its capital needs compared with other available project financing options without RAD.

Finally, our research team will collect survey data from a sample of tenants living in projects at the time RAD was implemented to assess the impact of RAD on their housing condition and relocation experience. For the Interim Report, our survey specialists have begun the process of enrolling tenants in this part of the study. Our data collection on tenants is ongoing, and our analysis of the impact of RAD on tenants will be included in the Final Report.

1.4.2. Research Questions, Approach, and Data Sources

Table 1 contains the central research questions posed by HUD, the approach our research team undertook to answer these questions, and the data sources our team relied on for the first part of our study, all of which are presented in this Interim Report. Section 1.8 includes the full range of research questions, our proposed approach, and our use of data sources for the Final Report.

Table 1. Interim Report Research Questions, Approach, and Data Sources

Research Questions Posed by HUD	Approach	Data Sources
For RAD projects that made it to closing, what were common sources of capital leveraged? How much external capital was leveraged? What was it about the RAD program that brought those capital sources to the table?	Our research team used HUD program data on closed RAD projects to identify their amount of capital funding by source, to determine whether the source was external or internal, and to calculate leverage ratios.	• HUD program data.
For RAD projects that made it to closing, did different financing strategies produce varied levels of success?	Our data analysts used HUD program data on closed RAD projects to develop logit regression analyses of the effect of different financing strategies on the probability of closing.	• HUD program data.
What was the experience of PHAs in obtaining external capital? Was the experience of obtaining external capital different based on the choice of PBRA or PBV or on the particulars of the PHA?	Our data analysts used HUD program data on closed RAD projects to analyze the use of external capital by choice of PBV or PBRA contract. Our team solicited web survey responses and conducted interviews with PHAs on their reasons for choosing PBV or PBRA and their experience with lenders. Trained staff also interviewed experienced RAD lenders for their views of the RAD program and the impact of PBV and PBRA.	• HUD program data. • Web survey responses. • PHA interviews. • Lender interviews.
Did PHA size and experience with mixed-finance housing play any factor in obtaining external capital?	Our data analysts used HUD program data on closed RAD projects to analyze the use of different financing sources by PHA size. Our team solicited web survey responses and conducted interviews with PHAs on their experience with mixed-finance and with obtaining external capital with RAD.	• HUD program data. • Web survey responses. • PHA interviews.
Why did some PHAs choose to participate in RAD?	Our data analysts used HUD data to compare RAD and non-RAD projects on the basis of selected characteristics. Our team solicited web survey responses and conducted interviews with PHAs on their reasons for participating or not participating in RAD.	• HUD program and administrative data. • Web survey responses. • PHA interviews.
What type of projects did they propose for conversion? What factors led PHAs to propose specific properties for RAD conversion?	Our data analysts used HUD data to compare RAD and non-RAD projects on the basis of selected characteristics. Our team solicited web survey responses and conducted interviews with PHAs on property characteristics.	• HUD program and administrative data. • Web survey responses. • PHA interviews. • PCA data.
What other programs (and forms of financing) do PHAs view as alternatives to RAD? What factors influence them to choose one rather than the other?	Our team solicited web survey responses and conducted interviews with PHAs on their use of alternative sources of funds for carrying out activities, their use of leveraging, and project viability.	• HUD program and administrative data. • Web survey responses. • PHA interviews.
For PHAs that chose not to participate in RAD, what influenced that decision?	Our team solicited web survey responses and conducted interviews with PHAs on their reasons for participating or not participating in RAD.	• HUD program and administrative data. • Web survey responses. • PHA interviews.
What factors prevented RAD projects from making it to closing?	Our data analysts used HUD program data on closed RAD projects to develop logit regression analyses of the effect of different financing strategies on the probability of a CHAP being withdrawn or revoked. Our team interviewed PHAs about the reasons why their projects lost their CHAPs.	• HUD program data. • PHA interviews.

CHAP = Commitment to Enter into a Housing Assistance Payment Contract. HUD = U.S. Department of Housing and Urban Development. PBRA = project-based rental assistance. PBV = project-based voucher. PCA = Physical Condition Assessment. PHA = public housing authority. RAD = Rental Assistance Demonstration.

1.4.3. Data Sources

Our research team used four data sources for this phase of our study.

1. **HUD internal program and administrative data** that captured basic project information such as number of units, physical condition of project, location of project, and so on. Our team used this information to conduct sampling, prepopulate sections of the RAD and non-RAD web surveys, and perform basic analysis.
2. **Responses to the web survey** that was sent to the primary contact person identified by HUD for each project in our sample. This survey captured the PHA's views on the implementation of the RAD program cutting across all research questions, and it was also used to supplement and cross-check data in HUD's administrative databases. See appendix F for the text of the web survey.
3. **Telephone interviews with PHAs** that enabled them to augment their initial responses to questions from the web survey and allowed us to ask for greater depth of information. See appendix G for the Interview Discussion Guide.
4. **PCAs** that provided quantitative data on the baseline physical and financial condition of non-RAD sample properties.

To supplement these data sources, our team selected four case studies of RAD projects that cover a broad range of financing strategies, from projects that use no outside sources of financing to projects that use LIHTC equity or first mortgage debt with or without FHA insurance. Then our financial analysts modeled how PHAs could finance the rehabilitation needs of these selected RAD projects without use of the RAD program. We also compared the impacts of RAD and the non-RAD financing alternative on the projects' long-run financial condition.

1.4.4. Sample Selection

The design of our research was to compare and contrast a sample of 24 RAD projects with a sample of 48 non-RAD projects, matching the RAD and non-RAD samples by their characteristics. This sampling methodology enabled us to manage the high cost of collecting primary data and to minimize the overall burden on PHAs to provide data for this study. The following describes each step of our approach.

1.4.4.1. Step 1: Defining the Sample Framework

The sample framework for this study consisted of 132 RAD properties that had an approved CHAP as of December 31, 2013, and had either closed or reached the RCC stage by December 31, 2014. To define this sample framework, the research team started with the list provided by the RAD program staff of 278 RAD properties that had an approved CHAP as of December 31, 2013. These properties accounted for a total of 36,027 units out of the 60,000 units that were originally

authorized.[40] During the course of our study, Congress raised the RAD authorization level to 185,000 units, which slightly impacted our methodology. Because CHAPs can be withdrawn or revoked, the research team decided to limit our sampling frame to the universe of RAD projects that had an approved CHAP as of December 31, 2013, and had either closed or reached the RCC stage by December 31, 2014.[41] This definition of our sampling frame reduced the sampling universe from 278 to 132 properties. It meant that the resulting sample would be representative of RAD projects that had moved from CHAP to RCC or closing in a timely manner.

1.4.4.2. Step 2: Dividing the Population Into Subgroups

In the second step of our sampling approach, our statisticians grouped the sampling population into relatively homogenous subgroups for sampling purposes. Our approach was to draw a sample in proportion to the population represented in these subgroups. After discussing with HUD various ways in which to divide the RAD population, the research team and HUD agreed on two characteristics: (1) PHA size and (2) the physical condition of the property. PHA size is a standard way in which HUD classifies, administers, and regulates the performance of PHAs. Physical condition of a project is another standard measure HUD has developed to assess the quality of public housing provided to tenants.

HUD classifies PHAs by size category based on the number of public housing units under the control of the PHA: very large (> 10,000), large (1,250–9,999), high-medium (500–1,249), low-medium (250–499), small (50–249), and very small (< 50). For purposes of this study, the research team collapsed these six size categories into three categories:

1. **Large PHAs.** Includes large and very large PHAs, or PHAs with more than 1,250 units.
2. **Medium PHAs.** Includes high- and low-medium PHAs, or PHAs with 250–1,249 units.
3. **Small PHAs.** Includes small and very small PHAs, or PHAs with fewer than 250 units.

According to the Real Estate Assessment Center (REAC), as shown in table 2—

- Small PHAs comprise 2,296 PHAs (75 percent), own 2,461 public housing projects (36 percent), and manage 211,324 units of public housing (20 percent).
- Medium PHAs account for 625 PHAs (21 percent), own 2,149 public housing projects (31 percent), and manage 312,676 units of public housing (29 percent).
- Large PHAs comprise 124 PHAs (4 percent), own 2,312 public housing projects (33 percent), and manage 555,868 units of public housing (51 percent).

[40] The original 60,000-unit cap on RAD was reached in January 2014. Because the projects added that month would have had even less time to close than the projects approved by the end of December 2013, they were not included in our sampling framework.

[41] Although 111 of the 278 RAD projects in the universe had closed by December 31, 2014, no RAD projects had closed in two of the nine strata from which our sample was drawn (see section 1.4.4.2). Our research team therefore adjusted our approach to allow projects that received an RCC before December 31, 2014, into the final sample. This change enabled us to fill one of the two strata. Our expectation was that projects that had received an RCC would be less likely to be withdrawn or revoked and would be more likely to close within the timeframe of our study. Of those projects, 19 more had closed by October 2015.

Table 2. Number and Percent Distribution of PHAs, Public Housing Projects, and ACC Units by Size of PHA for All Public Housing Projects

PHA Size	PHAs		Projects		ACC Units	
	No.	Pct.	No.	Pct.	No.	Pct.
Large	124	4	2,312	33	555,868	51
Medium	625	21	2,149	31	312,676	29
Small	2,296	75	2,461	36	211,324	20
Total	**3,045**	**100**	**6,922**	**100**	**1,079,868**	**100**

ACC = Annual Contributions Contract. PHA = public housing authority.
Source: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data

Of the 132 RAD properties in our sampling population, as shown in table 3—

- Small PHAs comprise 26 PHAs (35 percent), own 28 projects (21 percent), and manage 2,976 units (15 percent).
- Medium PHAs account for 38 PHAs (51 percent), own 80 projects (61 percent), and manage 11,272 units (56 percent).
- Large PHAs comprise 10 PHAs (14 percent), own 24 projects (18 percent), and manage 5,742 units (29 percent).

Compared with the universe of all public housing projects and units, projects and units owned by medium PHAs are relatively overrepresented in the population of 132 RAD properties from which our sample was drawn, and projects and units owned by small and large PHAs are relatively underrepresented. Compared with the universe of all PHAs, medium-size and large PHAs are relatively overrepresented in the population of 132 RAD properties, and small PHAs are relatively underrepresented.

Table 3. Number and Percent Distribution of PHAs, Public Housing Projects, and ACC Units by Size of PHA for Sampling Universe of 132 RAD Properties

PHA Size	PHAs		Projects		ACC Units	
	No.	Pct.	No.	Pct.	No.	Pct.
Large	10	14	24	18	5,742	29
Medium	38	51	80	61	11,272	56
Small	26	35	28	21	2,976	15
Total	**74**	**100**	**132**	**100**	**19,990**	**100**

ACC = Annual Contributions Contract. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data

HUD has developed the Public Housing Assessment System (PHAS)/Uniform Physical Condition Standards to measure the physical condition of public and assisted housing projects. REAC conducts inspections of properties that are owned, insured, or subsidized by HUD, including public housing and multifamily assisted housing, to determine whether the affordable housing stock is meeting the standard of being decent, safe, sanitary, and in good repair.

Inspection scores range from 0 to 100 points. Using these scores, the research team grouped the RAD population of properties into three mutually exclusive physical condition categories.

1. **High performers.** Properties that score more than 90 points, accounting for 61 out of 132 properties in our sampling universe (or 46.2 percent).
2. **Standard performers.** Properties that score between 70 and 89 points, accounting for 68 out of 132 properties in our sampling universe (or 51.5 percent).
3. **Substandard or troubled performers.** Properties that score lower than 70 points, accounting for 3 out of 132 properties in our sampling universe (or 2.3 percent).

According to REAC, as shown in table 4—

- High performers comprise 3,135 public housing properties (45.3 percent) and 347,613 units of public housing (32.2 percent).
- Standard performers comprise 2,902 public housing properties (41.9 percent) and 491,631 units of public housing (45.5 percent).
- Substandard or troubled performers comprise 883 public housing properties (12.8 percent) and 240,300 units of public housing (22.3 percent).

Table 4. Number and Percent Distribution of Public Housing Projects and ACC Units by Property Performance Rating for All Public Housing Projects

Property Performance Rating	Project		ACC Units	
	No.	Pct.	No.	Pct.
High	3,135	45.3	347,613	32.2
Standard	2,902	41.9	491,631	45.5
Substandard	883	12.8	240,300	22.3
Grand total	**6,920**	**100.0**	**1,079,544**	**100.0**

ACC = Annual Contributions Contract.
Note: Two projects with 324 units were not included due to lack of data.
Source: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data

Of the 132 RAD properties in our sampling universe, as shown in table 5—

- High performers comprise 61 properties (46.2 percent) and 7,189 units of housing (36.0 percent).
- Standard performers comprise 68 properties (51.5 percent) and 12,197 units of housing (61.0 percent).
- Substandard or troubled performers comprise 3 properties (2.3 percent) and 604 units of housing (3.0 percent).

Table 5. Number and Percent Distribution of Public Housing Projects and ACC Units by Property Performance Rating for Sampling Universe of 132 RAD Properties

Property Performance Rating	Projects		ACC Units	
	No.	Pct.	No.	Pct.
High	61	46.2	7,189	36.0
Standard	68	51.5	12,197	61.0
Substandard	3	2.3	604	3.0
Grand total	**132**	**100.0**	**19,990**	**100.0**

ACC = Annual Contributions Contract. RAD = Rental Assistance Demonstration.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD program data

Compared with the universe of all public housing projects and units, high-standard performing projects and units are relatively overrepresented in the population of 132 RAD properties from which our sample was drawn, and substandard projects and units are significantly underrepresented.

Our analysts stratified the sampling universe of 132 RAD properties into 9 strata based on the 3 values for PHA size and the 3 values for physical condition as indicated by REAC PHAS physical condition inspection scores.[42] The last stratum (substandard or troubled performers in small PHAs) contained zero projects in the sampling universe, leaving a total of eight strata.

1.4.4.3. Step 3: Selecting the RAD Sample

In our next step, our statisticians assigned random numbers to each of the 132 RAD properties and selected 24 of them based on the 8 groups for the sample. We calculated the sample size in each group as the percentage of the size of the group relative to the population as a whole multiplied by the total sample size of 24 projects. The number of projects in each group reflected this proportion after allowing for a minimum of one property in each group if one were available. As with the sampling universe, the last stratum of our sample (substandard or troubled performers in small PHAs) contained zero projects. The result is a sample that is broadly representative of RAD projects that have closed or that were expected to close during this phase of the evaluation. Table 6 presents the distribution of projects in the sampling universe and the sample by our PHA size and project performance categories.

[42] The inspection score for each of the RAD properties was obtained from a HUD Office of Policy Development and Research file that included the latest inspection scores for all properties in the PIH inventory. We matched the RAD properties using the PIC number to get an analysis file with both of the stratification variables.

Table 6. Sample Stratification by PHA Size and Project Performance Based on RAD Projects That Closed or Received an RCC by December 31, 2014

PHA Size	Stratum	Project Performance	Number of Projects in Universe	Percentage of Projects in Universe	Proportional Distribution of Sample	Number of Projects in Sample
Large	1	High	9	6.8	1.64	1
	2	Standard	13	9.8	2.36	2
	3	Substandard	2	1.5	0.36	1
Medium	4	High	34	25.8	6.18	6
	5	Standard	45	34.1	8.18	8
	6	Substandard	1	0.8	0.18	1
Small	7	High	18	13.6	3.27	3
	8	Standard	10	7.6	1.82	2
	9	Substandard	0	0.0	0.00	0
Total			**132**	**100.0**	**24.00**	**24**

PHA = public housing authority. RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment.

Appendix A provides a list of the 24 projects in our sample.

1.4.4.4. Step 4: Selecting the Non-RAD Sample

Our approach for the non-RAD sample was to select two non-RAD properties for each RAD property in the sample based on how well they matched a comparable property in our RAD sample.[43] Because our sample included 24 RAD properties, our statisticians selected 48 matching, non-RAD comparison projects from the PIH inventory of non-RAD projects that were matched on 13 key variables available from HUD or Census data sets. They used data from HUD's administrative systems and the American Community Survey (ACS) 2012 5-year estimates to compile our key matching variables, which are listed in table 7.

Our statisticians matched RAD properties to non-RAD properties using *genetic matching* because participation in RAD is voluntary for the PHA and not based on projects being randomly selected.[44] This method compares RAD to non-RAD properties that are as similar as possible. It is useful in observational studies, such as this study of the RAD program, in which program participation is nonrandomized, which potentially introduces ***self-selection bias*** into the data. For instance, PHAs might prefer to submit RAD applications for projects that have greater capital needs (which RAD would address). Smaller PHAs might be less likely to participate in RAD because they lack knowledge and experience with mixed-finance, which RAD uses. To eliminate potential self-selection biases and to strengthen our conclusions, our statisticians matched the 24 projects in our RAD sample against non-RAD public housing projects based on observable characteristics that could account for some of these possible differences. The strength of genetic matching lies in its use of equal percent bias reduction, a criterion that yields the highest possible reduction in selection bias for any linear combination of covariates. Based on our analysis of the results of our genetic match, as shown in appendix D, this method reduced bias in our sample to less than one-third of its original size.

[43] The higher ratio of non-RAD to RAD projects was used to improve the reliability of our comparisons and to allow for the possibility that less data could be available for non-RAD projects compared with RAD projects, for example, if non-RAD projects were less inclined to participate in our data gathering.
[44] See appendix D for a more detailed discussion of this technique.

Using HUD administrative data, our research team was able to create a data set of 5,993 non-RAD properties with usable information for 13 matching variables. These variables were selected to capture key characteristics of PHAs, public housing projects, and the neighborhoods in which the projects are located. The only PHA variable was the size of the PHA, based on the number of public housing units under management. Property-related variables included information on the property's size (number of Annual Contributions Contract units), age (Date of Full Availability), construction date, or date of last modernization), structural type (building and development type), bedroom mix (percentage of one- or two-bedroom units), physical condition (REAC inspection score), and vacancy rate. Neighborhood-related variables capture information on the strength or weakness of local affordable housing market conditions, such as rents that are high relative to income (cost-burden rate), overcrowded living conditions (overcrowding rate), degree of poverty in the community (poverty rate), extent to which households in the area rent rather than own their homes (percentage of renters), and the prevalence of vacant housing (vacancy rate). See table 7.

Table 7. Key Variables Used for Genetically Matching Non-RAD Properties Similar to RAD Properties

Key Matching Variables	Description and Rationale
PHA size	Size of the PHA that operates the development, based on the number of public housing units. Either large, medium, or small, as described in Section 1.4.4.2.
ACC unit count	The number of public housing units in the development, which measures the size of the project.[a]
Building type	HUD-designated type of building[b] in the development (for example, elevator highrises, townhomes, walkup apartments.).
Development type	HUD-designated type of development based on whether the development includes elderly units. Developments can be elderly only, no designated elderly units, or mixed with some designated elderly units.
Date (year) of Full Availability/construction date (year)/date (year) of last modernization	Establishes when a development can access the operating subsidy from a PHA's Operating Fund. This date is available on all projects and in most cases is the same as the construction date. Our analysts took into account the last modernization date, if available, and used the calendar year (discarding the month and day). These dates establish the age of the property.
Percentage of one- or two-bedroom units	The number of one- or two-bedroom units as a percentage of all units in the development. This variable measures the extent to which a property can serve the needs of large families (lower percentage of one- or two-bedroom units).
REAC inspection score	Most recent REAC inspection score for the development, which measures the physical condition of the property.
Development vacancy rate	The percentage of vacant units in a public housing project, which indicates how well the property attracts and retains tenants.
Census tract cost-burden rate	ACS data on percentage of households in the census tract with gross rent greater than 35 percent of household income. Neighborhoods with higher cost-burden rates have stronger demand for affordable housing.
Census tract overcrowding rate	ACS data on percentage of occupied housing units with more than 1.00 occupants per room in the census tract. Neighborhoods with higher overcrowding have a shorter supply of affordable housing.
Census tract poverty rate	ACS data on poverty rate for all people in the census tract. Neighborhoods with higher levels of poverty require higher levels of housing subsidy and could have higher rates of socioeconomic distress.
Percentage of renters in census tract	ACS data on percentage of renter-occupied units in the census tract. Neighborhoods with more renters have a larger rental housing market.
Census tract vacancy rate	ACS data on percentage of vacant housing units in the census tract. Neighborhoods with high residential vacancies have an oversupply of housing.

ACC = Annual Contributions Contract. ACS = American Community Survey. HUD = U.S. Department of Housing and Urban Development. PHA = public housing authority. RAD = Rental Assistance Demonstration. REAC = Real Estate Assessment Center.
[a] Public housing developments can include unsubsidized units or units scheduled for demolition/disposition. In these cases, the units are no longer under an ACC.
[b] HUD assigns one building type to each development, even if the development includes multiple types of buildings.
Note: All data are HUD Office of Public and Indian Housing Information Center (PIC) data, unless indicated as ACS data.
Sources: HUD PIC data; ACS data

Our data analysts removed HUD properties with partial or missing administrative data profiles, such as those without a REAC inspection score or that had missing or invalid geocoding (for matching to ACS data at the census tract level). In addition, our analysts removed those projects approved for demolition/disposition as listed in publicly available HUD Excel files. They also removed all projects with pending RAD applications and all active or completed RAD projects, using a list provided by the RAD program staff. Finally, our analysts excluded properties that were highly likely to participate in RAD, such as those covered under a Portfolio Award.

To account for potential errors in the HUD administrative data and the possibility that a project could be involved in RAD without being included in the program staff's list of RAD applicants

and projects, our statisticians initially matched four non-RAD properties to each RAD project, providing two more non-RAD projects per RAD project than were needed for sampling. In addition to removing some matched projects (for example, projects that are no longer public housing), they also removed a number of projects indicated by the RAD program staff as involved in RAD and certain projects at PHAs that declined to participate in this evaluation.

The initial four non-RAD matches proved insufficient for a few of the RAD projects. Six of the corresponding non-RAD properties were dropped because of errors in the HUD administrative data or a project's subsequent involvement in RAD, and three non-RAD properties were dropped because of their refusal to participate in this evaluation. Therefore, our statisticians conducted a second matching exercise on 12 RAD projects in the sample. After removing non-RAD projects that had already been matched, they used genetic matching on an updated list of projects to select four non-RAD properties. Although only a few of these matches were used in this analysis, the extra matches provide additional backup as needed.

As shown in appendix D, both genetic matching exercises produced statistically valid matches based on an equal weighting of all 13 matching variables. We replaced a small number of non-RAD properties that differed significantly on actual development characteristics if these differences could impact the analysis of physical condition. For example, a scattered-site non-RAD project that was matched to a one-building highrise RAD project would be replaced with a comparable one-building highrise non-RAD project.

See appendix B for a list of the 48 non-RAD projects in our sample.

1.4.4.5. Sampling Processes for RAD Projects Used for the Resident Impact Study

As of December 31, 2014, many of the projects in our original RAD sample had already gone to closing and, in some cases, construction and rehabilitation work had begun. Our research team was aware that in those cases the temporary relocation of residents likely would have begun before the team could start to enroll tenants in the resident impact study. We were concerned that we would lose access to existing tenants unless our team adopted a different sampling approach for this part of our study. To increase the enrollment and response rates of tenants for our evaluation, our data analysts developed a process for creating a second sample of up to 24 RAD projects specifically for the resident impact study.

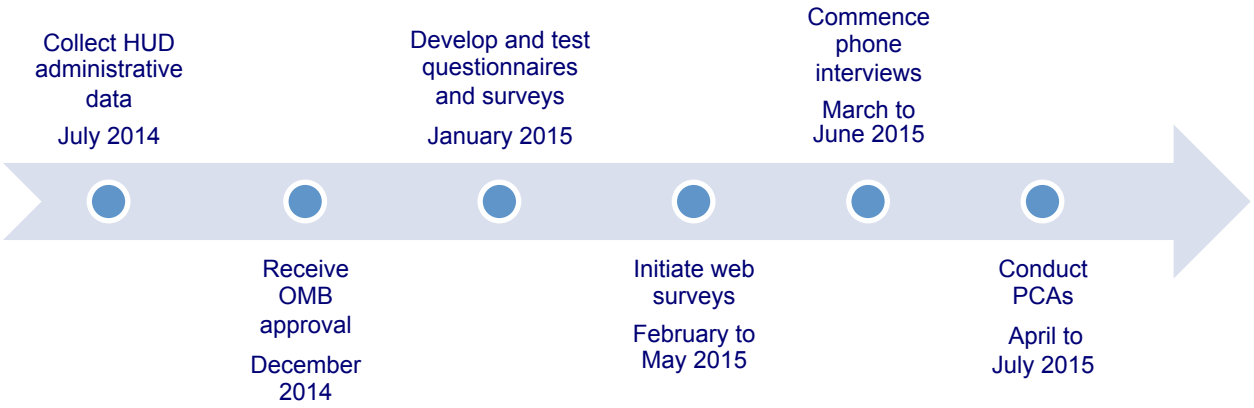
Therefore, our statisticians have started to draw our resident sample from RAD properties with RCCs that have not yet gone to closing. This alternative sampling approach for the tenant impact portion of our study allows us to use the time gap between when a RAD project receives an RCC and when that project goes to closing to contact and enroll residents before they are temporarily relocated by RAD. Led by the Urban Institute, our subcontractor for this part of the evaluation, our team has compiled this sample from RAD projects on a rolling basis as eligible projects for the sample have entered the RCC phase before going to closing. This approach enables us to enroll, track, and survey a representative sample of residents before temporary relocation occurs. As of the date of this report, this sample included 14 projects. Appendix C contains the list of sample projects used for analyzing the impact of RAD on resident temporary relocation.

Appendix H provides a detailed discussion of the Resident Impact Study sampling process.

1.4.5. Data Collection

Data collection has occurred over several months and continues as more PHAs provide interviews and agree to preparation of PCAs. Data collection consists of obtaining HUD program and administrative data, getting the approval of the U.S. Office of Management and Budget (OMB) for our approach to collecting primary data, eliciting web survey responses and interviews from PHAs in our RAD and non-RAD samples, and conducting PCAs for projects in our non-RAD sample, as needed. Figure 1 illustrates the timeline for data collection during this phase of the RAD evaluation.

Figure 1. Data Collection Steps and Timeline



HUD = U.S. Department of Housing and Urban Development. OMB = U.S. Office of Management and Budget. PCA = Physical Condition Assessment.

1.4.5.1. HUD Program and Administrative Data

Secondary data collection efforts involved obtaining HUD program and administrative data, including—

- RAD applications for the RAD sample projects.
- PIC data for the RAD and non-RAD sample projects.
- PHA Annual Plans for the RAD and non-RAD samples, where available.
- PHA public domain information for the RAD and non-RAD samples.

Our statisticians used information from these data sets to pull the RAD and non-RAD samples, describe the sample projects, enable interviewers to gain a quick understanding of the makeup of each project before conducting the interviews, and conduct comparative analyses for the Interim Report.

1.4.5.2. Obtaining OMB Approval

Because our web surveying and interviewing entailed contacting more than nine members of the public, our research team was required to work through HUD to obtain OMB approval under the Paperwork Reduction Act of 1995 (PRA).[45] Under the PRA, OMB requires HUD to clear the questionnaire or survey when asking the same questions of more than nine members of the public

[45] Pub. L. 104–13.

(nonfederal employees). The OMB approval process requires two Federal Register notices and a detailed application to OMB, which OMB has 60 days to review. The Federal Register published the 60-day notice for this study on June 25, 2014, and the 30-day notice on October 14, 2014. OMB granted approval on December 9, 2014, and issued OMB Control Number 2528-0304.

1.4.5.3. Developing and Testing the Web Surveys and Interview Questionnaires

Web surveys and telephone interviews with the RAD and non-RAD sample PHAs provided the basic primary data for our analysis of program implementation for the Interim Report. After receiving OMB approval on December 9, 2014, our team finalized the sample and commenced developing and testing the web surveys and interview questionnaires for the PHAs in our two samples. The surveys and interviews were divided into two sections.

1. **General Project Information.** This section allowed the PHA to address and confirm basic project information on the characteristics of the project. The project information included conversion type (for RAD projects), number of units, rent, capital needs and replacement reserves, and existing debt. For non-RAD projects, the survey asked for environmental factors such as accessibility, lead-based hazards, and project/unit lack of amenities or flaws (for example, small units, vandalism). Answers to initial questions could lead to broader and more substantive discussions; for example, confirmation of the conversion type could prompt a discussion of other conversion options considered by the PHA.
2. **PHA Experience.** This section of the survey collected information on a number of comparative factors of the PHAs with RAD properties versus non-RAD PHAs regarding development activities undertaken. It also asked for a self-assessment of the status of these activities.

To ensure that the proposed survey and interview questions provided insightful knowledge to address each of the research questions for this evaluation, our research staff conducted validity testing of the questions, developed an interview guide, and trained staff members so that they were adept at conducting interviews (see appendix G). Training consisted of instruction on how to conduct an interview, background information on the RAD program and respondents, and guidance on how to effectively and efficiently guide the interview through completion. Our staff tested the questionnaire on a subject matter expert consultant who has worked with PHAs to apply for RAD.

1.4.5.4. Soliciting Web Surveys and Performing Interviews

After testing was completed, our survey staff launched the web survey by sending a notice to the point of contact provided by HUD for each project in our sample. This notice included background on the evaluation and a link to the website for taking the survey. Separate notices were sent to the RAD and non-RAD projects in our sample to direct them to their respective websites, because the web surveys differed between the two samples. Our staff tracked respondents as they accessed the website and completed the survey. As needed, they distributed followup reminders to PHAs that were slow to respond. We solicited responses from the 23 PHAs represented in our sample of 24 RAD projects and the 44 PHAs represented in our sample of 48 non-RAD projects. Survey responses were received from 21 RAD PHAs and 38 non-RAD PHAs.

After a respondent had completed the web survey, our staff contacted the respondent via email and, if necessary, via phone. The body of the email provided sufficient background information to introduce the purpose of the interview, our role and relationship with HUD as evaluator, and our intent to contact them to arrange a phone interview. Our communication clarified that their participation in the study was voluntary. Our staff interviewed 17 PHAs from our RAD sample and 35 PHAs from our non-RAD sample.

When arrangements had been made for the phone interview, our team dispatched two staff members to conduct the interview. One staff member acted as the interviewer, and the other recorded the respondent's answers. The respondents for the PHA were key staff members with knowledge of the subject property and, in the case of a RAD property, the RAD application. Typical PHA respondents included the Executive Director, Development Director, asset manager, or other senior staff person with RAD knowledge as determined by the PHA.

The interview primarily solicited qualitative data from the respondents through open-ended questions; however, a few questions provided quantitative data that were available for later analysis. In addition, the interview served to validate the information received from the HUD administrative data. If the HUD information was found to be inaccurate upon validation with the PHA, our interview staff solicited an explanation from the PHA and included this information in the interview notes. Appendix G includes the list of questions that were asked.

1.4.5.5. Conducting PCAs

To assess the impact of RAD on the physical and financial condition of projects, our approach is to compare measures of the physical condition of the RAD and non-RAD sample of projects before and after the implementation of RAD and completion of project rehabilitation. This part of our evaluation will be presented in the Final Report. The Interim Report focused on obtaining baseline data on the physical condition of RAD and non-RAD projects in our sample.

For purposes of collecting data on projects' physical condition, our research team used the PCA submitted by the RAD project with the CHAP to establish the baseline physical condition for each RAD project in our sample. For the non-RAD projects, our team used a qualified subcontractor, EMG. EMG first reviewed any existing PCA or Physical Needs Assessment (PNA) to determine whether they were current enough and provided sufficient information for the purposes of our study. For situations in which those studies were not available, EMG prepared a new modified PCA, which became part of our database for this study.[46] EMG conducted 38 PCAs for the non-RAD projects in our sample, and HUD provided 24 PCAs for the RAD projects in our sample. For the Final Report, EMG will obtain a second round of PCAs for both the RAD and the non-RAD study samples.

[46] PCAs and PNAs are two instruments that HUD uses to capture data on the physical condition of public housing properties in order to project a property's future capital investment needs in the short and long terms. The PCA projects capital costs during a 20-year period, but the PNA projects those costs during only a 5-year period. The PCA and PNA are both accepted by HUD, although the PNA is undergoing modification. Because the PCA is a requirement of RAD and has been adapted for use in HUD's multifamily programs, it was our preferred instrument for collecting this type of information.

1.5. Description of RAD and Non-RAD Comparison Samples

As previously explained, to facilitate indepth analysis of primary data—including web surveys, interviews, and PCAs—our statisticians pulled two samples: (1) one of 24 RAD projects in the process of conversion and (2) another of 48 non-RAD public housing projects to serve as a control group. For the RAD sample, they used a stratified random selection methodology along two dimensions: (1) PHA size and (2) project performance rating. Each dimension included three categories, yielding nine ($3 \times 3 = 9$) potential groupings. As shown in the following discussion, however, only eight of these groupings were populated. For the non-RAD sample, which serves as our control group, our statisticians used a genetic matching technique to match 2 non-RAD projects for every RAD project along 13 variables (see appendix D).

Tables 8 and 9 compare these two samples, showing the number and percentage of projects in each category for each sample. Only eight of our nine categories are represented in each sample. The category of substandard-performing projects managed by small PHAs is empty for both samples. No projects were in that category in the population of 132 RAD projects that had received a CHAP award by December 31, 2013, and had closed or received an RCC by December 31, 2014. As a consequence, this group is represented neither in the RAD sample nor—because the non-RAD sample is meant to match the RAD sample—the non-RAD sample. The distribution of projects across the other categories is broadly similar. Although not identical in all categories, the distribution is the same for the PHA size categories. The slight differences reflect the use of 13 variables to make the match.

Table 8. Distribution of Projects in RAD Sample by PHA Size and Project Performance Rating

PHA Size/Project Performance Rating	Substandard		Standard		High Standard		Total Projects by PHA Size	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Small	0	0	2	8	3	13	5	21
Medium	1	4	8	33	6	25	15	63
Large	1	4	2	8	1	4	4	17
Total projects by performance rating	**2**	**8**	**12**	**50**	**10**	**42**	**24**	**100**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD program data

Table 9. Distribution of Projects in Non-RAD Sample by PHA Size and Project Performance Rating

PHA Size/Project Performance Rating	Substandard		Standard		High Standard		Total Projects by PHA Size	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Small	0	0	2	4	8	17	10	21
Medium	2	4	17	35	11	23	30	63
Large	3	6	3	6	2	4	8	17
Total projects by performance rating	**5**	**10**	**22**	**46**	**21**	**44**	**48**	**100**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD program data

Although the RAD sample contains 24 projects, the number of corresponding PHAs represented in the sample is 23, because 1 PHA has 2 projects. In a similar way, 44 PHAs are represented in the non-RAD sample of 48 projects, because 4 PHAs have 2 projects each in our sample.

1.6. Validation of Samples

Sample validation uses basic statistical tests, such as the comparison of means test with *t*-statistics, to confirm that a sample is representative of its corresponding population. The RAD sample was randomly selected from the population of active RAD projects in the first wave of the program that had converted or were close to converting—to be specific, the 132 RAD projects that had received a CHAP award by December 31, 2013, and had closed or received an RCC by the end of the following year, December 31, 2014. To validate the RAD sample, our statisticians compared it to the population of closed and almost closed RAD projects. In addition, because our goal is to draw valid inferences for the entire population of RAD conversions, our statisticians conducted an additional comparison with the population of 146 active CHAPs in the first wave that had not received an RCC. The non-RAD sample is a control group that was matched against the RAD sample. To validate it, our statisticians compared it to the RAD sample.

Appendix E includes detail on our sample validation method and results. For the RAD sample, of the 35 comparison of means tests that were performed, in no case was a pair of means statistically significantly different from each other. In addition, the population of 132 closed and RCC projects from which our statisticians drew the RAD sample is broadly representative of the population of 278 active CHAPs and closed transactions as a whole, with some skewing away from projects managed by large PHAs and a slight underrepresentation of substandard-performing projects. For the non-RAD sample, of the 35 comparison of means tests that were performed, only 1 pair of means—neighborhood overcrowding rate—was statistically different from each other. In summary, these tests validated the representativeness of the RAD sample to the RAD population and the representativeness of the non-RAD sample to the RAD sample.

1.7. Limitations

Any program evaluation, especially an evaluation of an ongoing program in the early stages of implementation, is subject to time and resource constraints that can impinge on the methodology and even affect the results. This evaluation of RAD is no exception. The following discusses some of these constraints, how they might have influenced our approach, and potential implications for our findings and conclusions.

1.7.1. Smallness of Sample Size

Our methodology called for collecting indepth information from a sample of RAD and non-RAD projects through the combination of a web survey and a telephone interview to capture their views and experiences of RAD. It also involved preparing PCAs, as needed, for a sample of non-RAD projects. Finally, our methodology included enrolling a sample of tenants in RAD projects so they could be surveyed later for the Final Report on their experiences under RAD. Collection of this indepth information is labor intensive and costly. To help control these costs, our research team worked with HUD to arrive at a sample size of 24 RAD projects and 48 non-RAD projects.

The smallness of this sample could inhibit our ability to draw valid inferences for the population. Cognizant of this limitation, our team used standard statistical techniques, when appropriate, to define the limitations of our sample estimates.

1.7.2. Timing of Sample Selection

RAD is a new initiative for HUD, and the evaluation of RAD began not long after the program started. RAD attracted considerable interest and generated a lot of activity within HUD and the public housing community in its first few years. Our statisticians sampled projects based on their reaching or almost reaching financial closing by a fixed date (December 31, 2014). This requirement reduced the chance that our small sample would become even smaller due to project cancellations. It is possible, however, that our sample is biased toward less complicated transactions if such transactions are more likely to close early. Because less complicated transactions may be less likely to encounter implementation problems, our findings could understate the incidence of such problems. Our research team will try to address this issue in the Final Report, when we can compare early RAD closings with later RAD closings in terms of financial complexity.

During our study, Congress authorized an increase in the size of the RAD program from 60,000 to 185,000 units. HUD announced that waitlisted RAD applications would move forward and be granted CHAPs beginning in February 2015. As such, approximately 1,000 properties included in our original universe of non-RAD comparison properties were expected to be moved into the RAD program. Our analysts removed all properties corresponding to waitlisted RAD applications from the non-RAD universe. The final selection of non-RAD matching properties for the study was largely completed when the cutoff date of December 31, 2014 arrived. If a PHA submitted a RAD application for a non-RAD project after the cap was lifted, however, that project was eliminated from the non-RAD sample and replaced with the next project.[47]

1.7.3. Quality of Data

Information on particular RAD projects can vary in terms of quality, accuracy, consistency, and completeness. Although HUD staff members perform quality control checks on the data, the information is prepared by each PHA, which may create data variability. Not all data are required to be reported, and data may be retained at the field office rather than at HUD headquarters, meaning some information may not be readily accessible to an outside researcher. In addition, project data will change over time as a project proceeds from application to approval, RCC, closing, and rehabilitation. In consequence, the project data that are available may be out of date when accessed. To address this issue, our research team has clarified to HUD the source of the project data used in this evaluation and worked with HUD to address any gaps or deficiencies discovered in our data. Our research team used the data provided by HUD to conduct its analyses. Any undetected data errors in the files provided by HUD could affect the analyses and conclusions presented in this report.

[47] On June 15, 2015, HUD announced legislative changes to the RAD program under HUD (2015a). The new guidance raised the cap on public housing conversions from 60,000 to 185,000, which enabled more non-RAD projects to apply under RAD. To avoid the ambiguity of having a project that was in the process of applying for RAD in our non-RAD sample, our staff checked the non-RAD projects in the sample against the list of new RAD applicants and eliminated the latter from the former.

1.7.4. Use of Estimated Versus Actual Data

As previously noted, the Interim Report is part of a longer-term study of the impact of RAD. That longer-term study will enable us to collect additional data on what actually transpired not only to the residents of RAD projects but to the projects themselves, including the actual cost of the rehabilitation, repair, or other changes to the project when it converted under RAD. In the meantime, the Interim Report will in certain places rely on the analysis of estimated rather than actual data. For instance, this study uses PHA estimates of their sources and uses of financing based on their applications or financial plans. This report makes clear when estimates are used.

1.7.5. Nonresponse Biases

Participation in this evaluation on the part of PHAs, tenants, and other informed sources is entirely voluntary. Voluntary participation has its advantages and disadvantages. On the positive side, it increases the likelihood that participants are providing candid views, when asked, and are not tailoring their views to an outside authority. The disadvantage is that they may decide not to participate because of lack of interest or time and end up as a nonresponse. If nonrespondents differ from respondents in key variables, the sample responses may not accurately reflect the views of the population. To try to control for this bias, our sample included backup projects that could replace nonrespondent projects and that met the same matching criteria as the original sample in the project. Some replacements were made. Despite these efforts, responses were less than complete. The response rate for surveys was 91 percent (21 out of 23) for RAD PHAs and 86 percent (38 out of 44) for non-RAD PHAs. The response rate for interviews was 74 percent (17 out of 23) for RAD PHAs and 77 percent (34 out of 44) for non-RAD PHAs. The response rate for PCAs was 75 percent (33 out of 44) for non-RAD PHAs.

1.7.6. Macroeconomic Conditions

This report evaluates the RAD program as it has performed over a limited time period, from 2013 to late 2015. During this period, the U.S. economy experienced a gradual recovery from a long recession that began in late 2007. This lengthy recovery period was characterized by slowly declining unemployment, moderate growth in gross national product and household income, low inflation, and low interest rates. Changes in macroeconomic conditions in later years could affect affordable housing demand and housing finance, which could impact the effectiveness of the RAD program. For example, if long-term interest rates rise and Section 8 rents do not, the amount of first mortgage debt that RAD projects could finance would decline. This effect would reduce the amount of leverage RAD projects could achieve.

1.8. Final Report

HUD plans to release the Final Report on the evaluation of the RAD program approximately 3 years from the date of this Interim Report. The Final Report will document and assess the impact of RAD conversion on the physical condition and administrative structure of the converted projects as compared with comparable nonconverted projects, the financial viability of converted projects (RAD participants) as compared with comparable nonconverted projects (non-RAD participants), and the impact of RAD conversion on tenants. In particular, the Final Report will—

- Compare the difference between the baseline physical condition and the final physical condition of RAD and non-RAD comparison properties.

- Assess RAD participant outcomes based on conversion type, financial viability, source and amount of capital, and other variables such as ownership, poverty level, minority composition, and type of structure.
- Characterize the financial models/strategies used by RAD participants, their benefits, and the level of success achieved by the participants using one type of financing rather than another.
- Evaluate the impact of RAD conversion on tenants by analyzing tenant experiences under RAD and their views of the benefits and costs of the program.

Table 10 provides a crosswalk between the research questions, approach, and data required for the Final Report on the evaluation of RAD.

Table 10. Final Report Planned Research Questions, Approach, and Data Sources

Research Questions Posed by HUD	Approach	Data Sources
For RAD projects that made it to closing, how many successfully completed rehabilitation on schedule? What factors influenced the ability of the PHA to complete rehabilitation on schedule?	Our research team will use HUD program data on closed RAD projects to identify which projects completed rehabilitation on schedule. Our analysts will use other data from HUD and the Census Bureau to develop a regression model to identify which factors have a statistically significant effect on the probability of a project completing rehabilitation on schedule.	• HUD program and other data.
To what extent were physical and financial conditions improved as a result of conversion?	Our analysts will analyze preconversion and postconversion PCA data on the RAD sample from HUD and during site visits to determine quantitative changes in the capital needs of each property between the two time periods, with detailed analysis by key components (for example, HVAC, life safety, kitchen) and utility savings. Our financial specialists will analyze preconversion and postconversion project financial data gathered from HUD to determine quantitative changes in project financial condition between the two time periods, including changes in net operating income, debt service coverage, loan-to-cost, and other financial ratios. Our research staff will collect web survey data from RAD sample PHAs and analyze the data to corroborate the preceding analysis of changes in physical and financial condition and to provide stakeholders' views about the qualitative nature of the changes (for example, whether the change represents a significant improvement in physical condition and how the change affects project management and operations). Our team will analyze changes in physical and financial condition of the RAD sample and stakeholder views by cross-tabulating results based on project and community characteristics.	• HUD program data. • Web survey. • PHA interviews. • Site visits (PCA/PNA). • Financing documents.
What would have happened to these properties in the absence of RAD?	Our research team will collect PCA data from non-RAD projects at the start and end of a comparable time period and analyze quantitative changes in the capital needs of each project. Our analysts will collect financial statement data from HUD for non-RAD projects at the start and end of a comparable time period and analyze quantitative changes in the financial condition of each project. Our analysts will compare non-RAD sample project results with RAD sample project results to identify and quantify the magnitude of the differences in the change in physical and financial condition between the two samples. Our team will analyze differential changes in physical and financial condition between the RAD and non-RAD samples by cross-tabulating results based on project and community characteristics. Our financial specialists will develop a counterfactual pro forma analysis of selected RAD and non-RAD sample projects to illustrate how non-RAD projects would have fared under RAD and how RAD projects would have fared without RAD. Our staff will collect web survey data from non-RAD sample PHAs and analyze them to provide stakeholders' views about the qualitative nature of the changes and whether RAD would have improved the outcome.	• HUD program data. • Web survey. • Follow-on interviews, if necessary. • Case studies.

Research Questions Posed by HUD	Approach	Data Sources
Were these outcomes different based on the choice of PBRA or PBV or based on the particulars of the PHA—for example, PHA size?	Our staff will use a web survey of the RAD sample to collect stakeholder views on the impact of the choice of PBRA or PBV and other factors on changes in physical and financial condition. Our analysts will analyze changes in physical and financial condition and compare the results for PBRA and PBV conversions. Our staff will analyze web survey responses of the RAD sample by cross-tabulating results based on selected characteristics, including choice of PBRA or PBV and PHA size.	• HUD program data. • Survey. • Site visits. • Follow-on interviews, if necessary. • ACS data. • RAD applications. • Financing documents.
To what extent did participating properties remain financially viable after conversion? What happened to properties that experienced financial distress?	Our staff will develop measures of project financial strength and weakness, such as debt-service coverage and net cashflow, from RAD sample financial statements. Through the web survey, our staff will collect views of the RAD sample PHAs on whether the project was financially viable or distressed. Our analysts will apply indicators to analyze the RAD sample in two categories: (1) financially viable and (2) financially distressed. Our staff will interview PHAs of identified financially distressed projects about how those projects have been managed and what steps have been or could be taken to resolve their distress.	• Web survey. • Site visits. • Follow-on interviews, if necessary. • Audits and financial statements, if available.
How did residents experience RAD? Are they aware of the program? Do they notice differences in the management and maintenance of the property as a result of RAD?	Our staff will develop a survey instrument and use it to collect information from tenants on their knowledge and experience under RAD and their perceptions of whether or how the management of their project has changed under RAD. The survey will be delivered over the telephone, when convenient, or on site. Analysis of the survey responses will characterize how tenants learned about RAD, their involvement in the process, and how they think it has impacted them.	• Telephone survey. • Site visits and interviews.
What was the demand for permanent relocation via the Choice-Mobility option? Did households using this option relocate to better neighborhoods?	Our staff will develop a survey instrument and use it to collect information from tenants on their knowledge, use, and experience of the Choice-Mobility option. In particular, we will examine whether those who used this option relocated to better projects in better neighborhoods. The survey will be delivered over the telephone, when convenient, or on site. Analysis of the survey responses will describe how tenants learned about the Choice-Mobility option and how it has impacted them.	• Telephone survey. • Site visits and interviews.
How many households were required to temporarily relocate? Where did they relocate to? Were they provided with relocation support? Did they relocate to better neighborhoods? Did they return to the property after rehabilitation?	Our staff will develop a survey instrument and use it to collect information from tenants on their experience with temporary relocation under RAD. We will examine whether they relocated to better neighborhoods, the level of support they received during their relocation, and whether they moved back to their original place of residence. The survey will be delivered over the telephone, when convenient, or on site. Analysis of the survey responses will describe how many tenants relocated temporarily, the quality of the neighborhoods they relocated to, the amount and types of relocation support they received, and whether they returned to their original place of residence.	• Telephone survey. • Site visits and interviews.

ACS = American Community Survey. HUD = U.S. Department of Housing and Urban Development.
HVAC = heating, ventilation, and air-conditioning. PBRA = project-based rental assistance.
PBV = project-based voucher. PCA = Physical Condition Assessment. PHA = public housing authority.
PNA = Physical Needs Assessment. RAD = Rental Assistance Demonstration.

The Final Report on the evaluation of RAD will analyze program outcomes using the measures indicated in table 11.

Table 11. Final Report Planned Outcomes and Measures

Outcomes	Measures
Physical condition	Change in critical needs/unit. Change in accessibility needs/unit. Change in short-term rehabilitation needs/unit. Change in long-term rehabilitation needs/unit. Change in improvements/unit.
Financial condition	Change in net operating income/unit. Change in rehabilitation escrow/unit (reserves). Change in debt service coverage ratio. Change in minimum occupancy level to maintain debt service. Change in net cashflow/unit after debt service and reserves for replacement.
Operational performance	Change in vacancy/occupancy rate. Time to achieve stable occupancy level. Change in operating expense ratio.
Project performance	Planned vs. actual time to completion. Planned vs. actual project cost. Cost overruns, changes in project scope. Percentage of capital needs after conversion.
Financing structure	Debt-to-asset ratio or debt-to-cost ratio. Capital stack (tax credit equity, private equity, private debt, public debt). Debt-to-equity ratio. Debt instrument terms (interest rate and maturity). Transaction costs.
Tenant impacts	Awareness of RAD. Temporary relocation. Choice-Mobility voucher use. Opinions of change in housing quality. Opinions of change in neighborhood quality. Opinions of support received for temporary relocation.

RAD = Rental Assistance Demonstration.

2. Results to Date

HUD has been active in establishing and managing the Rental Assistance Demonstration program since 2013, with concrete results to show for its efforts. During this short span of time, HUD's RAD program staff have processed more than 1,000 RAD applications from hundreds of public housing authorities around the country, issued more than 1,000 Commitments to Enter into a Housing Assistance Payment Contract covering more than 100,000 units of public housing, and assisted almost 200 projects serving nearly 20,000 households through the RAD conversion process and, simultaneously, have created the required processes and workflows, developed data systems, and trained staff. This chapter reports on the status of the RAD program through mid-October 2015. Unlike the analytical chapters that follow, this chapter is descriptive. The information presented here covers the current RAD program as a whole, not a subset of the program used for specific analytical purposes.[48]

2.1. Program Status/Results to Date

This section presents information and results based on the status of all RAD applications received as of the end of August 2015 with updates on all active CHAPs and all closed transactions through the middle of October 2015. As shown in table 12, through August 2015, PHAs had requested RAD conversion authority for 189,082 public housing units, which is slightly more than the authorized level of 185,000 units.[49] Of these applications, 24,029 units are still pending, 101,512 units have received CHAPs only, 1,186 units have submitted their financial plan and are waiting for their RAD Conversion Commitment, 6,602 have received an RCC but not yet closed, and 18,152 units have closed and converted.[50] An additional 37,601 units have been reserved for future CHAP award as part of an approved multiphase project or portfolio award that has been only partially awarded. These numbers do not include 113 applications (15,588 units) that have had their CHAPs withdrawn or revoked as of this date.

[48] Much of the information provided in subsequent chapters is based on a subset of RAD projects, such as the universe of 278 projects that had received a CHAP award as of the end of December 2013, the subpopulation of 132 projects that had received an RCC or closed by the end of December 2014, or the sample of 24 randomly selected projects.

[49] Unit counts in this paragraph and elsewhere in this report refer to Annual Contributions Contract units, which are units subsidized by public housing programs before conversion and units subsidized by a Housing Assistance Payment (HAP) contract after conversion. RAD projects could include unsubsidized units in addition to these subsidized units. HUD was unable to provide information on the number of unsubsidized units in these RAD projects.

[50] Closed projects have had their financing plan approved and HAP executed. Construction, if any, may begin. Depending on its complexity, the project may not be completed for a year or more after closing to allow for relocation, rehabilitation, or new construction and placement of the project into service. Active CHAPs are those projects that have received a CHAP and are working toward closing. HUD may revoke a CHAP if the project fails to meet milestones specified in the CHAP, if the PHA is unable to assemble the proposed financing package or viable alternative, or if the PHA is unresponsive to RAD requirements. PHAs also may withdraw their RAD application and return the corresponding CHAP to HUD at any time before closing for a variety of reasons.

Table 12. Status of All RAD Applications as of August 29, 2015

Status of All RAD Applications	Units	Percent
Applications pending	24,029	12.7
Reserve authority for portfolio/multiphase	37,601	19.9
CHAP awarded	101,512	53.7
Financing plan submitted	1,186	0.6
RCC issued	6,602	3.5
Closed/converted	18,152	9.6
Total applications in process	**189,082**	**100.0**

CHAP = Commitment to Enter into a Housing Assistance Payment Contract. RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment.
Source: RAD program data.

2.1.1. RAD Applications

PHAs from across the country submitted 1,256 applications to convert projects from public housing subsidy to project-based Section 8 rental assistance through the RAD program. HUD received RAD applications from all regions of the country. More than one-half of applications are from the South, with the remainder almost evenly divided between the Northeast, Midwest, and West. According to HUD, most applications are in urban areas and are family developments. Almost one-half of applications are from medium PHAs. Large PHAs account for more than one-third of applications, and small PHAs submitted less than one-fifth of applications.

Of these applications, 98 were portfolio applications and 60 were multiphase applications. The portfolio applications covered 813 properties (8.3 projects per application) for 106,387 total units (1,086 units per application). The multiphase applications included 193 phases (an average of 3.25 phases per project) for 13,647 total units (an average of 227.5 units per project).

Applicants proposed a variety of financing mechanisms, including Federal Housing Administration mortgage insurance, conventional debt, 4-percent and 9-percent low-income housing tax credit (LIHTC) equity, public housing capital, replacement housing and operating reserve funds, and other sources, which include grants, soft loans, deferred developer fees, and miscellaneous sources. The overall unadjusted leverage ratio (total non-HUD funds divided by total HUD funds) proposed in the 1,256 RAD applications is about 15.7:1; that is, the applicants proposed to secure about $15.70 in other funding for every $1 of public housing funds used in the proposed RAD transactions.[51]

2.1.2. RAD Awards (Active and Closed CHAPs)

As of the middle of October 2015, 1,155 awarded RAD projects had not withdrawn or had their CHAPs revoked by HUD, of which 189 had closed (including 4 Section 8 moderate rehabilitation projects) and 966 were still active (including 1 Mod Rehab project). Of the active CHAPs, 67 had received an RCC and 98 had submitted a financing plan. Altogether, these projects proposed converting 131,263 units to project-based Section 8 Housing Assistance Payment contracts. As with RAD applications, active and closed awarded RAD projects are dispersed across much of the country, with most awards going to medium or large PHAs.[52]

[51] Because this leverage ratio is unadjusted, it treats all other sources as non-HUD funds. See chapter 3 for a discussion of the impact of adjusting the leverage ratio.
[52] This information is more recent than the information reported in Table 12.

2.1.3. Proposed Financing Sources and Construction Costs for Active and Closed Awarded RAD Projects

The 966 RAD projects with active CHAPs proposed to raise about $8.0 billion in capital funding to rehabilitate and convert 111,598 units of housing through the RAD program at a total construction cost of $3.9 billion.[53] Of the total funding amount, external sources of funding included first mortgage debt for about $2.3 billion (28.3 percent); tax credit equity for about $3.1 billion (38.0 percent), split between 9-percent LIHTC ($1.0 billion) and 4-percent LIHTC ($2.1 billion); and other public, private, nonprofit, and local sources of funding for about $2.3 billion (28.2 percent). The smallest portion of proposed funding is from public housing funding sources, including operating reserves, capital funds, and replacement housing funds, which accounted for $445 million (5.5 percent) of total funding. As discussed in chapter 3, however, this proportion increases with adjustments that account for the portion of other sources provided by PHAs. On an unadjusted per-unit basis, total proposed funding for development (debt, tax credit equity, grants, and other sources) averages approximately $71,999 per unit, with only $3,988 coming from public housing funds.

2.1.4. Financing Sources and Construction Costs for Closed RAD Transactions

The 185 closed RAD public housing transactions provide some insight into RAD program outcomes. Through these transactions, PHAs converted 19,255 public housing units to project-based Section 8 HAP contracts. The conversion process included a proposed $1,172 million in new construction, rehabilitation, and repairs, or an average of $60,878 in construction costs per converted unit.[54]

To meet their financial goals, the PHAs raised $2,476 million in funding, of which $472 million (19 percent) was from first mortgage debt, $503 million (20.3 percent) was from 4-percent LIHTC, $474 million (19.1 percent) was from 9-percent LIHTC, and $862 million (34.8 percent) was from other sources. Only $166 million (6.7 percent) came from the public housing sources of operating reserves, capital funds, and Replacement Housing Factor funds/Demolition and Disposition Transitional Funding, giving these converted projects an unadjusted leverage ratio of 13.94:1.

Other sources consist of a variety of financing options, including—

- Grants, such as HOME Investment Partnerships Program, Community Development Block Grant, and Affordable Housing Program grants.
- Loans, such as second mortgages, purchase money mortgages, “seller” or “take-back” financing, and other cashflow loans, some of which may be provided by the PHA.
- PHA funds, such as cash on hand, transfers from other RAD projects, project revenues, and asset disposition proceeds.

[53] Units refer to converted RAD units. Some RAD projects include non-RAD units. Financing dollars and construction costs cover all units in a project, which may include non-RAD units that are not included in this discussion due to lack of available data.

[54] Construction costs are less than the total amount of capital financing, because the latter covers fees, reserves, interest, and other soft costs in addition to construction costs. For these closed transactions, total financing per unit of converted housing is $128,855.

- Deferrals, such as deferred developer fees and deferred loan interest.
- Additional tax credits, such as state tax credits and historic tax credits.

Some of these sources are clearly internal PHA resources, such as PHA cash on hand, and some clearly come from sources outside the PHA, such as grants and tax credits. Other sources, however, are ambiguous. For instance, deferred developer fees could be PHA resources if the PHA is the developer, and soft loans could represent funds provided by the PHA on easy repayment terms. As another example, seller or take-back financing is used to generate additional tax credit equity in rehab transactions by enabling the taxable entity, the limited liability company or limited partnership that receives the property from the PHA, to declare the "as-is" value of the PHA's contributed property for tax purposes. In RAD and other public housing mixed-finance transactions, PHAs typically take back a cashflow loan. Because this type of financing does not represent funds contributed by the PHA, it is usually counted among other sources.

2.1.5. Withdrawn or Revoked CHAPs

When CHAPs are issued, HUD requires the PHA to follow through on a series of milestones toward completion of the conversion from public housing to project-based Section 8. Although HUD has the discretion to grant extensions, HUD expects the PHA to keep the project moving toward closing. In the event that the PHA is not responsive to these requirements, HUD may revoke the CHAP and make those RAD units available to the next project on the waiting list. Also, PHAs have the option to withdraw their RAD applications and return the corresponding CHAPs to HUD at any time in the process. A PHA may do so for a variety of reasons, including failure to secure proposed financing, revised financial analyses that indicate the project is no longer viable, or other circumstances, such as failure to get required redevelopment approvals from the local government. As of the end of August 2015, 113 CHAPs (15,588 units) had been withdrawn by the PHA or revoked by HUD. By the middle of October, 129 CHAPs (17,401 units) had been withdrawn or revoked.

3. Physical and Financial Condition Analysis

This chapter provides a preliminary analysis of the impact of the Rental Assistance Demonstration program on the physical and financial condition of projects that closed. Our analysis found that RAD projects expect to meet a greater percentage of their capital needs up front and therefore have significantly lower capital needs over the long term, compared with non-RAD projects. They can do so by accessing significant amounts of external financing. Wide variation exists among RAD projects in the amount and types of financing they use because of differences in conversion strategies and rehabilitation plans.[55] Use of more complex financing strategies, such as some forms of tax credits and mortgage debt, tends to delay the closing process, possibly because those financing sources are more complicated to complete.

The bulk of our analysis uses financial data from HUD's RAD program on the 185 RAD public housing projects that closed through October 12, 2015, or on a subset of closed projects from our original study population. For certain aspects of the analysis, these data were supplemented with data collected from our sample of 24 RAD projects and from interviews with 5 financial institutions with RAD lending experience. Because our study is at the early stage of most conversions, our analysis does not extend beyond the point of closing. Therefore, this study does not assess the impact of RAD on the physical condition of projects or on their long-term financial performance, aside from showing that RAD projects can address more of their immediate capital needs and reduce more of their long-term capital needs compared with non-RAD projects. In addition, this study discusses how financial strategies, particularly the use of leverage, could impact the financial viability and risk of RAD projects post-conversion.

This analysis addresses the following research questions.

- For RAD projects that made it to closing, what were common sources of capital leveraged? How much external capital was leveraged? What was it about the RAD program that brought those capital sources to the table? Did different financing strategies produce varied levels of success?
- What was the experience of public housing authorities in obtaining external capital? Was the experience of obtaining external capital different based on the choice of project-based rental assistance (PBRA) or project-based vouchers (PBVs), or on the particulars of the PHA? Did PHA size and experience with mixed-finance housing play any factor in obtaining external capital?

3.1. Summary

One primary objective of the RAD program is to enable projects to meet their upfront and long-term capital needs. The Final Report will provide a full-scale review of the program's success in achieving that objective. Using our review of Physical Condition Assessment data for a sample

[55] See chapter 8 for an indepth analysis of financing strategies for four transactions taken from our sample of 24 RAD projects. These four cases include one nonfinancial transaction (simple conversion to Section 8 with no rehabilitation or financing) and three financial transactions (including use of debt and low-income housing tax credits [LIHTCs] for rehabilitation and new construction).

of RAD and non-RAD projects, we conclude that both groups appear to have the same level of capital needs over the next 20 years. Compared with non-RAD projects, however, RAD projects expect to meet significantly more of their capital needs up front (75 percent of total needs for RAD versus 2 percent of total needs for non-RAD). As a result, they expect to significantly reduce their capital needs over the next 19 years (25 percent of total needs for RAD versus 98 percent of total needs for non-RAD).

The RAD program enables PHAs to meet their immediate capital needs by drawing on an array of external financing sources for project capital funding, including mortgage debt, tax credits, and other loans and grants. These outside sources augment PHAs' limited internal resources. One goal of the RAD program is to enable projects to use debt financing to meet their financial needs. The 185 conversions that were studied demonstrate the success of the program in meeting that goal. They raised almost $472 million in first mortgage debt, 67 percent conventional and 33 percent with Federal Housing Administration insurance. They also relied on tax credit equity as a major financing source, accounting for nearly $977 million (39.4 percent) of their total financing need. In addition, they made substantial use of other sources for a total of $862 million (34.8 percent).

Further analysis, however, showed other sources to be an ambiguous category that includes external financing sources, such as state tax credits, HOME Investment Partnerships Program (HOME) grants, and Affordable Housing Program (AHP) grants; internal sources, such as PHA cash on hand and disposition proceeds; and sources that represent the transfer of property rather than the contribution of funds, such as seller or take-back financing in low-income housing tax credit transactions.[56] To determine the success of the RAD program in leveraging external sources of project financing, our analysts disaggregated other sources into four categories: (1) PHA funds, (2) additional third-party loans, (3) seller or take-back financing, and (4) other sources (including grants and deferred fees).[57]

Based on these adjusted results, our analysis found that for the 185 closed RAD public housing transactions in this study, PHAs contributed $250 million (about 50 percent more than reported) and raised an additional $2,227 million in external funds, for an overall adjusted leverage ratio of 8.91:1.[58] This ratio means that for every $1 invested by the PHAs in their RAD projects, private and public external sources invested an additional $8.91.

[56] As previously explained, seller or take-back financing accounts for the value of the property conveyed by the PHA to the tax credit entity. It is used to generate additional tax credit equity and is reflected in the LIHTC source of financing.

[57] HUD's reported data on closed transactions do not provide detailed description of "other sources." Abbreviated descriptions are available from RAD applications, but applications show proposed financing sources and amounts and do not accurately represent the financial structure that was finalized at closing. In addition, the abbreviated descriptions are provided in the form of notes that are not always clear or consistent. We had to crosswalk applications and closed transactions to develop estimates for the allocation of other sources across these four categories for our 185 closed projects.

[58] The leverage ratio for the RAD program is calculated in the same way that HUD calculates the leverage for its other mixed-finance programs: (total financing resources-public housing resources)/public housing resources. If seller or take-back financing is not counted as external funds, the leverage ratio declines to 7.61:1; if it is counted as PHA funds, the leverage ratio declines to 2.6:1.

Wide variation exists in leverage ratios for closed RAD projects. Of all closed projects, 62 (33.5 percent, or more than one-third) had no leverage, and 35 projects (18.9 percent) had a leverage ratio of more than 100:1. Projects with extremely high leverage ratios contributed little to no financing from their own resources. The amount of leverage a project used depended on the development scope of the project. New construction projects had the highest adjusted average leverage ratio at 19.21:1. Projects that simply converted to Section 8 had an average adjusted leverage ratio of only 3.13:1.

Do high leverage ratios indicate that RAD projects are taking on too much risk? For the RAD program, many capital sources do not increase the ***financial risk*** of a project, defined as the probability that a project will become insolvent (debt exceeds asset value). These capital sources do not add to a project's financial risk because they do not require repayment, they allow for flexible repayment terms, or they place the greater part of the risks on other parties. Such sources, however, do carry other risks, such as ***compliance risk.*** For instance, in the LIHTC program, tax credits can be canceled and recaptured if the project fails to comply with the requirement to use the housing to support income-eligible tenants. This risk usually impacts private investors and guarantors, which are usually developers, rather than PHAs and their projects. To more clearly understand the risk to PHAs from the use of LIHTC equity, however, one would have to examine the actual financing documents in each case.[59]

To assess the financial risk of RAD project financing strategies, a useful metric is the amount of total debt (mortgage loans plus third-party financing) used for project financing. Because mortgage debt is underwritten with loan-to-value (LTV) and debt service coverage (DSC) ratios, RAD projects would be assuming as much mortgage default risk as allowed in FHA-insured or conventional affordable housing mortgage loans.[60] The default risk of these programs would provide a useful benchmark for assessing this type of risk for RAD projects that borrow funds. With the addition of third-party financing, individual projects could be taking on more risk than those standards assume. This area is worthy of further exploration.

The primary factor that motivates a PHA to seek outside financing is the project's degree of total financing need. The simplest RAD projects, which merely convert public housing into project-based Section 8 housing, have minimal immediate financial needs. Many PHAs can absorb those needs using their internal resources. Projects that involve modest rehabilitation have greater financial needs. To meet those needs, PHAs turn to external sources, usually a first mortgage if the project can support it. In some cases a mortgage is insufficient, for instance, because the property hits its debt capacity limit given its Section 8 rents and projected operating costs. In such cases, the PHA will add other debt that has more favorable repayment terms and other soft funding sources such as grants. As the developmental scope and complexity of the project increases, the PHA will add tax credits to all other sources. Projects with the greatest need will tend to use tax credits the most. Although 9-percent LIHTC financing offers a deeper subsidy than 4-percent LIHTC financing, and for that reason is more valuable, it is awarded on a

[59] The greatest risk for the PHA would occur if the PHA were the guarantor, or if the loan documents triggered a loan default in the event of the loss of tax credits. If the PHA were the developer, another risk is that it could be locked out of the tax credit program for 6 to 8 years, depending on the state.

[60] FHA's 221(d)(4) mortgage insurance program allows an LTV of 90 percent or greater if a project received project-based assistance, as with RAD projects, which equates to a debt/equity leverage ratio of 9:1.

competitive basis.[61] In addition, 9-percent LIHTC financing has a cap on the amount of credits per project in many states, but 4-percent LIHTC financing does not. As a result, PHAs with larger projects, like large PHAs, will tend to use proportionately more 4-percent LIHTC credits compared with 9-percent LIHTC credits.

How does the pursuit of more complex financing strategies affect the likelihood that a RAD project will reach closing within a reasonable time period?[62] To answer this question, our research team analyzed the financing strategies of RAD projects that had received their Commitment to Enter into a Housing Assistance Payment Contract awards by the end of 2013. Comparing those that had closed through the middle of October 2015 with those that had not closed, our analysis found a clear difference in the likelihood that a project will complete closing within that timeframe, depending on a project's physical inspection score, use of PBV or PBRA contracts, participation in a portfolio application, amount of first mortgage debt financing, amount of 4-percent LIHTC equity, and use of 9-percent LIHTC equity.

Projects with lower physical inspection scores are less likely to close in a timely manner. These projects may have more difficulty closing because of their greater physical deficiencies. Alternatively, they may take longer to close because they have more complications that must be addressed before the project can close or they require longer review times, among other reasons. Projects that are part of a portfolio application are also less likely to close in a reasonable time. This effect could reflect the added burden on a PHA of managing multiple transactions, causing the transactions to take more time to complete. The impact of PBV choice on project closing could mean that PBV contracts are easier to execute. Alternatively, in both cases some other factor related to these variables could have this effect.

Projects that use first mortgage debt financing had a reduced likelihood of completing closing within 22 months of our CHAP award cutoff date; moreover, the amount of debt per unit and as a percentage of total financing has a negative effect on timely project closing. In a similar way, projects that use more 4-percent LIHTC equity per unit and as a percentage of total financing have a reduced likelihood of completing closing in a timely manner. By contrast, projects that use 9-percent LIHTC equity financing are more likely to close within a reasonable time period, although the effect was not statistically significant for the dollar amount per unit or the percentage of total financing. We could not determine whether these effects are due to these particular financing strategies—both 4-percent and 9-percent LIHTC equity and mortgage debt transactions have long closing timelines—or to certain characteristics or complications of the projects that choose to pursue these strategies. One plausible explanation is that 9-percent LIHTC equity is more competitive than 4-percent LIHTC equity or mortgage financing, and it has more tightly managed deadlines than other financing sources. As a result, it tends to attract projects that are better qualified to meet its requirements at the same time that it provides the added discipline to ensure that projects adhere to the closing schedule. What matters is whether

[61] The LIHTC subsidizes either 30 or 70 percent of the low-income unit costs in a project. The 30-percent subsidy, or 4-percent tax credit, covers new construction, if additional subsidies are provided, or the acquisition cost of existing buildings. The 70-percent subsidy, or 9-percent tax credit, supports new construction without additional federal subsidies.

[62] The closed projects that were analyzed received their CHAP awards up to the cutoff date of December 31, 2013. Some projects took more than 22 months to complete conversion.

a project had any 9-percent LIHTC equity, not how much it has. By contrast, 4-percent LIHTC equity and mortgage debt finance are less competitive but still complicated. They have many layers of review and approval by multiple parties that can result in delays; moreover, these complications would seem to be related to the amount of financing provided by each. These two sources of financing also tend to have a more permissive schedule, in contrast to 9-percent LIHTC equity. Their looser timeline may inadvertently result in projects taking a longer time to complete the closing process if they use 4-percent LIHTC equity or mortgage debt finance.

Our analysis also explored whether use of financing varies by PHA size. Smaller PHAs account for the lowest portion of the total amount of financing raised by closed RAD transactions compared with their proportion of projects in the population of closed transactions. Large PHAs account for the largest portion of financing under RAD compared with their proportion of projects in the population of closed transactions. In addition, small and medium PHAs tend to use more 9-percent LIHTC financing rather than 4-percent LIHTC financing, in contrast with large PHAs. This tendency could be due to the fact that 9-percent LIHTC financing has a cap on the amount of credits per project and that it is much less competitive to obtain credits through the 4-percent LIHTC program. Because large PHAs tend to have very large projects, they may have no choice but to use the 4-percent LIHTC program more than the 9-percent LIHTC program and use more of other sources, such as grants, in addition to or in lieu of tax credits.

PBV contracts may have a shorter contract period than PBRA contracts, because they are automatically set at 15 years for the former and 20 years for the latter, with renewals. The actual term of both types of contracts, however, may be similar because the PHA, which issues the Housing Assistance Payment contract, can extend the initial term of a PBV contract to 20 years. To the extent that they have shorter time periods, the use of such PBV contracts would tend to reduce a project's **capacity** to carry debt. Our analysis of closed projects found that those converting to PBVs used slightly less first mortgage financing ***as a percentage*** of their total financing than did projects converting to PBRA, even though the ***dollar amount*** of first mortgage financing per project was higher for PBV conversions than for PBRA conversions. Conversion to PBV, however, does not appear to reduce a project's **access** to debt financing. The lenders we spoke with said that PBV contracts provide sufficient security to lend against, in spite of any out-year uncertainty. Our conclusion is that choosing PBV rather than PBRA does not appear to have an impact on access to credit and has an unclear impact on the amount of credit a project assumes.

Given the small size of our respondent sample, this report cannot be entirely conclusive about how a PHA's previous borrowing or tax credit experience impacted their ability to obtain external financing. It appears that mixed-finance housing experience is not a prerequisite for RAD conversions—because PHAs can get outside assistance—though it probably helps. As reported in subsequent chapters, PHAs frequently pointed to the need for technical assistance with these projects, including assistance with mixed-finance. In many cases, however, they were able to use outside consultants to advise them throughout the process of completing these transactions.

3.2. Capital Needs: Baseline Analysis

The Final Report will address questions related to the impact of RAD on projects' physical and financial condition. To analyze that impact, our research team will study the capital needs of our sample of 24 RAD projects before and after they completed rehabilitation under RAD, and compare that result with the before-and-after capital needs of our sample of 48 non-RAD projects over the same time period. To conduct this analysis, we need PCAs for the two samples at two points of time to be able to measure baseline capital needs (before RAD conversion) and post-implementation capital needs (after RAD projects have had sufficient time to complete any planned rehabilitation).

This section provides information on the baseline capital needs of our RAD and non-RAD sample of projects. PCAs estimate capital needs starting with the current year (the short term) and projecting out to year 20, taking into account the PHA's plan for meeting those needs over the period. Under the RAD program, PHAs are required to develop a conversion strategy that enables a project to address its short-term capital needs up front through rehabilitation or new construction. As part of the plan, PHAs also develop a strategy for financing development costs out of the PHA's internal resources and/or external resources such as debt, LIHTC equity, and grants. In addition, this plan must demonstrate that the project can meet its medium- and long-term capital needs over the next 20 years. To do so, the operating pro forma must show that the project generates sufficient income, net of operating expenses and any debt service, to fund project reserves sufficient to cover its projected capital needs. Outside of the RAD program, the PCA will reflect the PHA's capability and intention for meeting the project's short-term capital needs, using whatever resources the PHA has available, and will make corresponding projections of the project's long-term capital needs.

Table 13 provides information on the comparative capital needs of RAD and non-RAD projects, using recent PCAs. PCAs were available for all 24 of the projects in our RAD sample and for 38 of the projects in our non-RAD sample.[63] For those 62 projects, table 13 shows the average capital needs per unit for the RAD and non-RAD sample of projects. The table also provides the difference in means in the short term (year 1), medium term (years 2–5), long term (years 6–20), and total for all years. Capital needs in the out-years are adjusted for inflation. The last column is the *t*-statistic, which measures the statistical significance of this difference in means. Capital needs with a statistically significant difference in means are in **bold** text. A *t*-statistic greater than the absolute value of 1.96 or -1.96 means the statistical significance is at the 5-percent level of confidence or better, as highlighted in yellow.

Table 13. Comparison of Means on Baseline Capital Needs of 24 RAD Projects and 38 Non-RAD Projects in Our Sample, With *t*-Statistic

Average Capital Needs per Unit	RAD Sample	Non-RAD Sample	Difference	*t*-Statistic
Short term (year 1)	**$30,884**	**$866**	**$30,018**	**(3.6481)**
Medium term (years 2–5)	**$1,746**	**$6,348**	**($4,603)**	**4.7532**
Long term (years 6–20)	**$8,660**	**$42,919**	**($34,259)**	**5.2843**
Total (years 1–20)	$41,289	$50,133	($8,844)	0.8486

[63] From our sample, 10 non-RAD projects did not agree to having PCAs performed.

Average Capital Needs per Unit	RAD Sample	Non-RAD Sample	Difference	*t*-Statistic
Projects	24	38		

RAD = Rental Assistance Demonstration.
Sources: RAD Physical Condition Assessments (PCAs) from RAD applications for 24 RAD projects; PCAs recently prepared for 38 non-RAD projects

Although the non-RAD sample had higher average per-unit total capital needs than the RAD sample ($50,133 versus $41,289), this difference was not statistically significant. This analysis shows that RAD and non-RAD projects have similar capital needs overall. Their capital needs, however, differ significantly by time period. In particular, RAD projects have significantly greater short-term capital needs per unit (mean of $30,884) than non-RAD projects (mean of $866). In addition, RAD projects have significantly lower long-term capital needs per unit (mean of $8,660) than non-RAD projects (mean of $42,919). This result reflects the ability of PHAs to address more of a project's capital needs up front using resources made available through RAD, compared with other options the PHAs could use without RAD.

Another way of interpreting these findings is to say that by enabling projects to address their capital needs up front, RAD is expected to significantly reduce their capital needs over the long run if their conversion strategy is implemented according to plan, as reflected in the PCA. RAD projects are able to address 75 percent of their 20-year capital needs in the first year and the remaining 25 percent over the next 19 years. By contrast, non-RAD projects are able to meet only 2 percent of their 20-year capital needs in the first year, leaving the remaining 98 percent of their capital needs to be addressed in future years on average.

3.3. RAD Projects That Have Closed to Date

This analysis of the impact of RAD on the physical and financial condition of projects focuses on closed transactions. Through October 12, 2015, the RAD program reported closing 189 transactions, of which 185 transactions were for the conversion of public housing projects.[64] The following discussion analyzes the sources of capital used by these converted RAD projects, how much external capital they were able to leverage, what features of the RAD program accounted for the different financing sources they obtained, and how the projects' financing strategies affected the total amount of capital they were able to raise.

3.3.1. Sources and Uses of Capital

This section describes the sources and uses of capital by closed RAD projects. Table 14 shows the sources of financing for all 185 closed public housing transactions based on financial data provided by HUD's RAD program staff. This table includes two sets of figures. The first set shows the amount of financing by source as reported by HUD. The second set shows an adjusted amount of financing by source, which was derived by performing additional analysis of other

[64] October 12, 2015, was the last closing date for the projects included in this analysis. The earliest transaction to close did so on September 20, 2013. The other 4 closed projects were Section 8 moderate rehabilitation projects, which are not part of this evaluation.

sources.[65] This analysis identified additional funds borrowed from third parties; additional PHA resources not included in the amount reported by HUD; the amount of seller or take-back financing used to generate additional tax credit equity; and the remaining amount of other sources, which includes grants, deferred fees, project income during construction, and other contributions that would not fall into the preceding categories. Although we have had to make some estimates to assign amounts to these four categories, the adjusted amounts more accurately reflect how these 185 closed transactions financed their capital needs.

Of the $2,476 million in financing that these projects raised—

- The greatest portion—around $977 million—came from private investors in LIHTC equity (39.4 percent). This portion includes $502.9 million (20.3 percent) from 4-percent LIHTC investors and $473.8 million (19.1 percent) from 9-percent LIHTC investors.
- The second largest portion—around $686 million (27.6 percent)—came from "soft money" sources. Such sources include $398.8 million (16.1 percent) from seller or take-back financing and $287.2 million (11.6 percent) from other sources. Seller or take-back financing represents the as-is value of the property contributed by PHAs to the tax credit entity in LIHTC transactions.[66] Other sources consist of HOME, AHP, and other grants; deferred developer fees; and other types of "gap" financing."[67]
- The third largest portion—around $563.8 million (22.7 percent)—came from lenders. This portion includes $471.6 million (19.0 percent) for first mortgage financing and $92.3 million (3.7 percent) from other third-party debt. Other third-party debt consists of subordinate loans, infrastructure loans, construction loans, HOME loans, AHP loans, Choice Neighborhoods Implementation loans, and other loans.
- The smallest financing category—around $249.9 million (10.1 percent)—comes from the PHA's own resources. These resources include operating reserves, capital funds, Replacement Housing Factor funds, cash on hand, funds from operations, transfers from other RAD projects, and other funds.[68]

[65] Other sources include a wide variety of funding sources, including second mortgages, seller or take-back financing, unrestricted operating funds, cash on hand, HOME grants, AHP grants, HOME loans, deferred developer fees, transfers from other RAD projects, interest income, state tax credits, and others. We classified other third-party debt, other PHA resources, seller or take-back financing, and the remaining balance of other sources based on our review of memo notes in the HUD applications data for other sources.

[66] This type of financing is used to maximize tax credits. Because it does not represent funds provided by the PHA, it is not considered as part of PHA resources. In lieu of seller or take-back financing, the PHA would receive a distribution of cash, which would reduce the amount of funds available for other uses and in many cases could render the transaction infeasible.

[67] These sources are called gap financing because they fill the gap between a project's total financing need and the amount of debt a project can carry and/or the amount of equity it can raise.

[68] A portion of deferred developer fees could also come from the PHA, if the PHA is the developer or co-developer, but in our analysis all deferred developer fees are included under other sources.

Table 14. Sources of Financing for 185 Closed RAD Public Housing Transactions, Adjusted and Unadjusted Dollars

Sources of Financing	Unadjusted Amount ($)	Pct.	Adjusted Amount ($)	Pct.
Public housing resources	165,742,872	6.7	249,877,208	10.1
First mortgage debt	471,584,417	19.0	471,584,417	19.0
Other third-party debt	—	0.0	92,255,846	3.7
Seller or take-back financing	—	0.0	398,767,862	16.1
4% LIHTC equity	502,909,205	20.3	502,909,205	20.3
9% LIHTC equity	473,752,879	19.1	473,752,879	19.1
Other sources	862,388,810	34.8	$287,230,767	11.6
Total financing	**2,476,378,184**	**100.0**	**2,476,378,184**	**100.0**

LIHTC = low-income housing tax credit. RAD = Rental Assistance Demonstration.
Source: RAD program data

RAD has demonstrated its ability to generate debt financing, but not all RAD projects have used the program for this purpose. Although RAD enabled projects to raise about $472 million in first mortgage debt, almost one-half of the closed projects—86 (46 percent)—took out no first mortgage debt. Of the 99 closed projects that used first mortgage debt, 74 projects (75 percent) did not use FHA mortgage insurance, and 25 projects (25 percent) used FHA mortgage insurance. Most of this debt, $317.5 million (67 percent), was from conventional sources such as Fannie Mae and Freddie Mac, and $154.1 million (33 percent) was through FHA mortgage insurance (see table 15).

Table 15. First Mortgage Financing With and Without FHA Insurance for 185 Closed RAD Public Housing Projects and Units

First Mortgage Debt Financing	Projects		Converted Units		First Mortgage Debt	
	No.	Pct.	No.	Pct.	Amt. ($)	Pct.
No first mortgage	86	46	8,913	46	—	0
Conventional first mortgage	74	40	6,678	35	317,494,248	67
FHA-insured mortgage	25	14	3,664	19	154,090,169	33
Total	**185**	**100**	**19,255**	**100**	**471,584,417**	**100**

FHA = Federal Housing Administration. RAD = Rental Assistance Demonstration.
Source: RAD program data

A few projects (24, or 13 percent) took on third-party debt other than or in addition to first mortgage debt—about $92 million more, or less than 20 percent of the amount of first mortgage debt. Projects with first mortgage debt were more likely to borrow additional debt compared with projects that had no first mortgage debt. Of those projects that had no first mortgage debt, 5 projects (2.7 percent) assumed other third-party debt of $14.8 million, whereas 17 projects (9.2 percent) had both conventional first mortgage debt and other third-party debt of $63.1 million. Only two projects (1.1 percent) had an FHA-insured mortgage plus other third-party debt of $14.4 million (see table 16).

Table 16. First Mortgage Financing and Use of Other Third-Party Debt for 185 Closed RAD Public Housing Projects

First Mortgage Debt Financing	No Third-Party Debt		Third-Party Debt		
	Projects	Pct.	Projects	Pct.	Amt. ($)
No first mortgage	81	43.8	5	2.7	14,775,546

First Mortgage Debt Financing	No Third-Party Debt		Third-Party Debt		
	Projects	Pct.	Projects	Pct.	Amt. ($)
Conventional first mortgage	57	30.8	17	9.2	63,088,287
FHA-insured mortgage	23	12.4	2	1.1	14,392,013
Total	**161**	**87.0**	**24**	**13.0**	**92,255,846**

FHA = Federal Housing Administration. RAD = Rental Assistance Demonstration.
Source: RAD program data

How do these projects intend to use their financing? Table 17 shows the distribution of closed transactions by planned development scope, total financing, total construction costs, and ratio of financing to construction costs. About 18.4 percent (34) of these projects had no plans to use their financing to fund any rehabilitation or construction. As one would expect, the amount of financing they raised was small—$66.8 million, or 2.7 percent of total financing for all closed transactions. The other 151 projects planned to use the remaining 97.3 percent of total financing dollars to fund rehabilitation or new construction. They expected to spend about one-half of this amount (47 percent of $1.2 billion) on construction costs, giving them an average ratio of financing to construction costs of 2.11:1.[69]

Table 17. Planned Construction Costs and Financing Ratio for 185 Closed RAD Public Housing Projects by Development Scope

Development Scope	Number of Projects	Percentage of Projects	Total Financing ($)	Total Construction Costs ($)	Financing/ Construction Ratio
New construction	35	18.9	890,668,004	567,401,855	1.57
Rehabilitation[a]	116	62.7	1,518,853,494	604,798,249	2.51
No rehabilitation	34	18.4	66,856,686	—	n.d.
Total	**185**	**100.0**	**2,476,378,184**	**1,172,200,104**	**2.11**

n.d. = no data. RAD = Rental Assistance Demonstration.
[a] Includes substantial rehabilitation and also moderate to minimal rehabilitation.
Source: RAD program data

3.3.2. Leveraging External Private and Public Capital

How much external private and public capital did closed RAD projects succeed in leveraging? Leverage is a principal metric of the RAD program's success, because RAD is intended to enable PHAs to gain access to external sources of financing. The more external dollars raised for each dollar the PHA contributes to financing a project, the greater the leverage for the project. By this standard, the RAD program appears successful.[70]

For the closed RAD transactions in this study, PHAs contributed $250 million and raised an additional $2,227 million in external funds, for an overall adjusted leverage ratio of 8.91:1.[71]

[69] The average ratio of financing to construction costs is higher for rehabilitation (2.5:1) than new construction (1.57:1) because of the wide range of development scope in the definition of rehabilitation. Some of the rehabilitation projects had extremely low construction costs relative to the amount of financing they raised.
[70] Affordable housing finance consultants have advised that the leverage under RAD is higher than the leverage in other public housing redevelopment programs, such as the Capital Fund Financing Program and HOPE VI. In their view, these other programs have had leverage ratios below 3:1.
[71] The leverage ratio for the RAD program is calculated in the same way that HUD calculates the leverage for its other mixed-finance programs: (total financing resources–public housing resources)/public housing resources. In its

This ratio means that for every $1 invested by the PHAs in their RAD projects, private and public external sources invested $8.91.[72] Looking at the leverage for each capital source, for every $1 invested by the PHA, private investors put in $3.91 in federal tax credits ($1.90 for 9-percent LIHTC equity + $2.01 for 4-percent LIHTC equity), lenders provided $2.26 in debt ($1.89 in first mortgage debt and $0.37 in other third-party debt), and soft sources accounted for $2.75 in funding ($1.60 in seller or take-back financing and $1.15 from other sources, such as grants and deferrals of developer fees) (see table 18).

Table 18. Adjusted Leverage for 185 Closed RAD Public Housing Projects by Source of Financing

Capital Source	Adjusted Amount per $1 PHA Investment
First mortgage debt	1.89
Other debt	0.37
Seller or take-back financing	1.60
4% LIHTC equity	2.01
9% LIHTC equity	1.90
Other sources	1.15
Total leverage	**8.91**

LIHTC = low-income housing tax credit. RAD = Rental Assistance Demonstration.
Source: RAD program data

In typical financial analysis, leverage refers to the ratio of debt to equity. It measures the ability of investors to increase (or "leverage") their returns by borrowing. It also indicates the relative riskiness of a financing strategy, however, because higher leverage means a greater chance that investors could lose their equity if a project faces financial stress and cannot meet its debt-payment requirements.

All external financing sources used by PHAs in RAD projects have associated risks. The risk, however, varies by source.

- Mortgage debt has the greatest ***financial risk*** because it obligates the project to repay the debt (plus interest) according to a fixed repayment schedule or else face foreclosure. Lenders mitigate this risk by requiring projects to establish reserves for replacement, and operating and affordability reserves; conducting lender reviews and physical inspections; using DSC ratios that require 15-percent to 20-percent surplus of cashflow after payment of operating costs, debt service, and reserves and LTV ratios that ensure there is equity in

other mixed-finance programs, such as HOPE VI, HUD does not consider seller or take-back financing to be a PHA resource. If it were treated as a PHA resource, the leverage ratio for these 185 closed RAD public housing projects would be 2.6:1.

[72] Distinguishing between public and private sources in housing finance can be challenging, because many sources mix private and public components. For example, FHA-insured mortgages are issued by private lenders under the terms of a federal program. Borrowers pay for the cost of this program through mortgage insurance premiums. According to OMB (2014a), table 3, FHA's multifamily mortgage insurance programs have negative credit subsidy, which means they have no budgetary cost for the federal government, although the government provides a guarantee and therefore has a contingent liability.

the project; and requiring an operating deficit guaranty.[73] Depending on the financing source, there may be additional reviews by FHA, the limited partner investor, and the housing finance agency (HFA).

- Grants and other soft funds, such as those from the AHP, local government, and philanthropic organizations, all have conditions for funding and associated potential risks of not receiving the funds at all or having the funds recaptured if program rules are not observed. These ***compliance risks*** are mitigated by the requirement to maintain extensive documentation supporting the appropriate use of funds.
- LIHTCs have their own ***compliance risks,*** namely that the tax credits will be recaptured and canceled if the project does not comply with tenant household income requirements. The tax credit investor would have the most to lose if credits were lost or the property was poorly managed. As a result, investors typically require several guaranties from the developer and general partner, including tax credit delivery guaranty, construction completion guaranty, and operating deficit guaranty. As a result, the guarantor ends up bearing most of the risk. PHAs could serve as guarantors, but most do not have the financial qualifications and need outside developers to play this role. In addition, many investors and HFAs will require the designated management agent to have demonstrated tax credit management experience, which means the PHA will hire a management agent and gradually transition its own staff members into the management role as they receive training and experience.
- Seller or take-back financing is relatively ***low risk.*** It is typically paid out of cashflow, so repayment depends on having a reasonable budget and maintaining operating costs within expected ranges. PHAs typically view seller or take-back financing as a form of equity and will use the unpaid loan to help offset any payment due to the investor at the end of the tax credit compliance period. Because these loans support acquisition tax credits in rehabilitation projects, they receive close scrutiny from the HFA and the investor, and their respective counsel, to make sure that the transaction meets Internal Revenue Service requirements.

The adjusted leverage ratio of 8.91:1 is an average for all 185 closed public housing transactions. As shown in table 19, wide variation exists in leverage ratios for closed RAD projects. Of the closed projects, 62 (33.5 percent, or over one-third) had no leverage. All their financing came from internal sources or else they had no financing. These projects accounted for only $51.2 million (2.1 percent) of total financing. At the high end, 35 projects (18.9 percent) had a leverage ratio of more than 100:1. They accounted for $805.7 million (32.5 percent) of total financing. Many of the projects that achieved such high leverage ratios did so not because they raised more financing from external sources, but because they contributed little to no financing from internal PHA sources.[74]

[73] FHA's 221(d)(4) mortgage insurance program has a standard LTV of 83.3 percent. However, if a project receives 90 percent or greater project-based assistance, as with RAD projects, the program allows an LTV of 90 percent. Conventional mortgage loans have an LTV of 80 percent. An LTV of 80 percent equates to a debt/equity leverage ratio of 4:1, and an LTV of 90 percent equates to a debt/equity leverage ratio of 9:1.

[74] The RAD program does not require PHAs to contribute any of their own funds to meet the project's capital needs.

Table 19. Distribution of 185 Closed RAD Public Housing Projects and Financing by Adjusted Leverage Ratio

Adjusted Leverage Ratio Range	Projects		Total Financing	
	No.	Pct.	Amt. ($)	Pct.
0 (no leverage)	62	33.5	51,249,717	2.1
> 0 and < 10	50	27.0	904,214,026	36.5
≥ 10 and < 100	38	20.5	715,200,842	28.9
100	35	18.9	805,713,599	32.5
Total	**185**	**100.0**	**2,476,378,184**	**100.0**

RAD = Rental Assistance Demonstration.
Source: RAD program data

The amount of leverage a project uses depends on the development scope of the project. The greater the project development scope, the greater the amount of financing the PHA needs and the greater the amount of external financing the PHA will seek. At the same time, the greater the amount of capital that can be raised, the more extensive the renovations can be. New construction projects have the greatest financing needs per project. Such projects account for 35 of the 185 closed projects (18.9 percent) and have the highest adjusted average leverage ratio—19.21:1 overall. At the other extreme, projects involving no new construction or rehabilitation need the least amount of financing. These projects include those that are simply converting to Section 8, and have the lowest average adjusted leverage ratio—3.13:1. In between are projects that require minimal to substantial rehabilitation. They constitute the majority of closed transactions—116 out of 185 (62.7 percent)—and have an average adjusted leverage ratio of 7.01:1 (see table 20).

Table 20. Leverage Ratio for 185 Closed RAD Public Housing Projects by Development Scope

Development Scope	Number of Projects	Percentage of Projects	Public Housing Resources ($)	External Sources of Capital ($)	Adjusted Leverage Ratio
New construction	35	18.9	44,066,906	846,601,098	19.21
Rehabilitation[a]	116	62.7	189,637,148	1,329,216,346	7.01
No rehabilitation	34	18.4	16,173,154	50,683,532	3.13
Total	**185**	**100.0**	**249,877,208**	**2,226,500,976**	**8.91**

RAD = Rental Assistance Demonstration.
[a] Includes substantial rehabilitation and also moderate to minimal rehabilitation.
Source: RAD program data

The amount of leverage a project uses also appears to be affected by the previous physical condition of the project as reflected in its project performance rating. The leverage ratio increases slightly, from 7.61:1 to 8.37:1 and then to 9.73:1, as the quality of project performance increases from substandard to standard to high performance (see table 21).[75] This finding suggests that better performing projects may be able to obtain proportionately more external

[75] For a handful of projects (7, or 3.8 percent), information on project performance was not available.

sources of financing through RAD, although any advantage does not appear to be large, particularly in comparison with the project's planned development scope.

Table 21. Leverage Ratio for 185 Closed RAD Public Housing Projects by Project Performance Rating

Project Performance Ranking	Number of Projects	Percentage of Projects	Public Housing Resources ($)	External Sources of Capital ($)	Adjusted Leverage Ratio
High performance	74	40.0	99,369,544	966,850,634	9.73
Standard performance	95	51.4	121,899,531	1,020,326,375	8.37
Substandard performance	9	4.9	21,109,688	160,563,965	7.61
Unknown[a]	7	3.8	7,498,445	78,760,003	10.50
Total	**185**	**100.0**	**249,877,208**	**2,226,500,976**	**8.91**

RAD = Rental Assistance Demonstration.
[a] The project development code could not be matched with the inspection score.
Source: RAD program data

3.3.3. Factors That Attract External Financing Sources to RAD

For a project to achieve closing, the owner—the PHA and/or its development partners—has to line up all the capital providers in the project's financial plan. With the assistance of multiple legal counsels, the PHA will oversee the drawing up of the various closing documents and legal forms that define the transactions, including the debt agreements, HAP contract, property deeds, limited liability company or limited partnership documents, construction contracts, insurance agreement, and others, depending on the particular requirements of the transaction. Then all parties, including each financing source, will execute their respective agreements. At that point, funds will begin to be made available according to the agreed-upon development timeline, or on the spot for a simple refinancing.

What factors of the RAD program contributed to a PHA's success in getting all these financing sources to the table? The answer to this question is broken into two parts.

1. What RAD projects do not use a financing source?
2. For RAD projects that do use a financing source, does that use increase or decrease as the financing need of a project changes?

The reason for a PHA to use any financing source for a RAD project is because the project has a financing need, which is tautological but still an important point. At low levels of financial need, the PHA typically should be able to use its internal resources. As a project's financing need increases, however, one would expect the PHA to tap into those outside financial resources that are more easily attainable or more cheaply acquired. As financing need increases further, the PHA would have to bring in additional financial resources, even if doing so is more challenging, or else the project will fail to close because of insufficient funds.[76]

[76] Sufficiency of funds includes the ability to demonstrate that the project can meet its 20-year capital needs, as determined by the RAD PCA, through initial rehabilitation plus 20 years of project reserves.

Table 22 is complicated but shows a clear pattern. As the financing need of a RAD project increases—measured by the dollar amount of financing per converted unit—the relative use of each financing source changes. Moreover, this general pattern holds across most PHA size categories. Visual analysis of this table shows the following.

- Use of internal public housing sources is the most stable of financing sources as financing need changes. It has the lowest percentage of nonuse (16.2 percent of properties do not use any public housing resources), and most of it is used at less than $20,000 per unit (113 projects, or 61.1 percent). This finding suggests that PHAs rely on internal financing sources more often than external sources. In that sense, it is the basic source of financing for RAD projects. Even so, a large number of projects do not use it.
- The second-most stable source of financing comes from other sources, which include deferred developer fees and grants. Although gap financing is used less than public housing sources (87 projects, or 47.0 percent, used no other sources), like public housing, its use is greater at less than $20,000 per unit (63 projects, or 34.1 percent) than at more than $20,000 per unit (35 projects, or 18.92 percent). Gap financing fills the financing needs of projects at most levels.
- Most projects did not use any LIHTC equity financing—133 projects (71.9 percent) did not use 4-percent LIHTC equity, and 136 projects (73.5 percent) did not use 9-percent LIHTC equity. In addition, most projects did not use "other debt" (161 projects, or 87.0 percent) or seller or take-back financing (117 projects, or 63.2 percent). Moreover, for projects that did use this type of financing, most of it was concentrated in projects that used more than $20,000 per unit of such funding. This finding suggests that PHAs may turn to LIHTC equity, other debt, and seller or take-back financing (which is linked to LIHTC equity) when other sources are not sufficient to meet their total financing need.
- The use of first mortgage debt lies between the extremes of internal PHA funds and other sources, on the one hand, and tax credit equity and seller or take-back financing, on the other hand. Like LIHTC equity, first mortgage debt is used mostly at the higher levels of financing need—70 projects (37.84 percent) used more the $20,000 per unit of first mortgage debt. By contrast with LIHTC equity and seller or take-back financing, however, first mortgage debt is more commonly used. Only 86 projects (46.5 percent) did not use first mortgage debt.

These results provide additional insight into the earlier findings on what causes the leverage ratio to increase as the development scope increases from no development to new construction. Together, they suggest that the simplest RAD project, which converts public housing into project-based Section 8 housing, has minimal financial needs and the PHA will rely mostly on internal resources or will use no resources. Projects that involve modest rehabilitation have greater financial needs. To meet those needs, the PHA will still use internal resources but will also take on a first mortgage. If that is not sufficient, for instance, because the property hits its debt capacity limit given its Section 8 rents and projected expenses, the PHA will add other soft funding sources such as grants. As the developmental complexity of the project increases, the PHA will add tax credits and other debt to the other financing sources. The addition of each financing source introduces new sets of rules, new applications, different timeline requirements and due diligence requirements, and other complications that amplify the challenges to completing a conversion on time.

The particular requirements of each source will affect financing choices. For instance, because 9-percent LIHTC equity has a cap on the amount of credits per project, large PHAs, which tend to have larger projects, will have to use proportionately more 4-percent LIHTC credits. This cap may explain why more projects use first mortgage financing than LIHTC equity (99 projects with first mortgage debt versus 52 projects with 4-percent LIHTC equity and 49 projects with 9-percent LIHTC equity).[77] Those projects that use LIHTC equity, however, use a greater amount of LIHTC financing than mortgage financing ($103,214 per unit for 4-percent LIHTC equity and $120,917 per unit for 9-percent LIHTC equity financing, compared with only $66,812 per unit for first mortgage financing at the highest level of more than $20,000 per unit).

[77] As noted in chapters 5 and 6, PHAs have other reasons for not wanting to use tax credits, including concerns that they could lose control over their projects to the public-private partnership that will become the new owners, the possibility that the PHA will not be qualified to serve as the management agent for the project, and in general the greater complexity in project management and compliance with the terms of the financing.

Table 22. Use of Financing Source by Project for Closed Transactions Based on PHA Size and Amount of Financing per Unit per Financing Source

PHA Size	$0 Financing per Unit		$1 to $20,000 Financing per Unit			> $20,000 Financing per Unit		
	No.	Pct.	No.	Pct.	Average	No.	Pct.	Average
Public housing resources								
Small	3	1.6	28	15.1	5,942	1	0.54	29,039
Medium	17	9.2	62	33.5	6,277	21	11.35	41,858
Large	10	5.4	23	12.4	5,848	20	10.81	56,212
Total	**30**	**16.2**	**113**	**61.1**	**6,153**	**42**	**22.70**	**51,240**
First mortgage debt								
Small	22	11.9	7	3.8	9,882	3	1.62	28,274
Medium	51	27.6	17	9.2	8,048	32	17.30	64,126
Large	13	7.0	5	2.7	13,228	35	18.92	70,525
Total	**86**	**46.5**	**29**	**15.7**	**9,739**	**70**	**37.84**	**66,812**
Other third-party debt								
Small	30	16.2	0	0.0	0	2	1.08	91,347
Medium	91	49.2	4	2.2	3,796	5	2.70	72,225
Large	40	21.6	3	1.6	10,168	10	5.41	59,941
Total	**161**	**87.0**	**7**	**3.8**	**5,774**	**17**	**9.19**	**63,400**
Take-back financing								
Small	27	14.6	3	1.6	10,389	2	1.08	37,748
Medium	66	35.7	10	5.4	13,916	24	12.97	104,939
Large	24	13.0	4	2.2	11,349	25	13.51	54,615
Total	**117**	**63.2**	**17**	**9.2**	**12,096**	**51**	**27.57**	**72,962**
4% LIHTC equity								
Small	31	16.8	0	0.0	0	1	0.54	28,036
Medium	79	42.7	2	1.1	4,867	19	10.27	106,163
Large	23	12.4	0	0.0	0	30	16.22	104,096
Total	**133**	**71.9**	**2**	**1.1**	**4,867**	**50**	**27.03**	**103,214**
9% LIHTC equity								
Small	21	11.4	0	0.0	0	11	5.95	95,237
Medium	70	37.8	0	0.0	0	30	16.22	126,078
Large	45	24.3	0	0.0	0	8	4.32	135,578
Total	**136**	**73.5**	**0**	**0.0**	**0**	**49**	**26.49**	**120,917**
Other sources								
Small	17	9.2	11	5.9	4,168	4	2.16	28,373
Medium	51	27.6	31	16.8	5,067	18	9.73	52,697
Large	19	10.3	21	11.4	11,441	13	7.03	202,584
Total	**87**	**47.0**	**63**	**34.1**	**7,602**	**35**	**18.92**	**113,116**

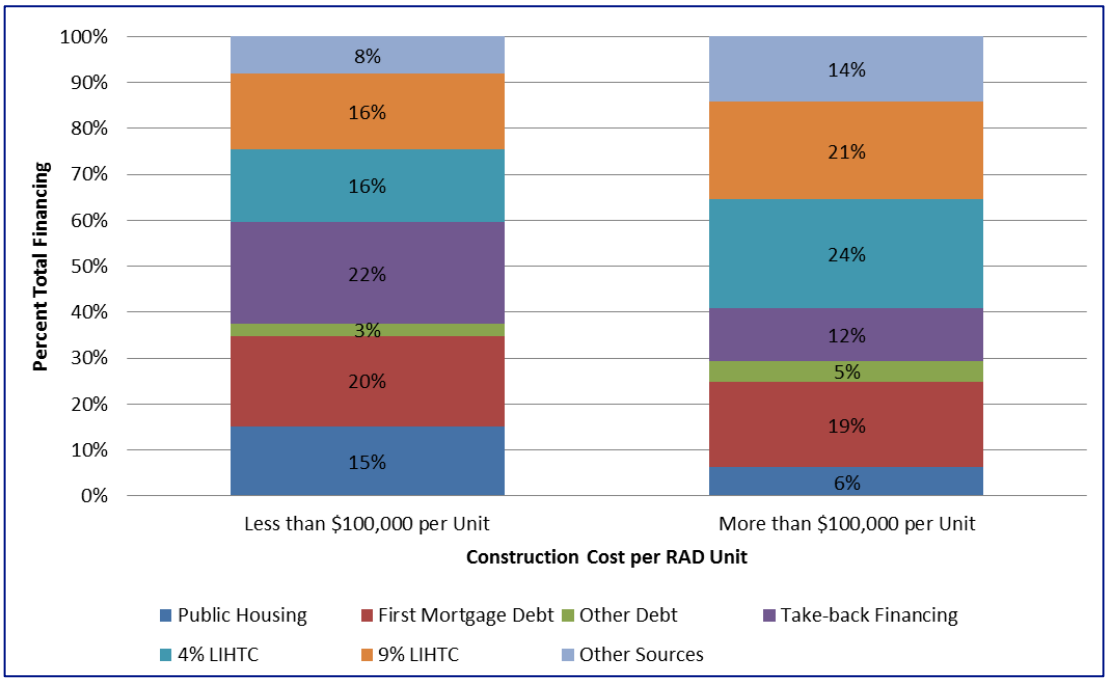
LIHTC = low-income housing tax credit. RAD = Rental Assistance Demonstration.

Notes: For each financing source, this table shows the number and percentage of projects by PHA size that do not use any funding from that source ($0 financing per unit), that use a little to a moderate amount of funding from that source ($1 to $20,000 financing per unit), or that use a moderate to a large amount of funding from that source (> $20,000 financing per unit). The percentages add down by PHA size and across by total, adding to 185 projects (100 percent) for each financing source. For example, looking at the first line for the first financing source, public housing, for small PHAs, 3 projects (1.6 percent) use no funding from that source, 28 projects (15.1 percent) use $1 to $20,000 per unit, and 1 project (0.54 percent) use more than $20,000 per unit. Five projects used no funding source.

Source: RAD program data

Figure 2 provides a second look at the data using per-unit construction costs and confirms these results. This chart divides the universe of 185 closed public housing projects into two groups: (1) projects with construction costs of less than $100,000 per unit and (2) projects with construction costs of more than $100,000 per unit.[78] The chart compares the percentage of total financing dollars accounted for by each financing source for these two groups. LIHTC equity financing is used proportionately more for higher cost projects (21 percent of 9-percent LIHTC and 24 percent of 4-percent LIHTC) compared with lower cost projects (16 percent for both 9-percent and 4-percent LIHTC). In a similar way, other sources of gap financing and other debt are used proportionately more for higher cost projects than for lower cost projects (14 percent versus 8 percent and 5 percent versus 3 percent, respectively). Public housing resources are used proportionately less for higher cost projects (6 percent) compared with lower cost projects (15 percent). Use of first mortgage debt is about the same between the two groups—19 percent for higher cost projects and 20 percent for lower cost projects. Seller or take-back financing appears to be an anomaly. Its relative use is greater for lower cost projects (22 percent for projects costing less than $100,000 per unit) than for higher cost projects (12 percent for projects costing more than $100,000 per unit). This result could be due to the fact that seller or take-back financing is based on the as-is value of the property, which may be negatively correlated with the cost of rehabilitating or replacing the property.

Figure 2. Percentage of Financing Source for Closed Transactions by per-Unit Construction Cost



LIHTC = low-income housing tax credit. RAD = Rental Assistance Demonstration.
Source: RAD program data

[78] For all closed projects, the average construction cost per unit is $60,878. Using this value as the breakpoint gives a lopsided allocation of total financing—18 percent below $60,000 per unit and 82 percent above $60,000 per unit. Using $100,000 per-unit construction cost as the breakpoint gives a more balanced allocation of total financing resources—43 percent below $100,000 and 57 percent above $100,000. In both cases, the pattern of use by financing source is the same.

3.3.4. Effect of Financing Strategies on Project Closing

As seen in the preceding discussion, PHAs are driven to employ different strategies for financing their RAD projects using varying combinations of internal and external financing sources in response to the overall needs of their projects. As these needs increase, the complexity of PHAs' mixed-finance strategies increases as well. This section examines whether the pursuit of different financing strategies is correlated with the likelihood that a RAD project will reach closing within a reasonable amount of time.

HUD provides different closing timelines for RAD projects depending on their financing strategies, in recognition of the different time requirements and complexities of each approach.

- For nonfinancing and mortgage loan-only transactions, PHAs have 180 days to submit their Financing Plans. Adding in the time for HUD to review the plan and issue the RAD Conversion Commitment, and for the PHA and other parties to complete preparation of the closing documents, most nonfinancing and mortgage loan-only transactions should be able to close within 1 year.
- For 4-percent LIHTC transactions, HUD provides 180 days for the PHA to submit the tax credit application and completed PCA to the HFA. The HFA will take several months to approve the application (which could involve more than one HFA if the tax credit application includes a bond application). The PHA then has 90 days from the award of tax credits to submit a Financing Plan to HUD. Adding in time for HUD to review and issue an RCC, and for all parties to prepare closing documents, a 4-percent LIHTC transaction could take more than 1½ years to close.[79]
- For 9-percent LIHTC transactions, PHAs need to file the application in the first competitive round more than 90 days after award of the CHAP. Depending on when the CHAP is awarded relative to the submittal date, some 9-percent LIHTC applications may not need to be submitted for up to a year. Adding in time for HUD to review and issue an RCC, and for all parties to prepare closing documents, a 9-percent LIHTC transaction could take more than 2 years to close.
- FHA mortgage loan insurance would add another layer of complexity and additional time for review and approval if it were used in any of these transactions.

One would expect some correlation between financing strategy and project closing, given the different closing timelines for different financing strategies. Do other factors, such as characteristics of the PHA, the project, or the community where the project is located, also affect time to close for RAD projects?

To answer this research question, our team used two analyses to determine factors that could influence the timely closing of RAD transactions. The first analysis compared closed RAD projects with nonclosed RAD projects along multiple variables, which are discussed further in this section. The second analysis used a logit regression for the same study population and a

[79] This conclusion assumes that the housing finance agency (HFA) accepts 4-percent LIHTC applications throughout the year. In some cases, HFAs have short windows for application submittal, which lengthens the timeline, similar to that of 9-percent LIHTC transactions.

shortened list of study variables due to collinearity. The study population was limited to 278 RAD projects that had received an approved CHAP by the end of 2013, which is about 22 months before the cutoff date used to define this population. This time period was expected to provide sufficient time for most projects to close, even projects that used the most complicated financial strategies with the longest closing timeline. Our study population consisted of 130 RAD projects that had closed by October 2015 and 148 RAD projects that had not closed by that date. Projects that had received CHAP awards after December 2013 (the cap was lifted in February 2015) but that had closed by October 2015 were not included. We narrowed the analytical population to our study cohort to give our population of CHAPs sufficient time to close.[80]

Our population of 278 projects included 130 projects that had closed by October 2015 and 148 projects that had not closed (that is, remained active CHAPs [115 projects] or had been withdrawn or had their CHAPs revoked [33 projects]), based on HUD records.

The analysis considered four types of factors, or variables, that could affect project closing for RAD: (1) the size of the PHA; (2) the characteristics of the project and its tenants; (3) the socioeconomic condition of the neighborhood in which the project is located; and (4) the type and development scope of the RAD project, including the project's proposed financing plan. In total, the analysis considered 31 variables across all four factor types.[81]

To measure the size of the PHA, the analysis considered three variables as defined by HUD.

1. **Large PHAs.** Includes large and very large PHAs, or PHAs with more than 1,250 units.
2. **Medium PHAs.** Includes high- and low-medium PHAs, or PHAs with 250–1,249 units.
3. **Small PHAs.** Includes small and very small PHAs, or PHAs with fewer than 250 units.

PHA size could affect the probability that a RAD project will close on time if it represents an approximate measure of the relevant background and experience of PHAs with closing mixed-finance transactions. PHAs play a critical role in managing their projects through the closing process. Their experience and skills in doing so are likely to affect the relative success of the closing process, including success at meeting closing milestones and deadlines. One would expect larger PHAs to have more mixed-finance experience and therefore to be more capable in seeing their project through a RAD closing in less time. On the other hand, larger PHAs tend to have larger projects, which could be more complicated to finance and therefore have more difficulties with timely closing.

As discussed in chapters 5 and 6, PHAs take into account project characteristics at various stages of the RAD program. These characteristics could influence a PHA's priorities for ensuring that

[80] Our data do not measure absolute failure to close; at best, the data can capture only the relative probability of a project closing or not closing within a reasonable amount of time. The 185 projects that had closed by the middle of October 2015 took an average of five quarters to do so.

[81] Several of these variables were also used in our sampling and genetic matching methodology mentioned in chapter 1, in our analysis of the factors involved in PHA participation and project selection for RAD in chapter 4, and in our analysis of the factors affecting a project to drop out of RAD in chapter 5.

the project achieves timely closing. They could also affect the motivation of other parties to the transaction, such as outside lenders and the providers of tax credit equity. To measure characteristics of the project that could affect the PHA's motivation to close on its RAD projects more timely, or the involvement of other parties to the transaction, such as lenders and state agencies, the analysis considered several project-related variables.

- **Project inspection score** (ranging from 1 to 100 points, in which a higher score indicates a higher level of quality in the physical condition of the project), which correlates with the physical condition of the project, using the Real Estate Assessment Center inspection score. This variable could indicate a project's relative capital needs. PHAs could consider projects with lower scores to be higher priorities, making the PHA more motivated to convert to RAD more quickly. A low inspection score, however, could also indicate that a project has performance problems, making it more difficult for the PHA to get the approvals of lenders and others needed to close in a timely fashion.
- **Project expenses total and per unit** for each project in annual dollars based on HUD Office of Public and Indian Housing Information Center data from HUD and using the number of Annual Contributions Contract (ACC) units in the denominator for the per-unit calculation. The higher a project's expenses per unit, the greater the advantage to the PHA from using RAD to reduce operating costs and reallocate project resources to improving and preserving the property. Hence, PHAs should be more motivated to close more timely on projects with higher total and per-unit costs.
- **Project size,** based on the number of ACC units in the project, using HUD PIC extract data from July 2014. This variable would tend to affect the total amount of financing a project would require. Projects that are too small may have trouble closing because of lack of lender interest, whereas projects that are too large may have trouble closing because of lenders' greater scrutiny of large loans or state agency caps on tax credit equity under the 9-percent LIHTC program.
- **Project bedroom mix,** based on the percentage of units in a project with one or two bedrooms, using HUD PIC extract data from July 2014. Projects with fewer one- or two-bedroom units have more large units to serve larger families. Because the housing needs of large families tend to be relatively underserved in most housing markets, PHAs could be more interested in preserving these types of projects through RAD and therefore more motivated to close on these projects more quickly.
- **Project tenants' median household income,** as measured by the median income of households residing in a project, using HUD PIC extract data from July 2014. Higher-income households can contribute more in rent; they also might have more stable employment and tenure, and they might be more apt to live in projects that are in better physical condition. Projects with higher and more predictable rents under RAD that are in better condition could be easier for lenders to underwrite and approve. Therefore, projects with higher median household income could close more timely.
- **Percentage of elderly households,** as measured by the percentage of units occupied by tenant households composed of one or more elderly people based on HUD PIC extract data from July 2014. Elderly units are defined as those occupied by people 62 years of age or older at the time of initial occupancy. Elderly households could have more stable

income through social security, making a project easier for lenders to underwrite and approve. PHAs also might consider projects with a large number of elderly residents to be a higher priority because they serve residents with accessibility issues and social service needs. These factors could make a project with more elderly households more likely to close more timely under RAD.

In our interviews with PHAs (see chapters 5 and 6), several PHAs discussed the possible impact of area and neighborhood conditions on properties converting to RAD. If certain area and neighborhood conditions are expected to impact a project's performance under RAD, then projects in those areas or neighborhoods could elicit more lender and investor due diligence, which could prolong the closing process. In addition, most PHAs that are using RAD see it as an important tool for preserving affordable housing. They might be more motivated to achieve timely closing on RAD projects that serve areas demonstrating a greater housing need. To capture the possible effect of local socioeconomic conditions on the timely closing of RAD projects, our analysis looked at four variables.

1. **Metropolitan area**, a binary variable indicating whether or not the project is located in a metropolitan area[82] This variable correlates with urban and nonurban communities. If projects in nonurban communities are less attractive to lenders and HFAs, as some PHAs have argued, does being in a nonurban area impede the timely progress of the project through the closing process?
2. **Poverty rate** of the census tract in which the project is located, as measured by the percentage of households in the census tract that fall below the federal poverty level, from the American Community Survey 2012 5-year estimates. Neighborhoods with higher poverty rates may have fewer amenities, more social problems, and lower rents, leading lenders and state agencies to take more time to review and approve these projects, and lengthening the closing process.
3. **Cost-burden rate** of the census tract in which the project is located, as measured by the percentage of households in the census tract with housing costs (rent plus utilities) greater than 35 percent of their income, from the ACS 2012 5-year estimates. A high cost-burden rate tends to indicate greater need for affordable housing. PHAs may place higher priority on the timely closing of projects when affordable housing preservation is more urgent, and lenders may take less time to review and approve these projects.
4. **Overcrowding rate** of the census tract in which the project is located, as measured by the percentage of households in the census tract living in overcrowded housing (defined as housing with more than one occupant per room), from the ACS 2012 5-year estimates.

[82] This variable follows the OMB definition of metropolitan and micropolitan statistical areas for use by federal agencies in collecting, tabulating, and publishing federal statistics. *Core Based Statistical Area* (CBSA) is a collective term for both metropolitan and micropolitan statistical areas. A metropolitan statistical area contains a core urban area of 50,000 or more population, and a micropolitan statistical area contains an urban core of at least 10,000 (but less than 50,000) population. Each CBSA consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core. For our analysis, nonmetropolitan areas consist of micropolitan statistical areas and non-CBSAs.

Like a high cost-burden rate, a high rate of overcrowding in a neighborhood indicates greater need for affordable housing, which could make these projects a higher priority for timely closing for PHAs and take less time for lenders to review and approve.

In addition to the preceding factors, a PHA's development and conversion plan could have an effect on the likelihood that a project would close in a timely fashion. Smaller and less complicated development plans should be easier to execute and therefore should be able to close more timely than larger and more complicated plans. Also, the fewer RAD conversions PHAs are managing, the more quickly they should be able to close. We looked at the following elements of a project's development and conversion plan to assess their impact on the probability of a project closing in a timely manner.

- **Construction costs per unit** is an estimate of the dollar amount of proposed rehabilitation or new construction proposed ("hard" construction costs) under RAD per ACC unit. As such, it indicates the relative scope of proposed development. Projects with higher per-unit construction costs will have a greater development scope. One would expect these types of projects to require a greater degree of review and approval, which could add to the closing timeline.
- **Multiphase** or not is a binary variable that shows whether the project is being subdivided into more than one development phase. Multiphase projects are more complicated than single-phase projects and should be more difficult to close in a timely manner.
- **Portfolio application** is a binary variable that indicates whether a project is one of multiple projects a PHA is proposing for RAD conversion (that is, part of a portfolio application), or is the PHA's only RAD project. Being part of a portfolio application could delay the closing of a project because of the greater burden on the PHA to manage multiple projects through the conversion process.
- **PBV or PBRA** contract under RAD is a binary variable that indicates whether the project is converting to a PBV type of HAP contract or a PBRA type of HAP contract. Because PBV contracts are financially more beneficial for PHAs compared with PBRA contracts, PHAs might be more motivated to close timely on projects converting to PBV contracts than PBRA contracts.

Finally, this analysis considered the possible impact of a project's **proposed financing plan** on the timeliness of closing, where the financing plan is represented by the sources and amounts of proposed project financing from each project's RAD application, including **public housing** sources (**operating reserves, capital funds,** and **RHF funds/Demolition and Disposition Transitional Funding [DDTF]**), **first mortgage debt, 9 percent LIHTC equity, 4 percent LIHTC equity, other sources of financing,** and **total financing.** We looked at various measures for expressing the use of each financing source, including **total dollar amount, dollar amount per ACC unit,** amount for each source as a **percentage of total financing,** and several **binary variables** indicating whether a project used a financing source (value = 1) or not (value = 0).

A priori, we would expect a project to experience a greater risk of not closing on time depending on its use of **external** financing sources, including first mortgage debt, 9-percent LIHTC equity, 4-percent LIHTC equity, and other sources of financing, compared with public housing sources, including operating reserves, capital funds, and RHF/DDTF funds. The more dependent a project

is on outside sources of financing, the more likely the project will be delayed because of the need for review and approval by outside parties. Conversely, PHAs will have fewer constraints if the project is financed with internal funds and should be able to close more quickly.

Our approach used two standard statistical techniques for estimating nonrandom relationships between one or more variables: (1) comparison of means with hypothesis testing and (2) logit regression. The main advantage of comparison of means is that it presents clear and simple results. Table 23 presents the means for several nonfinancing and financing variables for both the 130 projects that closed and the 148 projects that did not close, along with the *t*-statistics to estimate the statistical significance of their differences (closed minus not-closed). This list of variables includes 14 PHA, project, and neighborhood variables and 4 RAD conversion plan variables. It also includes 3 sets of 9 financing variables (one variable for each financing source): (1) dollar amount of financing per project by source, (2) dollar amount of financing per unit by source, and (3) percentage of total financing by source. We used the standard *t*-statistic for testing the statistical significance of the difference in means. If the *t*-statistic is greater than the absolute value of 1.96 or -1.96, then one can conclude that the difference in means is statistically significant at the 5-percent level of confidence, which is shown by yellow highlighting. If a variable is statistically significant for the comparison of means and the logit regressions, discussed in the next paragraph, the text is in **bold**.

Table 23. Comparison of Means of Multiple Variables for RAD Projects That Closed or Did Not Close, With *t*-Statistics

Financing and Nonfinancing Variables	Closed RAD Projects	RAD Projects That Did Not Close	Comparison of Means *t*-Statistic
Large PHA	22%	32%	– 1.90
Medium PHA	58%	50%	1.28
Small PHA	20%	18%	0.52
Project inspection score	**87.9**	**81.2**	**4.67**
Project expenses	$953,134	$1,206,652	– 1.84
Project expenses per unit	$6,121	$5,928	0.53
Project tenants' median household income	$10,884.02	$9,817.59	2.50
Project tenants' % elderly households	27.10%	24.80%	0.01
Project units covered by ACC	162	206	– 2.15
Project % one- or two-bedroom units	61.50%	58.90%	0.87
Project is in a metropolitan area	76.90%	80.80%	– 0.79
Neighborhood poverty rate	29.20%	30.70%	– 0.01
Neighborhood cost-burden rate	45.00%	43.40%	0.01
Neighborhood overcrowding rate	3.80%	4.40%	– 0.93
RAD construction costs per unit	$39,778	$51,751	– 1.38
Part of a RAD portfolio application	**22.30%**	**40.50%**	**– 3.34**
Part of a RAD multiphase application	3.10%	4.10%	– 0.44
PBV or PBRA contract	**52.30%**	**33.10%**	**3.27**
Operating reserves per project	$395,641	$256,587	1.92
Capital funds per project	$399,583	$288,866	1.01
RHF funds per project	$94,456	$54,612	1.13
Public housing funds per project	$889,680	$596,012	1.99
First mortgage debt per project	$2,229,210	$3,656,501	– 2.40
9% LIHTC equity per project	$2,559,447	$938,081	3.31

Financing and Nonfinancing Variables	Closed RAD Projects	RAD Projects That Did Not Close	Comparison of Means *t*-Statistic
4% LIHTC equity per project	$1,562,398	$3,017,615	– 2.44
Other sources per project	$3,169,306	$1,886,635	1.95
Total financing per project	$10,411,454	$10,030,662	0.22
Operating reserves per unit	$2,803	$1,661	2.38
Capital funds per unit	$2,340	$1,498	1.60
RHF funds per unit	$686	$309	1.69
Public housing funds per unit	$5,829	$3,444	2.93
First mortgage debt per unit	$15,811	$19,244	– 0.87
9% LIHTC equity per unit	$16,469	$6,430	2.88
4% LIHTC equity per unit	$10,238	$16,025	– 1.55
Other sources per unit	$22,747	$11,106	2.47
Total financing per unit	$71,100	$55,889	1.38
% public housing funds	37%	27%	2.06
% first mortgage debt	**14%**	**33%**	**– 6.39**
% 9% LIHTC equity	15%	7%	2.99
% 4% LIHTC equity	**6%**	**18%**	**– 5.84**
% other sources	24%	15%	2.99
Number of projects (total = 278)	**130**	**148**	

ACC = Annual Contributions Contract. LIHTC = low-income housing tax credit. PBRA = project-based rental assistance. PBV = project-based voucher. PHA = public housing authority. RAD = Rental Assistance Demonstration. RHF = Replacement Housing Factor.
Notes: Yellow highlighting for the *t*-statistic indicates statistical significance at the 5-percent confidence level. **Bold** text indicates variable is statistically significant for both the comparison of means and logit regression. Number of projects for comparison of means: total = 278; closed = 130; not closed = 148. Some variables had 1 or 2 fewer observations due to missing data.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center database; RAD program; American Community Survey.

The difference in means between the closed and not-closed RAD projects was statistically significant for a few of the project variables—namely, project inspection score, project tenants' median household income, and project units covered by an ACC—but for none of the PHA size or neighborhood characteristics variables. The difference in means was statistically significant for many of the RAD conversion and financing plan variables, including RAD portfolio application and PBV or PBRA, and most of the financing source variables, including public housing funds (per project, per unit, and percent), first mortgage debt (per project and percent), 9-percent LIHTC equity (per project, per unit, and percent), 4-percent LIHTC equity (per project, per unit, and percent), and other sources (per unit and percent).

The comparison of means approach does not isolate the effect of one variable from other variables and does not measure the magnitude of the effect, only its direction. Therefore, we also used a logit regression model to analyze the factors that influence RAD project closing, and the z-value, which is similar to the *t*-statistic, to estimate statistical significance.[83] The independent variables in the logit model are mostly the same variables used in the comparison of means analysis. Due to collinearity, however, we could not include all financing variables. In addition,

[83] Using logit regression coefficients to estimate the magnitude of the impact of an independent variable on a dependent variable is not as straightforward as it is with linear regression coefficients.

we performed separate regressions on different subsets of the financing variables, including one regression for the dollar amount of financing per unit by source, a second regression for the percentage of total financing by source, and a third regression for the binary variables measuring whether any financing was used by source.

Table 24 presents the results of these three logit regressions estimating the effect of various factors on the probability that a RAD project will close within a reasonable period of time. It shows the estimated coefficient and corresponding *z*-value for each variable included in the regression.[84] The first regression uses three financing variables measured on a dollars-per-unit basis; it does not include other sources, capital funds, operating reserves, or RHF funds due to collinearity issues. The second regression uses four financing variables for the percentage of total financing; it does not include capital funds, operating reserves, or RHF funds due to collinearity issues. The third regression uses binary variables for whether a financing source is used (yes = 1) or not (no = 0); it does not include other sources due to collinearity issues. The table also shows the *z*-values for each variable in each regression. If the *z*-value is greater than the absolute value of 1.96 or -1.96, then one can conclude that the regression coefficient for that variable is statistically significant at the 5-percent level of confidence, which is shown by yellow highlighting. The text is in **bold** if the variable is statistically significant for all regressions and the comparison of means.

[84] The coefficients in logit regressions can be used to estimate the magnitude of a change in a dependent variable from a change in independent variables; however, unlike in linear regressions, the process of quantifying the change is not straightforward. The sign of the coefficient in a logit regression does clearly indicate the direction of the impact. A positive coefficient indicates that the independent and dependent variables move in the same direction (both move up or down), whereas a negative coefficient indicates that the independent and dependent variables move in the opposite direction.

Table 24. Logit Regressions for RAD Projects That Closed (130) or Did Not Close (145)

Variables	Regression 1: Financing Variables in Dollars per Unit		Regression 2: Financing Variables in Percentage of Total Financing		Regression 3: Binary Financing Variables (With = 1, Without = 0)	
	Estimated Coefficient	*z*-Value	Estimated Coefficient	*z*-Value	Estimated Coefficient	*z*-Value
Nonfinancing variables						
Large PHA	0.19820	0.34	0.75506	1.18	0.80800	1.29
Medium PHA	0.04589	0.11	0.17064	0.38	0.26555	0.59
Small PHA[a]	*	*	*	*	*	*
Project inspection score	**0.05183**	**3.18**	**0.03945**	**2.37**	**0.04192**	**2.47**
Project tenants' median household income	0.00006	1.03	0.00003	0.53	0.00005	0.96
Project tenants' % elderly households	0.01201	1.43	0.01279	1.46	0.01299	1.59
Project is in a metropolitan area	– 0.10324	– 0.26	0.14401	0.33	0.19984	0.48
Project units covered by ACC	0.00054	0.55	0.00123	1.07	0.00072	0.65
Project % one- or two-bedroom units	0.41101	0.58	0.37615	0.51	0.67957	0.94
Neighborhood poverty rate	0.00451	0.35	– 0.00866	– 0.63	– 0.00513	– 0.39
Neighborhood cost-burden rate	0.01678	1.20	0.02332	1.54	0.02110	1.46
Neighborhood overcrowding rate	– 4.20486	– 1.19	– 3.94817	– 1.09	– 5.13161	– 1.58
Part of a RAD portfolio application	**– 1.60488**	**– 3.91**	**– 1.73745**	**– 3.99**	**– 1.74324**	**– 4.10**
Part of a RAD multiphase application	0.28889	0.31	0.88727	0.90	0.39962	0.44
PBV or PBRA contract	**1.20213**	**3.55**	**1.38491**	**3.74**	**1.37201**	**3.80**
RAD construction costs per unit	– 0.000004	– 1.23	– 0.00001	– 1.63	– 0.000002	– 1.44
Project expenses per unit	0.00006	0.89	0.00008	0.84	– 0.00004	1.22
Total financing (all sources) per unit	0.00004	4.06	0.00001	2.83	0.00007	2.81
Financing variables						
4% LIHTC equity	– 0.00008	– 4.19	– 4.73373	– 3.50	– 0.89241	– 1.81
9% LIHTC equity	– 0.00002	– 1.74	0.95248	1.05	1.72428	3.04
First mortgage debt	**– 0.00004**	**– 3.21**	**– 2.66751**	**– 3.80**	**– 0.90682**	**– 2.31**
Other sources	*	*	—	1.30	*	*
Capital funds	*	*	*	*	0.22924	0.64
Operating reserves	*	*	*	*	0.63087	1.63
RHF funds	*	*	*	*	0.13892	0.30
Number of projects or observations	**275**		**275**		**275**	

ACC = Annual Contributions Contract. LIHTC = low-income housing tax credit. PBRA = project-based rental assistance. PBV = project-based voucher. PHA = public housing authority. RAD = Rental Assistance Demonstration. RHF = Replacement Housing Factor.

[a] Used as a base in the logit regression.

* Variable omitted from model.

Notes: Yellow highlighting for *z*-value indicates statistical significance at the 5-percent confidence level. Number of projects for logit regression: total = 275; closed = 130; not closed = 145. **Bold** text indicates the variable was statistically significant for all regressions and the comparison of means. The logit regression has three fewer projects that had not closed due to missing data in one or more variables. Several variables were not included in the logit regression due to multicollinearity problems (financing sources by dollar amount) or their use as a base variable (for example, small PHA).

Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center database; RAD program; American Community Survey.

Considering both the differences in means and the logit regression results, our analysis found the following effects on the likelihood that a project would close.

- The size of a PHA appears to have no consistent impact on the likelihood that a project will close within a reasonable period of time.
- Project tenants' median household income and the number of ACC units in a project were statistically significant in the comparison of means but not in the logit regression, possibly because they are correlated with other variables in the regression. They are considered not to be significant in our analysis.
- The physical condition of a project, as measured by its inspection score, affects the likelihood that a project would be able to close in a timely manner; it was statistically significant in the comparison of means and in the logit regressions. In particular, the lower a project's inspection score, the less likely it is to close on time. Conversely, projects with higher inspection scores are more likely to close on time.
- No other characteristics of the project, tenants, or neighborhood were found to have a statistically significant impact on the likelihood that a project will close in a reasonable amount of time. These characteristics included project expenses, percentage of elderly households, bedroom size mix, being located in a metropolitan area, or neighborhood levels of poverty, housing cost burden, or overcrowding.
- Several aspects of a project's proposed financing and conversion strategy were found to have statistically significant effects on the likelihood that the project would be able to close in a timely manner. The total amount of financing per unit that a project uses increases the likelihood that a project will close in a reasonable amount of time, although this effect was not statistically significant in the comparison of means test. This result could be because projects with more total financing needs per unit are able to afford more support through the closing process or are given greater priority by the PHA or other parties, or for some other reason.
- Projects that plan to use more 4-percent LIHTC equity financing and first mortgage debt per unit or as a percentage of total planned financing are less likely to close on time. The effect of planned 4-percent LIHTC equity and first mortgage debt financing was confirmed in both the comparison of means and the logit regression analyses. This effect was statistically significant with the binary variable for first mortgage debt but not for 4-percent LIHTC equity, meaning the impact exists regardless of how much debt is assumed. For 4-percent LIHTC equity, however, the amount of the financing is what is driving the impact. The complexity of both of these two sources, which have multiple layers of review and approval, could account for this result. Because 4-percent LIHTC equity is a noncompetitive program, there is little impact from simply being selected.
- By contrast, projects that use any 9-percent LIHTC equity are more likely to close on time, although the amount of 9-percent LIHTC equity they use has no impact. Because 9-percent LIHTC equity is awarded competitively, it is possible that PHAs apply for it and HFAs award it only in those cases in which the project has a high probability of succeeding. In other words, the selectiveness of the program is causing this result. What matters is being selected, not how much is awarded. Also, because 9-percent LIHTC

equity programs tend to have tight closing schedules, these program dynamics could be increasing the likelihood that projects receiving this type of financing will close on time.

- The use of other types of planned funding, including public housing resources and other sources (which include grants, soft loans, and developer fees), does not appear to have a consistent effect on the likelihood that a project would close on time. Although our comparison of means analysis showed that these types of funding had a positive effect in increasing the probability of timely closing, that effect was not confirmed in the logit regression analysis, possibly due to multicollinearity with the other financing variables, which caused them to be dropped from the analysis.
- Two other aspects of a RAD conversion plan have a significant effect on timely closing. Projects that are part of a portfolio application and projects that the PHA intends to convert to PBRA contracts are less likely to close in a timely manner. Portfolio applications entail a PHA managing more than one project through the RAD program. This extra management burden could be causing these projects to be delayed. The role of PBRA contracts in contributing to delays in closing will be further investigated in the next phase of our study.
- None of the other financing and conversion strategy variables—whether the project is multiphase or the cost of construction for the project—had a statistically significant effect on the likelihood that a project would close on time.

In summary, comparing projects that had closed with those that had not closed, there is a clear difference in the likelihood that a project will complete closing within a 22-month or greater timeframe depending on its physical condition score, whether it is part of a portfolio application, whether it uses a PBV or PBRA contract, how much first mortgage debt financing or 4-percent LIHTC equity it plans to use, and whether any 9-percent LIHTC equity is being provided.

Projects with lower physical inspection scores have greater physical deficiencies. They may have more difficulty closing or may take longer to close because they have more complications that have to be addressed before the project can close or they require longer review times, among other reasons. Projects that are part of a portfolio application have reduced probability of closing on time. This effect could reflect the added burden on a PHA of managing multiple transactions, causing the transactions to take more time to complete. The positive impact of PBV choice on increasing the likelihood that a project would close on time could mean that PBV contracts are easier to execute.

Projects that plan to use either first mortgage debt financing or 4-percent LIHTC equity had a reduced likelihood of completing closing during this time period, whereas 9-percent LIHTC equity increased the likelihood of completing closing with no effect from the amount of such financing. Proposed use of either first mortgage debt financing or 4-percent LIHTC equity has two possible effects: (1) it increases the time it takes for a project to close and/or (2) it increases the chance that a project will not close. The complex requirements for each financing source could explain this outcome. It is also possible, however, that financing strategies are correlated with other factors that influence the likelihood of closing in a timely manner. For example, a PHA with less development experience may be more likely to pursue 4-percent LIHTC financing rather than 9-percent LIHTC financing or other sources because it is more widely available and

less competitive. PHAs may steer projects that will take longer to close toward 4-percent LIHTC to avoid the stricter timelines of 9-percent LIHTC, or the tighter schedules of the 9-percent LIHTC program compel participants to close in a more timely fashion. Chapter 5 examines the impact of these financing sources on the likelihood that a project would have its CHAP withdrawn or revoked. The Final Report will explore the influence of these factors in more detail.

3.4. PHAs' Experience in Obtaining External Capital

To evaluate the experiences of PHAs in obtaining external capital, our web survey asked the 23 PHAs represented in our sample of 24 RAD projects if they were able to find a lender easily. Access to credit is a significant topic because the RAD program could not achieve its objective of providing greater access to capital if lenders were not interested in financing RAD projects. Of the 21 PHAs that responded to our web survey, 8 said they planned to borrow and all of those 8 reported that they were able to find a lender easily. (Most respondents said they did not plan to borrow.) (See table 25.)

Table 25. Experience Finding a Lender (RAD Sample Survey)

Were you able to find a lender easily?		
Yes	8	38.1%
No	0	0.0%
Not applicable or no response	13	61.9%
Total	**21**	**100.0%**

RAD = Rental Assistance Demonstration.
Notes: The response to this question was conditional on public housing authorities (PHAs) indicating that they planned to borrow. Eight PHAs said they did.
Source: Web survey responses—23 PHAs solicited; 21 responded to the survey

In our interviews with RAD PHAs, respondents confirmed that they did not have trouble finding a lender or working with a lender for their RAD transaction. One PHA said, "[Our lender] was very much on board," and another echoed "[Our lender was] on board from the beginning." Two more PHAs added that "the lender was eager to do business with us" or "was easy to do business with."

To compare the views of borrowers with those of creditors, our staff also interviewed five lenders that have experience lending under RAD. Although they represent a broad range of financial institutions, these lenders were selected because of their familiarity with RAD. Their views do not necessarily represent the views of all lenders, including those that chose not to participate in RAD. They do, however, provide a complementary perspective on the accessibility of credit for RAD projects. All the lenders interviewed said that lending to RAD projects was a positive lending experience and that they planned to continue pursuing additional RAD financing opportunities. One lender noted, "RAD seems like a very creative way to introduce private monies into the rehabilitation or replacement of aging housing stock." In response to a question about the complexity of RAD transactions, one lender responded, "Non-RAD transactions are not necessarily simpler. They all have the same issues." Our conclusion is that members of the lending community with affordable housing experience appear to be comfortable with RAD. PHAs with RAD projects that can carry debt should be able to find a lender to serve them. A rise in interest rates, however, could reduce lender participation if projects have to reduce the amount of their borrowing and loan sizes become too small.

3.4.1. Choice of PBV and PBRA

As part of their conversion strategy, PHAs had to choose whether to apply for a PBV or PBRA Section 8 contract. What was that choice based on? To answer this question, we queried the PHAs from our sample of RAD projects. Most of the PHAs—13 (61.9 percent)—said they applied for PBV, and the remaining 8 (38.1 percent) said they applied for PBRA (see table 26). Among all 185 RAD public housing projects that have closed, the split is more even—100 (54 percent) PBV and 85 (46 percent) PBRA.

Table 26. Choice of PBV or PBRA (RAD Sample Survey)

Did your PHA pursue primarily PBV or PBRA for RAD?		
PBV	13	61.9%
PBRA	8	38.1%
Total	**21**	100.0%

PBRA = project-based rental assistance. PBV = project-based voucher. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Web survey responses—23 PHAs solicited; 21 responded

The PHAs that were interviewed said they based their choice of PBV at least in part on the opportunity to earn Section 8 administrative fees under PBV contracts—in contrast with PBRA contracts—and the fact that they could use those fees to support the PHA. As one respondent said, "PBV … comes with an administrative fee to fund the PHA and benefit employees …. [We] wanted to ensure the RAD conversion does not hurt staff and in fact enhances staff employment and advancement opportunities."

Does a PHA's decision to apply for PBV or PBRA affect their ability to obtain debt financing for their RAD project? PBV contracts may have a shorter contract period than PBRA contracts—as short as 15 years for the former, with the possibility of being longer, and 20 years for the latter—with automatic renewals. Thus, the preference for PBV contracts could tend to reduce a project's **capacity** to take on debt, that is, the amount of debt it could carry. Conversion to PBV, however, does not appear to reduce a project's **access** to debt financing. As one lender said in discussing their loan underwriting policies and procedures, "The selection of PBV or PBRA is not a factor in our lending decisions." This same lender, however, noted that with PBV support a RAD project could "encounter declining NOI [net operating income] starting in years 16, 17, and 18. If [the project] encounters anything extraordinary, the reserves could be stressed." This lender recognized that PBV contracts provide sufficient security to lend against, in spite of any out-year uncertainty.

Was the amount of debt financing affected by the PHA's choice of PBRA versus PBV? Table 27 shows the dollar amount and percentage distribution by financing for the 185 closed RAD public housing transactions. Closed projects converting to PBVs used slightly less first mortgage financing as a percentage of their total financing than did projects converting to PBRA—18.7 percent versus 19.6 percent—even though they used more first mortgage debt per project—$3.0 million versus $2.0 million. These differences are not substantial, however, and could be due to other factors. The conclusion is that the impact of choosing PBV rather than PBRA does not appear to have an impact on access to credit and has an unclear impact on the amount of credit a project assumes.

Table 27. First Mortgage Debt Financing for 185 Closed Transactions by Choice of PBV or PBRA, Dollars and Percent

Type of Subsidy	Number of Properties	First Mortgage Financing			Total Financing ($)
		Total Amount ($)	Pct.	Amount per Project ($)	
PBRA	85	173,209,583	19.6	2,037,760	884,663,463
PBV	100	298,374,834	18.7	2,983,748	1,591,714,721
Total	**185**	**471,584,417**	**19.0**	**2,549,105**	**2,476,378,184**

PBRA = project-based rental assistance. PBV = project-based voucher.
Source: Rental Assistance Demonstration program data

3.4.2. Impact of PHA Size

We investigated the effect of PHA size on RAD program performance. Our analysis found that for closed transactions, the use of financing is inversely related to PHA size and the proportion of financing by source varies by PHA size. As shown in table 28—

- Small PHAs account for the lowest proportion of the total amount of financing raised by the 185 closed RAD public housing transactions that were analyzed. They raised $141.2 million (5.7 percent) in total financing although they account for 32 (17.3 percent) of the closed projects and 2,550 (13.2 percent) of the units.
- Medium PHAs raised $1,010 million (40.8 percent) in financing through RAD, which is slightly less than their proportion in the population—they had 100 closed properties (54.1 percent) and 9,465 units (49.2 percent).
- Large PHAs account for the largest portion of financing under RAD. They raised $1,324 million (53.5 percent) in financing, which is more than their proportion of transactions (53 closed projects, or 28.6 percent), or their proportion of units (7,240 units, or 37.6 percent). One can identify which sources of financing were used more or less intensively by PHAs based on their size by using the percentage distribution of the total financing used by each PHA size category as the benchmark: small PHAs = 5.7 percent, medium PHAs = 40.8 percent, and large PHAs = 53.5 percent. By this standard—
- Small PHAs tend to use proportionately less first mortgage financing (2.6 percent), seller or take-back financing (2.9 percent) and 4-percent LIHTC financing (0.5 percent) and proportionately more 9-percent LIHTC financing (17.5 percent). This result is driven by the 11 small PHAs that used an average of $7.5 million in 9-percent LIHTC financing.
- Medium PHAs also tend to use proportionately more 9-percent LIHTC financing (62.6 percent) and proportionately less 4-percent LIHTC financing (30.2 percent) and first mortgage debt (35.8 percent).
- By contrast, large PHAs use proportionately less 9-percent LIHTC financing (19.9 percent) compared with more 4-percent LIHTC financing (69.3 percent), first mortgage debt (61.6 percent), other debt (74.1 percent) and other sources, such as grants (73.1 percent).

The use of relatively less 9-percent LIHTC financing by large PHAs could reflect the fact that large PHAs have larger projects and states tend to impose a cap per project on the use of the 9-percent LIHTC program.

Table 28. Sources of Financing for 185 Closed Transactions by PHA Size, Dollars and Percent

PHA Size	Properties	Units	Public Housing Resources	First Mortgage	Other Debt	Seller or Take-Back Financing	4% LIHTC	9% LIHTC	Other Sources	Total Financing
Numbers and dollars										
Small	32	2,550	15,638,008	12,385,373	5,937,541	11,555,120	2,663,432	82,855,838	10,763,322	141,798,634
Medium	100	9,465	90,299,442	168,648,493	18,000,053	218,275,175	151,835,357	296,534,974	66,609,341	1,010,202,835
Large	53	7,240	143,939,758	290,550,551	68,318,252	168,937,567	348,410,416	94,362,067	209,858,104	1,324,376,715
Total	**185**	**19,255**	**249,877,208**	**471,584,417**	**92,255,846**	**398,767,862**	**502,909,205**	**473,752,879**	**287,230,767**	**2,476,378,184**
Percentage distribution by total										
Small	17.3	13.2	6.3	2.6	6.4	2.9	0.5	17.5	3.7	5.7
Medium	54.1	49.2	36.1	35.8	19.5	54.7	30.2	62.6	23.2	40.8
Large	28.6	37.6	57.6	61.6	74.1	42.4	69.3	19.9	73.1	53.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

LIHTC = low-income housing tax credit. PHA = public housing authority.
Source: Rental Assistance Demonstration program data

This result is not surprising insofar as 9-percent LIHTC financing is considered one of the more difficult sources of financing to obtain. Small and medium PHAs whose projects completed closing secured proportionately more 9-percent LIHTC financing than large PHAs, probably because 9-percent LIHTC financing has a cap on the amount of credits per project and it is easier to get credits through the 4-percent LIHTC program. Because large PHAs tend to have very large projects, they may have no choice but to use the 4-percent LIHTC program more than the 9-percent LIHTC program for more of their projects, or to use more other sources, such as grants, in lieu of tax credits.

3.4.3. Impact of PHA Experience

To assess the impact of a PHA's previous experience with mixed-finance housing on closing under RAD, our web survey asked the PHAs from our sample of 24 RAD projects if they had ever borrowed funds to acquire, rehabilitate, replace, construct, or refinance a public housing project. Of the 20 who responded, 9 (45.0 percent) said they did have such borrowing experience and 11 (55 percent) said they did not have such experience (see table 29).

Table 29. Previous Borrowing Experience (RAD Sample Survey)

Has your PHA previously borrowed funds to acquire, rehabilitate, replace, construct, or refinance a public housing project?		
Yes	9	45.0%
No	11	55.0%
Total responses	**20**	**100.0%**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Web survey responses—23 PHAs solicited; 21 responded to survey; 1 did not respond to this question

The 11 respondents who said they had no experience were asked a followup question about their reasons for not previously borrowing for public housing projects. Respondents could indicate more than one response. None indicated that they had not borrowed because of lack of knowledge and experience with available programs. More common responses were that they did not have the need, thought that public housing rules and regulations were not conducive to borrowing, could not find a source, or could not repay it (see table 30).

Table 30. Reasons for Not Borrowing (RAD Sample Survey)

What are some of the reasons your PHA has not borrowed funds for public housing projects?		
Lack of capacity to repay	2	10%
Lack of knowledge/experience with available programs	0	0%
Lack of need	5	24%
Unable to find financing (e.g., a participating lender)	2	10%
Public housing program rules and regulations are not conducive to borrowing	7	33%
Other reasons (please describe)	1	5%
Unable to compete or unlikely to be awarded tax credits	2	10%

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Note: Respondents could indicate multiple answers or provide no response.
Source: Web survey responses—23 PHAs solicited

Given the small size of our respondent sample, this report cannot be entirely conclusive. It does appear, however, that previous experience with mixed-finance housing is not a prerequisite for RAD conversions, though it probably helps. As reported in subsequent chapters, PHAs

frequently pointed to the need for technical assistance with these projects, driven by the lack of capacity and experience with mixed-finance housing. In many cases, however, PHAs were able to use outside consultants to overcome their inexperience and help guide them through these often-complicated transactions, so the lack of such experience is not an insurmountable barrier.

3.5. Conclusions

One principal goal of the RAD program is to preserve affordable housing by enabling public housing projects to invest in necessary capital improvements. A comparison of a sample of RAD and non-RAD projects shows that RAD projects expect to be able to immediately address 75 percent of their capital needs with RAD. By contrast, non-RAD projects estimate being able to meet only 2 percent of their capital needs in the first year. The Final Report will evaluate how well RAD projects succeed in achieving this expected outcome. In the meantime, this report investigated how RAD projects plan to meet their capital needs—in terms of their financing and conversion strategies—and what the possible implications of their choices might be. This report addresses several questions: How are RAD projects financed, and for what end—simple conversion, rehabilitation, or new construction? Did different capital needs affect choice of financing strategy? Did choice of PBV or PBRA contract, PHA size and experience, or other factors affect their financing strategies? Did choice of financing strategy affect their prospects of closing on time or present long-term risks?

One primary objective of the RAD program is to enable projects to meet their upfront and long-term capital needs. The Final Report will provide a full-scale review of the program's success in meeting this objective. Using our review of PCA data for a sample of RAD and non-RAD projects, we conclude that both groups appear to have the same level of capital needs over the next 20 years. Compared with non-RAD projects, however, RAD projects expect to meet significantly more of their capital needs up front. As a result, they expect to significantly reduce their capital needs over the long term.

To meet these capital needs, RAD projects that have closed have raised significant resources. Using our analysis of 185 closed public housing transactions to date, we conclude that PHAs can draw on an array of financing sources for project capital funding and other needs, including mortgage debt, tax credits, and other loans and grants. These external sources significantly augment public housing resources. After making appropriate adjustments to HUD data, our analysis determined that PHAs contributed $250 million of their own funds and raised an additional $2,227 million in external funds, for an adjusted average leverage ratio of 8.91:1. This ratio means that for every $1 invested by PHAs in their RAD projects, private and public external sources invested an additional $8.91. This external funding consisted of $3.91 in tax credits ($1.90 for 9-percent LIHTC equity + $2.01 for 4-percent LIHTC equity), $1.89 in first mortgage debt, $0.37 in other third-party debt, $1.60 in seller or take-back financing, and $1.15 from other sources, such as grants and deferrals of developer fees.

A project's financing strategy—the amount and type of financing it uses—appears to be related to its capital needs. The simplest RAD projects have minimal immediate financial needs. Many PHAs can absorb those needs with internal funds. Projects that involve rehabilitation have greater financial needs, driving PHAs to turn to more external sources, usually a first mortgage if the project can support it. If a mortgage is insufficient, the PHA will add other debt that has more

favorable repayment terms and other soft funding sources such as grants. As the developmental needs of the project increase, the PHA will add tax credits to all other sources. Projects with the greatest need will tend to use tax credits the most. Financing strategy also varies by PHA size. For closed transactions, smaller PHAs used less total financing by project than large PHAs, probably because small PHAs have smaller projects than large PHAs. In addition, small and medium PHAs tend to use more 9-percent LIHTC financing rather than 4-percent LIHTC financing, in contrast with large PHAs. Again, this discrepancy could be because large PHAs have larger projects, including more projects that exceed the size limits of the 9-percent LIHTC equity program.

Financing strategy could also be related to a PHA's previous mixed-finance experience. Our survey attempted to explore this issue. Given the small size of our sample, however, we remain tentative about the impact of a PHA's previous borrowing experience on its ability to obtain external financing. Mixed-finance housing experience clearly is not a prerequisite for RAD conversions, though it likely helps. As reported in subsequent chapters, many PHAs used outside consultants to compensate for their lack of internal capacity to complete their RAD projects.

Choice of PBV or PBRA contract may have an impact on financing strategy, but the result is inconclusive. This choice does not appear to affect access to credit. Because PBV contracts may have shorter contract periods than PBRA contracts, the choice of PBV contracts could reduce a project's capacity to carry debt. Our analysis found that closed projects that converted to PBVs used less first mortgage financing as a percentage of their total financing; however, the average dollar amount of first mortgage financing was higher for PBV conversions compared with PBRA conversions. We found no evidence that conversion to PBV reduces a project's access to debt financing. The PHAs we spoke with indicated that they were able to find a lender if they wanted one. The lenders we spoke with, all of whom have experience lending to RAD projects, said that project-based Section 8 HAP contracts, whether PBV or PBRA, provide sufficient security to lend against, in spite of any out-year uncertainty. Hence, the program does not appear to have difficulty accessing credit. If interest rates rise, however, the amount of debt that RAD projects can carry could decline, and smaller loans could reduce lenders' interest in the program.

Different external capital sources present different types and levels of risk to RAD projects. First mortgage debt probably carries the greatest financial risk because it requires repayment of the debt on a fixed schedule or the project could default and go into foreclosure. By contrast, cashflow loans and seller or take-back financing allow for flexible repayment terms. Tax credits have compliance risks, requiring the project to adhere to tenant eligibility rules or else investors, or guarantors, will lose the advantage of their tax credits. Grants have similar compliance risks that funds could be recaptured and canceled. Because mortgage debt is underwritten with strict DSC ratios and LTV ratios, it is likely that RAD projects would assume about the same amount of mortgage default risk as other affordable housing rental properties financed with FHA-insured or conventional loans.

Did different financing strategies affect the likelihood that a project would close? To answer this question, we analyzed the planned financing strategies of 278 RAD projects that had received their CHAP awards by the end of 2013 and had at least 22 months to close. Of these projects, 130 had closed and 148 remained active, had withdrawn, or had their CHAP revoked. Our multivariate logit regression models found that projects had a reduced likelihood of completing closing within a

reasonable amount of time if they (1) had lower physical inspection scores, (2) participated in portfolio applications, (3) used PBRA rather than PBV contracts, (4) used more first mortgage debt, or (5) used more 4-percent LIHTC equity. By contrast, they had an increased likelihood of closing on time if they used any 9-percent LIHTC equity, regardless of the amount. Our analysis did not find a significant effect for the other variables describing the PHA, the property, tenants in the property, the neighborhood in which the property is located, or other aspects of the project's conversion and financing plan.

Projects with lower physical inspection scores have greater physical deficiencies. They may have more difficulty closing or take longer to close because they have more complications that must be addressed before closing or they require longer review times. Projects that are part of a portfolio application may have a reduced probability of closing on time because of the added burden on the PHA of managing multiple transactions. The positive impact of PBV choice on increasing the likelihood that a project would close on time could mean that PBV contracts are easier to execute. In all three cases, some other factor related to these variables could be responsible for the observed effect.

The most intriguing finding relates to the impact of financing strategy on a project completing closing in a reasonable amount of time. Projects that planned to use either first mortgage debt financing or 4-percent LIHTC equity had a reduced likelihood of completing closing during this time period. This finding is plausible, as these forms of financing generally have long closing timelines and are complicated enough that the closing process could take even longer as reviews are completed, approvals are obtained, and documents are drafted. Chapter 5 examines the impact of financing strategies on the likelihood that a project would have its CHAP withdrawn or revoked and finds that projects using more first mortgage debt and 4-percent LIHTC equity are more likely to be withdrawn or have their CHAP revoked.

One would expect 9-percent LIHTC equity, which has even stricter timelines, to have a similar relationship, but in fact it has the opposite effect. Projects that used any amount of financing from this source had an increased likelihood of closing on time. This finding could reflect the selectiveness of this program, which favors projects more likely to succeed, or the strict deadlines that require better management of the project through the closing process. The relative inflexibility of the 9-percent LIHTC program may drive those types of transactions to closing with greater regularity compared with mortgages and 4-percent LIHTC, which tend to be more open-ended. It is also possible that these financing strategies are correlated with other factors that influence the likelihood of closing in a timely manner. For example, a PHA with less development experience may be more likely to pursue 4-percent LIHTC financing, rather than 9-percent LIHTC financing or other sources, because it is more widely available and less competitive. By contrast, the 9-percent LIHTC program may tend to attract more experienced PHAs that are more capable of managing their projects successfully to timely completion. The Final Report will explore the influence of financing strategies and other factors on closing and other program outcomes in more detail.

4. Implementation Analysis: Types of Projects Proposed for RAD and Factors That Influence Project Selection in RAD

This chapter focuses on the differences between public housing projects in Rental Assistance Demonstration and public housing projects not taking part in RAD, and how these differences influence the decisions public housing authorities make in selecting projects for RAD. The analysis in this chapter found that RAD and non-RAD projects differ significantly across a range of factors, some of which relate to PHA choices. The particular research questions addressed in this chapter include—

- What types of projects did PHAs propose for conversion?
- What factors led PHAs to propose specific properties for RAD conversion?

These questions are also addressed in chapter 5. Chapters 4 and 5, however, differ in their use of data and analytical techniques. This chapter uses quantitative data on RAD and non-RAD projects, derived from internal HUD data and Census Bureau data, covering the population of RAD projects and other public housing projects not involved in RAD. Data analysis used standard statistical tools: comparison of means and logit regression. By contrast, the data analyzed in chapter 5 are principally qualitative, based on web survey and interview responses of the PHAs represented in our sample of 24 RAD projects. The findings from the different methodologies used in each chapter are mutually supportive. In particular, the insights gained from talking with PHAs, as described in chapter 5, informed our selection of variables and interpretation of the results of our analysis in this chapter. As appropriate, these linkages are noted in the text.

4.1. Summary

This chapter answers two research questions: (1) What types of projects did PHAs propose for RAD conversion? (2) What factors influenced PHAs to propose particular projects for the RAD program? These questions are important because RAD is a voluntary program. As a result, the projects in RAD are the product of two choices: (1) PHAs choose whether to become involved in RAD and (2) PHAs decide what projects to submit to RAD. The types of projects in the RAD program will depend on which PHAs choose to take part in RAD, the sizes and types of projects in their public housing portfolios, the criteria they use in selecting projects, and the proportion of their portfolio that they submit to RAD. By knowing what projects are taking part in RAD, one can better understand the program's overall impact, whether it is broadly based or concentrated by type of housing or community, whether it tends to serve the goals of the program, and whether it has any unintended consequences.

To identify the types of projects that PHAs proposed for RAD conversion, our research team compared RAD projects with non-RAD projects across multiple variables and conducted statistical analyses of their relationships using comparison of means and logit regression. RAD projects were defined as all public housing projects included in a RAD application, and non-RAD projects were defined as all remaining public housing projects not included in a RAD application. Our analysis examined four types of factors that could describe the types of projects proposed for RAD: (1) PHA size, (2) project and tenant characteristics, (3) socioeconomic condition of the neighborhood, and (4) the revenues and expenses of the project.

We found that projects in RAD are significantly different from projects that are not in RAD in terms of the types of PHAs that proposed those projects for RAD, the income of the tenants living in those projects, the unit mix of the projects, the urban location of the projects, the condition of the neighborhoods in which the projects are located, and the current revenues and expenses of the projects.[85] Project participation in RAD clearly is selective, not random.

For PHA size, our analysis found that projects owned by medium and large PHAs are more likely to be in RAD, and projects owned by small PHAs are less likely to be in RAD. This finding likely reflects the lower rate of participation of small PHAs in the RAD program and the smaller size of their portfolios compared with medium and large PHAs. The lower participation of small PHAs could be due to their relative lack of capacity and mixed-finance experience (as noted in chapter 5), characteristics of their housing portfolio not included in this analysis, or other factors. One consequence is that the type of project submitted to RAD is determined by the decisions of large and medium PHAs—and also their portfolios—more than by the decisions and portfolios of small PHAs.

For the characteristics of projects and their tenants, our analysis found that projects are more likely to be in RAD if they have a higher mix of larger units (measured by number of bedrooms) and tenants with lower median household incomes. Other project-related factors that we examined, including the project inspection score, the size of the project (number of Annual Contributions Contract units), and the percentage of elderly tenants in the project, were not statistically significant. Projects with a greater percentage of larger units meet the housing needs of larger families, an underserved segment of the housing market. Households with lower incomes also tend to have greater housing needs. It is possible that PHAs are more likely to apply to RAD if they have projects with these housing needs, or that some other factor is affecting this relationship.

Several neighborhood characteristics are associated with RAD projects. Projects are more likely to be in RAD if they are located in metropolitan areas and neighborhoods with lower rates of poverty (percentage of households living below the poverty threshold), higher housing cost burden (percentage of income devoted to housing and utility expenses), and greater overcrowding (percentage of households living in housing with more than one person per room). In general, these characteristics—urban communities that have high housing costs relative to income and have a higher proportion of households living in overcrowded housing conditions but are not experiencing extreme poverty—describe areas that are relatively stable (low poverty) and have a greater need for affordable housing. As in the case of lower-income tenants and family-sized units, PHAs may be more likely to apply to RAD if they have projects with these housing needs.

Projects are more likely to be in RAD if they have higher operating subsidies, lower expenses, and lower other revenue per unit. Per-unit capital funding was not statistically significant. Project operating and capital fund subsidies are important factors in determining contract rents under RAD; operating funds are about 2.5 times more important than capital funds based on their relative magnitudes. Other revenue does not affect contract rents. Rent minus expenses

[85] The significance of these differences between RAD and non-RAD projects supports our sampling methodology, which matched the non-RAD sample to the RAD sample based on the characteristics used in this analysis.

determines the feasibility of using debt to finance capital needs. Many PHAs we spoke with mentioned the importance of RAD rents being high enough to make conversion feasible, as a precondition for applying to RAD. The higher operating subsidies and lower expenses for RAD projects could reflect their relative importance in the determination of project feasibility, or their influence could be due to some other reasons. The negative association between a project being in RAD and other revenue, which includes provisional income, requires further exploration.

To identify the factors that influenced PHAs to propose particular projects for the RAD program, our researchers compared RAD projects to non-RAD projects in which both types of project were owned and managed by a participating PHA with a "mixed" housing portfolio, defined as a PHA that had submitted at least one RAD application and also had at least one non-RAD property in its portfolio. Excluded from this analysis were RAD projects owned and managed by a PHA that had all RAD projects and non-RAD projects owned and managed by a PHA that had all non-RAD projects. This approach focused on analyzing factors influencing the selection of projects for RAD by PHAs that still retained some latitude of choice. This second analysis used the same set of variables and statistical techniques as the first. PHAs that participate in RAD and have mixed RAD/non-RAD portfolios select which of their projects to propose for RAD on the basis of some but not all factors associated with the types of project in RAD, and in some cases the direction of impact is reversed.

The most significant difference between these two analyses is the impact of PHA size. Projects are more likely to be in RAD if they are owned by a large or medium PHA, compared with a small PHA. For PHAs with mixed portfolios that participate in RAD, however, large PHAs are less likely than small or medium PHAs to select their projects for RAD. These results seem contradictory, but they are not. First, large PHAs have a higher ***participation rate,*** defined as the number of PHAs that have submitted a RAD application divided by the total number of PHAs. Second, large PHAs have larger portfolios than small or medium PHAs. Even if a large PHA proposes a fraction of its entire portfolio for RAD, the number of projects it proposes will tend to be greater than the number proposed by small and medium PHAs that propose a larger proportion of their portfolios. Hence, because of their higher participation rates and larger portfolios, large PHAs have a greater ***representation rate*** in RAD, defined as the number of RAD projects divided by the total number of projects, and their projects comprise a larger portion of RAD projects despite their lower ***selection rate,*** defined as the number of projects proposed for RAD divided by the total number of projects in a PHA's portfolio. In other words, according to our data, selection rate is inversely related to portfolio size, whereas participation rate is positively related to portfolio size.

Two project-related factors—project tenants' median household income and project size (number of ACC units)—are statistically significant factors in PHAs' choice of RAD projects. Other project-related factors, such as the percentage of one- or two-bedroom units, however, are not significant. Participating PHAs with mixed portfolios tend to choose projects with lower tenant median income and projects that have fewer units. Do they do so because lower tenant income indicates greater housing need? Are smaller projects selected for RAD because they are easier to convert (for example, they would have fewer residents that would have to be relocated) or easier to finance (because some sources of financing have project caps, such as 9-percent low-income housing tax credit equity)? Do these relationships instead have some other explanation?

Two neighborhood factors that influence project selection are neighborhood poverty rate and neighborhood overcrowding rate. Participating PHAs with mixed portfolios tend to choose projects in neighborhoods with lower poverty rates and neighborhoods with greater overcrowding. In our discussion with PHAs on project selection, some mentioned the importance of favorable neighborhood conditions in the decision whether to pursue RAD. Greater overcrowding could indicate greater need for affordable housing, and lower poverty could indicate greater neighborhood stability, both of which would be considered favorable conditions that would support increased investment in preserving affordable housing. The other two neighborhood factors influencing the type of project in RAD—metropolitan area and neighborhood cost-burden rate—did not have a significant influence on project selection by participating PHAs with mixed portfolios.

A project's operating subsidy and expenses are the other factors that influence a PHA's choice of project to propose for RAD. Projects with higher per-unit operating subsidies and lower current per-unit expenses are more likely to be selected for RAD. Because projects with higher subsidies would tend to have higher contract rents under RAD, and projects with higher rents and lower expenses would tend to have greater capacity to carry debt, these findings suggest that PHAs could be choosing projects, at least in part, on the basis of a project's financing ability. As before, projects with higher other revenues per unit are less likely to be selected for RAD, which is a finding that will be explored in the next phase of our study.

4.2. Analytical Approach

We used two analyses to answer the research questions posed at the start of this chapter. To determine the types of projects proposed by PHAs for RAD conversion, the first analysis compared RAD projects with non-RAD projects. The study population consisted of 1,078 RAD applications submitted through mid-October 2015 and 5,844 non-RAD projects for a total population of 6,922 public housing projects. To determine what factors influenced PHAs to propose particular projects for the RAD program, the second analysis compared RAD projects to the subset of non-RAD projects owned and managed by a PHA that had submitted at least one RAD application and that also had at least one non-RAD project in its portfolio, that is, a PHA with a "mixed" portfolio. By eliminating projects owned by PHAs with "pure" portfolios (100-percent RAD or 100-percent non-RAD), the second study population used only 606 RAD applications and 1,335 non-RAD projects. Both analyses used two standard statistical techniques: (1) comparison of means with hypothesis testing and (2) logit regression.

Both analyses take the RAD application as the measure of RAD project selection. A project selected for RAD (or RAD project) is any project for which a PHA submitted an application to RAD. A project not selected for RAD (or non-RAD project) is any project not included in a RAD application. The analysis considered four types of factors that could affect project selection for RAD: (1) characteristics of the PHA, (2) characteristics of the project and its tenants, (3) characteristics of the neighborhood in which the project is located, and (4) the resources available to the project. In total, the analysis used 16 variables across all four factor types.[86]

[86] Our sampling and genetic matching methodology used many of these same variables to identify projects from the non-RAD population that were suitable matches for the RAD sample. By confirming that the RAD and non-RAD

To measure the characteristics of the PHA, the analysis considered PHA size as defined by HUD. It used three variables of PHA size.

1. **Large PHAs.** Includes large and very large PHAs, or PHAs with more than 1,250 units.
2. **Medium PHAs.** Includes high- and low-medium PHAs, or PHAs with 250–1,249 units.
3. **Small PHAs.** Includes small and very small PHAs, or PHAs with fewer than 250 units.

PHA size is an important factor affecting the type of projects proposed for RAD because PHAs are the decisionmakers and large PHAs tend to have more projects than medium PHAs, which tend to have more projects than small PHAs. Even if PHAs participated in the RAD program at the same rate, which they do not, the project selections made by medium and large PHAs would have a greater impact on the types of projects in RAD than would the project selections made by small PHAs. As a consequence, the types of projects owned by medium and large PHAs and the selection criteria they use in choosing which projects to submit to RAD are more likely to influence the types of project in RAD.

PHA size also has other possible associations. For example, PHA size could reflect a PHA's relative experience and capacity with managing mixed-finance developments like RAD. Although use of outside consultants can substitute for lack of capacity and experience, one would expect larger PHAs to have more mixed-finance experience and therefore to be more interested in participating in RAD. In addition, PHA size is correlated with other factors that could influence a PHA's decision to participate in RAD. For example, larger PHAs tend to have larger projects, which could be more difficult to finance. They also tend to be located in more metropolitan areas, which could have higher market rents than RAD projects can earn.

As we found in our discussions with PHAs (see chapters 5 and 6), a PHA's selection of projects for RAD will be influenced by more than just its experience and abilities. It will likely involve an assessment of the extent to which the PHA's public housing projects would benefit from the RAD program, both financially and in the sense of preserving affordable housing. To measure characteristics of the project that could enter into the PHA's assessment of its suitability for RAD, the analysis considered several project characteristics.

- **Project inspection score,** which correlates with the physical condition of the project, using the Real Estate Assessment Center inspection score. This variable could indicate a project's relative capital needs, making projects with lower scores better candidates for RAD if the PHA wants to use RAD to improve the condition of its projects. It could also indicate a project's performance, however, meaning that projects with lower scores may be riskier and less likely to be proposed for RAD because the PHA would consider them to have more development challenges and a greater chance of failing.
- **Project size,** based on the number of ACC units in the project, using HUD Office of Public and Indian Housing Information Center extract data from July 2014. This variable

populations of projects statistically differ for these variables, this chapter provides further support to this sampling approach.

would tend to affect the total amount of financing a project would require. On the one hand, projects that are too small may have trouble qualifying because of lack of lender interest in small loans. On the other hand, projects that are too large may have trouble putting together a total financing package because of limits on certain financing sources, such as 9-percent LIHTC equity. In either case, the PHA may consider the size of a project in selecting it for RAD.

- **Project bedroom mix,** based on the percentage of units in a project with one or two bedrooms, using HUD PIC extract data from July 2014. Projects with a lower proportion of one- or two-bedroom units will have larger units that are able to meet the housing needs of larger families. Because this segment of the affordable housing market tends to be relatively underserved, PHAs could be more interested in preserving these types of projects through RAD.
- **Project tenants' median household income,** as measured by the median income of households residing in a project, using HUD PIC extract data from July 2014. This variable could affect a PHA's RAD decision in several ways. Higher-income households can contribute more in rent. Because current tenant rent is included in the determination of the RAD contract rent, these projects would have higher rents under RAD and therefore could support more debt financing. Higher-income households also might have more stable employment and tenure, which would reduce project operating expenses. Therefore, projects with higher median household income could be considered less risky for RAD. At the same time, these projects may be in better condition and more recently renovated, which is why they can attract higher-income tenants, and less in need of RAD.
- **Percentage of elderly households,** as measured by the percentage of units occupied by tenant households composed of one or more elderly people based on HUD PIC extract data from July 2014. Elderly units are defined as those occupied by people 62 years of age or older at the time of initial occupancy. Elderly households could have more stable income through social security, making a project less risky to redevelop because of lower turnover. They also have accessibility issues and social service needs, which could require renovations to the project. All these factors could make a project with more elderly households a more attractive candidate for RAD.

Some of the PHAs we spoke with mentioned that they considered the relative attractiveness of the neighborhood of the property in assessing which projects to submit to RAD. Some specifically mentioned the importance of a neighborhood that is stable and invites sustainable development for supporting high occupancy levels (see chapter 5). To capture the possible effect of local socioeconomic conditions on PHAs' selection of RAD projects, our analysis looked at four variables.

1. **Metropolitan area**, a binary variable indicating whether or not the project is located in a metropolitan area. This variable correlates with urban and nonurban communities. Some of the nonparticipating PHAs we spoke with thought that RAD was less workable in nonurban communities because of lower rents and less interest by lenders and housing finance agencies (see chapter 6).
2. **Poverty rate** of the census tract in which the project is located, as measured by the percentage of households in the census tract that fall below the federal poverty level,

from the American Community Survey 2012 5-year estimates. Neighborhoods with higher poverty rates would have a greater need for subsidized housing, but they may also have fewer amenities, more social problems, and lower rents. All these factors could deter housing investment. Lower rents in particular would mean that projects in high-poverty neighborhoods may not be able to generate enough capital under RAD to finance their physical needs.

3. **Cost-burden rate** of the census tract in which the project is located, as measured by the percentage of households in the census tract with housing costs (rent plus utilities) greater than 35 percent of their income, from the ACS 2012 5-year estimates. A high cost-burden rate should indicate greater demand for affordable housing to alleviate the high cost of housing relative to low incomes. These markets would tend to support more investment in housing that is subsidized to make it affordable, making them more attractive for projects converting to RAD.
4. **Overcrowding rate** of the census tract in which the project is located, as measured by the percentage of households in the census tract living in overcrowded housing (defined as housing with more than one occupant per room), from the ACS 2012 5-year estimates. A high rate of overcrowding in a neighborhood indicates that it suffers from an undersupply of affordable housing, which would make it more attractive for new investment to preserve it through RAD.

Many PHAs emphasized the importance of project rents in their calculation to determine if a project is a good candidate for RAD (see chapter 5). Several PHAs noted that they did not participate in RAD because when they analyzed their projects they found RAD to be infeasible—the contract rents were too low to support the amount of debt they would need to meet their capital needs[87] (see chapter 6). Contract rents under RAD are based on the sum of the current operating subsidy, tenant payments, and the capital fund subsidy attributable to the project. A project's ability to finance debt depends on its net operating income, which is the difference between its rental income and operating expenses. To analyze the potential impact of public housing subsidies on RAD project selection, we looked at four variables measuring a project's income (three variables) and expenses (one variable).[88]

1. **Per-unit expenses** for each project in annual dollars based on PIC data from HUD. The higher a project's operating expenses, the less debt a project will be able to support, making a project less attractive for RAD.
2. **Per-unit operating funds** for each project in annual dollars based on PIC data from HUD. The higher a project's operating income (or contract rents), the more debt a project will be able to support, making a project more attractive for RAD.

[87] Projects can use other external sources to meet their capital needs. Insufficient debt capacity would not always be decisive in these cases. However, low project rent was a common reason given by PHAs for not participating in RAD.

[88] Some of the project and neighborhood variables discussed previously, such as median household income, metropolitan area, and poverty rate, also could influence contract rents under RAD.

3. **Per-unit capital funds** for each project in annual dollars based on PIC data from HUD. The higher a project's contract rents due to its capital fund allocation, the more debt a project will be able to support, making a project more attractive for RAD.
4. **Per-unit other revenues** for each project in annual dollars based on PIC data from HUD. The higher a project's income from other sources, the more debt a project will be able to support, making a project more attractive for RAD.

Our approach used two standard statistical techniques for estimating nonrandom relationships between one or more variables: (1) comparison of means with hypothesis testing and (2) logit regression. The main advantage of comparison of means is that it presents clearly evident results. We used the standard *t*-statistic for testing the statistical significance of the difference in means. If the *t*-statistic is greater than the absolute value of 1.96 or -1.96, then one can conclude that the difference in means is statistically significant at the 5-percent level of confidence. The comparison of means approach does not isolate the effect of one variable from other variables and does not measure the magnitude of the effect, only its direction. Therefore, we also used a logit regression model to analyze the factors that influence RAD project selection, and the *z*-value, which is similar to the *t*-statistic, to estimate statistical significance. If the *z*-value is greater than the absolute value of 1.96 or -1.96, then one can conclude that the independent variable has a statistically significant effect on the dependent variable at the 5-percent level of confidence. The independent variables in the logit model are the same variables used in the comparison of means analysis.

4.3. Types of Projects Proposed for RAD Conversion

This section reports on the analysis used to answer two research questions: (1) What types of projects did PHAs propose for RAD conversion? (2) What factors influenced PHAs to propose particular projects for the RAD program? The first section provides an overview of the three populations included in our analysis: (1) all RAD applications, (2) all non-RAD public housing projects, and (3) non-RAD public housing projects owned by PHAs participating in RAD. The second section analyzes all RAD projects (all RAD applications) and all non-RAD projects (all projects not included in a RAD application) using the 31 variables discussed previously to determine the types of projects that PHAs proposed for RAD conversion. The third section performs a similar analysis but compares only RAD and non-RAD projects owned by participating PHAs (PHAs that submitted at least one RAD application) with a mixed portfolio of RAD and non-RAD projects.

4.3.1. Overview of Study Population

This section provides a brief overview of the RAD populations and the two comparison non-RAD populations that served as the basis for much of the analysis in this chapter. The entire RAD population consists of 1,076 RAD projects (based on public housing applications received through mid-October 2015, minus 2 projects missing performance data). The population of all non-RAD projects consists of 5,844 public housing projects not included in the RAD population.

The population of RAD projects owned by PHAs with a mixed portfolio consists of 606 projects submitted in a RAD application. The population of non-RAD projects owned by PHAs with a mixed portfolio consists of 1,335 public housing projects not proposed for RAD.[89]

The following tables reveal clear differences between the RAD and non-RAD populations along these factors. They also show that the types of projects in the RAD program are largely influenced by the types of projects submitted by medium and large PHAs, given their higher rates of participation in the program and their larger portfolios of public housing projects. These tables divide the four study populations of (1) all RAD, (2) all non-RAD, (3) mixed-portfolio RAD, and (4) mixed-portfolio non-RAD projects into one of three PHA sizes (small, medium, or large) and one of three project condition or performance levels (substandard, standard, or high standard). These characteristics are the same as those used to stratify our RAD and non-RAD samples. The number and percentage distribution of projects by PHA size and project performance for these populations are shown in tables 31, 32, 33, and 34.

The entire RAD population is about 15.5 percent of the total population of 6,922 public housing projects.[90] In terms of project condition or performance rating, of the 1,076 RAD projects, about 40 percent (432) perform at a substandard level, 47 percent (507) perform at a standard level, and 13 percent (137) perform at a high-standard level (see table 31). By comparison, the performance of the non-RAD population of 5,844 public housing projects is 46 percent (2,703) substandard, 41 percent (2,395) standard, and 13 percent (746) high standard (see table 32).[91] Both populations have about the same percentage of high-standard-performing projects. The main difference is that the non-RAD population skews slightly more toward substandard-performing rather than standard-performing projects.

Table 31. Distribution of All RAD Project Applications by PHA Size and Project Performance Rating

PHA Size/ Performance Rating	Substandard		Standard		High Standard		PHA Size Total	
	Projects	Pct.	Projects	Pct.	Projects	Pct.	Projects	Pct.
Small	96	8.9	92	8.6	20	1.9	208	19.3
Medium	207	19.2	228	21.2	54	5.0	489	45.4
Large	129	12.0	187	17.4	63	5.9	379	35.2
Total by performance rating	**432**	**40.1**	**507**	**47.1**	**137**	**12.7**	**1,076**	**100.0**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Notes: Based on all 1,078 unique projects with RAD applications. Two RAD projects did not have physical inspection scores and were dropped from this analysis.
Sources: RAD program data; U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data

[89] The 1,078 RAD applications were submitted by 423 PHAs. Those PHAs owned an additional 1,335 projects for which they did not apply to RAD.
[90] In total, HUD received 1,256 applications. Of this number, 1,225 applications applied to public housing projects; the others were for Section 8 moderate rehabilitation or missing identifying information. Of the 1,225 public housing applications, 147 were multiple applications, leaving only 1,078 unique public housing developments.
[91] Since the cap was raised in early 2015, the RAD population has increased and the non-RAD population has decreased.

In terms of PHA size, the entire non-RAD population of projects is split with about 33 percent (1,931) from small PHAs, 28 percent (1,660) from medium PHAs, and 39 percent (2,253) from large PHAs. By contrast, the entire RAD population of projects is 19 percent (208) from small PHAs, 45 percent (489) from medium PHAs, and 35 percent (379) from large PHAs. The entire RAD population has about the same percentage of projects from large PHAs as does the entire non-RAD population, but a much smaller percentage of projects from small PHAs (about 50 percent in percentage terms) and a much greater percentage of projects from medium PHAs (about two-thirds more, proportionately).

Table 32. Distribution of All Non-RAD Public Housing Projects by PHA Size and Project Performance Rating

PHA Size/ Performance Rating	Substandard		Standard		High Standard		PHA Size Total	
	Projects	Pct.	Projects	Pct.	Projects	Pct.	Projects	Pct.
Small	816	14.0	772	13.2	343	5.9	1,931	33.0
Medium	700	12.0	752	12.9	208	3.6	1,660	28.4
Large	1,187	20.3	871	14.9	195	3.3	2,253	38.6
Total by performance rating	**2,703**	**46.3**	**2,395**	**41.0**	**746**	**12.8**	**5,844**	**100.0**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data on deducting 1,078 unique projects with RAD applications from universe of 6,922 public housing projects

Tables 33 and 34 provide information on the distribution of projects by PHA size and project performance factor for RAD and non-RAD projects owned and managed by PHAs with a mixed portfolio, that is, PHAs that had submitted at least one application to RAD and also had at least one non-RAD project in their portfolio. Comparing the RAD and non-RAD projects of mixed-portfolio PHAs enables us to analyze the factors used by PHAs in choosing which projects to propose for RAD conversion.

Table 33. Distribution of RAD Projects of Mixed-Portfolio PHAs by PHA Size and Project Performance Rating

PHA Size/ Performance Rating	Substandard		Standard		High Standard		PHA Size Total	
	Projects	Pct.	Projects	Pct.	Projects	Pct.	Projects	Pct.
Small	1	0.2	13	2.1	13	2.1	27	4.5
Medium	30	5.0	110	18.2	93	15.3	233	38.4
Large	57	9.4	175	28.9	114	18.8	346	57.1
Total by performance rating	**88**	**14.5**	**298**	**49.2**	**220**	**36.3**	**606**	**100.0**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Note: Based on 606 unique projects with a RAD application owned by PHAs with at least 1 non-RAD project in their portfolio.
Source: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data

As shown in table 33, the project performance ratings for the RAD projects of mixed-portfolio PHAs are about 15 percent (88) substandard, 49 percent (298) standard, and 36 percent (220) high standard. For the non-RAD projects of mixed-portfolio PHAs, table 34 shows that about

20 percent (270) are substandard, 41 percent (545) are standard, and 39 percent (520) are high standard. PHAs with mixed portfolios appear to be more likely to select projects for RAD that have standard performance ratings and less likely to select projects that have substandard or high-standard performance ratings compared with the non-RAD projects in their portfolio.

Table 34. Distribution of Non-RAD Projects of Mixed-Portfolio PHAs by PHA Size and Project Performance Rating

PHA Size/ Performance Rating	Substandard		Standard		High Standard		PHA Size Total	
	Projects	Pct.	Projects	Pct.	Projects	Pct.	Projects	Pct.
Small	4	0.3	8	0.6	16	1.2	28	2.1
Medium	49	3.7	120	9.0	131	9.8	300	22.5
Large	217	16.3	417	31.2	373	27.9	1,007	75.4
Total by performance rating	**270**	**20.2**	**545**	**40.8**	**520**	**39.0**	**1,335**	**100.0**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Note: Based on 1,335 unique projects without a RAD application owned by PHAs with at least 1 RAD application; 1 project was dropped due to missing data.
Source: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data

A comparison of tables 33 and 34 shows that mixed-portfolio PHAs submit a higher proportion of their projects to RAD as the size of the PHA decreases. In particular, small PHAs submit the highest, medium PHAs submit the second highest, and large PHAs submit the lowest proportion of their projects to RAD. For RAD projects managed by mixed-portfolio PHAs, small PHAs account for 5 percent (27), medium PHAs account for 38 percent (233) and large PHAs account for 57 percent (346). For non-RAD projects managed by mixed-portfolio PHAs, small PHAs account for 2 percent (28), medium PHAs account for 23 percent (300) and large PHAs account for 75 percent (1,007).

Table 35 further confirms this pattern. This table shows the distribution of the PHAs participating and not participating in RAD and the projects proposed or not proposed for RAD by PHA size and percentage of projects submitted. Of 381 projects submitted to RAD by large PHAs, 42.3 percent (161) were submitted by PHAs that submitted more than 75 percent of their total projects to RAD. By contrast, 59.7 percent (292) of the projects submitted by medium PHAs were submitted by PHAs that submitted more than 75 percent of their projects to RAD, and 87 percent (181) of the projects submitted by small PHAs were submitted by PHAs that submitted more than 75 percent of their projects to RAD.

Table 35. Distribution of RAD PHAs, Projects, and Units by PHA Size and Percentage of Projects Proposed for RAD

RAD Projects as Pct. of Total Projects	PHAs		Projects Proposed for RAD		Projects Not in RAD		Total Projects	
Small PHAs								
< 25%	1	0.0%	1	0.5%	4	0.2%	5	0.2%
25–49%	2	0.1%	2	1.0%	5	0.2%	7	0.3%
50–74%	12	0.5%	24	11.5%	19	0.8%	43	1.7%
75–100%	167	7.3%	181	87.0%	—	0.0%	181	7.4%
Total participating	182	7.9%	208	100.0%	28	1.2%	236	9.6%
Nonparticipating	2,114	92.1%	—	0.0%	2,225	98.8%	2,225	90.4%
Small PHA total	**2,296**	**100.0%**	**208**	**100.0%**	**2,253**	**100.0%**	**2,461**	**100.0%**
Medium PHAs								
< 25%	20	3.2%	23	4.7%	136	8.2%	159	7.4%
25–49%	20	3.2%	30	6.1%	62	3.7%	92	4.3%
50–74%	48	7.7%	144	29.4%	93	5.6%	237	11.0%
75–100%	93	14.9%	292	59.7%	9	0.5%	301	14.0%
Total participating	181	29.0%	489	100.0%	300	18.1%	789	36.7%
Nonparticipating	444	71.0%	—	0.0%	1,360	81.9%	1,360	63.3%
Medium PHA total	**625**	**100.0%**	**489**	**100.0%**	**1,660**	**100.0%**	**2,149**	**100.0%**
Large PHAs								
< 25%	28	22.6%	61	16.0%	757	39.2%	818	35.4%
25–49%	11	8.9%	91	23.9%	175	9.1%	266	11.5%
50–74%	9	7.3%	68	17.8%	53	2.7%	121	5.2%
75–100%	12	9.7%	161	42.3%	22	1.1%	183	7.9%
Total participating	60	48.4%	381	100.0%	1,007	52.1%	1,388	60.0%
Nonparticipating	64	51.6%	—	0.0%	924	47.9%	924	40.0%
Large PHA total	**124**	**100.0%**	**381**	**100.0%**	**1,931**	**100.0%**	**2,312**	**100.0%**
Total participating	**423**	**13.9%**	**1,078**	**100.0%**	**1,335**	**22.8%**	**2,413**	**34.9%**
Total nonparticipating	**2,622**	**86.1%**	**—**	**0.0%**	**4,509**	**77.2%**	**4,509**	**65.1%**
Grand total	**3,045**	**100.0%**	**1,078**	**100.0%**	**5,844**	**100.0%**	**6,922**	**100.0%**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Sources: RAD program data; U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data

Most RAD properties are owned and managed by large and medium PHAs, because of their high rates of participation in the program and their large public housing portfolios. Large PHAs have the highest rate of participation in RAD, 48.4 percent (60 out of 124 PHAs); medium PHAs have the second highest rate, 29 percent (181 out of 444 PHAs); and small PHAs have the lowest rate, 7.9 percent (182 out of 2,296 PHAs). The low rate of participation in the RAD program by small PHAs, combined with their smaller portfolios of properties, accounts for the low representation of projects owned by small PHAs in the RAD program. Small PHAs that participate in RAD propose a higher percentage of their portfolios compared with large and medium PHAs because their portfolios are so small, in most cases comprising only a single project.[92]

[92] Several buildings can be aggregated into a single asset management project (AMP). The finding that small PHAs propose a higher percentage of their portfolios for RAD is also true using ACC units rather than AMPs.

4.3.2. Types of Projects Proposed for RAD Conversion

This section reports on the analysis used to answer one research question: What types of projects did PHAs propose for RAD conversion? It analyzes all RAD projects (all RAD applications) and all non-RAD projects (all projects not included in a RAD application). To determine the types of projects that were proposed for RAD conversion, our research team analyzed the 16 factors described in Section 4.2, using both comparison of means and logit regression. The population that was analyzed consisted of 1,078 RAD applications and 5,844 public housing projects not included in a RAD application. The following summarizes the analysis, showing which variables are statistically significant, to describe the types of projects proposed for RAD conversion.

Table 36 summarizes the results of our comparison of means analysis of the 16 variables described previously on our study population of 1,078 RAD and 5,844 non-RAD public housing projects. The mean value for each variable is shown for RAD and non-RAD projects. A positive *t*-statistic indicates that the RAD population has a higher mean value than the non-RAD population for that variable. The *t*-statistic also measures whether the difference in means for each variable (RAD minus non-RAD) is statistically significant. A *t*-statistic greater than 1.96 or less than 1.96 indicates statistical significance at the 5-percent confidence level, and is indicated by yellow highlighting. A statistically significant difference in means enables us to conclude that the RAD and non-RAD populations differ from one another for that characteristic. **Bold** text indicates that the variable is statistically significant in both the comparison of means and the logit regression.

Table 36. Comparison of Means of Multiple Variables for Projects Included or Not Included in a RAD Application, With *t*-Statistics, for All Public Housing Projects

Variables	Mean for RAD	Mean for Non-RAD	Comparison of Means *t*-Statistic
Large PHA	35.30%	33.00%	1.46
Medium PHA	**45.40%**	**28.40%**	**10.42**
Small PHA	**19.30%**	**38.60%**	**– 14.15**
Project inspection score	83.9	85	– 2.33
Project tenants' median household income	$10,927	$11,569	– 5.16
Project tenants' % elderly households	28.90%	32.40%	– 4.1
Project is in a metropolitan area	**85.20%**	**69.50%**	**12.72**
Project units covered by ACC	163.4	154.7	1.66
Project % one- or two-bedroom units	**62.20%**	**66.60%**	**– 4.9**
Neighborhood poverty rate	**30.20%**	**27.50%**	**5.2**
Neighborhood cost-burden rate	**44.70%**	**41.80%**	**6.75**
Neighborhood overcrowding rate	**4.60%**	**3.60%**	**5.05**
Per-unit expenses	$5,411	$5,367	0.5
Per-unit Operating Fund	$3,476	$3,333	0.6
Per-unit Capital Fund	$1,400	$1,330	3.2
Per-unit other revenue	$154	$292	– 0.61
Number of projects	**1,078**	**5,844**	

ACC = Annual Contributions Contract. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Notes: Comparison of means analyzes 1,078 unique projects included in RAD applications and 5,844 public housing projects not included in a RAD application. Yellow highlighting indicates that the *t*-statistics are statistically significant at the 5-percent confidence level. **Bold** text indicates variable is statistically significant in both the means comparison and the logit regression in table 37.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center database; RAD program; American Community Survey

Table 37 presents the results of a logit regression, which estimates the effect of each variable on the likelihood that a project will be in the RAD population while controlling for all other variables. Like the *t*-statistic, the *z*-value presented in the table measures whether the effect is statistically significant and the direction of the effect. A positive *z*-value means that the variable increases the likelihood that a project will be in RAD, and a negative *z*-value means that the variable decreases that likelihood. A *z*-value greater than 1.96 or less than -1.96 indicates statistical significance at the 5-percent confidence level and is indicated by yellow highlighting. If the difference in means and the estimated coefficient are both statistically significant, then the variable is listed with **bold** lettering in both tables 36 and 37.

Table 37. Logit Regression for All Public Housing Projects Included (1,074) or Not Included (5,816) in a RAD Application

Variables	Estimated Coefficient	*z*-Value
Large PHA	0.3193	2.90
Medium PHA	**0.9000**	**9.30**
Small PHA	*	*
Project inspection score	0.0016	0.57
Project tenants' median household income	– 0.0211	– 1.94
Project tenants' % elderly households	0.9264	0.58
Project is in a metropolitan area	**0.7030**	**6.86**
Project units covered by ACC	0.0001	0.51
Project % one- or two-bedroom units	**– 0.3071**	**– 2.27**
Neighborhood poverty rate	**– 0.0060**	**– 2.16**
Neighborhood cost-burden rate	**0.0060**	**2.02**
Neighborhood overcrowding rate	**2.6613**	**4.00**
Per-unit expenses	– 0.1766	– 5.17
Per-unit Operating Fund	0.2215	4.77
Per-unit Capital Fund	0.0188	0.44
Per-unit other revenue	– 0.2275	– 4.80
Number of projects or observations	**6,890**	

ACC = Annual Contributions Contract. PHA = public housing authority. RAD = Rental Assistance Demonstration.
* Small PHAs are used as a base in the logit regression.
Notes: Logit regression analyzes 1,074 RAD and 5,816 non-RAD public housing projects. Fewer projects were included in the logit regression than in the means comparison due to missing data. Yellow highlighting indicates *z*-values are statistically significant at the 5-percent confidence level. Intercept (not reported in table) had an estimated coefficient of -2.40 and a *t*-statistic of -7.38. **Bold** text indicates variable is statistically significant in both the means comparison of table 36 and the logit regression.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center database; RAD program; American Community Survey

As can be seen, the population of all RAD applications is highly statistically significantly different from the population of all non-RAD public housing projects over most of the variables included in our analysis. All but 1 of the 16 variables are statistically significant at the 5-percent confidence level for one or both analytical approaches—comparison of means and/or logit regression—as indicated by yellow highlighting in the tables. Seven variables are statistically significant for both approaches, as shown by the use of **bold** text. The only variable that showed no significance using either approach is the number of project units covered by an ACC.

Three variables were statistically significant using the comparison of means test but not in the logit regression: (1) project inspection score, (2) percentage of project tenants who are elderly, and (3) capital funds per unit. A statistically significant difference in means does not necessarily imply that one variable has an effect on another variable. Because logit regression estimates the effect of each variable independent of other variables included in the regression, it isolates the impact of each variable. For this reason, we rely more on the results of the logit regression and do not consider these three variables to describe the type of projects that PHAs submit to RAD.

Four variables were not statistically significant using the comparison of means test but were statistically significant in the logit regression: (1) large PHAs, (2) per-unit project expenses, (3) per-unit operating funds, and (4) per-unit other revenue. This result could happen if the two

means for a variable are quite similar, so there is no significant difference between them, even though the dependent variable is sensitive to small changes in the independent variable, making the regression coefficient estimate for the variable significant.

The logit regression shows that these four variables have a statistically significant effect on the likelihood that a project would be in RAD, despite the insignificance of the differences in their means. Therefore, we rely on those regression results and consider these variables to describe the type of projects that PHAs submit to RAD.

Of the seven variables that are statistically significant at the 5-percent confidence level for both approaches, four **increased** the likelihood that a project would be in RAD: (1) medium PHAs, (2) being located in a metropolitan area, (3) neighborhood cost burden, and (4) neighborhood overcrowding. Three variables **decreased** the likelihood that a project would be in RAD: (1) small PHAs (used as a base in the logit regression), (2) neighborhood poverty rate, and (3) percentage of one- or two-bedroom units. An eighth variable, which is the fourth one that decreased the likelihood that a project would be in RAD, was significant in both cases at the *10-percent* level of significance: project tenants' median household income.[93] We use the logit regression results as the indicator of the type of project likely to be in RAD.

In summary, the types of projects that PHAs proposed for RAD conversion were likely to be properties with the following 10 characteristics (12 variables, because PHA size was measured as three variables).

1. Owned by a medium or large PHA (and not owned by a small PHA).
2. With lower tenant median household income (significant at the 10-percent level).
3. With a lower percentage of units with one or two bedrooms.
4. Located in metropolitan areas.
5. Located in neighborhoods with lower poverty rates.
6. Located in neighborhoods with higher cost burden.
7. Located in neighborhoods with greater overcrowding.
8. With lower per-unit expenses.
9. With higher per-unit operating funds.
10. With lower per-unit other revenue.

The data reveal these patterns but do not explain them. Do these patterns represent the impact of the criteria used by PHAs in choosing which projects to submit to RAD, or other factors not included in this analysis? The Final Report will analyze these results in greater depth. In the next section, we analyze the factors that influenced PHAs to select projects for RAD.

4.3.3. Factors That Influenced PHAs To Propose Particular Projects for the RAD Program

This section reports on the analysis used to answer one research question: What factors influenced PHAs to propose particular projects for the RAD program? It analyzes all RAD and non-RAD

[93] As noted previously, using the coefficients in a logit regression to estimate the magnitude of the impact on a dependent variable from a change in an independent variable is not as direct as with linear regressions. The coefficients can be readily used, however, to estimate the direction of the impact.

projects owned and managed by PHAs that had submitted at least one RAD project but also had at least one non-RAD project, that is, "mixed-portfolio" PHAs. To clarify, the analysis in Section 4.3.2 used RAD and non-RAD projects from all PHAs—PHAs in which all of their projects were RAD, PHAs in which none of their projects were RAD, and PHAs that had a mix of both RAD and non-RAD projects. The analysis in this section uses only those PHAs that have a mix of both RAD and non-RAD projects in their portfolio.[94] This study population has 606 RAD projects and 1,335 non-RAD projects. To determine the factors that influenced PHAs to propose particular projects for the RAD program, our research team analyzed the 16 factors described in Section 4.2, using both comparison of means and logit regression. The following summarizes the analysis, showing which factors are statistically significant.

Table 38 summarizes the results of our analyses of the 16 variables described previously on our study population of 606 RAD applications and 1,335 non-RAD public housing projects from "mixed-portfolio" PHAs. The mean value for each variable is shown for RAD and non-RAD projects. A positive *t*-statistic indicates that the RAD population of projects has a higher mean value than the non-RAD population of projects for that variable. A *t*-statistic greater than 1.96 or less than -1.96 indicates statistical significance at the 5-percent confidence level. A statistically significant difference in means enables us to conclude that the RAD and non-RAD populations differ from one another for that characteristic. Yellow highlighting indicates that the *t*-statistic is statistically significant at the 5-percent confidence level. **Bold** text indicates the variable is statistically significant for the comparison of means and logit regression, discussed in the next paragraph.

[94] Structuring the analysis in this way enabled us to analyze projects belonging to PHAs that had elected to participate in RAD (because they had submitted at least one RAD application) and that continued to have non-RAD projects against which their RAD projects could be compared. It excluded projects belonging to PHAs that had chosen all their projects for RAD and therefore had no non-RAD projects that could be used for comparison. It also excluded PHAs that had chosen none of their projects for RAD and therefore had no RAD projects that could be used for comparison.

Table 38. Comparison of Means of Multiple Variables for Projects Included or Not Included in a RAD Application, With *t*-Statistics, for Mixed-Portfolio PHAs With at Least One RAD and One Non-RAD Project

Variables	Mean for RAD	Mean for Non-RAD	Comparison of Means *t*-Statistic
Large PHA	**57.10%**	**75.43%**	**– 7.86**
Medium PHA	38.45%	22.47%	6.99
Small PHA	4.46%	2.10%	2.55
Project inspection score	82.9	81.8	1.69
Project tenants' median household income	**$10,861**	**$12,062**	**– 5.95**
Project tenants' % elderly households	28.36%	29.69%	– 1.00
Project is in a metropolitan area	94.88%	97.88%	– 3.06
Project units covered by ACC	**170.7**	**268.4**	**– 7.83**
Project % one- or two-bedroom units	62.53%	63.91%	– 0.86
Neighborhood poverty rate	**32.37%**	**34.12%**	**– 2.19**
Neighborhood cost-burden rate	44.93%	44.74%	0.32
Neighborhood overcrowding rate	4.82%	4.78%	0.15
Per-unit expenses	$5,323	$5,531	– 1.43
Per-unit Operating Fund	$3,621	$4,141	– 1.17
Per-unit Capital Fund	$1,444	$1,470	– 0.79
Per-unit other revenue	$228	$917	– 1.58
Number of projects	**606**	**1,335**	

ACC = Annual Contributions Contract. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Notes: **Bold** text indicates variable is statistically significant for the logit regression and comparison of means. Comparison of means analyzes 606 unique projects included in RAD applications and 1,335 unique public housing projects not included in a RAD application. Yellow highlighting indicates that the *t*-statistic is statistically significant at the 5-percent confidence level.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center database; RAD program; American Community Survey

The differences in means between the populations of RAD and non-RAD projects owned by PHAs that have a mix of both types of project are highly statistically significant for 7 of the 12 PHA size, project and tenant characteristics, and neighborhood condition factors, but for none of the 4 project financial factors. The significant factors include PHA size (three factors), project tenants' median household income, being located in a metropolitan area, number of project units covered by ACC, and neighborhood poverty rate.

Table 39 presents the results of the logit regression, which estimates the effect of each variable on the likelihood that a project would be selected to be in RAD. The *z*-value presented in the table measures whether the effect is statistically significant. A positive *z*-value means that the variable increases the likelihood that a project would be in RAD; a negative *z*-value means that the variable decreases the likelihood of being in RAD. A *z*-value greater than 1.96 or less than -1.96 indicates statistical significance at the 5-percent confidence level, as indicated by yellow highlighting. If the difference-in-means and the estimated coefficient in the regression are both statistically significant, then the text is in **bold**.

Table 39. Logit Regression of Multiple Variables for Projects Included (604) or Not Included (1,321) in a RAD Application, With *z*-Values, for Mixed-Portfolio PHAs With at Least One RAD and One Non-RAD Project

Variables	Estimated Coefficient	*z*-Value
Large PHA	**– 0.8384**	**– 2.92**
Medium PHA	– 0.0471	– 0.16
Small PHA	*	*
Project inspection score	0.0014	0.36
Project tenants' median household income	**– 0.0356**	**– 2.36**
Project tenants' % elderly households	0.0021	1.00
Project is in a metropolitan area	– 0.1980	– 0.70
Project units covered by ACC	**– 0.0007**	**– 2.86**
Project % one- or two-bedroom units	– 0.1386	– 0.86
Neighborhood poverty rate	**– 0.0084**	**– 2.29**
Neighborhood cost-burden rate	– 0.0063	– 1.39
Neighborhood overcrowding rate	1.8005	1.92
Per-unit expenses	– 0.2323	– 4.69
Per-unit Operating Fund	0.3529	4.92
Per-unit Capital Fund	– 0.0372	– 0.52
Per-unit other revenue	– 0.3591	– 4.97
Number of projects or observations	**1,925**	

ACC = Annual Contributions Contract. PHA = public housing authority. RAD = Rental Assistance Demonstration.
* Small PHAs are used as a base in the logit regression.
Notes: **Bold** text indicates variable is statistically significant for the logit regression and the comparison of means. Logit regression analyzes 604 RAD projects and 1,321 non-RAD public housing projects. Fewer projects were included in the logit regression due to missing data. Yellow highlighting indicates that the *z*-values are statistically significant at the 5-percent confidence level.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center database; RAD program; American Community Survey

Aside from the PHA size factors, which are affected by the fact that PHAs being compared need to have a minimum of two projects (one RAD and one non-RAD), only the metropolitan area variable was statistically significant using the comparison of means test but not for the logit regression. By contrast, of the four financial variables, three were statistically insignificant using the comparison of means test but were statistically significant for the logit regression: (1) per-unit expenses, (2) per-unit operating fund, and (3) per-unit other revenue. Also, the neighborhood overcrowding rate had an insignificant mean difference but had an estimated coefficient in the regression that was statistically significant at the *10-percent level.*

In total, 7 of the 16 variables are statistically significant at the 5-percent confidence level, and an eighth is statistically significant at the 10-percent level. Controlling for all factors, a PHA is more apt to select a project for RAD if—

- The PHA is not large (given that the PHA needed to have a minimum of two projects (one RAD and one non-RAD) to be included in this analysis, a statistically significant difference between small and medium PHAs was unlikely).
- Tenants in the project have lower median household income.
- The project is located in a neighborhood with a lower poverty rate.

- The project has fewer units covered by ACC, that is, the project is smaller.
- The project is located in a neighborhood with a higher overcrowding rate (significant at the 10-percent level).
- The project has lower per-unit expenses.
- The project has greater per-unit operating funds.
- The project has lower per-unit other revenue.

In comparing the logit regression using projects of all PHAs (table 37) with that using only PHAs that have a mix of RAD and non-RAD projects (table 39), the signs and significance of the four financial variables in these models were unchanged. Of the neighborhood and project characteristic variables that were significant when analyzing all projects of all PHAs, three were insignificant when analyzing only projects owned by PHAs with a mix of RAD and non-RAD projects: (1) location in a metropolitan area, (2) lower percentage of one- or two-bedroom units in a project, and (3) greater neighborhood cost burden. Greater neighborhood overcrowding rate changed from significant at the 5-percent level to significant at the 10-percent level. Although a project's location in a metropolitan area affects the probability that a project will be in RAD, that variable has no effect on which projects a PHA will choose to submit to RAD if the PHA retains a mix of RAD and non-RAD projects in its portfolio.

One variable—units covered by ACC—that was insignificant when all RAD and non-RAD projects were analyzed became significant when only projects belonging to mixed-portfolio PHAs were analyzed. This change may be because of the fact that the PHAs with mixed projects tended to be larger, because at least two projects were necessary for a PHA's project to be included in that analysis. A second variable—median household income—was significant at the 10-percent level using all RAD and non-RAD projects and became significant at the 5-percent level when the analysis was limited to the projects of mixed-portfolio PHAs.

The types of projects in the RAD program are a product of—

- The types of projects in the portfolios of PHAs that choose to participate in RAD, including the condition, size, and configuration of their projects; their tenant characteristics; and the types of neighborhoods in which they are located.
- The relative size of their portfolios.
- The criteria they use in selecting which projects from their portfolios to submit to RAD.
- The proportion of their portfolios that they choose to submit to RAD.

The types of projects in RAD will tend to be dominated by the types of projects in the portfolios of medium and large PHAs and the choices they make in proposing projects for RAD. Projects owned by medium PHAs are relatively overrepresented in RAD, whereas projects owned by small PHAs are relatively underrepresented, even though small PHAs participating in RAD submit a higher proportion of their units to RAD (86 percent) than do medium PHAs (60 percent). The underrepresentation in RAD of projects from small PHAs is because of the relative underparticipation of small PHAs in the RAD program (189 out of 2,297, or 8 percent) versus medium PHAs (183 out of 660, or 28 percent) and to the smaller portfolios of small PHAs that

participate in RAD (24,700 units) compared with those of medium PHAs that participate in RAD (106,454 units). Projects owned by large PHAs are also relatively overrepresented in RAD because of the higher participation rate of large PHAs (62 out of 135, or 46 percent) and the large portfolios of those that participate (410,124 units), even though they submit the lowest proportion of their units to RAD (17 percent).

The interaction between PHA participation rates and project characteristics could account for why some factors are significant predictors of whether a project will be in the RAD program but are not significant factors that a PHA uses in selecting particular projects for RAD. For example, the two regressions showed that projects in metropolitan areas are more likely to be in RAD, but PHAs are not more likely to use metropolitan location as a basis for selecting a project for RAD. This discrepancy could be because the RAD program tends to attract PHAs with metropolitan projects, such as medium and large PHAs, and, because most of their projects are in metropolitan areas, they have little room for making project selection on that basis.

Another example is the impact of unit bedroom size (one- and two-bedroom units as a percentage of total units), which reduces the probability of a project being in RAD but is not a factor in project selection. This outcome could reflect the higher concentration of small units within the projects managed by small PHAs and the fact that small PHAs have a lower rate of participation in RAD, even though PHAs do not appear to use that factor in making project selection.

The neighborhood cost-burden rate and neighborhood overcrowding rate both have statistically significantly positive effects on the probability of a project being in the RAD program. That is, as the neighborhood cost burden or overcrowding rates rise, the likelihood that a project would be in RAD increases. Conversely, as the neighborhood cost burden or overcrowding rates fall, the likelihood that a project would be in RAD decreases. Because cost burden and overcrowding measure housing need, this result suggests that the RAD program is serving projects in areas with greater housing need. These variables, however, are less significant as factors that PHAs use in selecting which projects to submit to RAD, which suggests that PHAs may be less inclined to take housing need into account when choosing projects for RAD.

The neighborhood poverty rate and project tenants' median household income have a statistically significantly negative effect on the probability of a project being in the RAD program and on the likelihood that a PHA will select to submit a project to RAD. A PHA is more likely to submit a project to RAD if the project is located in a neighborhood with lower poverty rates. This preference may because higher poverty neighborhoods are less stable. Interviews with PHAs indicate that some PHAs consider the condition of the neighborhood in deciding which projects to submit to RAD. A PHA is less likely to submit a project to RAD if the median household income of tenants residing in the project is higher. This result is counterintuitive, because projects with higher tenant incomes should be more stable. Does higher income indicate the project is in good condition, which is why it can attract and retain higher-income tenants, and therefore less in need of rehabilitation under RAD? Is there instead some other explanation for this result? These relationships can be explored further in the next phase of this study.

4.4. Conclusions

This chapter presented statistical analyses of RAD and non-RAD public housing projects to answer two research questions: (1) What types of projects did PHAs propose for RAD conversion? (2) What factors influenced PHAs to propose particular projects for the RAD program? Answers to these questions provide a partial picture of the potential impact of RAD, because they describe the types of housing, tenants, and communities that the program serves.

One of our major conclusions is that the involvement of a project in RAD is a selective, not a random, process. The types of projects in the RAD program reflect the decisions by PHAs to participate in RAD, the types of projects they have in their portfolios, and their choices of which ones to submit. Several factors influence these choices. Our research team defined RAD projects as public housing projects included in RAD applications, and non-RAD projects as any remaining public housing projects not part of a RAD application. To identify the types of projects being proposed for RAD, the team compared all RAD projects with all non-RAD projects across 31 variables and conducted statistical analyses of their relationships using comparison of means and logit regression.

Our team found that RAD projects are significantly different from non-RAD projects in terms of—

- **PHA size.** Projects owned by medium and large PHAs are more likely to be in RAD, compared with projects owned by small PHA. Small PHAs have lower rates of participation in the RAD program and smaller portfolios compared with medium and large PHAs. Their lower participation could be related to their relative lack of capacity and mixed-finance experience (as noted in chapter 5), the types of projects in their housing portfolio, or other factors. One consequence is that large and medium PHAs have a greater impact on the types of projects submitted to RAD than do small PHAs.
- **Project tenant income.** Projects are more likely to be in RAD if they have tenants with lower median household incomes. Households with lower incomes tend to have greater housing needs. It is possible that PHAs are more likely to apply to RAD if they have projects with these housing needs, or some other factor could be affecting this relationship.
- **Project unit mix.** Projects are more likely to be in RAD if they have a higher mix of units with more bedrooms. Projects with a greater percentage of larger units meet the housing needs of larger families, an underserved segment of the housing market, which could be influencing this outcome. Also, small PHAs tend to have smaller units.[95] The underparticipation of small PHAs in the RAD program could mean that smaller units are underrepresented in RAD. Other reasons alternatively may be responsible for this effect.
- **Urban location.** Projects are more likely to be in RAD if they are located in metropolitan areas. Urban areas tend to have high housing costs, creating a housing need for lower-income segments of the population. As in the case of lower-income tenants and family

[95] According to our analysis of HUD PIC data, small PHAs have an average of 70 percent one- or two-bedroom units in their projects compared with 63 percent for medium PHAs and 64 percent for large PHAs.

units, PHAs may be more likely to apply to RAD if they have projects with these housing needs. For example, medium and large PHAs are more likely to have projects located in metropolitan areas, and they are more likely to participate in RAD.

- **Neighborhood conditions.** Projects are more likely to be in RAD if they are located in neighborhoods with lower rates of poverty (percentage of households living below the poverty threshold), higher housing cost burdens (percentage of income devoted to housing and utility expenses), and greater overcrowding (percentage of households living in housing with more than one person per room). In general, higher housing cost burden and greater overcrowding describe neighborhoods in which residents have a greater need for affordable housing, and lower levels of poverty indicate neighborhoods that are more stable. As in the case of urban areas, PHAs may be more likely to apply to RAD if they have projects located in areas with affordable housing needs and generally favorable conditions for making investments to preserve this type of housing.
- **Project revenues and expenses.** Projects are more likely to be in RAD if they have higher operating subsidies, lower expenses, and lower other revenue per unit. Per-unit capital funding was not statistically significant. Because project operating and capital fund subsidies affect contract rents under RAD, and rent minus expenses determines the feasibility of using debt to finance capital needs, these results could mean that projects are more likely to be in RAD if they are more likely to be financially feasible.

To identify the factors that influenced PHAs to propose particular projects for the RAD program, our researchers compared RAD projects with non-RAD projects owned and managed by participating PHAs with a mixed portfolio, defined as PHAs that have at least one project submitted to RAD and at least one project that was not submitted to RAD (non-RAD). This second analysis used the same set of variables and statistical techniques as the first. We found that PHAs with a mix of RAD and non-RAD projects select which of their projects to propose for RAD on the basis of some but not all of factors associated with the types of projects in RAD, including—

- **PHA size.** Projects are more likely to be in RAD if they are owned by a large or medium PHA, but large PHAs are less likely to select their projects for RAD. Large PHAs have higher ***participation rates*** (percentage of PHAs that have applied to RAD) and larger portfolios. According to our data, the ***project-selection rate*** (a PHA's RAD projects divided by its total projects) is inversely related to portfolio size, whereas the PHA participation rate is positively related to portfolio size. Because of their higher participation rates and larger portfolios, large PHAs have a higher ***representation rate*** in RAD (more RAD projects as a percentage of all RAD projects), and their projects comprise a larger portion of RAD projects even though they tend to select fewer of their projects for RAD.
- **Project size.** Mixed-portfolio PHAs are more likely to select a project for RAD if the project is smaller in terms of the number of ACC units. This preference could be due to the greater challenges a PHA faces when trying to convert a large project, which would have more tenants to relocate, greater rehabilitation needs, and larger financing requirements, or it could be due to some other explanation.

- **Project tenants' median household income.** Participating PHAs tend to choose projects with lower tenant median income. This effect could be because lower tenant income indicates greater housing need, which is affecting their choice, or because of some other factor not included in our analysis.
- **Lower poverty neighborhoods.** Participating PHAs tend to choose projects for RAD that are located in neighborhoods with lower poverty rates. PHAs mentioned the importance of neighborhood stability in their decision whether to pursue RAD. Neighborhoods with lower poverty rates could be deemed more stable, affecting PHAs' choice of projects for RAD, or there could be another explanation for this relationship.
- **Greater neighborhood overcrowding.** PHAs with mixed portfolios tend to select projects in neighborhoods with greater overcrowding (significant at the 10-percent confidence level). Neighborhoods with more overcrowding have a greater need for affordable housing, which may be affecting PHAs' choice of projects for RAD, or there could be another explanation for this relationship
- **Project revenues and expenses.** Projects with higher operating subsidies and lower current expenses are more likely to be selected for RAD. Because projects with higher subsidies would tend to have higher contract rents under RAD, and projects with higher rents and lower expenses would tend to have greater capacity to carry debt, these findings suggest that PHAs could be choosing projects for RAD, at least in part, on the basis of a project's financial feasibility. Some other explanation alternatively could apply. As before, projects with higher other revenue are less likely to be selected for RAD.

The other factors did not have a significant influence on project selection by participating PHAs. For instance, mixed-portfolio PHAs do not appear to choose projects for RAD depending on their metropolitan or nonmetropolitan location, even though this factor is a significant predictor of the type of project in RAD. This result could reflect the limited variability in the metropolitan/ nonmetropolitan dimension of most PHA portfolios—they are either one or the other—leaving little room for PHAs to make project selection for RAD on this basis.

The types of projects in RAD are affected by the PHAs that participate in RAD, the types of projects in their portfolios, and the factors that influence their selection of projects. RAD projects tend to be managed by large or medium PHAs, so the projects they manage have a significant influence on the types of project in RAD. These projects tend to be occupied by lower-income tenants living in family-sized units and in stable (lower poverty) neighborhoods with higher affordable housing needs; thus, they are well suited for preservation and improvement. At the same time, RAD projects tend to have higher operating subsidies, which would mean higher rents under RAD, and lower costs. This combination of higher rents and lower costs would give them greater financing capacity for making improvements to the condition of the project under RAD. Thus, in selecting projects for RAD, PHAs appear to consider tenant housing needs, supportive neighborhood conditions, and adequate project subsidies relative to expenses.

5. Implementation Analysis: Experience of Public Housing Authorities That Participated in RAD

This chapter relies on reported Rental Assistance Demonstration data and the views of our sample of RAD public housing authorities to describe and better understand the experience of those PHAs that applied for RAD, were awarded a Commitment to Enter into a Housing Assistance Payment Contract, and received a RAD Conversion Commitment or went to closing within the year. It is based on an analysis of web survey and interview responses distributed to the PHAs that owned and managed the 24 projects in our RAD sample.[96] The analysis supplements their views with those of other stakeholders, including lenders that have participated in closed RAD transactions and PHAs that have had their RAD CHAPs withdrawn or revoked. It also includes a statistical analysis of various factors that could affect the likelihood that a CHAP will be withdrawn or revoked. This chapter complements the analysis presented in the preceding and following chapters.

The information reported on, analyzed, and discussed in this chapter serves to answer the following research questions, which have been analyzed in previous chapters using different data.[97]

- Why did PHAs choose to participate in RAD?
- What types of projects did they propose for conversion? What factors led PHAs to propose specific properties for RAD conversion? (Also discussed in chapter 4.)
- What other programs (and forms of financing) do PHAs view as alternatives to RAD? What factors influence them to choose one rather than the other?
- For RAD projects that did not make it to closing by the mid-October 2015, what factors prevented the PHA from securing adequate financing?

These questions were also analyzed in the two preceding chapters. Those chapters relied on the tabulation and statistical analysis of quantitative data, including HUD and Census Bureau data. This chapter provides supplemental analysis that captures PHAs' subjective experience with RAD based on survey and interview responses. The findings and conclusions in this chapter support without repeating those in the two previous chapters.

5.1. Summary

As discussed in more detail in this chapter, our analysis found that, for the PHAs that were interviewed, the primary motive for participating in RAD is to augment their capital for rehabilitating or redeveloping their public housing. In other words, these PHAs' main rationale

[96] In our sample of 24 RAD projects, 23 PHAs were represented. Of those, 21 PHAs responded to the web survey and 17 PHAs agreed to be interviewed. Most interviewees were executive directors or assistant directors, and many had other staff members present during the interview.

[97] Chapter 6 will address the research question, "For PHAs that chose not to participate in RAD, what influenced that decision?" The Final Report will address the last research questions pertaining to RAD implementation: "For RAD projects that made it to closing, how many successfully completed rehabilitation on schedule? What factors influenced the ability of a PHA to complete rehabilitation on schedule?"

for RAD participation is to meet their cumulative capital needs, which is the program's primary purpose; however, PHAs have other motives for wanting to use RAD. Some PHAs are interested in RAD to help move their properties out from under public housing programs and into Section 8. Public housing programs have limited resources and heavier regulatory requirements, and Section 8 has more stable funding and enables PHAs to engage in better long-term planning and asset management. Some PHAs are attracted to RAD because of its transformational ability—they want to use it to achieve large-scale conversion of their properties.

RAD is one tool that PHAs can use to finance capital projects. Other HUD financing options include the Capital Fund Financing Program (CFFP), Replacement Housing Factor, Low-Income Housing Tax Credit program, Choice Neighborhoods Implementation (CNI), Community Development Block Grant (CDBG), PHA Mortgaged Transactions (PMTs), and Section 18 Demolition/Disposition. We describe these alternatives in more detail in subsequent sections of this chapter. How do PHAs decide which tool to use? In their interviews, PHAs mentioned four factors that they take into account.

1. The amount of funding they would expect to receive for each option, which includes an analysis of how much debt a project could finance given its expected contract rents.
2. The challenge of meeting the eligibility criteria for each option.
3. The relative ease or difficulty of the process of applying for and completing a transaction for each option, and the PHA's technical capabilities to manage the transaction throughout the process.
4. The ability of each option to support other goals the PHA might have—most importantly for the choice of RAD, the goal of moving their properties out of public housing and into Section 8.

For PHAs contemplating RAD, additional factors influencing their choice of RAD rather than alternatives include their perception of Section 8. Is Section 8 a better program than public housing to support the long-term preservation of their affordable housing? Are their Section 8 rents sufficient to fund their capital needs and make their projects competitive in their market? Another factor involves the scale of change they hope to accomplish; the larger the scope of their effort, the more likely they will be attracted to RAD.

Our analysis examined why some projects lost their CHAP award and failed to close. Seven PHA respondents mentioned the importance of having the technical capacity to conduct the transaction and stakeholder buy-in, especially that of their own staff. Some respondents thought that HUD's responsiveness to the needs of each project was also important to the success or failure of the project. In particular, they pointed to RAD's strict milestones as a cause for their projects losing their CHAPs. They thought the milestones were primarily an artifact of RAD being a demonstration, which had to show results quickly, and operating under a program cap, which gave priority to fast-moving over slow-moving projects.

Statistical analysis showed that a project is more likely to withdraw from RAD or have its CHAP revoked if (1) the project's planned financing is lower; (2) the PHA plans to use less of its own resources and other sources of financing, such as grants; and (3) the PHA plans to use more mortgage debt, 4-percent LIHTC equity, or 9-percent LIHTC equity. Our review of RAD

transactional summaries of 33 withdrawn projects found that loss of financing was the most common reason that they had to withdraw from RAD. Other factors found to affect the risk of dropping out of RAD include having a lower inspection score, being a smaller project (in terms of Annual Contributions Contract units), and having a smaller percentage of elderly residents.

These findings could have several possible explanations, including the effect of factors not included in this analysis. It is possible that projects that drop out of RAD are more vulnerable to losing their financing simply because of their greater reliance on external sources of financing. Those sources, like mortgage debt and LIHTC equity, have more complex underwriting, review, and approval processes and requirements than do internal sources of financing from the PHA or soft funding sources, such as deferred developer fees. The Final Report will explore these possible explanations in greater depth.

As a final note, our interviewees recommended that HUD could improve the RAD program by reviewing the adequacy of Section 8 rents and allowing PHAs to appeal their rents in high-rent markets. They thought that in many cases Section 8 rents were not high enough to support the amount of borrowing needed to meet their capital needs. Some interviewees also recommended that HUD provide more technical assistance and training to PHAs throughout the RAD process and make reforms to streamline and reduce the complexity of the process.

5.2. Reasons PHAs Gave for Participating in RAD

The PHAs in our sample that completed the online survey and participated in telephone interviews provided multiple answers regarding why they applied to the RAD program. Their answers, however, can be reduced to two closely connected underlying motivations—

1. To remove their properties from public housing programs, which left their capital needs unmet and imposed onerous regulatory, management, and reporting requirements.
2. To move those properties into the Section 8 program, which offered not only access to more capital but also improvements to asset and program management, especially if they could consolidate all their housing under this program.

Often, PHAs cited both motivations in describing their reasons for participating in RAD. These PHAs see RAD enabling them to meet the significant capital needs of their public housing projects, which they have not been able to do under current public housing programs because of the downward trend in public housing funding. For some PHAs, it also offered relief from what they perceived as the burden of managing their properties as public housing.

- As one respondent summarized, “Well, my main reason for actually being interested [in RAD] was because of the condition of my public housing units. We definitely needed to do a lot of rehabilitation and just didn’t have the resources to do it. We’ve been fumbling around for years to find monetary resources to get things to work here, to get things done. [RAD] has worked astronomically well for us.”
- Another PHA was more specific: “[We] felt [public housing] funds were diminishing and that RAD would be a more consistent source of funding.” This view was echoed by a second PHA: “Given the funding cuts we have experienced [in public housing], we thought RAD could be more stable.”

- One respondent added that they were attracted to RAD because it "relieved us of the regulatory burden under public housing."

In addition to wanting to get out of public housing, PHAs were also positively attracted to the Section 8 program. Several said that Section 8 offered "an opportunity to streamline their operations" while providing more stable project financing and better capital budget planning. For these PHAs, the long-term predictability of a Section 8 Housing Assistance Payment contract would better enable them to plan for a project's future capital needs, in contrast with public housing's annual funding, which has tended to decline year to year. Conversion to Section 8 also gave some PHAs the chance to capitalize on their existing capacity and experience with Section 8 program administration. As several PHAs commented—

- "[We] already have a fairly large tenant-based Section 8 program. So, providing project-based vouchers [PBVs] seemed like a good match and business decision."
- Section 8 "seems more stable over the long term and the steady cash flow is beneficial."
- Section 8 helps "to simplify management structure to better emulate [the] private-sector housing market."

In several cases, respondents combined both reasons in their explanation of why they chose to participate in RAD.

- "[RAD provided an] opportunity to shift from unreliable public housing to more reliable funding stream of Section 8."
- "[We] thought it was in our best interest that we would understand our income better for the next 15 years [under Section 8] compared with the fluctuation in the Capital Fund and the operating subsidy [under public housing]."

5.3. Types of Projects Proposed for Conversion

The RAD PHAs that spoke with us reviewed the properties in their portfolios before deciding which ones to submit in their RAD applications or whether they even wanted to apply for RAD for any project. According to our interviews, the principal factor that influenced these PHAs to select particular properties for RAD was their evaluation of the physical condition of the property. Most of our respondents mentioned physical condition as a factor in their decision. A smaller number of respondents mentioned two additional factors: (1) their assessment of their ability to obtain adequate financing for making planned improvements to the property, and (2) their evaluation of the suitability of the neighborhood surrounding the property to support major investment in improving affordable housing. As seen in previous chapters, local housing market conditions are associated with the probability of a PHA applying to RAD for a project.

The following analysis suggests that a project's capital needs are an important factor in a PHA's decision to propose a property for RAD conversion; probably the single most important factor for most of the PHAs that we interviewed. Nonetheless, capital needs are not decisive in all cases. In some instances, PHAs are more interested in using RAD to convert their properties to Section 8 to improve project management and, if they can convert all their housing to Section 8, to improve the PHA's overall administrative efficiency.

PHAs also consider the potential financing challenges in choosing a project for RAD. They do not necessarily avoid projects that have complicated financing; however, they do take into account what financing strategies are likely to be workable when they choose projects for RAD, including how much debt the project can carry, whether they need 4-percent or 9-percent LIHTC to augment resources beyond what they can borrow, and what their prospects would be for obtaining LIHTC financing. PHAs recognize the amount of debt a project can afford to finance, given its RAD rents and operating expenses, as a key constraint driving project financing strategies. The project's contract rent under RAD is determined as the sum of the operating subsidy, capital fund allocation, and tenant payment received by the project before RAD. PHAs argue that in high-cost markets this rent will not be sufficient to finance major rehabilitation costs, compelling the project to find other sources of financing in addition to debt, such as tax credits and grants.

Finally, some PHAs mentioned that they evaluate locational factors, including the advantages of the neighborhood surrounding the project, when they decide which projects to apply for RAD conversion. They recognize that RAD projects operate in a more competitive environment than public housing, because of pressures to repay debt and comply with LIHTC requirements. To ensure a project's success, they evaluate the advantages and disadvantages of the local market area.

In considering the physical condition of a property, not all PHAs made the same judgment call. Many PHAs chose properties with significant capital needs, which are what the program was primarily designed to address. For instance, one PHA noted that they "selected properties that were older and in disrepair" because such properties would have capital needs that could be addressed through RAD. Another said they looked at "properties that were already planned for teardown and replacement, and would have to be replaced through new construction." On the other hand, other PHAs said they selected projects that had no or very limited capital needs.

Responses to the web survey indicated the seriousness of the physical problems that some PHAs were trying to address in the projects they proposed for RAD (see table 40). These physical problems included—

- Failing to meet handicap accessibility requirements (as defined in Section 504)—three PHAs (more than 14 percent).
- Presence of lead-based paint hazards—four respondents (more than 19 percent).
- Other deterrents, such as units that are too small or that have been vandalized—eight respondents (more than 38 percent).

A large number of the RAD PHAs that responded to our survey—eight, or more than 38 percent—thought that some or all of the units in the projects they proposed for RAD conversion were in urgent need of rehabilitation to remain viable.

Table 40. Condition of Projects Before RAD Conversion (RAD Sample Survey)

	Prior to your participation in the RAD program, did your PHA meet HUD's Section 504 requirements (as defined at 24 CFR 8.4, 8.24, and 8.33)?		Prior to the RAD conversion, were there lead-based hazards present at this project?		Prior to the RAD conversion, were there project/unit deterrents such as small units, vandalism, etc., present at units covered by this CHAP?		Did you consider some or all of the units under this CHAP to be "at risk" prior to the RAD conversion (that is, in urgent need of rehabilitation to remain viable)?	
Yes	17	80.95%	4	19.05%	8	38.10%	8	38.10%
No	3	14.29%	16	76.19%	13	61.90%	13	61.90%
Blank	1	4.76%	1	4.76%	0	0.00%	0	0.00%
Total	**21**	**100.00%**	**21**	**100.00%**	**21**	**100.00%**	**21**	**100.00%**

CHAP = Commitment to Enter into a Housing Assistance Payment Contract. HUD = U.S. Department of Housing and Urban Development. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Web survey responses—23 PHAs solicited; 21 responded to this question

Table 40, however, also reveals that although these cases of extreme need were numerous, they were not in the majority. For each physical problem included in our survey, most of the PHAs among our respondents indicated that the projects they proposed for RAD conversion did not have the problem, and more than 60 percent thought their projects were "not at risk." A lack of serious problems does not mean that a PHA would not want to use RAD for rehabilitation purposes. It does suggest, however, that many PHAs do not view RAD as a tool for addressing only serious capital needs.

As seen in table 41, the conversion plans of the RAD PHAs who responded to our web survey reflect the primary intent of the RAD program, which is to enable PHAs to meet their needs for rehabilitation and construction. Of 19 respondents, 15 (almost 80 percent) planned to rehabilitate their projects, followed by 5 (25 percent) who planned to replace their current housing and 4 (20 percent) who planned on new construction.[98] One sees a similar response rate for tenant relocation, which is directly related to the degree to which a project is being renovated or rebuilt. Of the respondents, 16 (more than 80 percent) plan to relocate their tenants. Most respondents (11, or about 58 percent) expect to relocate them temporarily, but a large minority (5, or more than 26 percent) expects that at least some of their tenants will relocate permanently.

Not all PHAs, however, were interested in using RAD to meet the capital needs of their projects. One PHA (5 percent) planned to use RAD to refinance the debt on their project. This PHA is the same one that selected a project that had already been rehabilitated through CFFP. Two PHAs (10.5 percent) said they planned to transfer the RAD subsidy to other projects. Four PHAs (more than 21 percent) said they planned to perform other actions on their projects that did not include rehabilitation, demolition, replacement, or new construction.

[98] Respondents could provide multiple responses, because these activities are not mutually exclusive. Also, some of the PHAs had multiple projects or multiple applications.

Table 41. Planned Activities for RAD Conversion (RAD Sample Survey)

What activities do you plan to conduct as part of your RAD conversion?		
Rehabilitation	15	78.9%
Replacement	5	26.3%
New construction	4	21.1%
Refinance	1	5.3%
Transfer RAD subsidy to other projects	2	10.5%
Demolition	4	21.1%
Temporary relocation	11	57.9%
Permanent relocation	5	26.3%
Other	4	21.1%
Total respondents	**19**	

RAD = Rental Assistance Demonstration.
Note: Respondents could indicate multiple answers.
Source: Web survey responses—23 PHAs solicited; 21 participated in the survey; 2 did not respond to this question

Some of the interviewed PHAs were clearly less interested in using RAD to finance rehabilitation or construction than using RAD to convert their properties to Section 8. These PHAs are attracted to RAD because they view Section 8 as providing a better platform than public housing for managing their properties. In selecting properties for RAD, these PHAs preferred properties that had minimal capital needs. As one PHA noted, in choosing which property to propose for RAD, they considered properties "that could easily convert to RAD because they did not require major upgrades or rehabilitation." Another PHA said they selected properties "that had already been rehabilitated through CFFP in the past decade" and did not need additional rehabilitation.

Some of our interview respondents mentioned that in choosing a project for RAD they took into account the project's chances for obtaining financing. The most important issue for these PHAs was not debt financing but equity financing, particularly through the LIHTC program. One PHA explicitly said they chose their property because they "had already submitted a tax credit application." Another selected their project because they "felt [it] had a good chance of receiving tax credits."

Table 42 confirms the use of LIHTC as a means of financing for some RAD projects. This table shows the sources of financing that the PHAs who responded to the web survey said they planned to use for their RAD conversions: Federal Housing Administration insurance, public debt, private debt, 9-percent LIHTC equity, 4-percent LIHTC equity, public housing funds, and other (which includes grants and deferred developer fees). It is not surprising that most of our respondents (13, or 65 percent) plan to use public housing funds as a source of capital for their RAD projects. We were surprised at the relative balance in the number of respondents that plan to take on debt and the number that plan to use LIHTC equity. Four respondents (20 percent) said they planned to take out a commercial loan (private debt), three (15 percent) planned to borrow with FHA insurance, four (20 percent) planned to use 9-percent LIHTC, and four (20 percent) planned to use 4-percent LIHTC.

RAD is designed to enable projects to use long-term Section 8 contracts to finance borrowing, which many do; however, RAD also allows these projects to obtain outside equity investors through the tax credit program. This option has become important for many projects, and it is one that PHAs seriously consider in choosing which projects to submit to RAD.

Table 42. Planned Sources of Capital (RAD Sample Survey)

What sources of capital did your PHA pursue for RAD?		
FHA insurance	3	15.0%
Public debt	0	0.0%
Private debt	4	20.0%
9% LIHTC equity	4	20.0%
4% LIHTC equity	4	20.0%
Public housing funds	13	65.0%
Other	5	25.0%
Total respondents	**20**	

FHA = Federal Housing Administration. LIHTC = low-income housing tax credit. RAD = Rental Assistance Demonstration.
Note: Respondents could indicate multiple answers.
Source: Web survey responses—23 PHAs solicited; 21 participated in the survey; 1 did not respond to this question

Finally, some of the interviewed PHAs considered the location of the property as a factor in their selection of projects for the RAD program. These PHAs pointed out that they preferred to propose properties for RAD that are located in "relatively stable neighborhoods." As one PHA mentioned, they "determined [if the current location] would be a good place to invest resources in preserving affordable housing, and that would support sustainable redevelopment by enabling the property to maintain a high occupancy rate."

5.4. PHA Views of Alternatives to RAD

When asked, the PHAs that were interviewed said that before they applied for RAD, they considered other options for meeting their capital needs, including—

- **Capital Fund.** Provides funds annually to PHAs for the development, financing, and modernization of public housing developments and for management improvements. The Capital Fund is the mainstay program that all PHAs can access for funding public housing capital needs. It is included for the sake of completeness but is not discussed in this report as an alternative to RAD. In 2014, HUD provided about $1.8 billion in Capital Fund grants to PHAs, or about $1,500 per unit of public housing per year (OMB, 2014b).
- **CFFP.** Under this program, a PHA may borrow private capital through either a bond or a conventional bank loan to make improvements to its public housing in return for pledging a portion of its future annual capital funds to cover the debt service payments on the borrowing. All pledges are subject to the availability of appropriations. A PHA generally can pledge no more than 33 percent of its current annual Capital Fund grant and up to 100 percent of any projected RHF grants for debt service payments. PHAs pursuing any type of CFFP transaction must follow all statutory and regulatory requirements related to the Capital Fund grant program. From 2000, when it began, to 2014, the CFFP program

approved 181 proposals for $3.8 billion in capital resources, not including refinance transactions. This total represents an average of $273 million per year and $21.1 million per project.[99]

- **LIHTCs.** PHAs whose capital improvement needs exceed their available resources can apply to HUD for approval to use Mixed-Finance Modernization in conjunction with CFFP. They bridge this funding gap by obtaining either 4-percent or 9-percent tax credits. LIHTC allows investors to receive a credit against federal tax owed in return for providing funds to developers to help build or renovate housing. In return, this housing must be rented to lower-income households for an initial compliance period of 15 years, and possibly for a subsequent extended use period of 15 more years. These tax credits are a form of equity. PHAs that use the LIHTC program have no financial obligation to pay a return on this equity; however, they commit to keeping LIHTC-funded projects in compliance with program requirements. The two types of tax credits are (1) a 9-percent credit on construction and rehabilitation costs and (2) a 4-percent credit on acquisition costs and all development costs partially using below-market financing. The LIHTC program accounted for about $7 billion in tax expenditures in 2014, including expenditures for past and current tax credit projects (CBO, 2015). According to one recent estimate, $778 million in federal tax credits was allocated in 2015 (Novogradac, 2015).[100]
- **RHF Funds/Demolition and Disposition Transitional Funding.** These funds are Capital Fund grants awarded to PHAs that have removed units from inventory for the purpose of developing new public housing units. A PHA may only develop or acquire public housing rental units with RHF funds. All replacement housing must be undertaken in accordance with public housing development regulations. RHF/DDTF funds do not increase a PHA's capital funds; rather, they prevent the PHA from losing funds when removing units from its inventory. A PHA receives approximately the same amount of RHF for the units removed from its inventory that it would have received in its Capital Fund formula if the units were still operating.
- **PMT.** Under Section 30 of the United States Housing Act of 1937,[101] PHAs may mortgage or otherwise encumber their public housing real estate and other property to secure financing transactions, which is defined as PMT.
- **CDBG program.** The CDBG program is a flexible formula grant program that provides communities with resources to address a wide range of unique community development needs, including ensuring decent, affordable housing. The program allows states and local governments to use CDBG funds to eliminate blight through grants, direct loans, loan guarantees or other forms of credit enhancements, or rental assistance for low-income households. In 2014, HUD obligated $3.15 billion for more than 1,200 CDBG formula grants to states, local governments, and insular areas (OMB, 2014b).

[99] Information from HUD's Office of Public Housing Investments.
[100] Estimates excluded nine states and territories.
[101] Pub. L. 75–412.

- **CNI Grants.** CNI grants are intended to help communities transform distressed neighborhoods and public and assisted projects into viable and sustainable mixed-income neighborhoods by linking housing improvements with appropriate services, schools, public assets, transportation, and access to jobs. HUD received an appropriation of $90 million for CNI grants in 2014 (OMB, 2014b).
- **Section 18 Demolition/Disposition.** Demolition/disposition is a management strategy option for public housing developments that have difficulties associated with physical deterioration or the overall deterioration of the surrounding community, or that were built to a standard that is no longer acceptable for the general public.

Of course, all PHAs are familiar with the Capital Fund program, which is the annual subsidy they receive from HUD for their public housing. Their main comment about the Capital Fund program is that funds have been declining and do not meet their capital needs. Most of the RAD PHAs that spoke with us said they were familiar with some or all of the other programs. Many had experience with the mixed-finance programs, including CFFP and PMT. According to responses to the web survey, nine PHAs (almost 43 percent) have borrowed funds to acquire, rehabilitate, replace, construct, or refinance a public housing project. Slightly more than one-half (11, or 52.4 percent) had no such experience (see table 43).

Table 43. Experience With Borrowing Funds (RAD Sample Survey)

Has your PHA previously borrowed funds to acquire, rehabilitate, replace, construct, or refinance a public housing project?		
Yes	9	42.9%
No	11	52.4%
No response	1	4.8%
Total responses	**21**	**100.0%**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Web survey responses—23 PHAs solicited; 21 responded

The PHAs that were interviewed did not provide an extensive overview of each program. Some, however, did offer comments on select programs, particularly CFFP, RHF, PMT, and Section 18 Demolition/Disposition. Some PHAs mentioned that they had used private/mixed-finance under Section 30/35 in the past. They had considered using RHF funds, "but [it was] not enough for complete demolition and new construction, or … anything else." A second PHA noted that they lost their Section 18 Demolition/Disposition funding for one project and "the only other options to perform the necessary rehabilitation were RAD or CFFP. Since CFFP requires a declaration of trust, we decided to go with RAD." Another PHA added, "With our Choice Neighborhoods grant, we have been working on a planning grant for 4 years. Four years later and we are still planning and trying to get the application together. So there is really no comparison [with RAD] to that experience." Finally, one PHA noted that CFFP "was something they could have used if they needed it but … it would just create another layer of debt and … if [public housing] funding was dwindling, how could the housing authority guarantee payments on what it had borrowed?"

In their views, the PHAs we spoke with thought that these alternatives to RAD had the following limitations.

- Some of the alternatives did not provide as much financing as they could get through RAD for their particular project. For instance, RHF provided less financing, which could be the result of the limited amount of funding available through these programs.
- Compared with RAD, some of the alternatives were more difficult to qualify for. For example, Section 18 Demolition/Disposition was singled out as a program that provides a lot of funding to support new housing construction but is usable only for the most severely deteriorated housing projects and cannot be used by most of the housing that uses RAD.
- Some of the alternatives were more complicated and time-consuming to complete than RAD, such as CNI. Few of the PHAs who have gone through the RAD process described it as simple or trouble-free. Several noted, however, that alternative programs to RAD can suffer from similar or even worse complications.
- Compared with RAD, some of the alternatives did not address more fundamental issues, such as declining public housing funding and the ongoing burden of complying with public housing regulations. For example, CFFP is probably the closest alternative to RAD in terms of enabling PHAs to borrow to raise the capital needed to improve their public housing. For PHAs that want to move their properties out of public housing and into Section 8, however, RAD would be the preferred option.

5.5. Factors That Influenced the Choice of RAD Rather than Alternatives

From the preceding discussion, it is clear that HUD offers PHAs an array of options for meeting the capital needs of their public housing. Moreover, PHAs are well aware of these options, although a high percentage have no experience with the most innovative options HUD has to offer. Like RAD, several options allow PHAs to borrow against future cashflows. Some options allow PHAs to access LIHTCs as a financing source for renovation and new construction. Given these similarities between RAD and alternative financing programs, the question arises: How do PHAs decide among the alternatives? Several interview questions asked PHAs to evaluate how RAD compares with other public housing programs that also help PHAs fund improvements to their properties. How do they weigh RAD's advantages against its disadvantages? Would they use RAD again if they had the opportunity? Would they recommend that other PHAs use RAD if it were made available? Their answers enabled us to identify the factors that influence PHAs' choice of RAD rather than alternative means of project financing.

5.5.1. Ease Versus Difficulty of Use

HUD has made a major investment in the RAD program with the development of explanatory materials, guides, webinars, tools, and templates and the recruitment and training of staff. By developing the infrastructure for the program, this investment should have made it easier to use for the PHAs. PHAs gave conflicting opinions in this area, however. Some PHAs that were interviewed described RAD as easier to work with compared with other public housing programs. Although the RAD conversion process could be long and complicated, these PHAs thought that, compared with the alternatives, the RAD application, approval, and closing process was less time-consuming and easier to maneuver through. According to one PHA, "The timetable is longer than some other programs. But RAD is not the longest, as we have done a

CFFP project before, which took longer." Another respondent noted that "The application process was straightforward and very easy. For example, the estimator tool was straightforward, and the models were easy to use." Several respondents stated that "the [RAD] application part … was very easy" and "an easier tool to work with compared to other HUD options." Working with HUD staff also received high marks. As one PHA said, "up through closing, [our] expectations were that working with HUD would be difficult, but HUD ended up being very easy to work with and it was clear that HUD was motivated to make it work."

From the opposite point of view, several PHAs mentioned the difficulties they had with the RAD process. At the extreme, one PHA stated, "[The] whole process was cumbersome and complicated …. No one knew what anyone was doing." The problems that these PHAs discussed included excessive data requirements due to data collection templates that duplicated information available elsewhere. The Physical Condition Assessment was faulted for being too long, complicated, and expensive, compared with what was needed. One PHA recommended that HUD "could have used a tailored rent and assessment tool." Another PHA opined that the "property assessment documentation could be simplified." Excessive data demands increased the cost of participating in the program, which especially impacted smaller PHAs, according to one source.

For the most part, these complaints appeared to relate to the fact that RAD was just beginning. As one PHA commented, RAD "was brand new. Not sure how much [these problems] could have been avoided." Another PHA opined, "It's a demonstration program, which means they don't have everything worked out." Another startup issue involved changes to the program without adequate direction from HUD. For example, as one PHA noted, HUD "opened [RAD] up to the use of tax credits as a means of doing new development, which is fine except that they had people … who had no experience in what tax credits mean and how they operate. This caused us an enormous delay." These complaints may have reflected these PHAs' relative lack of experience with mixed-finance transactions overall, which are complicated and not always easy to complete.

Every PHA that was interviewed responded that despite any problems they may have had with the early implementation of RAD, they would choose to apply for RAD again if given the chance. Several PHAs noted that they already have submitted additional applications to RAD. One PHA summarized a common sentiment by responding, "Yes, despite doubts in the beginning, we are even more convinced [that we would use RAD again] as we have gone through the program."

5.5.2. Technical Capacity

Whether they considered RAD easy or difficult to use compared with alternative programs, PHAs recognized that they needed adequate technical capacity to successfully participate in the RAD program. In particular, PHAs thought they needed the capacity to develop a viable RAD application, work with HUD to obtain CHAP approval of their conversion strategy, secure legal support to complete the closing process, and provide for the long-term management of the property under the HAP contract. In addition, in many cases the PHAs also thought they needed the capacity to find financing sources and negotiate complicated financing requirements, line up one or more capable developers, manage tenant relocation, and oversee contractors in the performance of the required rehabilitation or construction work.

About one-half of the PHAs indicated that they lacked sufficient internal capacity to use the RAD program effectively. To augment their capacity, they mostly hired outside consultants who helped prepare their RAD applications and later helped implement the RAD conversion (see tables 44 and 45). The types of consultants used varied from financial advisors for the application submission, CHAP award, RCC, and closing stages to development companies at the construction and occupancy stages. As one PHA recognized, "[We] have a development partner that works with us. They were the leading force in helping us with this RAD conversion. We just did not have the capacity to do it ourselves." Although few survey respondents relied on HUD staff, in those situations in which HUD assigned technical assistance consultants to support PHAs in the RAD process, PHAs considered those consultants to be helpful. As one PHA expressed, "just the fact that HUD did give us a consultant on top of the contact person at HUD was an advantage." Another added that "HUD assigning consultants to RAD agencies is the way to go."

Regarding the need for more training, one PHA noted, "Before any housing authority applied for RAD, it would have been good for someone on a state or regional level to give a good workshop on what to look for when partnering with a developer. There are developers out there now that can easily take advantage of a housing authority because they—the developers—know what they are doing but the housing authorities don't." Without adequate training for their own staff, PHAs thought that they had no other choice but to hire outside consultants, which made the program more costly. Some PHAs also thought that HUD staff could have used more training on the RAD program.

Table 44. Use of Outside Assistance (RAD Sample Survey)

Did your PHA complete its own applications?		
Yes, in its entirety	11	52.4%
Yes, partially (with outside assistance)	9	42.9%
No, relied on outside entity	1	4.8%
Total responses	**21**	**100.0%**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Web survey responses—23 PHAs solicited; 21 responded

Table 45. Type of Outside Assistance (RAD Sample Survey)

If PHA relied on outside assistance, what type of entity was used?		
HUD field office only	0	0.0%
HUD HQ only	0	0.0%
Consultant/vendor only	8	80.0%
HUD field office, HQ, and consultant/vendor	2	20.0%
Total responses	**10**	**100.0%**

HQ = headquarters. HUD = U.S. Department of Housing and Urban Development. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Notes: Answers conditional on a "yes" response to previous question. Total of 11 "yes" responses to previous question received; 1 "yes" respondent did not answer this question.
Source: Web survey responses

5.5.3. Perception of Section 8

Overall, the RAD PHAs that were interviewed saw more advantages than disadvantages to Section 8, compared with public housing. The ability to convert to project-based Section 8 was the one feature of RAD that made it more attractive to these PHAs. They were pleased with Section 8 for giving them the ability to borrow against a property to finance immediate and longer-term capital

needs and improvements. In addition, these PHAs appreciated Section 8 because it enabled them to use project resources more efficiently by managing their property according to commercial methods, such as building up project reserves to cover future capital needs. One PHA mentioned that "In the future, when and if capital improvements are needed, the funding stream [from project reserves will be] more consistent" with RAD. Some PHAs also perceived the benefit of simplifying their internal operations by consolidating their assets into a single program—Section 8—with simpler reporting requirements than those of public housing. Other PHAs emphasized the benefit of Section 8 in providing them with more flexibility in the management of their affordable housing assets. One PHA said, "The government … does a poor job managing property. You want to get to a place where government is writing checks, but not managing property."

PHAs also liked that Section 8 allowed them to engage in more predictable long-term project planning, as the Section 8 subsidy contract offers a long-term and more reliable revenue stream. As one PHA noted, "Public Housing is difficult to plan …. [W]ith RAD, at least I can plan." Another PHA added, "Previous funding [under public housing] was subject to cuts in funding. RAD allows long-term planning … [and] a more solid financial platform." It helps PHAs preserve their affordable housing by leveraging Section 8 subsidies to improve the quality and reduce the operating costs of that housing. One PHA noted that they have "the ability to maintain units as low-income housing … [and] to leverage the subsidy coming in to renovate and rehabilitate the properties. [We] did not have the ability to do that with the capital fund and operating fund." Another PHA added, "Over time being able to borrow on the properties … locks in our energy efficiency improvements over [the] long term."

Finally, a few PHAs thought that, through Section 8, RAD offers tenants more affordable housing options, including housing choice vouchers. "Converting it to project-based [Section 8] also gives residents the option one year after they are in the program … to [request a PBV to] move into the private sector."

Although most PHAs interviewed were pleased with the level of support their project received through Section 8, some PHAs mentioned that Section 8 rents were lower than they expected. Insufficient Section 8 rents seemed to be a more serious problem in higher rent markets. As noted by one PHA, "HUD sets the contract rent … but we are in a nice community and can command a higher market rent for a one bedroom.… So, a number of residents [are] financially qualified to move in. But their Total Tenant Payment—their 30 percent [of income]—is higher than the contract rent, so they have to pay market rent." This same PHA qualified this problem by admitting that "[W]e knew this process going in, and are still getting more from the tenant rent than what we are missing out on [under public housing]." In other words, their RAD Section 8 rents may be below market rents, but RAD still enabled the PHA to increase the cashflow on the property. This situation is not so much a disadvantage of RAD as recognition that RAD could be even more advantageous if RAD Section 8 rents were determined more flexibly. Several PHAs did note, however, that the delay in the start of Section 8 funding to the PHA in the first partial year after conversion caused temporary cashflow problems.

All respondents said they would recommend that other PHAs convert their properties to RAD, primarily because the Section 8 HAP payment is a more reliable and stable source of project support than public housing operating or capital funds, other sources of redevelopment funding are inadequate, and RAD can help recapitalize and preserve their properties.

5.5.4. Access to Capital

One of our more interesting findings involves PHAs' expectations about the amount of financing available for their projects under the RAD program. Few of the respondents to our web survey appeared to be disappointed with the amount of funding they were able to raise through RAD—only two (less than 10 percent) indicated that funding was less than they expected. Most respondents—12 out of 21 (or more than 57 percent)—thought RAD met their funding expectations, and 5 respondents (about 24 percent) thought that the funding they received under RAD exceeded their expectations (see table 46).

Table 46. Expectations of Total Combined Funding (RAD Sample Survey)

How does the total combined sources of funding compare to your PHA's expectation?		
More than expected	5	23.8%
About the same as expected	12	57.1%
Less than expected	2	9.5%
No response	2	9.5%
Total responses	**21**	**100.0%**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Web survey responses—23 PHAs solicited; 21 responded

On the other hand, only four respondents (19 percent) think they have obtained more funding under RAD than they could have obtained through other programs. The largest number, nine (almost 43 percent), think RAD provides the same amount of funding as they could get elsewhere, and four (19 percent) think they are getting less financing from RAD than they could through other means (see table 47). These views appear to contradict an objective of RAD, which is to provide additional funding for capital improvements; however, they also could reflect the wide range of reasons that PHAs have given for applying for RAD, aside from getting access to more capital funds. As already discussed, these reasons include the ability to take advantage of better planning and asset management opportunities under Section 8. The responses also reflect the range of conversion options being pursued by our PHAs, not all of which proposed to raise large amounts of capital financing for their projects. Finally, these views could reflect the sense of some PHAs that their RAD contract rents are too low, which would limit the amount of debt financing that their projects could carry if they had higher rents.

Table 47. RAD Funding Compared With Other Programs (RAD Sample Survey)

How do you think the amount of financing obtained through RAD would compare to financing available through other programs?		
More than available through other programs	4	19.0%
About the same	9	42.9%
Less than available through other programs	4	19.0%
No response	4	19.0%
Total responses	**21**	**100.0%**

RAD = Rental Assistance Demonstration.
Note: Question identified the Capital Fund Financing Program, HOPE VI, and other mixed-finance programs as the alternative programs to compare with RAD.
Source: Web survey responses—23 PHAs solicited; 21 responded

5.5.5. Large-Scale Conversions

Some PHAs mentioned that a major advantage of RAD over alternative programs was that RAD gave them the ability for large-scale conversions. Most respondents said they submitted only 1 or 2 applications (14 PHAs, or 87 percent) and received a comparable number of CHAP awards (9, or 60 percent). HUD's RAD program data showed their numbers were slightly off—only 12 PHAs from our sample (58 percent) submitted 1 or 2 applications, and 13 PHAs (62 percent) received a CHAP award. Several PHAs submitted multiple RAD applications and received multiple CHAPs, however; 1 PHA submitted applications for 23 projects. Of our sample, four PHAs (19 percent) received "portfolio awards," which are single awards to convert multiple projects to RAD (see tables 48, 49, and 50).

The goal of PHAs that submitted multiple applications or portfolio applications was to use the RAD program to convert as much of their public housing to RAD as they could. As one PHA noted, "We were moving away from public housing for a number of years." Another PHA said, "It was easier from an operational standpoint to move [all] properties through the RAD conversion." Others tested RAD on a few of their properties and said they planned to convert the rest of their portfolio later if it proved successful. For these PHAs, RAD provided a vehicle for getting out of public housing. One PHA noted, "I am actually converting my complete [housing] portfolio into RAD."

Table 48. Number of RAD Applications Submitted (RAD Sample Survey and Program Data)

How many RAD applications did your PHA submit?	Survey Responses		RAD Program Data	
One	9	42.9%	6	29%
Two	5	23.8%	6	29%
Three	3	14.3%	1	5%
Four	2	9.5%	4	19%
Five	1	4.8%	1	5%
More than five	1	4.8%	3	14%
Total responses	**21**	**100.0%**	**21**	**100%**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Sources: Web survey responses—23 PHAs solicited and 21 responded; RAD program data for 21 PHAs that responded to the survey

Table 49. Number of CHAPs Received (RAD Sample Survey and Program Data)

How many CHAPs did your PHA receive?	Survey Responses		RAD Program Data	
One	6	40%	6	29%
Two	3	20%	7	33%
Three	1	7%	1	5%
Four	2	13%	3	14%
Five or more	3	20%	4	20%
Total	**15**	**100%**	**21**	**100%**

CHAP = Commitment to Enter into a Housing Assistance Payment Contract. PHA = public housing authority.
RAD = Rental Assistance Demonstration.
Sources: Web survey responses—23 PHAs solicited and 15 responded; RAD program data for 21 PHAs that responded to the survey

Table 50. Number Receiving Portfolio Award (RAD Sample Survey and Program Data)

Did your PHA receive a portfolio award?	Survey Responses		RAD Program Data	
Yes	11	52.4%	4	19%
No	9	42.9%	17	81%
Response unclear	1	4.8%	0	0.0%
Total	**21**	**100.0%**	**21**	**100%**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Web survey responses—23 PHAs solicited, 21 responded, and 1 response was unreadable; RAD program data for 21 PHAs that responded to the survey

5.6. Factors That Influenced Why RAD Projects Did Not Close

To analyze the factors that influence why some RAD projects did not complete closing, our research staff asked the sample of RAD PHAs to describe their perceptions of the barriers and success factors to completing the RAD conversion process.[102] Because no projects in our sample have had their CHAPs withdrawn or revoked, our project staff also interviewed seven PHAs that had withdrawn or had their RAD CHAP award revoked about the reasons their projects did not close.

5.6.1. Perceived Barriers to Completing the Conversion Process

Respondents were split almost down the middle as to whether barriers emerged to completing the conversion process. In the online survey, nine respondents (almost 43 percent) reported encountering no barriers to their participation in the RAD program. By contrast, eight respondents (38 percent) indicated that the most significant barrier to participating in RAD was lack of program understanding, and six (29 percent) indicated that it was lack of information from HUD. These informational barriers often occur when a new program launches and can be solved through better program management or technical assistance by HUD and outside consultants. Less easily addressed are barriers that are internal to a PHA. Although no PHAs mentioned resistance from their board of directors as a barrier to participation in RAD, four respondents (19 percent) identified resistance from their own staffs as a barrier, one (about 5 percent) mentioned resistance from residents, and one (about 5 percent) mentioned local political challenges. This issue arose again when the interviewed PHAs noted the need for stakeholder buy-in. No other significant barriers were indicated (see table 51).

[102] At the time of our analysis, 22 of the 24 projects in our sample had completed closing.

Table 51. Barriers to Participating in RAD (RAD Sample Survey)

Did you encounter any of the following barriers in participating in RAD?		
Local political challenges	1	4.8%
Soft local market demand	0	0.0%
Lack of understanding of program requirements	8	38.1%
Lack of information from HUD	6	28.6%
Inability to obtain additional funding	1	4.8%
Residents' resistance	1	4.8%
PHA board of directors resistance	0	0.0%
Internal PHA staff resistance	4	19.0%
Other	1	4.8%
None	9	42.9%
Total respondents	**21**	**100.0%**

HUD = U.S. Department of Housing and Urban Development. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Web survey responses—23 PHAs solicited and 21 responded; respondents could indicate multiple answers; total number of responses = 31

In their interviews, PHAs repeated these same barriers to completing RAD conversion: inadequate training and capabilities on the PHA's part and insufficient information and support from HUD. The imposition of sometimes burdensome processes and requirements only exacerbated these barriers. In addition, some PHAs included their low RAD contract rents, as described in Sections 5.5.3 and 5.7.1, as a barrier to RAD conversion. One PHA stated, "Funding on the backend [that is, through the Section 8 contract] was the most difficult aspect and we did not receive the level of assistance from HUD we thought we were going to receive."

5.6.2. Perceived Success Factors to Completing the Conversion Process

Interviewees were asked what they did to ensure completion of their projects. The primary factor to successful conversion that most PHAs mentioned was building the technical capacity to carry the transaction all the way through to closing. They achieved this capacity either by recruiting and training knowledgeable staff members or by hiring experienced consultants. One PHA mentioned the importance of "investing in training so staff can acquire the skills needed for successful implementation." These skills include learning to "think and speak about [their housing] as a commercial asset that has to be leveraged and maintained." Some PHAs recognized the importance of a financial consultant "to guide [the project along] and have creative ideas to make the project work." Other PHAs mentioned the importance of managing the project timeline by starting tasks early and paying close attention to deadlines. The specific time-sensitive tasks they discussed included organizing the relocation team ahead of time and getting qualified for tax credit purposes, "which was a much bigger task than anticipated," according to one PHA.

The second factor to success was stakeholder buy-in. Stakeholders include the board of directors, residents, city officials, and congressional staff members. Probably most important is "getting buy-in from all staff to commit to the project." To obtain buy-in, PHAs would brief staff and their board of directors, conduct outreach to residents, and meet with city officials and congressional staff to provide information on their plans for RAD and their progress during the RAD process. One PHA commented, "The key is the right partnerships for the housing authority, to make sure they get connected with the right kind of developer, the attorney, the consultant, who all have a focus on prioritizing the residents."

5.6.3. Experience With Having CHAP Withdrawn or Revoked

None of the projects in our sample have had their CHAPs withdrawn or revoked. To obtain insight into the factors that could cause a project to drop out of the RAD program, our research staff conducted separate interviews with the Executive Directors and Development Directors of seven PHAs that had withdrawn or had their RAD CHAP award revoked. These PHAs were selected from the current list of RAD withdrawals and revocations. The selected projects represented PHAs that were small, medium, and large in size and located in various parts of the country. Two projects lost their CHAPs when they failed to obtain LIHTC financing. The other five lost their CHAPs due to local zoning and approval issues.

Our interviewees identified two principal reasons for the withdrawal/fallout of their projects from the RAD process: (1) unworkable milestones and (2) inadequate preparation.

- Many of these seven PHAs thought that the milestones established by HUD for the conversion process, especially the 180-day financial plan milestone, were too aggressive, and they were unable to meet them. They did not have enough time to complete their financing requirements in time to qualify for an RCC. As one PHA said, "if there were no time constraints we would have held on to our CHAP award and continued with the process until we had successfully achieved our financing commitments for the developments."
- Some of these seven PHAs admitted that in order to compete for the fixed number of CHAP awards available and not miss this limited opportunity to convert their units, they had applied to RAD before they were certain that conversion of their property would be financially feasible. They had conducted preliminary analyses to position their application in the queue and win approval from their board of directors. After they received the CHAP award, however, additional analysis revealed that their project was financially infeasible or their board was not comfortable with the possible impact of RAD conversion on the PHA.

Most of the seven PHAs said they had worked with outside consultants to complete their RAD application and develop their RAD development and financing plans. They also said the HUD RAD program staff and the local field office staff were helpful throughout the process, even though they eventually lost their award. They acknowledged that it is the PHA's responsibility to conduct their own due diligence, manage their applications and awards, and overcome any obstacles to completion of conversion.

Despite their negative experience, these seven PHAs made positive observations about the RAD program. They thought it could be a great tool for raising capital for the renovation or redevelopment of their projects. Many expressed the desire to reapply for RAD at a later time if possible. These PHAs, however, thought that RAD was hampered because it was a demonstration. The tight timelines might not exist—or might not be as stringent—if the program were made permanent. In their view, the main purpose of these deadlines was to enable HUD to reallocate the limited number of RAD units from faltering projects to other projects that were more likely to meet their deadlines. If the program were made permanent, PHAs could pursue transactions with more complicated financing options, such as LIHTCs, without the threat of losing a CHAP if completing the financing took too much time. Also, PHAs would not feel pressured to apply too early and without adequate preparation if they were reassured that

opportunities to convert to RAD were not constrained by the cap. Finally, some PHAs argued that if the program had been permanent, their board of directors would have been better educated about the impact of RAD conversion on their PHAs earlier in the process.

5.6.4. Comparison of Withdrawals and Nonwithdrawals

Chapter 3 analyzed the impact of financing strategy on the likelihood that a RAD project will reach closing in a reasonable time period. This section includes a parallel analysis of the same population of 278 projects whose CHAPs had been awarded as of December 31, 2013, to determine what factors would affect the likelihood that they would have their CHAP withdrawn or revoked by the end of August 2015, which is about 20 months after the cutoff date used to define this population.[103] For the study population, 33 projects lost their CHAPs or their CHAPs were withdrawn and 245 projects stayed in the RAD program.[104] Our analysis consisted of a comparison of means with a test of statistical significance and logit regressions performed on this study population. The comparison of means test included several variables describing the characteristics of the PHA, the project, the tenants in the project, and the neighborhood in which the project is located, and also the project's financing and conversion strategy under RAD, including its proposed use of different financing sources. The logit regressions included subsets of those variables, as we tested different ways in which to capture the impact of financing sources, including the dollar amount per unit, the percentage of each financing source as a share of total financing, and a binary variable measuring whether each financing source was used at all.

We used two analyses to determine factors that influence the likelihood that a project would drop out of RAD because its CHAP was withdrawn or revoked. The first analysis compared RAD projects that have dropped out, that is, have had their CHAPs withdrawn or revoked, against RAD projects that had not withdrawn and had active CHAPs or had closed. The comparison was made across multiple variables, as discussed further in this section. The study population was limited to 278 RAD projects that had received an approved CHAP by the end of 2013. These projects have had sufficient time to drop out of RAD by the time this study was undertaken, which was in October 2015, 22 months later. Of this study population, 245 RAD projects had active CHAPs or had closed through October 2015 and 33 RAD projects had their CHAPs withdrawn or revoked by that date. The second analysis used a logit regression for the same study population and many of the same study variables.

For the purpose of this analysis, a RAD project was deemed to have dropped out if it had its CHAP withdrawn or revoked (33 projects), based on HUD's records. A RAD project was labeled as not having dropped out if HUD records indicated it had an active CHAP (115 projects) or the project had closed (130 projects). Similar to our analysis of RAD closings, this analysis considered four types of factors that could affect whether a project drops out of RAD: (1) the size of the PHA; (2) the characteristics of the project and its tenants; (3) the socioeconomic

[103] This study population differs slightly from the population of closed projects, which was through mid-October 2015. In both cases, however, our data have allowed sufficient time for a project's status to change. Because the program is still ongoing, our data do not measure the complete likelihood of withdrawing, but only the relative probability of a project being withdrawn within a reasonable amount of time.

[104] In total, 113 RAD projects had withdrawn or had their CHAPs revoked when we pulled our data; all but 33 of those projects had been awarded the CHAPs after the cutoff date of December 31, 2013, which was our sampling frame.

condition of the neighborhood in which the project is located; and (4) the type and development scope of the RAD project, including the project's proposed financing plan. In total, the analysis considered multiple variables across all four factor types. These variables are discussed in detail in chapter 3. In most cases, their hypothesized effects on the likelihood that a project would drop out of RAD, which are detailed in the following discussion, are similar to their hypothesized effects on the timely closing of a RAD project, as discussed in chapter 3; however, significant differences exist in the outcomes of our two parallel analyses.[105]

The analysis of RAD dropouts considered three PHA size variables as defined by HUD.

1. **Large PHAs.** Includes large and very large PHAs, or PHAs with more than 1,250 units.
2. **Medium PHAs.** Includes high- and low-medium PHAs, or PHAs with 250–1,249 units.
3. **Small PHAs.** Includes small and very small PHAs, or PHAs with fewer than 250 units.

PHA size could affect the probability of a project dropping out of RAD by reflecting PHAs' experience with mixed-finance transactions like RAD. PHAs will withdraw a project from RAD, or HUD will revoke a CHAP, if a project fails to make sufficient progress on getting its financing plan approved, lining up its sources of financing, getting approvals from local government, and completing all the steps necessary to close. Regardless of the scenario, PHAs play the most important role in keeping a project in RAD or causing the project to be voluntarily withdrawn or involuntarily have its CHAP revoked. A PHA's experience and skills are likely to affect the chances of a project continuing in RAD or dropping out of RAD. Larger PHAs may have more mixed-finance experience and therefore could be more successful at keeping their projects in RAD.

As discussed in chapters 5 and 6, the characteristics of a project can affect a PHA's expectations about the chances of a project's success and its motivations for ensuring that a project continues in RAD or drops out. These project characteristics could also affect how motivated other parties, such as outside lenders and tax credit equity providers, would be to work with a PHA to keep a project in RAD. To measure characteristics of the project that could affect the PHA's and other parties' motivations to keep a project in RAD, the analysis considered several variables.

- **Project inspection score** (ranging from 1 to 100 points, where a higher score indicates a higher level of quality in the physical condition of the project), which correlates with the physical condition of the project, using the Real Estate Assessment Center inspection score. This variable could indicate a project's relative capital needs. PHAs could consider projects with lower scores to be higher priorities, making the PHA more motivated to keep a project in RAD. A low inspection score, however, also could indicate that a project has performance problems, making it more difficult for the PHA to get the approvals of lenders and others needed to prevent the project from losing its CHAP.

[105] Several of these variables also were used in our sampling and genetic matching methodology, as discussed in chapter 1; in our analysis of factors that influence a project to close in a timely manner, as discussed in chapter 3; and in our analysis of the factors affecting PHA participation and project selection for RAD, as discussed in chapter 4.

- **Project expenses in total and per unit** for each project in annual dollars based on HUD Office of Public and Indian Housing Information Center data from HUD and using the number of ACC units in the denominator to calculate expenses per unit. The higher a project's operating expenses, the greater the need to use RAD to reallocate the project's resources to improve and preserve it, if possible. Hence, the higher a project's operating expenses per unit, the more the PHA should be motivated to keep the project in RAD.
- **Project size,** based on the number of ACC units in the project, using HUD PIC extract data from July 2014. This variable would tend to affect the total amount of financing a project would require. Projects that are too small may have trouble attracting lender interest, making them more likely to drop out. On the other hand, projects that are too large may have difficulty securing large loans or tax credit equity (due to the cap on 9-percent LIHTC equity) and may have to drop out.
- **Project bedroom mix,** based on the percentage of units in a project with one or two bedrooms, using HUD PIC extract data from July 2014. Projects with fewer one- or two-bedroom units can serve larger families with larger units. Because large families are relatively underserved in most housing markets, PHAs could be more motivated to keep these projects in RAD.
- **Project tenants' median household income,** as measured by the median income of households residing in a project, using HUD PIC extract data from July 2014. Higher-income households pay more rent, tend to have more stable employment and tenure, and are more likely to live in better quality housing. These types of projects would be easier for lenders to underwrite and approve. Therefore, projects with higher median household income could be less likely to lose their CHAP.
- **Percentage of elderly households,** as measured by the percentage of units occupied by tenant households composed of one or more elderly people based on HUD PIC extract data from July 2014. Elderly units are defined as those occupied by people 62 years of age or older at the time of initial occupancy. PHAs might consider projects with more elderly residents to be a higher priority, because they serve residents with accessibility issues and social service needs. Also, lenders could find it easier to underwrite and approve projects with more elderly households because they have more stable income through social security. Together, these factors could make it more likely that a project with more elderly households will stay in RAD and not drop out.

In our interviews with PHAs (see chapters 5 and 6), several PHAs mentioned that certain area and neighborhood conditions could negatively impact a project's performance under RAD. If so, projects in those areas or neighborhoods could be more likely to drop out of RAD. PHAs might be more motivated to keep a project in RAD if it is serving an area with greater housing need. To capture the possible effect of local socioeconomic conditions on the likelihood that a project would lose its CHAP, our analysis looked at four variables.

1. **Metropolitan area**, a binary variable indicating whether or not the project is located in a metropolitan area. This variable correlates with urban and nonurban communities. If projects in nonurban communities are less attractive to lenders and housing finance agencies, as some PHAs have argued, these projects could be more likely to have their CHAPs withdrawn or revoked.

2. **Poverty rate** of the census tract in which the project is located, as measured by the percentage of households in the census tract that fall below the federal poverty level, from the American Community Survey 2012 5-year estimates. Neighborhoods with higher poverty rates may have fewer amenities, more social problems, and lower rents, leading lenders and state agencies to take more time to review and approve these projects, which would put those projects at greater risk of losing their CHAPs.
3. **Cost-burden rate** of the census tract in which the project is located, as measured by the percentage of households in the census tract with housing costs (rent plus utilities) greater than 35 percent of their income, from the ACS 2012 5-year estimates. A high cost-burden rate tends to indicate greater need for affordable housing. PHAs may place higher priority on keeping a project in RAD, and lenders may be more cooperative, if a project is located in an area where affordable housing preservation is more urgent.
4. **Overcrowding rate** of the census tract in which the project is located, as measured by the percentage of households in the census tract living in overcrowded housing (defined as housing with more than one occupant per room), from the ACS 2012 5-year estimates. A high rate of overcrowding in a neighborhood indicates greater need for affordable housing, which could make these projects a higher priority for PHAs and could reduce the time for lenders to review and approve these projects, all of which would decrease the project's likelihood that its CHAP would be withdrawn or revoked.

In addition to the preceding factors, a project's development and conversion plan could have an effect on the likelihood that it would drop out of RAD. Projects with smaller and less complicated development plans should be easier to execute and therefore should be better able than larger and more complicated plans to meet their RAD deadlines and not lose their CHAPs. Also, the fewer projects PHAs have submitted to RAD, the better able they should be to manage their projects successfully through the RAD conversion process. We looked at the following elements of a project's development and conversion plan to assess its impact on the probability of a project dropping out of RAD.

- **Construction costs per unit** is an estimate of the dollar amount of proposed rehabilitation or new construction proposed ("hard" construction costs) under RAD per ACC unit. Projects with higher per-unit construction costs will have a greater development scope. One would expect these types of projects to require a greater degree of review and approval, which could put them at greater risk of losing their CHAP.
- **Multiphase** or not is a binary variable that shows whether the project is being subdivided into more than one development phase. Multiphase projects are more complicated than single-phase projects and should be more likely to encounter issues that would lead to them having to drop out of RAD.
- **Portfolio application** is a binary variable that indicates whether a project is one of multiple projects a PHA is proposing for RAD conversion (that is, part of a portfolio application), or is the PHA's only RAD project. Being part of a portfolio application could increase the probability that a project would lose its CHAP because of the greater burden on the PHA to manage multiple projects through the conversion process while complying with RAD deadlines and requirements.

- **PBV or project-based rental assistance contract** under RAD is a binary variable that indicates whether the project is converting to a PBV or a PBRA type of HAP contract. Because PBV contracts are financially more beneficial for PHAs compared with PBRA contracts, PHAs might be more motivated to keep a project in RAD if it is converting to a PBV contract than if it is converting to a PBRA contract.

Finally, this analysis considered the possible impact of a project's **proposed financing plan** on the likelihood that a project will stay in RAD or will have its CHAP withdrawn or revoked, where the financing plan is represented by the sources and amounts of proposed project financing from each project's RAD application, including **public housing** sources (**operating reserves**, **capital funds,** and **RHF/DDTF funds**), **first mortgage debt, 9-percent LIHTC equity, 4-percent LIHTC equity, other sources of financing,** and **total financing.** We looked at various measures for expressing the use of each financing source, including **total dollar amount, dollar amount per ACC unit,** amount for each source as a **percentage of total financing,** and several **binary variables** indicating whether a project used a financing source (value = 1) or not (value = 0).

In general, we would expect a project to experience a greater risk of dropping out of RAD the more it depends on external financing sources, including first mortgage debt, 9-percent LIHTC equity, 4-percent LIHTC equity, and other sources of financing, and the less it depends on public housing sources, including operating reserves, capital funds and RHF/DDTF funds. Outside sources of financing put a project at risk of being delayed or even stopped—and therefore of losing its CHAP—because of the need for review and approval by an outside party. A project financed with internal funds conversely has a more simplified review and approval process with fewer chances of losing its CHAP.

Our approach used two standard statistical techniques for estimating nonrandom relationships between one or more variables: (1) comparison of means with hypothesis testing and (2) logit regression. The first test compared the mean values of multiple variables across the study population of withdrawn and not-withdrawn RAD projects. The main advantage of comparison of means is that it presents clearly evident results. We used the standard *t*-statistic for testing the statistical significance of the difference in means. If the *t*-statistic is greater than the absolute value of 1.96 or -1.96, then one can conclude that the difference in means is statistically significant at the 5-percent level of confidence, as shown by the yellow highlighting.

Table 52 shows the results of this analysis. This table compares the means of each variable for RAD projects that had withdrawn and those that had not withdrawn along with the *t*-statistic. Nine of the variables have significant differences in the means for the two groups, only one of which—project inspection score—is not related to financing. Seven of the variables have negative differences in means, because the mean for the projects that withdrew from RAD is statistically significantly less than the mean of the projects that did not withdraw from RAD for those variables. These variables include project inspection score; public housing funds per project and per unit; other sources of financing per project, per unit, and as a percentage of all

sources; and total financing per project and per unit. Projects that withdrew from RAD used a statistically significantly lesser amount of financing from public housing sources, other sources, and in total and had lower physical inspection scores, compared with projects that did not withdraw from RAD. The other two variables—percentage of financing due to first mortgage debt and percentage of financing due to 4-percent LIHTC equity—have positive differences in means. Projects that withdrew from RAD used a statistically significantly greater percentage of first mortgage debt and 4-percent LIHTC equity as a share of total financing than did projects that remained in RAD.

Table 52. Comparison of Means of Multiple Variables for Projects Withdrawn From RAD and Projects Not Withdrawn From RAD, With *t*-Statistics

Financing and Nonfinancing Variables	Withdrawn From RAD	Not Withdrawn From RAD	Comparison of Means *t*-Statistic
Large PHA	21%	29%	– 0.88
Medium PHA	67%	52%	1.61
Small PHA	12%	20%	– 1.03
Project inspection score	78.8	85.0	– 2.67
Project expenses	$949,946	$1,106,709	– 0.82
Project expenses per unit	$6,188	$5,996	0.34
Project tenants' median household income	$9,906	$10,372	– 0.71
Project tenants' % elderly households	19.5%	26.7%	– 1.76
Project units covered by ACC	173	187	– 0.43
Project % one- or two-bedroom units	55.4%	60.7%	– 1.15
Project is in a metropolitan area	72.7%	79.8%	– 0.94
Neighborhood poverty rate	29.2%	30.1%	– 0.29
Neighborhood cost-burden rate	43.6%	44.2%	– 0.27
Neighborhood overcrowding rate	3.2%	4.3%	– 1.06
RAD construction costs per unit	$37,055	$47,377	– 0.76
Part of a RAD portfolio application	39.4%	31.0%	0.97
Part of a RAD multiphase	0.00%	4.1%	– 1.18
PBV or PBRA contract	45.5%	41.6%	0.42
Operating reserves per project	$162,833	$343,353	– 1.61
Capital funds per project	$75,915	$376,656	– 1.81
RHF funds per project	$94,209	$70,485	0.44
Public housing resources per project	$332,957	$789,053	– 1.99
First mortgage debt per project	$2,680,803	$3,028,018	– 0.37
9% LIHTC equity per project	$571,207	$1,851,541	– 1.67
4% LIHTC equity per project	$2,029,616	$2,375,917	– 0.37
Other sources per project	$0	$2,824,122	– 2.80
Total financing per project	$5,614,582	$10,827,534	– 1.97
Operating reserves per unit	$1,306	$2,322	– 1.37
Capital funds per unit	$648	$2,066	– 1.75
RHF funds per unit	$512	$484	0.08
Public housing resources per unit	$2,466	$4,853	– 1.89
First mortgage debt per unit	$13,838	$18,137	– 0.71
9% LIHTC equity per unit	$7,126	$11,728	– 0.85
4% LIHTC equity per unit	$8,790	$13,903	– 0.89
Other sources per unit	$0	$18,874	– 2.61

Financing and Nonfinancing Variables	Withdrawn From RAD	Not Withdrawn From RAD	Comparison of Means *t*-Statistic
Total financing per unit	**$32,220**	**$67,241**	**– 2.08**
% public housing funds	23%	33%	– 1.44
% first mortgage debt	**47%**	**21%**	**5.50**
% 9% LIHTC equity	7%	11%	– 0.88
% 4% LIHTC equity	**23%**	**11%**	**3.43**
% other sources	0%	22%	– 4.52
Number of projects (total = 278)	**33**	**245**	

ACC = Annual Contributions Contract. LIHTC = low-income housing tax credit. PBRA = project-based rental assistance. PBV = project-based voucher. PHA = public housing authority. RAD = Rental Assistance Demonstration. RHF = Replacement Housing Factor.
Note: **Bold** text indicates variable is statistically significant for the comparison of means and the logit regressions. Yellow highlighting for *t*-statistic indicates statistical significance at the 5-percent confidence level.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center database; RAD program; American Community Survey

The comparison of means approach does not isolate the effect of one variable from other variables and does not measure the magnitude of the effect, only its direction. Therefore, we also used logit regression models to analyze the factors that influence a project dropping out of RAD, and the *z*-value, which is similar to the *t*-statistic, to estimate statistical significance. Many of the independent variables in the logit model are the same variables used in the comparison of means analysis. Due to collinearity among the financing variables, however, we performed three separate regressions on different subsets of those variables, including one regression for the total dollar amount per unit by financing source, a second regression for the percentage of total financing by financing source, and a third regression for the binary variables showing whether a project had any funds from each financing source (0 = none and 1 = some).

Table 53 presents a set of three logit regressions with the dependent variable being binary and set equal to 1 if the project was withdrawn and set equal to 0 if not. This table shows the estimated coefficients and *z*-values for each variable in each of the three regressions.[106] The first regression uses financing variables measured on a dollar-amount-per-unit basis. The second regression uses the percentage of financing provided by source as a share of total financing. The third regression uses a simple binary variable on whether a financing source was used (yes = 1) or not (no = 0). Several independent variables that were analyzed in the comparison of means table are not included in the logit regression due to collinearity problems or because they provided a base for other variables—for example, small PHA size is the base for large and medium PHA size. The *z*-value for a logit regression is similar to a *t*-statistic for a least-squares regression. A *t*-statistic or *z*-value greater than 1.96 or less than -1.96 indicates statistical significance at the 5-percent confidence level, and is highlighted in yellow. The independent variables that are significant at the 5-percent confidence level for all logit regressions and the comparison of means are in **bold** text.

[106] These coefficients show the direction of the impact of a change in the independent variables on the change in the dependent variable. Using them to estimate the magnitude of the change can be a complicated process.

Table 53. Logit Regressions for RAD Projects Withdrawn From RAD (33) or Not Withdrawn From RAD (242) in a RAD Application

Variables	Regression 1: Financing Variables in Dollars per Unit		Regression 2: Financing Variables in Percentage of Total Financing		Regression 3: Binary Financing Variables (With = 1, Without = 0)	
	Estimated Coefficient	*z*-Value	Estimated Coefficient	*z*-Value	Estimated Coefficient	*z*-Value
Nonfinancing variables						
Large PHA	– 0.32507	– 0.32	– 0.42088	– 0.41	– 0.95956	– 0.89
Medium PHA	1.34309	1.73	1.05109	1.27	0.52222	0.63
Small PHA[a]	*	*	*	*	*	*
Project inspection score	– 0.05636	– 3.06	– 0.01788	– 0.94	– 0.01360	– 0.74
Project tenants' median household income	0.00002	0.20	0.00017	1.61	– 0.00009	– 0.09
Project tenants' % elderly households	– 0.02998	– 1.73	– 0.04031	– 2.04	– 0.03662	– 1.87
Project is in a metropolitan area	– 0.38644	– 0.62	0.03880	0.05	– 0.80302	– 1.11
Project units covered by ACC	– 0.00283	– 1.45	– 0.00641	– 2.14	– 0.00433	– 1.73
Project % one- or two-bedroom units	0.20665	0.16	0.22108	0.16	– 1.89744	– 1.35
Neighborhood poverty rate	0.00419	0.20	0.02099	0.99	– 0.01925	0.94
Neighborhood cost-burden rate	– 0.01651	– 0.73	– 0.00090	– 0.04	– 0.02241	– 0.94
Neighborhood overcrowding rate	– 5.26384	– 0.72	– 5.92816	– 0.89	– 1.54096	– 0.23
Part of a RAD portfolio application	0.74462	1.18	0.63730	0.95	0.78967	1.23
Part of a RAD multiphase	—	—	—	—	—	—
PBV or PBRA contract	– 0.30146	– 0.53	– 0.79696	– 1.31	0.06121	0.11
RAD construction costs per unit	– 0.000003	– 0.43	0.000003	0.61	– 0.000002	0.05
Total expenses per unit	– 0.000003	– 0.04	0.00005	0.29	0.00001	– 0.14
Total financing per unit	**– 0.00044**	**– 4.36**	**– 0.00004**	**– 3.05**	**– 0.00005**	**– 3.49**
Financing variables						
4% LIHTC equity	**0.00044**	**4.26**	**10.25922**	**4.63**	**2.13235**	**2.39**
9% LIHTC equity	0.00044	4.25	6.94773	3.47	0.50061	0.45
First mortgage debt	**0.00047**	**4.49**	**7.73258**	**4.27**	**3.99644**	**4.15**
Other sources	—	—	—	—	—	—
Capital funds	—	—	3.53213	1.54	– 2.2873	– 3.45
Operating reserves	—	—	—	—	0.40211	0.68
RHF funds	—	—	7.56337	2.85	1.64403	2.21
Number of projects or observations	**275**		**275**		**275**	

ACC = Annual Contributions Contract. LIHTC = low-income housing tax credit. PBRA = project-based rental assistance. PBV = project-based voucher. PHA = public housing authority. RAD = Rental Assistance Demonstration. RHF = Replacement Housing Factor.

[a] Used as a base in the logit regression.

* Variable omitted from model.

Notes: Yellow highlighting for *z*-value indicates statistical significance at the 5-percent confidence level. Small PHAs and % Public Housing Funds used as base case in logit regression. Because RAD Multiphase had 0 values for dropouts, it could not be included in the logit regression. Other financing variables were excluded from logit regression due to multicollinearity. Number of projects for logit regression: total = 275; withdrew = 33; not withdrew = 242. The logit regression has 3 fewer projects that had not closed due to missing data in one or more variables.

Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center database; RAD program; American Community Survey

Our analysis of RAD withdrawals found the following.

- The size of a PHA appears to have no relation to a project being withdrawn or having its CHAP revoked. The three PHA size variables had no statistically significant impact in the comparison of means test or the three logit regression models.
- The only project, tenant, or locational characteristics that had a statistically significant relationship with projects dropping out of RAD (whether difference-in-means or logit regression analyses) were a project's physical inspection score, the percentage of elderly units, and the number of ACC units, all of which had a statistically significant negative effect in one of the logit regression analyses (but not in the other two). A project was less likely to have its CHAP withdrawn or revoked if it had higher physical inspection scores, more elderly residents, or more ACC units. It is possible that projects with lower inspection scores have greater physical or performance challenges that result in those projects dropping out of RAD with greater frequency. It is also possible that larger projects and projects with more elderly tenants are a higher priority for PHAs and receive more time and attention, which reduces their chance of dropping out of RAD. As an alternative, these results could be spurious—they depend on the selection of financing variables—or due to some other explanation.
- Several variables related to a project's financing strategy were consistently statistically significant across most or all of our analyses. In particular, as the scope of planned total project financing increases, a project is less likely to drop out of RAD. This result is robust whether the financing source variables were specified as dollar amounts per unit, as percentage share of total financing, or in a binary (with/without) format, because the result was highly statistically significant in all three cases. Furthermore, the difference between the means of the two groups is also highly statistically significant. In fact, the average planned total project financing per unit for projects not withdrawn from RAD ($67,241) is more than double the average planned total financing per unit for projects that were withdrawn from RAD ($32,220). Are PHAs and other parties more mindful of projects requiring more financing per unit? Can these projects support greater resources to keep them on track? Does the increased amount of time, attention, and care reduce the risk that these projects will fail? The next phase of our study will explore these issues.
- Our analysis also found that projects that require more first mortgage debt, 9-percent LIHTC equity financing, and 4-percent LIHTC equity financing, whether in terms of dollars per unit or as a proportion of their total financing, are more likely to drop out of RAD. In other words, the amount of debt or tax credit equity financing increases the risk of a RAD project losing its CHAP. The risk is present regardless of how much first mortgage debt or 4-percent LIHTC equity a project has; however, for 9-percent LIHTC equity, the risk depends on the amount of financing, not whether the project has any financing from that source.
- Our comparison of means test also found that projects using more financing from public housing sources or other sources, which include grants, are more likely to stay in RAD. We also tested the effect of specific components of public housing resources and found that the risk of dropping out of RAD is increased by RHF funds, decreased by capital funds, and unaffected by operating reserves, although these results were not consistent for all regressions. The effect of other sources was not tested in the logit regressions.

- No other aspect of a project's RAD conversion strategy, including whether it would convert to PBV or PBRA, had a statistically significant relationship on whether a project would be withdrawn or have its CHAP revoked.

We conclude that a project is less likely to be withdrawn from RAD or have its CHAP revoked if (1) the project is in better shape (as shown by having a higher inspection score), is larger, and has more elderly residents, which could make the project more financially stable or a higher priority; (2) the PHA plans to finance more dollars per unit, making the project a higher priority for the PHA and other parties to the transaction; (3) the project will use more of the PHA's own resources and other sources of soft financing, such as grants, which again would make the project a higher priority; (4) the project will use less mortgage debt or 4-percent LIHTC equity, both of which require multiple reviews and approvals that can put a project a greater risk of failing; or (5) the project will not use any amount of 9-percent LIHTC equity, which can be difficult to compete for. Probably the most significant set of factors affecting the risk that a project might drop out of RAD, as revealed by this analysis, is the source of project financing. The use of internal and soft money sources tends to reduce that risk, whereas the use of "hard" money sources from lenders and HFAs tends to increase that risk.

Table 54 summarizes the reasons stated in the transactional summaries prepared by RAD program staff for why 33 RAD projects had their CHAPs withdrawn or revoked. The predominant reason (16 cases, or 48 percent) for why these projects dropped out of RAD is the loss of their financing, including loss of 4-percent LIHTC, 9-percent LIHTC, and debt financing. These findings are in broad agreement with our statistical analysis of RAD dropouts. Other stated reasons, such as the decision of the PHA's board of directors or the project's failure to meet its milestones, could also have an underlying relationship with the project's proposed financing.

Table 54. Reasons Given for CHAP Being Withdrawn or Revoked, Number and Percentage of Withdrawn Projects (RAD Program Data)

Stated Reason for CHAP Being Withdrawn or Revoked	Number of Withdrawals	Percentage of Withdrawals
Lost financing	16	48%
PHA board decision	6	18%
Failed milestones	2	6%
Intend to reapply	4	12%
Other	5	15%
Total	**33**	**100.0%**

CHAP = Commitment to Enter into a Housing Assistance Payment Contract. PHA = public housing authority.
RAD = Rental Assistance Demonstration.
Source: Data from RAD program files transaction summary

Altogether, these findings could have several possible explanations. They may be attributable to factors not included in this analysis, such as the riskiness of the project or the experience of the PHA. It is also possible that projects that drop out of RAD are more vulnerable to losing their financing simply because of their greater reliance on external sources of financing. Those sources, like mortgage debt and LIHTC equity, have more complex underwriting, review, and approval processes and requirements than do internal sources of financing from the PHA or soft funding sources such as deferred developer fees. This effect may be less consistent in the case of

9-percent LIHTC if PHAs are more selective in choosing that option because they are aware of its greater stringencies, and if projects that qualify for that financing are less risky to begin with because it is awarded competitively. In the Final Report, we intend to explore these possible explanations in greater depth.

5.7. Recommendations for Improving RAD

Three basic recommendations for improving RAD emerged from interviews with the 23 PHAs representing our sample of 24 RAD projects.

1. HUD should increase Section 8 contract rents or add other HUD funding to projects in high-rent markets.
2. HUD should provide more and better organized training to its staff, PHAs, and consultants.
3. HUD should streamline the application, approval, and closing processes and requirements to save on time and cost.

5.7.1. Section 8 Contract Rents and HUD Funding

Some PHAs consider the current approach to funding RAD conversions to be inadequate. Under this approach, HUD funds the project at the level of the RAD contract rents, which are based on the total of the operating subsidy, capital funding, and tenant rents that the project received under public housing. For projects in high-rent markets, Section 8 contract rents may be too low, making it difficult for the PHA to renovate the project to sufficiently high standards to attract and retain affordable housing tenants. PHAs in this situation advocate for higher Section 8 rents or supplemental funds to make RAD work. As one PHA described their situation—

> "The contract rent is established for everyone across the country and uses a certain formula. But our area commands a good market rent. I would have liked HUD to see that and consider giving us an increase in the contract rent [because] the disparity between our market rent and what we were approved for on the contract rent was pretty high. I wish HUD had been able to take that into consideration, if possible."

To address this issue, PHAs recommended that HUD (1) provide a financial guidebook that includes RAD contract rents and clarifies how and when they are determined, and (2) allow PHAs to appeal for adjustments in their RAD contract rents when the situation justifies it. Under current statute RAD is prohibited from increasing contract rents.

5.7.2. Technical Training and Support

The second area in which PHAs recommended that HUD make improvements involved the training of staff and consultants and the provision of technical support. The recommendation for earlier and more consistent staff training generally applied to both PHA staff and HUD staff. For instance, respondents noted that PHA staff needed more training on Physical Needs Assessments early in the process, more financial training, and more training on accounting for RAD transactions. In fact, the need for PHA training and guidance from HUD generally cuts across almost all aspects of the program, in the view of these PHAs. One PHA thought that HUD should provide a handbook or guidebook that PHAs could use to navigate the complexities of various types of RAD transactions.

This recommendation also included the need to train more HUD specialty staff. Although PHAs gave the program high marks for the website and helpdesk, they thought that without adequately trained staff, HUD was unable to provide PHAs with guidance when requested. Inadequate guidance also resulted from HUD having too few staff members to provide support, from staff being moved around so that their support was inconsistent, and from poor staff organization for providing continuous and coordinated support. One PHA complained that HUD had "too few people to answer questions about specific issues, for example, accounting for certain transactions [such as] … how much capital fund could be counted toward operating subsidy." Another specifically recommended that "there should be a conversion coordinator to stay with the PHA until they have started receiving their Section 8 subsidy." Several PHAs recommended that HUD assign "closing consultants" to PHAs to lead them through the complicated process of closing a RAD transaction.

Some of these comments may pertain to the period when RAD was just beginning, before enough staff members were trained in how the program worked to provide useful support to PHAs and before HUD had created all the guidance that is currently available. Now HUD has contractor support to process questions received within a short turnaround time and assigns Transaction Managers to every transaction. HUD offers several guidebooks to lead PHAs through the RAD conversion process, including the *Welcome Guide, Financing Plan Guide, RAD PCA Guide, RAD Guide for Choosing Between PBV and PBRA,* and more. In addition, HUD provides dozens of online webinars covering a wide array of RAD-related topics. At the same time, the program's training needs will change over time. For example, when the program cap was lifted, an upsurge in demand for processing staff occurred that could have impacted the availability of experienced staff members, and HUD resorted to assigning staff to support RAD projects only at the request of the PHA.

5.7.3. Process Streamlining

The third focus of PHAs' recommendations was for HUD to streamline the process of applying and converting to RAD. Many PHAs who recommended streamlining admitted that they did not have the expertise to recommend specific ways in which the process could be made less complicated. They could point out only those aspects of the process that seemed "cumbersome, time-consuming, and expensive" and that HUD should target for potential streamlining. A typical response was, "I would like HUD to simplify the process, but I'm not sure how." At the very least, it was thought that HUD could streamline the process for PHAs that are not using financing in their RAD conversions. Respondents recommended that HUD try to streamline the following areas.

- The volume of documentation was considered to be overwhelming and therefore eligible for reduction. Some respondents thought that HUD should strive to reduce documentation at closing, and others thought that HUD should simplify documentation after the application phase as well. Fewer documents would simplify the process of tracking a RAD application throughout the conversion process and reduce the number of offices that applicants have to wade through (such as Fair Housing and Equal Opportunity, Multifamily Housing, Section 8, Public Housing, and so on.).
- The RAD PCA (or PNA) is one document in particular that several PHAs recommended could and should be simplified to save on time and costs. As one PHA noted, "One slowdown [in the conversion process] was the needs assessment. It was very complicated.

Our contractor we hired to do it had difficulty.… [He] finally got it, but we did not realize how intense it would be before we started up.… But it is still needlessly complicated and very expensive, and I am uncertain if it is needed."

- Related to document reduction and simplification is the recommendation that HUD reduce the number of people in the conversion process. PHAs thought that the number of people involved in the process created coordination problems, confusion about what was required, and delays in completing conversion. As one PHA lamented, "We got handed off to a lot of people through the process. Then people left that we were working with and we had to almost start over." The closing process also included many outside parties such as developers, bankers, developer's attorney, lender's attorney, and government attorney. Specific recommendations included that HUD (1) create teams of two to three staff members who will work with the PHA and develop a strong working relationship throughout the process, (2) provide the PHA with the names and contact information for the HUD staff members with whom they will be working, and (3) reduce the number of steps at which the project is handed off from one official to another.

5.8. Conclusions

Through the web survey and telephone interviews, our sample of RAD PHAs was given the opportunity to explain their reasons for participating in RAD, describe how they chose particular projects for RAD, and relate their views of alternatives to RAD. As appropriate, we supplemented these views with those of other stakeholders, including lenders with RAD experience, and PHAs that have had their CHAPs withdrawn or revoked. We also performed statistical analysis on projects that withdrew from RAD or had their CHAPs revoked. In the course of providing this information, PHAs voiced their satisfaction or dissatisfaction with the RAD program and made recommendations for improvements, all of which this chapter has summarized and included. Because many projects are still in the early stages of redevelopment, the comments of the PHAs contacted for this Interim Report are confined to their RAD experiences up to conversion. The Final Report will address additional RAD implementation questions on the factors that influence a PHA's ability to complete rehabilitation on time. The following subsections summarize our findings.

5.8.1. Reasons for Applying to RAD

The PHAs interviewed for this study gave two reasons for applying to RAD. Many said they applied to RAD because it would address some of the negative aspects of the public housing program. These downsides include (most importantly) the lack of funding for the capital needs of public housing and also the greater regulatory burden under public housing. A few PHAs also mentioned that now that HOPE VI is no longer available, public housing offers few options for transforming their portfolio. One such option, the Section 18 Demolition/Disposition program, applies to only a few cases, as one PHA noted.

Many PHAs also said they were attracted to RAD by the positive qualities of the Section 8 program, including more stable funding and more secure long-term planning for their housing projects. Some already had properties in Section 8 and thought that RAD would work well for them as part of their consolidation strategy under a single housing assistance program.

5.8.2. Types of Projects Proposed for RAD

Our RAD sample proposed a range of projects that closely matches the main goal of the program, which is to provide more resources for rehabilitation. The primary factor they consider in selecting a project for RAD is the physical condition of the property, but that does not necessarily mean that they choose properties with the greatest need or that other factors do not influence their decisionmaking. The second factor in their choice of projects for RAD is the financing challenges of the project and their assessment of the likelihood that they will be able to solve those challenges. The third factor is their evaluation of the neighborhood surrounding the property, including how well it will support a converted project that will have to survive in a competitive housing environment.

Respondents recognize that RAD has different advantages, and PHAs have different reasons for choosing RAD. For instance, not all public housing projects have capital needs, but some PHAs still choose to convert them to RAD to gain the benefits of Section 8. A PHA may not want to convert a project with capital needs to RAD if the project cannot fund the cost of rehabilitation based on the RAD contract rents or the condition of the property, or if the neighborhood would not be good enough after rehabilitation to attract and retain renters.

5.8.3. Alternatives to RAD

The PHAs that we spoke with are aware of the alternatives to RAD, including CFFP, LIHTC, RHF, PMT, CDBG, CNI, and Section 18 Demolition/Disposition. Most of the PHAs interviewed are familiar with some or all of these programs. About one-half have experience borrowing under at least one of these programs. These PHAs see RAD as being generally more advantageous than alternative programs. RAD may not offer the greatest subsidy, but it is easier to qualify for than those programs that may offer larger subsidies.

In choosing RAD rather than these alternative capital financing programs, PHAs consider the following factors.

- **Ease of use.** Many of the interviewed PHAs consider RAD easier to use than alternative programs, but a large number think that the RAD process was more cumbersome and complicated than it needed to be.
- **Technical capacity.** All PHAs recognized that they needed to have or acquire the technical ability to make RAD work, including the capacity to develop a viable RAD application, work with HUD to obtain CHAP approval of their conversion strategy, secure legal support to complete the closing process, find financing sources and negotiate complicated financing requirements, line up one or more capable developers, manage tenant relocation, oversee contractors in the performance of the required rehabilitation or construction work, and provide for the long-term management of the property under the HAP contract. To acquire this capacity, they relied on HUD support, staff training, and the services of contractors experienced in mixed-finance public housing.
- **Perception of Section 8.** The PHAs that participated in RAD have positive views of the advantages of Section 8 compared with public housing. Section 8 gives them the ability to preserve their affordable housing by leveraging Section 8 subsidies to improve the quality and reduce the operating costs of that housing. In addition, it also improves long-term planning and asset management, promotes commercial property management

practices, helps simplify operations by consolidating assets under one program, reduces reporting requirements, and avoids the funding cuts that have occurred in public housing programs.

- **Access to capital.** Although most interviewed PHAs were satisfied with the amount of capital funding they received under RAD, a majority thought they received no more funding under RAD than they would have received using alternatives to RAD. This result confirms that PHAs have multiple objectives in applying for RAD. Some are interested in using RAD to increase their capital funding, but others are more interested in using RAD to convert to Section 8.
- **Large-scale conversions.** Some PHAs point to the advantage RAD offers for them to convert a large part or their entire portfolio to Section 8, which enables them to maximize the benefit of consolidating their operations under a single program.

5.8.4. Why Some Projects Did Not Make It to Closing

In gathering information on why some projects had their CHAPs withdrawn or revoked, our analysis supplemented our RAD PHA interviews and surveys with interviews of a handful of additional PHAs that lost their CHAPs. Our RAD PHAs identified two factors that explain why a project may fail to make it to closing: (1) the inability of the PHA to manage the project and (2) HUD's failure to provide adequate information and support while imposing burdensome requirements. Some PHAs also described their low RAD contract rents as a barrier to conversion. In the interviews, PHAs that had lost their CHAPs attributed that outcome to the combination of HUD's aggressive closing timeline and the PHA's lack of advance preparation.

In our statistical analysis of projects that withdrew from RAD, we found that the greater the total amount of proposed financing per unit and the greater the percentage and amount of proposed funding accounted for by 4-percent LIHTC equity, 9-percent LIHTC equity or first mortgage debt, the greater the likelihood that a project will have its CHAP withdrawn or revoked. As shown elsewhere in our study, 4-percent LIHTC equity and first mortgage debt were also found to decrease the likelihood that a project will close in a timely fashion (see chapter 3). Other possible factors include the project inspection score, the size of the project (based on ACC units), and the percentage of elderly tenants, which could affect the relative stability of the project, the extent to which the PHA considers the project a priority, or other factors.

Both LIHTC and mortgage financing present challenges that may increase the risk that a project will not move forward, including the risk that the capital sources will withdraw their support during the RAD process. It is possible that projects that drop out of RAD are more vulnerable to losing their financing simply because of their greater reliance on external sources of financing that have more difficult requirements. In the Final Report, we intend to explore this issue further. Given the multicollinearity among financing sources, we were unable to test for the impact of the other financing sources.

It is worth noting that other variables in our model, including PHA size, choice of PBV or PBRA, and neighborhood characteristics, did not have a statistically significant effect on the probability that a project would have its CHAP withdrawn or revoked.

5.8.5. Recommendations for Improving RAD

The RAD PHAs that agreed to be interviewed were generally optimistic about RAD and said they would convert more properties to RAD if they could. At the same time, several PHAs had recommendations for how HUD could improve the program.

- **Section 8 rents.** Some PHAs think that Section 8 contract rents are too low in high-rent markets. They recommend that HUD (1) provide a financial guidebook that includes RAD contract rents and clarifies how and when they are determined and (2) allow PHAs to appeal for adjustments in their RAD contract rents as needed.
- **Training and support.** The second recommendation was for HUD to improve training and technical support. Although PHAs gave the program high marks for the website and helpdesk, they thought that HUD was not able to provide PHAs with guidance when requested because of lack of specialty staff. They specifically recommended that HUD assign "closing consultants" to PHAs to lead them through the complicated process of closing a RAD transaction and a "conversion coordinator" to stay with the PHA until they start receiving their Section 8 subsidy.
- **Streamline process.** The final recommendation was for HUD to streamline the process of applying and converting to RAD by (1) creating teams of two to three staff members who will work with the PHA and develop a strong working relationship throughout the process, (2) providing the PHA with the names and contact information for the HUD staff members with whom they will be working, and (3) reducing the number of steps at which the project is handed off from one official to another.

6. Implementation Analysis: Views and Experiences of Public Housing Authorities That Did Not Participate in RAD

The overwhelming majority of public housing authorities have elected not to participate in the Rental Assistance Demonstration. This chapter explores some of the reasons why these nonparticipating PHAs (non-RAD PHAs) have arrived at that decision, examines whether they plan to take advantage of the opportunity to apply to RAD the next time it becomes available, and asks what recommendations they have for making the program more likely to attract their interest. It complements the analysis presented in the previous two chapters and answers the following research question: For PHAs that chose not to participate in RAD, what influenced that decision?

The value of this exercise derives from the insights it provides into the thinking of the PHAs and the motivations behind their decision. How did they arrive at it? Was it well informed? What factors, if any, could cause them to change this decision? Our research team analyzed the web survey and interview responses of the PHAs that managed projects in our non-RAD sample.[107] Our staff collected this information through the web survey and prearranged interviews over the telephone with senior staff members from these PHAs, usually including the Executive Director and sometimes also the Development Director. To ensure that our interviews captured consistently reliable responses, interviewers used overlapping questions that captured similar information. The summary of this chapter presents the most significant findings. The conclusion provides a longer summary and also suggests how HUD could resolve any misconceptions or uncertainties about the RAD program.

6.1. Summary

Many of the non-RAD PHAs that agreed to be interviewed said they had attended conferences or information sessions conducted by either HUD or a consulting firm that exposed them to RAD. Some PHAs also did their own research and found that they were not a good fit for RAD. Others never got around to doing any research. For the most part, they thought they had a basic understanding of the RAD program, including the fact that RAD projects convert from public housing to project-based Section 8 assisted housing and have the ability to borrow or use tax credits to finance their rehabilitation, new construction, or other capital needs.

A handful of PHAs were initially interested in participating in RAD, but after they "ran the numbers" they ultimately concluded that "the math does not work." Some PHAs thought their properties were in good shape and did not need capital funding. Others were not sure how long the RAD program would last, how stable it would be because it was only a demonstration program, whether the Section 8 rents would be adequate, or what the impact would be on their staff if they converted their public housing to Section 8 housing.

[107] The sample of 48 non-RAD projects comprised 44 non-RAD PHAs. Of those 44 non-RAD PHAs, 38 responded to the web survey and 34 agreed to be interviewed. Most interviewees were executive directors or assistant directors, and many had other staff members present during the interview.

Although most interview respondents were reluctant to offer recommendations for improving the RAD program, several respondents did offer ways in which HUD could change the RAD program to make it more appealing to PHAs. These recommendations included—

- "Simplify the program to make it feel like you still have some local control over it. That you and your staff are capable of doing it by themselves without the need for outside consultants."
- "Shorten the timeline. Let 'non-rehab' projects move forward more quickly [through a streamlined process] to 'clear the decks' for more complex deals."
- "HUD should provide upfront financing, because the RAD application requires us to get contractors, and the whole process can be expensive."
- "[M]ake it a program through law and legislation that defines exactly what the program will do, and it becomes a real program and not just a demonstration program."
- "I think the level of subsidy [has to be improved] …. If you're gaining subsidy on one end but you lose it on the other end that affects your budget a great deal."

6.2. Knowledge and Understanding of RAD

Most of our non-RAD respondents claimed to have some knowledge of the RAD program but had not taken a lot of time and effort to understand RAD in all of its details. As shown in table 55, 33 respondents (about 87 percent) indicated that they were "very familiar" or "somewhat familiar" with the RAD program.

Table 55. Familiarity With RAD (Non-RAD Sample Survey)

How familiar are you with HUD's RAD program?		
Very familiar	6	15.8%
Somewhat familiar	27	71.1%
Hardly familiar	4	10.5%
Not at all familiar	1	2.6%
Total responses	**38**	**100%**

RAD = Rental Assistance Demonstration.
Source: Web survey responses—44 PHAs solicited; 38 responded

These PHAs had learned what they knew about RAD from reading emails and correspondence from HUD when RAD first started, viewing HUD's publications and website, watching webcast sessions in which other PHAs described their experiences with RAD, attending housing industry conferences such as those of the National Association of Housing and Redevelopment Officials, and attending meetings with HUD officials where RAD was discussed. Through these means they had gained a basic understanding of RAD, as shown by the PHA who admitted—

> I'm not an expert in it, but I do know the peripherals of the [RAD] program such that it allows a housing authority a different avenue for funding [for rehabilitation]. The funding would come from a private source with the understanding that they would get a certain stream of revenue. There would be a cashflow on one end and there would be a cost—like a mortgage or financing—on the other end. From that framework, a housing authority could use the upfront money from the mortgage to do renovations.

Most PHAs seemed satisfied with their initial understanding of RAD. They credited HUD and others including outside consultants they had hired, industry associations, or their peers with providing the information they relied on to understand the program. Only one PHA claimed that "I don't think a whole lot of easily understood information has been provided by HUD."

Several PHAs suggested that what they learned about RAD convinced them that it would not be a good program for them. Others thought that after conducting preliminary analysis of their housing, they still could not make RAD work as an effective means for meeting their capital needs. These views are reflected in the following examples.

- "We learned about RAD from HUD and, subsequently, from several consultants. RAD was not attractive because of its packaging with tax credits, large-scale rehabilitation focus, and lack of funding—a good tool if you have high subsidy and high land value and a source of soft funds, as well as reserves, but less advantageous without those."
- "It does not fit with some of our larger, older facilities, because … the numbers just don't work."
- "We have been working on some draft [RAD] applications at this point. We have had a hard time finding a project that we think will even work well with RAD …. The RAD rents, combined with [the condition of] our [housing] stock, and the level of capital investment needed [means] the math does not work."
- "We really didn't see the program as beneficial to the agency because of the long payback time [for project debt]."
- "We were told that the contract rent that would be set would not cover the debt from the capital fund refinancing program or the EPC [Energy Performance Contract]. Thus, we were not able to do the RAD program. We still have a need but the numbers don't make sense yet."

These PHAs were deterred from using RAD because they had determined that Section 8 would not enable them to borrow enough to meet all their project financing needs, and therefore their projects would have to rely on additional sources of financing.

A small number of PHAs claimed to understand RAD but questioned the long-term viability of the demonstration and therefore chose not to get involved. The following highlights these concerns.

- "As a Demonstration program, [RAD is] not guaranteed to continue."
- "One thing that bothered me was that HUD seemed to be pushing off all of the questions we asked as far as, how long it's going to be here? If we have tensions in Congress, what would it do with this program? We had concerns with money—funding—with previous programs. How can we be assured that this program is different?"

When asked to compare RAD to other programs they could use to help finance rehabilitation (for example, Capital Fund Financing Program [CFFP], HOPE VI, and Choice Neighborhoods Implementation [CNI]), most respondents claimed they had little direct experience with these other HUD programs and therefore were unable to make a comparison with RAD. Of the non-RAD PHAs that took the web survey, only one-third (13 out of 38) said they had previously borrowed

funds to acquire, rehabilitate, replace, construct, or refinance a public housing project (see table 56). The few who had experience with other programs usually thought that they did not know enough about RAD to make a comparison. The exception was the respondent who noted that "with both Choice Neighborhoods and HOPE VI, you have to have a dysfunctional housing project to anchor your Choice neighborhoods contract and we are at a disadvantage because we don't have dysfunctional housing …. RAD seems to be designed to be accessible to everybody … [PHAs with] decent housing stock can participate." Another respondent noted that they have "used many other HUD programs, including CFFP, LIHTC [low-income housing tax credit], HOPE VI/Choice Neighborhoods, private/mixed financing, and CPD funds … and have been successful but not always on the first try, and we are in a predicament because [when we analyzed RAD for our projects we determined that] you just don't get enough capital money to update your portfolio."

Table 56. Experience With Borrowing Funds for Public Housing (Non-RAD Sample Survey)

Has your PHA previously borrowed funds to acquire, rehabilitate, replace, construct, or refinance a public housing project?		
Yes	13	34.2%
No	23	60.5%
No response	2	5.3%
Total responses	**38**	**100.0%**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Web survey responses—44 PHAs solicited; 38 responded

6.3. Perceived Disadvantages of RAD

Our non-RAD respondents were asked their opinion of the advantages and disadvantages of RAD. Overall the respondents tended to emphasize RAD's disadvantages rather than its advantages, which probably reflects their decision not to apply for RAD conversion. Common disadvantages mentioned include the high implementation cost of RAD, PHAs' inability to attract outside investors, inadequate Section 8 rents or insufficient capital financing, uncertainty about how the program would be implemented or whether it would survive, and concerns about the burden of project debt.

- **High transaction and administrative costs.** On the disadvantage of RAD's high startup or transaction costs, one PHA said RAD "costs a lot of money in consultants and … requires more staff." Another PHA noted that "having to add increased management complexity to an already diverse Agency portfolio with limited funding is not our preference." A third PHA added that RAD is "difficult to implement for staff and [has] multiple regulations depending upon funding."
- **Insufficient Section 8 rents and capital.** One PHA concluded that RAD was disadvantageous for them because it would not enable their projects to generate enough capital. "The disadvantage for my authority would be getting all of the properties ready to sustain themselves for 20 years, and paying for major renovations such as roofing, [utility] line replacement, etc., out of the amount of funds that we would be receiving." Another PHA commented, "We have had a hard time finding a project that we think will even work well with RAD. We are in a very high-market city. The RAD rents, combined with our [housing] stock and the level of capital investment needed [means that] the math does not work."

- **Unworkable for small and rural PHAs.** Other PHAs expressed a general sense that RAD is disadvantageous for PHAs in small towns and rural areas because it does not work there. One PHA noted hearing "rumors that the numbers don't work as well for smaller housing authorities." Another added, "I don't think it works for small town housing authorities …. We don't have investors that come out here and say they'll invest in our properties."
- **Uncertainty of Section 8.** Some PHAs viewed the RAD conversion to Section 8 contracts as a disadvantage because they doubted whether Section 8 subsidies would continue to be funded over the long term. One PHA called it "somewhat theoretical [that] the program would depend on stable rent subsidies over time." In citing the disadvantages of RAD, one PHA listed "insufficient funding, long pipeline, and the difficulty of assuring that you could still serve the kind of client mix we can serve in public housing at the rents we currently charge."
- **Burden of debt.** Some PHAs consider the use of debt financing under RAD to be a disadvantage. They expressed concern that project debt could hurt the viability of a project. "It would be just like any mortgage you have. Now [under RAD] you have a mortgage on the property with the bank and the priority is always to pay the mortgage first."
- **Effect on mission.** In addition, several PHAs expressed concerns that RAD would threaten their ongoing operation and mission as a PHA by eroding their tenant base or undermining their control over their housing. One housing director captured this attitude: "It didn't really fit us because I did not understand … the mechanism where you take the tenants in the public housing and give them a Section 8 [voucher] in two years' time. I understand the objectives of RAD are to get people moving and [give them] flexibility where they live, so they don't feel like they are trapped in a public housing unit and if they want subsidy they have to stay in that unit. I understand the benefit of that, but as a housing authority executive director, that would mean more turnover costs that I can't grapple with. My tenants, they tend to stay in the unit on their own accord for 10 to 12 or 15 years."
- **Impact of tax credits.** Several PHAs thought that the common use of tax credits in RAD projects would change project ownership and weaken the PHA's control. The PHA would transition from wholly owning and controlling its housing to sharing ownership and control with outside investors through a limited liability company or limited partnership under the management of a general member. As one PHA noted, "If you are packaging [RAD] with tax credits, then [there is] loss of ownership to private partnerships with equity investors."

In many cases, the explanations given by these PHAs for why they did not participate in RAD combined several of these reasons. As one PHA explained, "RAD was not attractive because of its packaging with tax credits, large-scale rehabilitation focus and lack of funding. [It is] a good tool if you have high subsidy and high land value and a source of soft funds, as well as reserves, but less advantageous without those."

6.4. Perceived Advantages of RAD

Aside from pointing out RAD's disadvantages, respondents pointed out some of the advantages of RAD. The advantages include less dependence on public housing programs and increased ability to manage their housing in a rational manner, the chance to get more capital funding to meet their capital needs, and the opportunity to offer vouchers that are portable and provide more choices for residents.

- **Not public housing.** One PHA noted that "Advantages [of RAD] are not being held to the vagaries of Congressional funding and declining capital funds, along with the ability to have a capital reserve and to make prudent business decisions. If you need to do a lot of rehabilitation, the packaging with tax credits is pretty good." Another PHA mentioned the advantage of "some relief from requirements, as there are not as many mandates or reports to HUD [under RAD compared with public housing]."
- **Access to capital funds.** As one PHA identified, "One of the major advantages [of RAD] is to get that upfront funding for improvements." Another PHA added that "We get such little capital money [under public housing. With RAD] we would be making several properties viable for the next 20–25 years. [That] would be the advantage."
- **Voucher option.** Several PHAs touted the advantage of tenants moving to tenant-based vouchers under RAD. "Folks could move after one year," one PHA noted, and tenants are "not tied to the property." Another PHA indicated that "Vouchers are preferred by [our tenant] clients. Vouchers are portable."

6.5. Reasons for Not Participating in RAD

Of those PHAs that responded to the survey and agreed to be interviewed and had not applied for the RAD program, most chose to stay out because they did not need capital improvements, lacked the capacity or understanding to undertake a RAD project at the time the program started, or questioned whether RAD conversion would benefit their projects or residents. The following bullet points highlight specific quotes from these PHAs regarding why they did not apply for RAD.

- **No capital needs.** Several PHAs mentioned that they did not apply for RAD because they had no need for capital improvements, or their needs could be met without resorting to RAD. "We have a minimal need for capital improvements," said one PHA. "[Our] properties are in pretty good shape," said another PHA. "I don't see it fitting into our portfolio. As a small housing authority, we only have 118 units. Our apartments are in decent shape and we seem to get by with operating subsidies and capital fund programs."
- **Lack of capacity.** Some PHAs explained that they did not have the administrative capacity to take on a RAD project. Said one PHA, "[We are] in the middle of two HOPE VI projects and looking to do Choice Neighborhoods. Our plate is full." Others thought they did not understand it well enough. "It was just a lot of the unknown," said one PHA. "We had no clear awareness of what the program involves," said another PHA.
- **Insufficient or uncertain benefits.** Several PHAs remarked that RAD's lack of clear benefits to the PHA, their housing, or their tenants led them to decide not to apply for it. As one PHA flatly noted, "The numbers didn't work." Another PHA admitted that "there is still a lack of clarity as to what PHAs will benefit most or at all from RAD." A third

PHA expressed concern that by "applying for the RAD program we would lose our subsidy in another area." One PHA said "We were very concerned about how it would affect our residents and whether or not their rents would be frozen." Another PHA added "Not sure we would be able to sustain the property or if our residents would still pay 30 percent of their income or more." Finally, one PHA questioned the viability of the Section 8 contract under RAD: "Since the funding isn't guaranteed and is very limited we felt it wasn't a good risk." Another PHA echoed this concern: "I am being shorted in the voucher program right now, what's to say they won't short me down the road?"

According to their answers to the survey, however, nearly one-half (47.4 percent; 42.1 percent + 5.3 percent) considered RAD to be a possible option or even a good match when they first heard about it, even though they ultimately decided not to apply (see table 57). Perhaps with more information about RAD or more technical assistance, these PHAs would have made a different decision.

Table 57. Reasons for Not Applying for RAD (Non-RAD Sample Survey)

When you first heard about RAD, did you consider applying for it? If not, why not?		
Yes, RAD appeared to be a good match	2	5.3%
No, poor fit with our structure and operations	5	13.2%
No, RAD was a possibility but we needed more information	16	42.1%
No, initial presentation of RAD was not attractive	6	15.8%
No, satisfied with current financing	6	15.8%
No, do not have capital needs backlog	3	7.9%
No, first time hearing about RAD	0	0.0%
Total responses	**38**	**100.0%**

RAD = Rental Assistance Demonstration.
Source: Web survey responses—44 PHAs solicited; 38 responded

6.6. Plans To Apply for RAD in Future

Most of the non-RAD PHAs that responded to the web survey (23, or 60.5 percent) said they were undecided about whether they would pursue RAD in the future. The second largest number, 14 (36.8 percent) said they had no plans to pursue RAD in the future. Only one PHA (2.6 percent) indicated having such plans (see table 58).

Table 58. Future Plans To Apply for RAD(Non-RAD Sample Survey)

Are you planning to pursue RAD in the future?		
Yes	1	2.6%
No	14	36.8%
Undecided	23	60.5%
No response	0	0.0%
Total responses	**38**	**100.0%**

RAD = Rental Assistance Demonstration.
Source: Web survey responses—44 PHAs solicited; 38 responded

When our staff spoke with them in interviews, however, more PHAs seemed inclined to consider applying to RAD at some point, especially if changes were made to the program. Almost one-half of our interview respondents said they planned to or might apply for RAD in the future.

Their main reason for planning to apply was because they needed capital improvements. As one PHA stated, "We are taking units coming out of tax-credit compliance and … they may need some capital improvements." Others said they would be interested in applying for RAD if it would work for them. One PHA said, "We remain highly interested in repositioning. If RAD is a tool we can use, we are interested." Another stated, "Development is not beyond our bandwidth—it just needs to be the right project." Others said they would consider using RAD because they have few alternatives. As one PHA said, "I think new regulations … make it much more difficult for housing authorities …. So I guess the more unfunded mandates that are put upon us, it is driving us to realize we have to do something. RAD might just be the answer."

More than one-half of our respondents said they did not plan to apply for RAD or were uncertain about whether they would. PHAs gave many reasons for not planning to apply for RAD; these reasons largely recapitulate the reasons given previously for why they did not apply for RAD in the first place. Some admitted that they had "no clear awareness of what the program involves." Others were "unsure [and] waiting to see how other Housing Authorities shake out" before they decided whether to pursue RAD. Some respondents objected to the upfront cost of outside consultants or staff time to apply for RAD. As one respondent said, "We are attending to other more pressing concerns and issues and it would take too much to bring the staff and the Board up to speed on the program." Another offered that applying for RAD is "too steep a learning curve for questionable benefits." Some of their reasons revolved around the uncertainty of meeting the long-term RAD commitment to pay back debt. As one respondent asked rhetorically, "Will we be able to maintain [financial] structures under RAD long term?" Another asked, "Does the financial structure [of RAD] make sense?" A third stated, "It will be seven years before the loan is paid off and we have no idea what the market will be like then." Other respondents thought the program was not financially attractive enough. As one said, "If the subsidy reflected actual costs then the RAD option may be feasible for us." Another said, "We would be more interested in RAD if the rent levels were higher."

Other respondents said they simply had low capital needs or they thought they could meet their capital needs without RAD: "Our program is working well and we wouldn't want to go out for financing." A change in circumstances, however, could influence their decision. "Significant decreases in [public housing] operating funds would facilitate a need [for RAD] but not at this time." These PHAs did not anticipate having significant capital needs that they could not meet within their current resources. One respondent summed it up by stating that "basically … our capital fund programs we get annually from the government and our operating subsidies. And at this point, they seem to be working sufficiently for us." Another respondent noted that "We are working within the resources we have." Another respondent, however, said he "just doesn't foresee any major capital funding needs they would have trouble meeting."

6.7. Recommendations for Improving RAD

Most of the non-RAD PHAs that spoke with us made recommendations for how HUD could improve RAD. They thought HUD should (1) give PHAs more information and training on RAD, (2) make RAD a permanent program and finalize the program's rules, and (3) address the lack of adequate funding under RAD.

- **More information and training.** A general lack of understanding about the program, how it would be implemented for them, and its impact on project finances and PHA finances seems to be the major hurdle to using RAD for these PHAs. Several PHAs recommended that HUD "provide technical assistance," "provide solid information and specifics," or "hold additional training."
- **Make RAD permanent.** Several respondents questioned whether HUD will follow through on its long-term commitment to RAD, considering it is only a demonstration program. They also were uncomfortable with becoming embedded in a program that was not permanently authorized and did not have its own set of rules and standards that they could follow. Their recommendation to HUD was to "finalize the rules." As one PHA said, "I think if they go ahead and make it [clear] through law and legislation exactly what the program will do, and [it] becomes a real program and not just a demo program, then that will be more beneficial." Another PHA said, "I'm weary about the structure, the promise, the funding, and the like. If HUD doesn't keep that [promise] … then you will have bankruptcies and foreclosures all over the place. I don't want to be part of that demonstration."
- **Increase RAD funding.** Several respondents noted that the program would be more attractive if HUD provided additional project subsidies, either through higher Section 8 rents or additional sources of funds, additional administrative subsidies to the PHA, or additional capacity-building funds to support the PHA's application process. As one PHA noted, "In high-market neighborhoods, they need to look at the rent levels." Another said, "There has to be another means of funding. If you're gaining subsidy on one end but you lose it on the other end that affects a great deal of your budget." A third recommended that HUD should provide "upfront financing—money—because the application requires us to get contractors, and … the whole process can be expensive."

Some of those that provided recommendations to HUD for improving RAD indicated that they would apply for RAD if HUD followed through on their recommendations. "Yes … [we have] successfully leveraged almost every type of funding." One respondent said that they would apply only if it "didn't affect the amount of funds [they] received." Another added, "No philosophical problem on our part. We are fine with moving public housing to voucher system. Changing the model is fine. No policy resistance. Our trouble is finding a project with numbers that would work." Another noted that their "participation isn't about the rules or training, it just isn't the right time for us and we don't have the right staff."

6.8. Conclusions

Our findings from interviews of a sample of PHAs indicate that PHAs that have not applied for RAD have a basic understanding of the RAD program. HUD has been reasonably effective at disseminating information about RAD to PHAs through the RAD Library on the HUD website and also training and outreach efforts. PHAs' understanding of RAD, however, is imperfect and incomplete. In some cases, they may have arrived at conclusions—for example, that RAD does not work for their projects—without testing the assumptions on which those conclusions are based. For future training and outreach efforts, HUD should focus on filling the following knowledge gaps about RAD.

- RAD is a tool PHAs can use to address their capital needs, but RAD also can benefit projects that do not have significant capital needs. Most PHAs recognize that RAD is designed to help PHAs fund public housing rehabilitation costs. Some PHAs do not appreciate, however, that RAD can be used to preserve public housing that is already in good condition with 15- and 20-year Section 8 contracts. About one-half of the projects closed to date have not needed a mortgage, suggesting that rehabilitation was not the objective of converting to RAD. HUD could provide more information with real-world examples on how RAD can benefit projects by providing stable and more predictable funding.
- RAD is a tool that can be used by PHAs of all sizes, including small and rural PHAs, yet some PHAs think RAD is not workable in those circumstances. To address this assumption, HUD could provide information or case studies on examples of small PHAs and rural projects that have converted under RAD.
- RAD is a tool that can be used to meet projects' capital needs. Some PHAs, however, think RAD will not work for large and distressed projects or projects with CFFP or EPC loans that will have to be repaid. HUD could address these assumptions by providing more information on how RAD compares with alternative capital subsidy programs and how RAD can be used in combination with other programs. For instance, CNI can be paired with RAD for distressed properties. Also, by financing longer-term loans, RAD should enable projects to refinance existing CFFP or EPC debt. Other projects may exist in which the available range of resources, including RAD, is not sufficient to redevelop the project. HUD training can address the alternatives to RAD, such as CNI grants, Demolition/Disposition with Tenant Protection Vouchers, or project-based vouchers. Not all projects may qualify for CNI or Tenant Protection Vouchers, and some PHAs do not have their own HCVs (or have reached their limit of 20 percent of the vouchers being project-based). Additional subsidies from HUD/Congress may be needed to preserve these affordable units.
- RAD enables projects to use tax credits to finance rehabilitation and new construction; however, tax credits are not required. In fact, about one-half of the projects that have converted to date do not include tax credits. Some PHAs are anxious about the ownership, control, and termination issues related to tax credits. To address these concerns, HUD should provide more information to PHAs on their options with tax credits, how PHAs continue to exercise control over tax credit projects, how tax credit projects are managed, and what happens at the end of compliance.
- RAD offers existing tenants access to Choice Mobility Vouchers. Most PHAs understand this option, but some PHAs are concerned that it will increase their costs and management burdens. HUD could provide information on how PHAs can manage the implementation of Choice Mobility Vouchers to address these concerns.

In general, PHAs would make better decisions about participating in RAD if they understood all of its benefits, the range of circumstances—PHA size, location, project condition—in which RAD has been used successfully, and how RAD works in combination with other programs, including CNI and tax credits. HUD could support PHA decisionmaking focusing its future training and outreach on these subject areas.

PHAs also need to be shown the strategic advantages of RAD and other tools for the management of their housing portfolio. RAD is available to solve their capital needs. If it is insufficient, RAD can be combined with other public housing programs. Most PHAs recognize the funding issues they face in public housing. Some PHAs also express concerns about funding issues under Section 8. For these PHAs to use RAD, they first would need to be shown the strategic advantages of converting their public housing projects to 15- and 20-year Section 8 contracts that are automatically renewable. PHAs may benefit from modeling future scenarios to determine which programs are best for them over the long run. Perhaps HUD could offer more technical assistance to PHAs to engage in long-term strategic portfolio planning.

Several PHAs mentioned the high startup costs of the RAD program as a deterrent. RAD permits PHAs to use up to $100,000 per project of capital funds to cover predevelopment costs and, if needed, a higher amount could be approved. This subsidy may not be available to PHAs that are considering applying to RAD but decide not to do so after they have incurred due diligence costs. In addition to predevelopment funding, HUD should consider providing additional technical assistance to PHAs that could be used to explore their options under RAD and other public housing, possibly for long-term planning purposes.

Some PHAs are disinclined to use RAD solely because, as a demonstration program, it is too risky (experiments can fail) and costly (the learning curve is too steep) compared with its potential benefits, which are statutorily capped. For these PHAs, their cost-benefit calculation could change if RAD were to be permanently authorized and made more widely available as a demonstrably feasible option.

7. Financial Analyses of Four RAD Conversions

This chapter provides an indepth analysis of how public housing authorities meet the financial needs of their projects by using the Rental Assistance Demonstration rather than available alternatives. To illustrate the range of capital needs and financing choices that PHAs face with RAD projects, it presents four case studies of RAD conversions. Each case study is an actual RAD project selected from our sample of 24 RAD projects that has completed closing. We subjected each case to the sort of financial analysis that PHAs engage in when evaluating whether to pursue RAD conversion. We also present an alternative scenario for each case study that achieves the same development program as proposed under RAD but does not rely on the full scope of resources and funding flexibilities available with RAD.[108] The comparative analysis of RAD against these alternatives provides insights into the financial benefits that PHAs expect to achieve with RAD—principally by leveraging mortgage debt and improving project cashflow—compared with their options without RAD.

7.1. Introduction

As discussed throughout this report, considerable variation exists among RAD transactions in baseline characteristics, type and amount of financing required, and extent of rehabilitation activity. Therefore, we selected four case studies that reflect the range of relatively common RAD transactions. The first case discussed is a "nonfinancial transaction" that converts the project to Section 8 with no major rehabilitation or new construction, and using no sources of funds other than PHA resources. The next three cases are financial transactions that use RAD to finance substantial rehabilitation (two cases) or new construction (one case). The second case presented uses conventional mortgage debt (without low-income housing tax credit equity) to finance substantial rehabilitation. The third case funds the cost of new construction through a combination of 9-percent LIHTC equity with conventional mortgage debt. The fourth case uses 4-percent LIHTC equity and tax-exempt, Federal Housing Administration-insured mortgage debt to meet its substantial rehabilitation needs.

[108] The non-RAD development financing alternatives considered in this analysis are technically feasible, but they may not always be readily available. For instance, three of the four cases substitute soft funds for project debt. Obtaining these soft funds could be challenging for the PHA or could require the PHA to divert funds from other projects, which it may prefer to avoid doing. This analysis did not examine the status quo alternative for these three cases, in which the PHA uses only its existing capital funds, because that alternative would have left each project's capital needs largely unmet.

For each case, we present two common tools in housing and real estate analysis: (1) the development budget (Sources and Uses statement) and (2) the long-term operating pro forma. The development budget identifies how much financing is coming from what sources and how those funds will be deployed to complete the planned development at the time of conversion. For the development budget to be in balance, total sources of funds should equal total uses of funds.[109]

Sources of funds typically include the following categories.

- First mortgage debt, which could be commercial or FHA-insured, taxable or tax-exempt. The amount of first mortgage debt a project can carry is limited by the maturity period, the interest rate, and the project's net operating income.[110]
- Other types of third-party debt, such as second loans.
- Outside equity, such as 4-percent or 9-percent LIHTC equity.
- Contributions from the project sponsor, such as the PHA, including capital grants, operating reserves, cash on hand, Replacement Housing Factor/Demolition and Disposition Transitional Funding monies, and "soft loans."
- Sources from the project (such as rehabilitation assistance funds received during the construction phase, sometimes called "funding from operations").
- Gap financing, also known as "soft money," which is usually funding from a public entity that may be in the form of grants or soft loans, that is, loans with flexible repayment terms.
- Deferred developer fees, which could come from the PHA as developer.

The uses of funds section summarizes the development budget by line item, showing the type and amount of expenditures that must be made to complete the development. These expenditures include—

- Acquisition costs, if the PHA plans to buy another building or piece of land.
- Payoff of existing debt, such as any outstanding Capital Fund Financing Program loans.
- Construction costs, also known as "hard costs."
- The cost of relocating tenants during rehabilitation or demolition (if necessary).
- Professional fees for outside consultants, advisors, attorneys, and architects, and also for local permits and approvals.

[109] The development budget initially may not be in balance. In putting together a development budget, the uses are usually determined first. Sources are then determined based on the debt capacity (if any) of the project, tax credit equity (as appropriate), and all known soft sources of funding, from either the PHA or other sources. Any difference between total known sources and total uses creates a gap. Because sources may already include the maximum potential debt the project can support, any gap will have to be filled with soft funds, either grants that do not have to be repaid or loans that are payable subject to the project generating sufficient cashflow. If sources exceed uses, it is possible for a PHA to receive a cash payment from the transaction. Those funds could be used to support other projects or purposes of the PHA. Any such payments to the PHA would be indicated as one of the uses in the development budget. None of the four cases examined had such a cash payment.

[110] This debt is fixed rate, permanent, and fully amortizing. A rise in interest rates would reduce a project's debt capacity if all other factors were unchanged.

- Financing fees and related costs, for example, application and underwriting fees and interest on construction loans during the construction period.
- Project reserves, which HUD and lenders will require to ensure that the project can cover any losses until the project achieves stabilized occupancy, typically cast as a percentage of occupancy (for example, 95 percent) over a number of months (for example, 6 months).
- Developer fees, some of which could go to the PHA as the co-developer. (If the developer defers part of its fees, that would appear as "deferred developer fees," which is an offsetting source of funds.)

The long-term operating pro forma examines income and expenses for a project after the development (or conversion) is complete. Common income sources include—

- Rental income, including the tenant-paid and government-subsidized portions of rent, as determined by the contract rent in RAD conversions and public housing operating and capital fund subsidies in non-RAD alternatives.
- Other income collected by the project, for example, from onsite laundry facilities.

Rental income and other income (gross income), less vacancy and bed debt expenses, equals effective gross income (EGI).

Project expenses include—

- Operating expenses, which cover insurance, utilities (except tenant-paid utilities), maintenance, asset management, tenant services, payments in lieu of taxes, administrative costs, security, and other costs to operate the project.
- Contributions to the project's reserves, which are the required annual deposits into controlled accounts to fund future nonroutine maintenance items, such as HVAC (heating, ventilation, and air-conditioning) replacement.[111]
- Debt service (payments on loans).

NOI is calculated as EGI minus operating expenses and contributions to reserves but not debt service. The debt service coverage ratio is calculated as the ratio of NOI to debt service payments. At application, RAD requires a DSC ratio of 1.2, which means that for every dollar of debt service, the project's budget needs to show that there is $1.20 of available NOI to provide an additional cushion above and beyond the various project reserves. When NOI exceeds debt service, it results in positive cashflow (NOI–debt service); when NOI is less than debt service, cashflow is negative. After the initial-year operating budget is established, it is then trended for 20 years based on the lender, investor (if any), insurer (HUD FHA), and RAD criteria. RAD requires that income be trended with a 2-percent increase and that expenses be trended at 3 percent annually. As a result of these trending assumptions, NOI, the DSC ratio, and cashflow tend to decline over time.

[111] The contribution to reserves amount is determined by HUD at project underwriting for RAD projects over a 20-year period. In the case of tax credit projects, the investor and/or housing finance agency may require a different amount. The higher of the two amounts is the amount that must be contributed.

These two documents—the development budget (Sources and Uses statement) and the operating pro forma—work in tandem. The development budget determines how much of a project's capital needs can be met up front, which affects out-year incomes (by supporting rents) and expenses (by reducing maintenance and utilities). The operating pro forma demonstrates the longer-term sustainability of a project if it can meet all of its financial obligations and still generate positive cashflow. The operating pro forma is particularly important for projects requiring debt, because adequate DSC is essential for attracting lender support.

Certain assumptions are necessary for these analyses. For projects involving debt, we have had to make assumptions about the term and interest rate of the mortgage (these assumptions vary slightly from one case to another, and are detailed in each case study). For all projects, we have assumed that operating expenses increase by 3 percent each year, consistent with HUD's underwriting guidelines. For the RAD scenario presented for each case, we have assumed that contract rents will increase each year by a 2-percent operating cost adjustment factor, which is again consistent with HUD guidance. For non-RAD financing scenarios, we have assumed that public housing funds (operating funds and capital funds) will decline at 1 percent per year, which is a lower rate of decrease than has occurred over the past 15 years.[112] These last two assumptions significantly affect the outcomes of our analysis, so we also include two sensitivity analyses for the non-RAD financing scenarios: one that assumes a 2-percent annual decline in public housing funds and another that assumes public housing funds remain constant.[113]

It is possible to test other non-RAD scenarios for comparative purposes, such as a reduced level of upfront improvements, the status quo (few or no improvements), or the use of tax credits to fund improvements. Each of these alternative scenarios would require detailed modeling and analysis of the project's physical condition, financial requirements, and operating costs over time, and would take many more assumptions than we have had to make.[114] We decided to defer this more indepth study to the Final Report, after we have obtained more detailed information on the actual experience of RAD projects with making physical repairs and improvements.

[112] No set standard exists for projecting the future change to revenue in the non-RAD approach, because both the Capital Fund and Operating Fund grants to housing authorities are subject to congressional actions. The general consensus is that these revenues will not increase over time, but rather will trend downward. For example, public housing Capital Fund appropriations have declined from $2.9 billion in 2000 to $1.9 billion in 2015, or by 2.9 percent per year. However, in 2009, the program received a total of $6.5 billion in appropriations, in part because of one-time stimulus funding in the American Recovery and Reinvestment Act of 2009 (Pub. L. 111–5).

[113] Our analysis does not examine the impact of interest rate changes. All else equal, an increase in the mortgage interest rate would reduce the amount of first mortgage debt that RAD projects could carry. Our analysis also does not include future refinancing. Based on the project underwriting standards used by HUD, lenders for RAD projects, housing finance agencies, and investors (in tax credit projects), refinancing should not be necessary during the initial Housing Assistance Payment contract term (15 to 20 years).

[114] For instance, if we modeled the impact of a reduced scope of development, we would have to make assumptions about what improvements would be made, what impact they would have on operating costs, and whether reserves would be sufficient to cover the 20-year capital needs. Similarly, if the PHA simply continued operating the property as public housing with current subsidies, we would need to make assumptions about obsolescence, the capital needs backlog, and the impact on future project performance. If the PHA chose to apply for 9-percent LIHTC equity, we would have to make assumptions about the competitiveness of the project.

The following sections describe each case study, summarize the development sources and uses budget and operating pro forma as described in their RAD documentation, and present the results for each case under RAD and under the alternative assumption that the PHA could use financing sources other than through the RAD program to carry out its development plan.

7.2. Nonfinancial RAD Conversion

The first case is a 197-unit project that primarily serves families and is converting to RAD. This project has only limited immediate repair needs (about $1,000 per unit) and therefore does not require borrowing or other outside sources of capital. The primary purpose of this case study is to illustrate the effect on the project's financial condition from moving the project from the public housing platform to the Section 8 platform via RAD. As shown in this case, even if a project has no or few upfront capital needs, RAD can benefit a project's long-run financial condition by providing enhanced revenues through the OCAF compared with the funding the project is expected to receive in the public housing program (see table 59).

Table 59. Nonfinancial Case: Comparison of RAD Conversion and Non-RAD Alternative

	RAD Conversion	Non-RAD Alternative
Type of project—family	No development	No development
Total units	197	197

RAD = Rental Assistance Demonstration.

Sources and Uses Development Budget

Table 60 presents the sources and uses budget for this RAD project and an alternative scenario without RAD. In this case, the sources and uses are the same for both scenarios. This project is not using external capital, and all development resources used by the RAD project would be available to the project even in the absence of RAD. The sources include public housing reserves, previous-year public housing capital funds, and RHF/DDTF funds resulting from previous demolition or disposition. The total funding of approximately $2.2 million is used for limited rehabilitation (construction costs and fees) and other items, but the bulk of the funding ($1.9 million, or 87 percent of the total) is placed into a reserve account to cover future repair needs.

Table 60. Nonfinancial Case: Sources and Uses Development Budget for RAD Conversion and Non-RAD Alternative

Sources and Uses	RAD Conversion ($)	Non-RAD Alternative ($)
Sources		
First mortgage	—	—
9% LIHTC equity	—	—
Public housing reserves	680,000	680,000
Previous-year public housing Capital Fund	150,778	150,778
Gap/additional soft funding	—	—
RHF/DDTF	1,357,331	1,357,331
Deferred developer fee	—	—
Total sources	**2,188,109**	**2,188,109**
Uses		
Acquisition cost	—	—
Pay off existing debt	—	—
Construction costs	197,074	197,074
Relocation costs	—	—
Professional fees	25,000	25,000
Financing fees and related costs	—	—
Other	65,000	65,000
Reserves	1,901,035	1,901,035
Developer fees	—	—
Total uses	**2,188,109**	**2,188,109**

DDTF = Demolition and Disposition Transitional Funding. LIHTC = low-income housing tax credit. RAD = Rental Assistance Demonstration. RHF = Replacement Housing Factor.
Source: Project sources and uses data maintained by RAD program

7.2.1. Pro Forma Operating Budget

Although the sources and uses budget is the same regardless of whether the property converts to RAD, the pro forma operating budget shows an important difference between RAD and the non-RAD alternative (see table 61). In the first year, the RAD and the non-RAD scenarios have the same level of overall revenues ($1.3 million) and operating expenses ($1.0 million). This equivalence is because RAD contract rents are based on the project's current public housing subsidy. In each year thereafter, however, revenues increase under the RAD scenario by 2 percent per year and decrease under the non-RAD scenario by -1 percent per year. Both scenarios assumed that expenses will increase 3 percent per year, as required by HUD's underwriting standards.

Table 61. Nonfinancial Case: 20-Year Pro Forma for RAD Conversion and Non-RAD Alternative

RAD Income/Expenses	Year 1 ($)	Year 10 ($)	Year 20 ($)	All Years ($)
Rental income (@ 2% p.a. OCAF)	1,313,484	1,569,735	1,913,498	31,914,206
Other income (@ 2% p.a.)	19,550	23,364	28,481	475,014
Less vacancy (5% rental income)	(65,674)	(78,487)	(95,675)	(1,595,710)
Effective gross income (EGI)	1,267,360	1,514,612	1,846,304	30,793,510
Operating expenses (OE @ 3% p.a.)	(1,036,058)	(1,351,821)	(1,816,734)	(27,839,266)
Contributions to reserves (CR)	(156,615)	(156,615)	(156,615)	(3,132,300)
Net operating income (NOI = EGI – OE – CR)	74,687	6,177	(127,045)	(178,057)
Debt service payment (DSP)	—	—	—	—
Cashflow (NOI – DSP)	74,687	6,177	(127,045)	(178,057)

Non-RAD Income/Expenses	Year 1 ($)	Year 10 ($)	Year 20 ($)	All Years ($)
Rental income (@ – 1 % p.a.)	1,313,484	1,199,890	1,085,159	23,917,632
Other income (@ 2% p.a.)	19,550	23,364	28,481	475,014
Less vacancy (5% rental income)	(65,674)	(59,995)	(54,258)	(1,195,882)
Effective gross income (EGI)	1,267,360	1,163,260	1,059,382	23,196,764
Operating expenses (OE @ 3% p.a.)	(1,036,058)	(1,351,821)	(1,816,734)	(27,839,266)
Contributions to reserves (CR)	(156,615)	(156,615)	(156,615)	(3,132,300)
Net operating income (NOI = EGI – OE – CR)	74,687	(345,176)	(913,967)	(7,774,802)
Debt service payment (DSP)	—	—	—	—
Cashflow (NOI – DSP)	74,687	(345,176)	(913,967)	(7,774,802)
Cashflow if rent increases at 0% p.a.	74,687	(237,262)	(697,059)	(5,540,357)
Cashflow if rent decreases at – 2% p.a.	74,687	(444,713)	(1,094,820)	(9,758,451)

OCAF = operating cost adjustment factor. p.a. = per annum. RAD = Rental Assistance Demonstration.
Source: Pro forma model using RAD project data

By converting public housing operating funds and capital funds into a single funding stream through a Section 8 Housing Assistance Payment contract, RAD enables the project to receive more revenue compared with the non-RAD status quo. This outcome reflects the impact of the Section 8 OCAF, which has increased by more than traditional public housing operating and capital funds during the past decade. By year 10, the RAD project will have EGI of $1.5 million compared with $1.2 million for the non-RAD scenario. Subtracting operating expenses and contributions to reserves from EGI, we see that in year 10 the NOI and cashflow for the RAD project is still positive, at $6,177, but for the alternative scenario without RAD conversion NOI and cashflow have become negative, at -$345,176. With RAD, the project could cover a small portion of its contribution to reserves (NOI is -$127,045 whereas the contribution to reserves is -$156,615) by year 20. Without RAD, however, the project would not be able to make its contribution to reserves by year 7 (not shown), and it could not meet any of its contributions to reserves and a large portion of its operating expenses by year 20, because NOI would be -$913,967. A flat rather than declining subsidy lessens this loss to -$697,059, which is still quite large. With a 2-percent annual decline in subsidy, the loss in year 20 under the non-RAD alternative would be -$1,094,820.

7.2.2. Comparing Overall Results

Table 62 presents the cumulative results of the development and operating budget during this 20-year period for the RAD project and the non-RAD alternative. There is no difference in the impact of their development budgets; all the difference derives from the operating budget. Under the RAD conversion, the 20-year cumulative net cashflow loss is -$0.178 million, which is close to breaking even. To cover this loss, the project could reduce its contribution to reserves of $3.132 million and still cover all of its expenses. This reduction in reserves would be small, about 5.7 percent of its total contribution to reserves during this period, and would have minimal impact on the project.

By contrast, the non-RAD alternative scenario has a cumulative cashflow loss of -$7.8 million over 20 years, which is greater than the cumulative loss under RAD by $7.6 million, or $38,562 per unit. Absorbing this loss would eliminate all of project's contributions to reserves and severely impact the project's ability to cover annual operating expenses, which could lead to reduced or eliminated maintenance, security, tenant services, and asset management.

Table 62. Nonfinancial Case: Comparison of 20-Year Cumulative Cashflow and Development Budget for RAD Conversion and Non-RAD Alternative

20-Year Cumulative Cashflow and Development Budget	With RAD ($)	Non-RAD Alternative ($)	Variance ($; RAD minus Non-RAD)
Effective gross income (EGI)	30,793,510	23,196,764	7,596,745
Operating expenses (OE)	(27,839,266)	(27,839,266)	—
Contributions to reserves (CR)	(3,132,300)	(3,132,300)	—
Net operating income (NOI = EGI – OE – CR)	(178,057)	(7,774,802)	7,596,745
Debt service payment (DSP)	—	—	—
Cashflow (CF = NOI – DSP)	(178,057)	(7,774,802)	7,596,745
Development budget (DB) added resources	—	—	—
Total variance (CF + DB)			**7,596,745**
Total variance per ACC unit			**38,562**

ACC = Annual Contributions Contract. RAD = Rental Assistance Demonstration.

Even in a relatively simple case in which a project has minimal repair needs, the RAD conversion still offers benefits by providing more stable growth in operating income. Over 20 years, this income growth amounts to $7.6 million in additional income. The project can use this income to meet all of its annual operating expenses, fund its maintenance program, and fill almost all of its project-level reserves for addressing its future capital needs. Without RAD, this project would struggle in a few years to pay its recurring bills, allow its maintenance backlog to grow, and neglect its continuing investment needs.

7.3. RAD Conversion for Substantial Rehabilitation Using Conventional Mortgage Debt (and No Tax Credits)

This case is a 198-unit project that primarily serves families and is converting to RAD to address its significant repair needs. This example illustrates a situation in which a PHA assumes significant project debt under RAD in order to finance major construction costs. This financing strategy works because the project has sufficient projected NOI under RAD. Without RAD, the project would have difficulty supporting this amount of project debt. It most likely would have to resort

to alternative financing sources, such as gap financing, for the project to meet its capital needs. Compared with the alternative scenario of using gap financing, the RAD scenario would leave the project better off financially despite the repayment of debt (see table 63).

Table 63. Rehabilitation With Conventional Debt: Comparison of RAD Conversion With Non-RAD Alternative

	RAD Conversion	Non-RAD Alternative
Type of project—family	Rehab	Rehab
Total units	198	198

RAD = Rental Assistance Demonstration.

7.3.1. Sources and Uses Development Budget

Table 64 shows the development budget for this project. Sources and uses of funds for the RAD conversion are shown in the middle column and for the non-RAD alternative are shown in the right-hand column. The PHA proposes substantial rehabilitation for this project of approximately $31,400 per unit ($6.2 million total) in hard costs. Under the RAD scenario, total development cost (TDC) is $44,300 per unit ($8.8 million total), whereas under the non-RAD scenario, TDC is slightly less at $41,279 per unit ($8.2 million total) because of the reduction in financing fees and related costs, such as construction interest.[115] All other uses of funds are the same for both scenarios.

After contributing its own capital funds (in the form of a soft loan), contributing limited project funds from operations, and deferring its development fee, the PHA has a large financing shortfall of almost $6.0 million, or $30,126 per unit, which is 68 percent of the project's financing requirement under RAD. The PHA plans to fill this shortfall with conventional mortgage debt. This debt carries a 4.23-percent rate of interest with a term of 40 years and requires a DSC ratio of 1.2. Section 7.3.2 discusses how the payment of debt service affects the project's cashflow for the next 20 years.

[115] We used the "Loans and Fees" section of the RAD application to complete the "Financing fees and related costs" line item in the sources and uses development budget. This section of the RAD application has about 14 separate items. Many of these items would be required regardless of whether there is a loan, such as organizational costs, recordation, title insurance, escrow agent fees, and other miscellaneous items that are part of any closing.

Table 64. Rehabilitation With Conventional Debt: Sources and Uses Development Budget for RAD Conversion and Non-RAD Alternative

Sources and Uses	RAD Conversion ($)	Non-RAD Alternative ($)
Sources of funds		
First mortgage	5,965,000	—
9% LIHTC equity	—	—
PHA loan	2,388,369	2,388,369
Previous-year public housing Capital Fund	—	—
Gap/additional soft funding needed	—	5,368,550
RHF/DDTF	—	—
Funding from operations	116,316	116,316
Deferred developer fee	300,000	300,000
Total sources	**8,769,685**	**8,173,235**
Uses of funds		
Acquisition cost	—	—
Pay off existing debt	—	—
Construction costs	6,224,462	6,224,462
Relocation costs	50,000	50,000
Professional fees	398,390	398,390
Financing fees and related costs	806,365	209,915
Other	57,602	57,602
Reserves	632,866	632,866
Developer fees	600,000	600,000
Total uses	**8,769,685**	**8,173,235**

DDTF = Demolition and Disposition Transitional Funding. LIHTC = low-income housing tax credit. PHA = public housing authority. RAD = Rental Assistance Demonstration. RHF = Replacement Housing Factor.
Source: Project sources and uses data maintained by RAD program.

Without RAD, in order to achieve the same scope of development for this project, the PHA would need to replace the project's mortgage debt with another financing source.[116] Because the PHA is already providing a soft loan of $2.4 million, which usually comes out of the PHA's capital funds, RHF/DDTF funds, or PHA reserves, the PHA may be unable or disinclined to use more of its own resources. Our analysis therefore assumes that the PHA would use outside gap financing (equal to the first mortgage amount under RAD) to replace the mortgage debt under RAD.[117] Gap financing would be in the form of grants or soft loans. Raising such a large amount of soft funds could be a challenge, however, and would compete with other uses for these limited funds. Without this gap financing, the proposed development would be infeasible without RAD. Because the gap financing would reduce project borrowing, financing fees and related costs

[116] Although RAD is a "no new money" program, the conversion of the Capital Fund subsidy into an operating subsidy and the application of the OCAF to future contract rents under RAD provides converted projects with the ability to support more debt than they could without RAD.
[117] Tax credits also could be used as a financing source for this project for both the RAD approach and the non-RAD alternative. PHAs may choose not to use tax credits because of the challenge of competing for 9-percent LIHTC, their desire to provide direct management services, or their lack of sufficient tax credit experience. Although the project is generating sufficient cashflow initially to make debt payments, by year 9 it could not meet its debt service requirement. Therefore, without RAD, the project could not support debt at the same interest rate and repayment terms as under RAD.

would decline by almost $600,000 (mostly from the savings on interest during construction). Therefore the amount of "gap "financing under the non-RAD alternative would be $5.4 million, which is $0.6 million less than the $6.0 million in project mortgage debt for the RAD scenario that was replaced.

7.3.2. Pro Forma Operating Budget

Table 65 presents two pro forma operating budgets of this rehabilitation project—one each for the RAD and non-RAD scenarios. The key to understanding how well the project performs with RAD is to compare the cashflows under each scenario. Under both scenarios, the operating budgets start at the same level in the first year. They have the same income of $1.4 million because we assume the project receives the same amount of capital funding under both scenarios.[118] They also have the same vacancies ($69,000) and expenses ($652,000) in the first year because the project has the same level of investment under both scenarios. Finally, both operating budgets have the same level of contributions to the reserve for replacement ($99,000) in all years.[119]

Over time, however, annual EGI and NOI increase under RAD and decrease under the non-RAD alternative. The reason for this difference is that the RAD pro forma assumes an annual OCAF of 2 percent and the non-RAD pro forma assumes revenue dropping by 1 percent per year. Both pro formas assume that expenses will increase 3 percent per annum, as required by the underwriting criteria in the RAD program.

[118] In RAD, capital funding is part of the contract rent. To facilitate comparison, we assume that the PHA provides equivalent capital funding to the project in the non-RAD alternative scenario. In reality, this situation may not be possible because capital funds are not easily obtainable, and, even when they are, the amount the PHA can use may not be the full amount that would be provided under RAD.

[119] In many cases, the authority would retain the capital funds, use some of them to support operating costs (at the project level and central office as well), and then use the balance of the capital funds to provide improvements at needier projects. Because our analysis has treated the comparison this way in all of our examples, it probably significantly overstates the results for the non-RAD approach.

Table 65. Rehabilitation With Conventional Debt: 20-Year Pro Forma for RAD Conversion and Non-RAD Alternative

RAD Income/Expenses	Year 1 ($)	Year 10 ($)	Year 20 ($)	All Years ($)
Rental income (@ 2% p.a. OCAF)	1,381,512	1,651,035	2,012,602	33,567,108
Less vacancy (5% rental income)	(69,076)	(82,552)	(100,630)	(1,678,355)
Effective gross income (EGI)	1,312,436	1,568,483	1,911,972	31,888,753
Operating expenses (OE @ 3% p.a.)	(652,370)	(851,195)	(1,143,935)	(17,529,426)
Contributions to reserves (CR)	(99,000)	(99,000)	(99,000)	(1,980,000)
Net operating income (NOI = EGI – OE – CR)	561,066	618,288	669,037	12,379,326
Debt service payment (DSP)	(309,480)	(309,480)	(309,480)	(6,189,608)
Cashflow (NOI – DSP)	251,586	308,808	359,557	6,189,719

Non-RAD Income/Expenses	Year 1 ($)	Year 10 ($)	Year 20 ($)	All Years ($)
Rental income (@ – 1 % p.a.)	1,381,512	1,262,035	1,141,362	25,156,375
Less vacancy (5% rental income)	(69,076)	(63,102)	(57,068)	(1,257,819)
Effective gross income (EGI)	1,312,436	1,198,933	1,084,294	23,898,556
Operating expenses (OE @ 3% p.a.)	(652,370)	(851,195)	(1,143,935)	(17,529,426)
Contributions to reserves (CR)	(99,000)	(99,000)	(99,000)	(1,980,000)
Net operating income (NOI = EGI – OE – CR)	561,066	248,738	(158,641)	4,389,130
Debt service payment (DSP)	—	—	—	—
Cashflow (NOI – DSP)	561,066	248,738	(158,641)	4,389,130
Cashflow if rent increases at 0% p.a.	561,066	362,242	69,502	6,739,302
Cashflow if rent decreases at – 2% p.a.	561,066	144,046	(348,860)	2,302,744

OCAF = operating cost adjustment factor. p.a. = per annum. RAD = Rental Assistance Demonstration.
Source: Pro forma model using RAD project data

The RAD pro forma shows that the project is able to cover its payments of $309,000 per year on the debt used to finance the rehabilitation under RAD and still generate substantial cashflow. Over 20 years, the project will make $6.2 million in loan payments on its original loan balance of $6 million under RAD. At the same time, the project will generate another $6.2 million in cashflow. This result illustrates how RAD conversion can help PHAs raise financing through project debt while leaving the project in a financially strong position.

Although the non-RAD alternative included no fixed-payment mortgage debt, it generates only $4.4 million in cashflow over 20 years—about $1.8 million less than under the RAD scenario—if income declines by 1 percent per year. Because our results are sensitive to this assumption, we also looked at the impact of using different income projections in the non-RAD scenario. If income is flat (0-percent change), the 20-year non-RAD cashflow improves to $6.7 million, which is slightly better than under RAD; if it falls by 2 percent per year, the 20-year non-RAD cashflow falls to $2.3 million, which is significantly worse than under RAD.

7.3.3. Comparing Results

Table 66 summarizes and compares the results of our analysis of both the 20-year operating pro formas and the upfront development budgets for this project under the RAD and non-RAD scenarios. Both scenarios have significant variances in all items except for operating expenses

and contributions to reserves. The RAD conversion has $8 million more than the non-RAD alternative for EGI and NOI. This gain is partially offset by the $6.2 million in debt payments under RAD, leaving a net gain in cashflow of $1.8 million for the project under RAD compared with the non-RAD alternative. In addition, in the non-RAD alternative, the PHA has to cover a development shortfall of $6 million that was funded by project debt in the RAD scenario, less $600,000 in reduced loan costs. Without the advantage of RAD conversion, the PHA has to find an additional $5.4 million in gap financing order to finance the substantial rehabilitation of this project (which has fallen from $8.8 million under RAD to $8.2 million in the non-RAD alternative).

Table 66. Rehabilitation With Conventional Debt: Comparison of 20-Year Cumulative Cashflow and Development Budget for RAD Conversion and Non-RAD Alternative

20-Year Cumulative Cashflow and Development Budget	With RAD ($)	Non-RAD Alternative ($)	Variance ($; RAD Minus Non-RAD)
Effective gross income (EGI)	31,888,753	23,898,556	7,990,196
Operating expenses (OE)	(17,529,426)	(17,529,426)	—
Contributions to reserves (CR)	(1,980,000)	(1,980,000)	—
Net operating income (NOI = EGI – OE – CR)	12,379,326	4,389,130	7,990,196
Debt service payment (DSP)	(6,189,608)	—	(6,189,608)
Cashflow (CF = NOI – DSP)	6,189,719	4,389,130	1,800,588
Development budget (DB): Project debt under RAD less change in total use of funds under non-RAD = additional gap financing	5,965,000	596,450	5,368,550
Total variance (CF + DB)			**7,169,138**
Total variance per ACC unit			**36,208**

ACC = Annual Contributions Contract. RAD = Rental Assistance Demonstration.
Source: Pro forma model developed by The Communities Group using RAD project data.

Combining the development shortfall of $5.4 million with the pro forma 20-year results, the total variance between the RAD scenario and the non-RAD mixed-finance scenario (at 1-percent annual decline) is $7.2 million, or $36,208 per unit. The most important contributors to the positive outcome for this RAD conversion are the transformation of capital funding and operating funding into RAD contract rents and the stability and upward trend of those contract rents under the project-based Section 8 program. This long-term funding permits borrowing ($30,126 per unit) in lieu of the PHA using other sources of financing. It also results in positive cashflow over 20 years, improving the results for the RAD conversion compared with the non-RAD alternative by an additional $9,094 per unit.

This approach to comparing this actual RAD project to an alternative non-RAD approach is as close as possible to comparing "apples to apples" in that it assumes that in the non-RAD alternative, the project initially receives capital funds equal to the level at the time of conversion and uses those funds to cover the capital needs of the project. These funds most likely will decline over time, as they have during the past decades. Also, few PHAs apply all their available capital funds to capital needs—rather, a portion is used for operating costs, planning, central office cost center operations, and so on. Second, having the same level of capital improvements at the outset allows operating costs to be treated as equal. Third, with other changes to the assumptions, it becomes nearly impossible to control all the variables and provide a reasonable

comparison. Even as presented, assuming the PHA uses reserves and capital funds or HUD's CFFP to close the gap, this approach will likely result in a disproportionate use of those resources to complete this project—at the expense of other projects in the PHA's portfolio.

7.4. RAD Conversion for New Construction Using Conventional Mortgage Debt and 9-Percent LIHTC

This example is a 50-unit demolition and new construction project, primarily serving families, that proposes to convert to RAD. As a new construction project, this case has high development costs. With only a modest amount of internal funding available from the PHA, this project proposes to meet its development needs through the addition of conventional mortgage debt and 9-percent LIHTC equity. Most of the project's financing need is being met through tax credits. This case illustrates the importance of 9-percent LIHTC equity in financing projects with high construction costs when RAD contract rents can support only limited debt (see table 67). This case also illustrates the importance of RAD in supporting mortgage debt in lieu of gap financing and in contributing to the long-term financial stability of the project through contract rents and rent increases that exceed what the project is likely to receive under public housing.

Table 67. New Construction With Conventional Debt and 9-Percent LIHTC: Comparison of RAD Conversion With Non-RAD Alternative

	RAD Conversion	Non-RAD Alternative
Type of project—family	New construction	New construction
Total units post-development	50	50

LIHTC = low-income housing tax credit. RAD = Rental Assistance Demonstration.

7.4.1. Sources and Uses Development Budget

In the budget shown in table 68, the PHA proposes to invest $9.7 million in construction costs ($194,425 per unit) and $13.2 million ($263,797 per unit) in TDC to build this 50-unit project that it is converting to RAD. Development costs are high because this project is new construction. If the project were developed as a non-RAD, mixed-finance project, development costs would be slightly lower, at $12.8 million ($255,623 per unit). The difference is because the non-RAD mixed-finance development requires an Annual Contributions Contract reserve of approximately $162,792—which is required for mixed-finance projects but not for RAD conversions—but it has lower financing fees and related costs ($359,000 without RAD compared with $931,000 under RAD) because of the loss of the first mortgage debt without RAD.

For the RAD conversion, the sources of financing for this development include PHA sources totaling $612,000—public housing reserves, capital funds, RHF/DDTF funds, and other funds—plus conventional mortgage debt of $1.2 million and 9-percent LIHTC equity of $11.2 million. The proposed financing structure for this project is typical for medium RAD projects that have high development costs and low RAD contract rents that can support limited debt. Most of project financing (85 percent) comes from 9-percent LIHTC because the PHA has limited funds

and cannot assume more debt under RAD.[120] The size of the loan is at or near its maximum, because it is limited by the project's NOI, discussed in Section 7.4.2, and the underwriting requirement of a 1.2 DSC ratio.[121]

In the non-RAD alternative mixed-finance development budget, the PHA contributes the same amount of funds and raises the same amount of 9-percent LIHTC equity. The PHA would not be able to support the $1.2 million in project debt, however, without RAD contract rents. Our analysis assumes that the PHA would contribute or raise soft funds to cover the entire shortfall of $0.8 million, which is equal to the first mortgage amount under the RAD approach plus the ACC reserve and minus the difference in financing fees and other costs.

Table 68. New Construction With Conventional Debt and 9-Percent LIHTC: Sources and Uses Development Budget for RAD Conversion and Non-RAD Alternative

Sources and Uses	RAD Conversion ($)	Non-RAD Mixed-Finance Alternative ($)
Sources		
First mortgage	1,183,200	—
9% LIHTC equity	11,234,237	11,234,237
Public housing reserves	107,008	107,008
Previous-year public housing Capital Fund	111,000	111,000
Gap/additional soft funding	—	774,492
RHF	169,447	169,447
Other	225,000	225,000
Deferred developer fee	159,946	159,946
Total sources	**13,189,837**	**12,781,129**
Uses		
Acquisition cost	225,000	225,000
Pay off existing debt	—	—
Construction costs	9,721,261	9,721,261
Relocation costs	73,650	73,650
Professional fees	452,710	452,710
Financing fees and related costs	930,582	359,082
Other	555,759	555,759
ACC reserve	—	162,792
Reserves	220,000	220,000
Developer fees	1,010,875	1,010,875
Total uses	**13,189,837**	**12,781,129**

ACC = Annual Contributions Contract. LIHTC = low-income housing tax credit. RHF = Replacement Housing Factor.
Source: Project sources and uses data maintained by RAD program

7.4.2. Pro Forma Operating Budget

Table 69 shows the pro forma operating budget for this project over 20 years under the RAD program and the non-RAD alternative. These pro formas show that the RAD program provides

[120] Project size is an important factor in this case because most states have a project limit on 9-percent LIHTC equity, which makes that program difficult to use for larger projects unless they can be funded in phases.
[121] The loan is for a 30-year term with 6.75 percent interest, which is a market rate of interest.

greater financial stability than the non-RAD alternative during this 20-year period. Higher contract rents plus the OCAF enable the project to cover its debt service and still show positive cashflow under RAD. By contrast, the project's cashflow becomes negative in the non-RAD alternative, making the project incapable of maintaining its contributions to reserves or covering some of its operating expenses.

Table 69. New Construction With Conventional Debt and 9-Percent LIHTC: 20-Year Pro Forma for RAD Conversion and Non-RAD Alternative

RAD Income/Expenses	Year 1 ($)	Year 10 ($)	Year 20 ($)	All Years ($)
Rental income (@ 2% p.a. OCAF)	373,392	446,238	543,962	9,072,444
Other income (@ 2% p.a.)	—	—	—	—
Less vacancy (5% rental income)	(18,670)	(22,312)	(27,198)	(453,622)
Effective gross income (EGI)	354,722	423,926	516,764	8,618,821
Operating expenses (OE @ 3% p.a.)	(221,325)	(288,779)	(388,095)	(5,947,086)
Contributions to reserves (CR)	(15,000)	(15,000)	(15,000)	(300,000)
Net operating income (NOI = EGI – OE – CR)	118,397	120,147	113,669	2,371,736
Debt service payment (DSP)	(93,398)	(93,398)	(93,398)	(1,867,960)
Cashflow (NOI – DSP)	24,999	26,749	20,271	503,776

Non-RAD Income/Expenses	Year 1 ($)	Year 10 ($)	Year 20 ($)	All Years ($)
Rental income (@ – 1 % p.a.)	326,118	297,914	269,428	5,938,383
Other income (@ 2% p.a.)	—	—	—	—
Less vacancy (5% rental income)	(16,306)	(14,896)	(13,471)	(296,919)
Effective gross income (EGI)	309,812	283,019	255,957	5,641,463
Operating expenses (OE @ 3% p.a.)	(221,325)	(288,779)	(388,095)	(5,947,086)
Contributions to reserves (CR)	(15,000)	(15,000)	(15,000)	(300,000)
Net operating income (NOI = EGI – OE – CR)	73,487	(20,760)	(147,138)	(605,622)
Debt service payment (DSP)	—	—	—	—
Cashflow (NOI – DSP)	73,487	(20,760)	(147,138)	(605,622)
Cashflow if rent increases at 0% p.a.	73,487	6,033	(93,283)	(50,844)
Cashflow if rent decreases at – 2% p.a.	73,487	(45,474)	(192,041)	(1,098,132)

LIHTC = low-income housing tax credit. OCAF = operating cost adjustment factor. p.a. = per annum. RAD = Rental Assistance Demonstration.
Source: Pro forma model developed using RAD project data

In the first year, under RAD versus the non-RAD alternative, the project has higher rental income ($373,392 versus $326,118) and higher EGI ($354,722 versus $309,812) because of the way in which HUD funds new construction projects under public housing.[122] In addition, the project's revenues under RAD grow by 2 percent per year to $543,962 in year 20 due to the OCAF, whereas they decline in the non-RAD alternative by 1 percent per year to $269,428 in

[122] In a mixed-finance replacement of public housing (without RAD), the project gets a new Date of Full Availability, which substantially reduces or even eliminates the capital funding for the project. Capital funding is divided into "future needs" and "backlog needs." Because a new construction project does not have "backlog needs," the capital funding is reduced. We have made this adjustment by reducing capital funds by one-half in the first year for the non-RAD alternative.

year 20. Both scenarios show the same level of expenses and contributions to a reserve for replacement in all years and the same rate of increase in expenses, 3 percent per year as required by HUD's underwriting guidelines. Under RAD, the project makes debt service payments of $93,398 per year; no such payments exist in the non-RAD alternative.

As a consequence, the project's cashflow (NOI minus debt service payments) under RAD remains positive throughout the period; it gradually falls from $24,999 in year 1 to $20,271 in year 20 and, cumulatively, is a positive $503,776. By contrast, under the non-RAD alternative the project's cashflow starts high, at $73,487, in year 1 but declines rapidly; it becomes negative in year 9 (not shown) and reaches as low as -$147,138 by year 20. During the 20-year period, the project's cumulative cashflow under the non-RAD alternative is -$605,622, which is worse than under RAD. If income remains flat under the non-RAD alternative, the project shows better cumulative cashflow performance, at -$50,844, which is still worse than under RAD. If income falls by 2 percent per year under the non-RAD alternative, the project would have to make deep cuts in its operations to offset the projected cumulative cashflow loss of -$1,098,132.

These results mean that RAD would enable the project to access the financial resources to be well run, well maintained, and in good repair and to add to the level of resources that the PHA can use to support other projects or other programs. The cashflow shortfall under the non-RAD alternative would exhaust the project's reserves for replacement in the most likely scenario—making it vulnerable in the case of capital repairs—and require the project to save on expenses, probably by reducing maintenance. In the worst-case scenario, the project would have to make deeper cuts, probably in resident services and project management.

7.4.3. Comparing Results

Table 70 summarizes our analysis of both the 20-year operating pro formas and the upfront development budgets for this new construction project under the RAD and non-RAD scenarios. Both scenarios have significant variances in all items except for operating expenses and contributions to reserves. The RAD conversion has $3 million more than the non-RAD alternative for EGI and NOI. It also has $1.9 million in debt payments, for a net gain in cashflow of $1.1 million for the project under RAD compared with the non-RAD alternative. The non-RAD alternative also requires the PHA to replace project debt and fund ACC reserves with $0.8 million in other funds from additional gap financing, despite the savings on loan costs. In total, RAD provides for $1.9 million in increased project resources ($37,678 per unit) compared with the non-RAD alternative.

Table 70. New Construction With Conventional Debt and 9-Percent LIHTC: Comparison of 20-Year Cumulative Cashflow and Development Budget for RAD Conversion and Non-RAD Alternative

20-Year Cumulative Cashflow and Development Budget	With RAD ($)	Non-RAD Alternative ($)	Variance ($; RAD Minus Non-RAD)
Effective gross income (EGI)	8,618,821	5,641,463	2,977,358
Operating expenses (OE)	(5,947,086)	(5,947,086)	—
Contributions to reserves (CR)	(300,000)	(300,000)	—
Net operating income (NOI = EGI – OE – CR)	2,371,736	(605,622)	2,977,358
Debt service payment (DSP)	(1,867,960)	—	(1,867,960)
Cashflow (CF = NOI – DSP)	503,776	(605,622)	1,109,398
Development budget (DB): Project debt under RAD less change in total use of funds under non-RAD = additional gap financing	1,183,200	408,708	774,492
Total variance (CF + DB)			**1,883,890**
Total variance per ACC unit			**37,678**

ACC = Annual Contributions Contract. RAD = Rental Assistance Demonstration.
Source: Pro forma model developed using RAD project data

The RAD conversion in this case takes advantage of several key features of the program. Increased operating income (due to converting capital funding into operating subsidy and applying the OCAF to contract rents) provides the stabilized revenues to support debt, cover operating expenses, and fund reserves for replacement. As a result, the project produces greater cashflow under RAD compared with the non-RAD alternative. Because project debt is insufficient to finance the high development costs of new construction, leveraging with tax credits is an important component of the financing for this project, accounting for 85 percent of the TDC under RAD. The non-RAD alternative mixed-finance development also provides for leveraging with the same amount of tax credits, but requires the PHA to find additional gap financing to replace the debt the project cannot support without RAD. In total, RAD provides for increased project resources to replace this housing and support its operation and maintenance during the next 20 years, compared with the non-RAD alternative.

7.5. RAD Conversion for Substantial Rehabilitation Using Tax-Exempt, FHA-Insured Debt and 4-Percent LIHTC

The fourth case is a 134-unit project that mostly serves senior tenants. It is converting to RAD to finance its substantial rehabilitation needs. Similar to the previous new construction case, the development costs of this rehabilitation project are more than the amount of debt the project can finance with its RAD contract rents. Like that case, this case shows that RAD can support mortgage debt in lieu of gap financing and can contribute to the long-term financial stability of the project. When compared with our other three cases, however, this case has the most complicated and creative financing structure. It is particularly instructive as a RAD conversion that uses an FHA-insured loan (funded through the issuance of tax-exempt Section 11(b) bonds)

along with 4-percent LIHTC equity, because these financing sources are often related to one another (see table 71). It also illustrates the example of a project that uses seller or take-back financing as an option to enhance the value of tax credits.[123]

Table 71. Substantial Rehabilitation With FHA Insurance and 4-Percent LIHTC for RAD and Non-RAD Alternative

	RAD Conversion	Non-RAD Alternative
Type of project—elderly	Rehab	Rehab
Total units post-development	134	134

FHA = Federal Housing Administration. LIHTC = low-income housing tax credit. RAD = Rental Assistance Demonstration.

7.5.1. Sources and Uses Development Budget

As shown in table 72, this project is proposed for RAD conversion to finance substantial rehabilitation costs of $5.2 million ($38,948 per unit) in "hard" costs and $10.9 million ($81,140 per unit) in TDC, which includes various fees, reserves, tenant relocation costs, and the value of the building the PHA is contributing to the development. Without RAD, construction costs would be the same, but TDC would decrease slightly to $10.8 million ($80,525 per unit) due to the reduction in financing fees and related costs (partly offset by the new ACC reserves requirement).[124]

For the RAD conversion, development financing is provided by a variety of sources. The largest single source of financing is from 4-percent LIHTC equity, but all forms of financing—equity, loans, and grants—are needed to make this development project feasible. An important source of funding is project debt secured by FHA mortgage insurance under the Section 221(d)(4) program in the amount of $1.7 million, with a loan term of 40 years and a tax-exempt interest rate of 3.5 percent. Because the project cannot support debt without RAD, the PHA has to replace the FHA-insured mortgage, most likely with a soft funding source, if it does not convert to RAD. The PHA also would have to replace the $650,000 in HOME Investment Partnerships Program funds, because these funds cannot be combined with public housing funding (HUD, 2015b). In total, without RAD the PHA would have to contribute or raise soft funds to cover a shortfall of $2.3 million, equal to the first mortgage amount and HOME funds not available without RAD, plus the ACC reserve and minus the reduction in financing fees and related costs.

All other external sources of financing are the same under both approaches, including 4-percent LIHTC of $2.9 million, seller or take-back financing from the PHA of $1.6 million (which offsets the acquisition cost of the project contributed by the PHA), Housing Development Assistance Program funds of $1 million, deferred developer fees of $60,000, and recontributed developer fees of $1.3 million. The PHA is contributing $1.7 million (16 percent of total costs) from its public housing reserves and bond proceeds.

[123] Most state financing authorities provide 4-percent LIHTC as a matter of right to affordable housing projects that are financed through the state's tax-exempt bond financing program and that want tax credits. These states also require a credit enhancement, like FHA insurance, with their bond financing. PHAs can increase their tax credit allocation by claiming the acquisition cost of the property they contribute to the tax credit entity, which they offset through the use of seller or take-back financing.

[124] When a PHA uses tax credits in a mixed-finance transaction, the investor typically requires an ACC (affordability) reserve equal to 50 percent of the estimated annual operating subsidy.

Table 72. Substantial Rehabilitation With FHA Insurance and 4-Percent LIHTC: Sources and Uses Development Budget for RAD Conversion and Non-RAD Alternative

Sources and Uses	RAD Conversion ($)	Non-RAD Mixed-Finance Alternative ($)
Sources		
First mortgage (FHA 221(d)(4))	1,700,000	—
4% LIHTC equity	2,893,159	2,893,159
Public housing reserves	1,135,000	1,135,000
Previous-year public housing Capital Fund	—	—
Seller or take-back loan	1,575,000	1,575,000
HOME funds (grant)	650,000	—
HDAP funds	1,000,000	1,000,000
Gap/additional soft funding needed	—	2,267,615
Recontributed developer fee	1,294,865	1,294,865
Other: PHA equity (11b bond proceeds)	565,000	565,000
Deferred developer fee	59,684	59,684
Total sources	**10,872,708**	**10,790,323**
Uses		
Acquisition cost	1,575,000	1,575,000
Pay off existing debt	—	—
Construction costs	5,219,028	5,219,028
Relocation costs	140,000	140,000
Professional fees	1,144,381	1,144,381
Financing fees and related costs	566,659	280,862
Other	—	—
ACC reserve	—	203,412
Reserves	477,640	477,640
Developer fees	1,750,000	1,750,000
Total uses	**10,872,708**	**10,790,323**

ACC = Annual Contributions Contract. FHA = Federal Housing Administration. HDAP = Housing Development Assistance Program. HOME = HOME Investment Partnerships Program. LIHTC = low-income housing tax credit. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Project sources and uses data maintained by RAD program

7.5.2. Pro Forma Operating Budget

Table 73 shows the pro forma operating budget for this project over 20 years under the RAD program and the non-RAD alternative. The RAD program provides greater financial stability than the non-RAD alternative. Higher contract rents plus the OCAF enable the project to cover its debt service on the $1.7 million mortgage and still show positive cumulative cashflow under RAD. By contrast, the project's cumulative cashflow is significantly negative in the non-RAD alternative, making the project incapable of maintaining its contributions to reserves or covering part of its operating expenses.

Table 73. Substantial Rehabilitation With FHA Insurance and 4-Percent LIHTC: 20-Year Pro Forma for RAD Conversion and Non-RAD Alternative

RAD Income/Expenses	Year 1 ($)	Year 10 ($)	Year 20 ($)	All Years ($)
Rental income (@ 2% p.a. OCAF)	833,244	995,804	1,213,879	20,245,638
Other income (@ 2% p.a.)	19,662	23,498	28,644	477,735
Less vacancy (5% rental income)	(41,662)	(49,790)	(60,694)	(1,012,282)
Effective gross income (EGI)	811,244	969,511	1,181,829	19,711,091
Operating expenses (OE @ 3% p.a.)	(635,000)	(828,531)	(1,113,476)	(17,062,688)
Contributions to reserves (CR)	(46,900)	(46,900)	(46,900)	(938,000)
Net operating income (NOI = EGI – OE – CR)	129,344	94,080	21,453	1,710,403
Debt service payment (DSP)	(79,028)	(79,028)	(79,028)	(1,580,555)
Cashflow (NOI – DSP)	50,316	15,053	(57,575)	129,848

Non-RAD Income/Expenses	Year 1 ($)	Year 10 ($)	Year 20 ($)	All Years ($)
Rental income (@ – 1 % p.a.)	833,244	761,183	688,400	15,172,795
Other income (@ 2% p.a.)	19,662	23,498	28,644	477,735
Less vacancy (5% rental income)	(41,662)	(38,059)	(34,420)	(758,640)
Effective gross income (EGI)	811,244	746,622	682,624	14,891,890
Operating expenses (OE @ 3% p.a.)	(635,000)	(828,531)	(1,113,476)	(17,062,688)
Contributions to reserves (CR)	(46,900)	(46,900)	(46,900)	(938,000)
Net operating income (NOI = EGI – OE – CR)	129,344	(128,809)	(477,752)	(3,108,798)
Debt service payment (DSP)	—	—	—	—
Cashflow (NOI – DSP)	129,344	(128,809)	(477,752)	(3,108,798)
Cashflow if rent increases at 0% p.a.	129,344	(60,351)	(340,151)	(1,691,317)
Cashflow if rent decreases at – 2% p.a.	129,344	(191,954)	(592,481)	(4,367,179)

FHA = Federal Housing Administration. LIHTC = low-income housing tax credit. OCAF = operating cost adjustment factor. p.a. = per annum. RAD = Rental Assistance Demonstration.
Source: Pro forma model developed using RAD program project data

In the first year, the project has identical rental income ($833,244) and EGI ($811,244) under RAD and the non-RAD alternative because RAD contract rents are based on public housing operating subsidies and capital funding. Thereafter, project revenues under RAD grow by 2 percent per year to $1,213,879 in year 20 due to the OCAF, whereas they decline in the non-RAD alternative by 1 percent per year to $688,400 in year 20. Both scenarios show the same level of expenses and contributions to a reserve for replacement in all years and the same rate of increase in expenses, 3 percent per year as required by HUD's underwriting guidelines. Under RAD, the project makes debt service payments of $79,028 per year; no such payments exist in the non-RAD alternative.

The project's cashflow (NOI minus debt service payments) gradually falls under the RAD scenario from $50,316 in year 1 to -$57,575 in year 20, but is positive cumulatively at $129,848. By contrast, under the non-RAD alternative the project's cashflow starts high at $129,344 in year 1 but quickly becomes negative in year 6 (not shown) and falls to -$477,752 by year 20. During the 20-year period, the project's cumulative cashflow under the non-RAD alternative is -$3,108,798, which is significantly lower than under RAD. If income remains flat under the non-RAD alternative, the project shows better cashflow performance, at -$1,691,317,

which is still worse than under RAD. If income falls by 2 percent per year under the non-RAD alternative, the project would have to make deep cuts in its operations to offset the projected loss of -$4,367,179.

These results mean that RAD would enable the project to access the financial resources to be well run, well maintained, and in good repair and to add to the level of resources that the PHA can use to support other projects or other programs, at least during the first 20 years of the project post-rehabilitation. The cashflow shortfall under the non-RAD alternative would exhaust the project's reserves for replacement in the most likely scenario—making it vulnerable in the case of capital repairs—and require the project to save on expenses, probably by reducing maintenance. In the worst-case scenario, the project would have to make deeper cuts, probably in resident services and project management.

7.5.3. Comparing Results

Table 74 summarizes our analysis of both the 20-year operating pro formas and the upfront development budgets for this rehabilitation project under the RAD and non-RAD scenarios. Both scenarios have significant variances in all items except for operating expenses and contributions to reserves. The RAD conversion has $4.8 million more than the non-RAD alternative for EGI and NOI. It also has $1.6 million in debt payments, for a net gain in cashflow of $3.2 million for the project under RAD compared with the non-RAD alternative. The non-RAD alternative also requires the PHA to replace project debt and the HOME grant, and to fund ACC reserves (less the reduction in financing fees and related costs) with $2.3 million in additional gap financing. In total, RAD provides for $5.5 million in increased project resources ($41,091 per unit) compared with the non-RAD alternative.

Table 74. Substantial Rehabilitation With FHA Insurance and 4-Percent LIHTC: Comparison of 20-Year Cumulative Cashflow and Development Budget for RAD Conversion and Non-RAD Alternative

20-Year Cumulative Cashflow and Development Budget	With RAD	Non-RAD Alternative	Variance (RAD Minus Non-RAD)
Effective gross income (EGI)	19,711,091	14,891,890	4,819,200
Operating expenses (OE)	(17,062,688)	(17,062,688)	—
Contributions to reserves (CR)	(938,000)	(938,000)	—
Net operating income (NOI = EGI – OE – CR)	1,710,403	(3,108,798)	4,819,200
Debt service payment (DSP)	(1,580,555)	—	(1,580,555)
Cashflow (CF = NOI – DSP)	129,848	(3,108,798)	3,238,645
Development budget (DB): Project debt and HOME funds under RAD less change in total use of funds under non-RAD = additional gap financing	2,350,000	82,385	2,267,615
Total variance (CF + DB)			**5,506,260**
Total variance per ACC unit			**41,091**

ACC = Annual Contributions Contract. FHA = Federal Housing Administration. LIHTC = low-income housing tax credit. RAD = Rental Assistance Demonstration.
Source: Pro forma model developed using RAD project data

The most important contributors to the positive outcome for RAD in this case are the conversion of the capital fund into operating revenue and the stability and upward trend of the contract rents under RAD. Higher trending rents provide the stabilized revenues to support debt, cover operating expenses, and fund reserves for replacement. As a result, the project produces greater

cashflow under RAD compared with the non-RAD alternative. Because project debt is insufficient to finance the high development costs of substantial rehabilitation, this project relies on many financing sources, including tax credits, grants, soft loans, seller or take-back financing, and fee deferrals under both RAD and the non-RAD alternative. The difference is that the non-RAD alternative requires the PHA to find additional gap financing to replace the project mortgage and HOME funds. In sum, RAD provides for significant amounts of increased project resources to rehabilitate this housing and support its operation and maintenance during the next 20 years, compared with the non-RAD alternative.

7.6. Comparison of Financial Results for the Four RAD Conversion Transactions

Table 75 summarizes and compares the key results of the four cases analyzed in this chapter, including the nonfinancial case, which had limited repair needs financed out of public housing funds, and the three financial cases, which relied on multiple sources of outside funding, including some combination of loans, tax credits, grants, and other sources, to finance substantial rehabilitation (2 cases) or new construction (1 case). These four cases have many and varied impacts on the PHA, including impacts on use of capital funds and reserves as part of the transaction, reduction in capital funding available for Capital Fund program management, receipt of developer fees, cashflow, earned management fees, earned Section 8 administrative fees, and potential impacts on staffing at the project level and even at the central office.

Table 75. Comparison and Analysis of Four Closed RAD Transactions

Type of Conversion	Nonfinancial	Rehab	New Construction	Rehab
Total units converting	197	198	50	134
Debt financing	N/A	Conventional	Conventional	FHA 221(d)(4)
Tax credit equity financing	N/A	N/A	9% LIHTC	4% LIHTC
Total resource variance (RAD–non-RAD)	$7,596,745	$7,169,138	$1,883,890	$5,506,260
Total resource variance per unit	$38,562	$36,208	$37,678	$41,091
Total development cost (TDC)	$2,188,109	$8,769,685	$13,189,837	$10,872,708
Variance as % of TDC	347%	88%	14%	51%
PHA funds per unit	$11,107	$14,165	$12,249	$12,687
Non-PHA funds per unit	$—	$30,126	$251,548	$68,453
Leverage ratio (non-PHA funds/PHA funds)	—	2.1	20.5	5.4
Capital funds per unit	$1,096	$1,735	$1,686	$1,581
Years capital funds to cover	—	2.8	2.7	0.6
20-year RAD cashflow per unit per year	($45)	$1,563	$504	$48
20-year non-RAD cashflow per unit per year	($1,973)	$1,108	($606)	($1,160)
Developer fees per unit earned by PHA	$—	$3,030	$20,218	$13,060

FHA = Federal Housing Administration. LIHTC = low-income housing tax credit. N/A = not applicable. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Source: Pro forma models developed using RAD project data

The major impacts of the four case studies as summarized in this table include the following.

- **Total resource variance.** The variance between the RAD and non-RAD alternative in the resources raised for development and the 20-year cashflow is positive in all cases.

This result indicates that RAD provides more resources to preserve this affordable housing regardless of the scope of the development, the size of the budget, or the mix of financing sources used. In each instance, when combining the variance in resources raised for development and the variance in 20-year cashflow between the RAD and non-RAD alternative, the RAD conversion results in more positive cashflow per unit, ranging from $36,208 in the case of the rehabilitation project with conventional debt and no LIHTC equity to a high of $41,091 per unit in the case of the rehabilitation project with FHA-insured debt and 4-percent LIHTC equity.

- **Total variance as a percentage of TDC.** When variance is analyzed as a percentage of TDC, the range across our four cases is quite broad. In the case of the rehabilitation project with 4-percent LIHTC and FHA financing, the total variance equals 51 percent of TDC. In the case of the rehabilitation project with conventional debt and no LIHTC, the variance equals 88 percent of TDC. In the case of the new construction project with 9-percent LIHTC and conventional debt, variance equals only 14 percent of TDC. The total variance as a percentage of TDC in the nonfinancial case is the highest of the four, at 347 percent, which is logical given the low TDC, lack of project debt or tax credit equity, and large variance in cashflow over 20 years.
- **Leverage ratio.** The four cases differed significantly in their use of leverage. Their leverage ratios of non-PHA resources to PHA resources ranged from 0:1 (the nonfinancial case) to 20.5:1 for the new construction project using 9-percent LIHTC equity and conventional debt. The rehabilitation project with 4-percent LIHTC and FHA-insured debt leveraged $5.40 in non-PHA funds for every $1 in PHA funds, and the rehabilitation project with conventional debt and no tax credit equity leveraged $2.10 in non-PHA funds for every $1 contributed by the PHA.
- **Capital funds to cover shortfall in mixed-finance alternative.** For the three financial transactions, our analysis looked at the most recent Capital Fund grant and calculated how many years of that funding would be needed to make up for the shortfall in sources to achieve the same level of development as was achieved under the RAD conversion.
    - For the rehabilitation project with FHA-insured debt and 4-percent LIHTC equity, it would require 60 percent of 1 year's Capital Fund grant (or some combination of capital funds and reserves) to achieve the same level of development for this project as under the RAD conversion. This level of diversion of capital funds to this single project could be a manageable alternative for this PHA.
    - For the rehabilitation project with conventional debt and no tax credits, however, it would require about 2.8 years of capital funding to make up the shortfall needed to achieve the same level of development. The diversion of nearly 3 years of capital funding would likely exacerbate the backlog of capital needs at the other properties in this PHA's portfolio.
    - For the new construction project with 9-percent LIHTC equity and conventional debt, it would require about 2.7 years of capital funding to make up the shortfall. This PHA is converting 100 percent of its units to RAD. If it were to replace the present RAD conversion with a mixed-finance project and forgo conversion of the

other units through RAD, it would likely exacerbate the backlog of capital needs at the other properties in the portfolio by disproportionately investing capital funds into this one project to the disadvantage of the other projects.

- **PHA funds and capital funding.** Each of the PHAs contributed public housing funds to the transactions, ranging from $11,107 per unit for the nonfinancial transaction to $14,165 per unit for the rehabilitation project with conventional debt. For comparative purposes, we examined this amount divided by the per-unit capital funding for the project. The new construction project with 9-percent LIHTC contributed the least on a per-unit basis (7 times), and the nonfinancial transaction contributed the most (10 times). The rehabilitation project with 4-percent LIHTC and FHA-insured debt and the rehabilitation project with conventional debt were in between, at 8 times and 9 times, respectively.
- **20-year cashflow under RAD and non-RAD.** Three of the four RAD conversion projects will provide net positive cashflow to the PHA during the 20-year period, ranging from $48 per unit per annum (PUPA) for the rehabilitation project with FHA-insured debt and 4-percent LIHTC to $504 PUPA for the new construction project with 9-percent LIHTC and conventional debt, and $1,563 PUPA for the rehabilitation project with conventional debt and no equity. The nonfinancial transaction will average an annual loss of $45 PUPA.[125] In each case, the cashflow of the project is greater under RAD than under the non-RAD alternative. The rehabilitation project with the conventional loan and no tax credits would have a positive cashflow during the 20 years of $1,108 PUPA without RAD. The other three projects would average a loss during the 20-year period, ranging from -$606 PUPA for the new construction project with 9-percent LIHTC and conventional debt to $1,160 PUPA for the rehabilitation project with FHA insurance and 4-percent LIHTC and -$1,973 for the nonfinancial transaction.
- **Developer fees.** The PHAs also can benefit from developer fees (which are not considered program income and can be used for any purposes covered under the PHA's mission). For tax credit projects, PHAs are permitted to earn a fee of up to 15 percent (as a percentage of TDC, excluding the developer fee). For other projects, a 10-percent fee is permitted. In these four projects under review, as would be expected, the LIHTC projects earned the most in developer fees per unit for the PHA: $20,218 per unit for the 9-percent LIHTC project and $13,060 per unit for the 4-percent LIHTC project. The rehabilitation project without tax credits earned $3,030 per unit for the PHA in developer fees, but the nonfinancing project did not earn a developer fee.

7.7. Conclusions

The following discussion presents our conclusions and lessons learned from the analysis of these four RAD case studies.

- RAD conversions can be effectively applied to a wide range of existing public housing projects and with a variety of approaches to the conversion. After reviewing these four cases and also the data on the 185 public housing projects closed as of October 12, 2015,

[125] This loss arises because expenses rise faster than income—3 percent per year for expenses and only 2 percent per year for income under RAD.

we determined that development sources can range from PHA resources to tax credit equity and can include conventional debt, FHA-insured debt, and soft debt and also interim project income during development. RAD can be used to finance projects with limited capital needs, from a low of $11,107 TDC per unit in the case of the nonfinancial transaction to a high of $263,797 TDC per unit in the case of the new construction project.

- In each case, RAD provides more resources, ranging from $36,208/unit to $41,091/unit, including both upfront development sources and long-term operational sources.
- These cases also illustrate how RAD provides substantial unadjusted leverage, as high as 20.5:1, to increase financing resources. In these four examples, the greatest unadjusted leverage comes from the use of 9-percent LIHTC equity, followed by 4-percent LIHTC equity (5.4:1 leverage ratio) and then conventional debt (2.1:1 leverage ratio). The nonfinancial transaction by definition does not result in leverage on the development sources.
- Achieving the same level of capital improvement using alternative non-RAD, mixed-finance approaches likely would come at the expense of other properties in the PHAs' portfolios. The mixed-finance or alternative models that were compared with RAD have a substantial funding gap that needs to be filled with soft funds, which are limited in amount and availability. Using these funds for these alternatives means they will not be available for the needs of other projects in a PHA's portfolio.
- The major features of RAD that can make it more effective than alternative mixed-finance options include (1) stabilizing and converting capital funding to an operating subsidy that supports debt financing; (2) locking in current subsidy levels, with future OCAF increases, over the long term; and (3) leveraging greater project resources to achieve more substantial capital improvements and investment, thereby reducing the capital needs backlog and future maintenance and utilities costs for converted projects.

8. Interim Findings

Because this evaluation is a midterm report on a longer-term and more comprehensive evaluation of the impact of the Rental Assistance Demonstration program, it covers only a portion of the research questions posed by HUD on the impact of RAD on the physical and financial condition of projects that closed and on the various factors that impacted the implementation of RAD. This chapter summarizes our findings for the following research questions regarding the impact of RAD on the physical and financial condition of projects that closed.

- For RAD projects that made it to closing, what were common sources of capital leveraged? How much external capital was leveraged? What was it about the RAD program that brought those capital sources to the table? Did different financing strategies produce varied levels of success?
- What was the experience of public housing authorities in obtaining external capital? Was the experience of obtaining external capital different based on the choice of project-based rental assistance or project-based vouchers, or on the particulars of the PHA? Did PHA size and experience with mixed-finance housing play any factor in obtaining external capital?

This chapter also summarizes our findings for the following research questions on the factors that impacted the implementation of RAD.

- Why did PHAs choose to participate in RAD? What types of projects did they propose for conversion? What factors led PHAs to propose specific properties for RAD conversion?
- What other programs (and forms of financing) do PHAs view as alternatives to RAD? What factors influence them to choose one rather than the other?
- For PHAs that chose not to participate in RAD, what influenced that decision?
- What factors prevented PHAs from making it to closing?

8.1. Summary of Significant Findings

The most significant findings of this report include the following.

- PHAs expressed mixed motives about using RAD. Some PHAs view it as an opportunity to get out from under a burdensome public housing program that underfunds their projects. Others see RAD as a means for financing the capital needs of their projects. Still others intend to convert their entire portfolio to Section 8 and see RAD as the most efficient way to do so.
- PHAs that participate in RAD emphasize its advantages rather than its disadvantages, which is the reverse for PHAs that do not participate in RAD. In particular, participating PHAs admire the ability of Section 8 to provide long-term, predictable funding, leading to better asset management and greater financing capacity for meeting the capital needs of their projects. Nonparticipating PHAs are more likely to doubt the long-term future of the RAD program and more likely to question whether Section 8 rents would be sufficient to enable them to finance their capital needs. They also questioned the impact on their tenants and the reliance of the program on tax credit financing.

- Most PHAs, whether or not they use RAD, recognize that it is one among many alternative means of project financing, such as the Capital Fund Financing Program and Choice Neighborhoods Implementation. Those PHAs that have used RAD have found it to be relatively easier to use and to offer greater access to capital. They also preferred RAD rather than alternatives because of the advantage of Section 8 over public housing—more assured subsidies over the long term—and the ability to convert their whole program to a single subsidy program.
- Our analysis of RAD projects that have completed conversion found that the RAD program enables PHAs to leverage substantial amounts of external financial resources to improve the physical and financial condition of their projects. The 185 closed projects raised $2.3 billion in external financing and contributed $250 million of their own funds. The average leverage ratio of external funding to internal funding was 8.91:1; however, a wide range of leverage existed, from 0:1 (no external funding) to more than 100:1 (very little or no internal funding).
- RAD is successful at enabling projects to borrow against their long-term Section 8 contracts. Borrowing accounts for a large part of total funds (22.7 percent) for closed transactions. PHAs with RAD projects that wanted to borrow say they had no difficulty in finding a lender willing to lend. Lenders with RAD lending experience say RAD projects are able to meet their lending requirements and are no more difficult to finance than other affordable housing projects they have lent to.
- Some projects have greater capital needs than they can finance through borrowing. Tax credits provide a large source of funding needs (39.4 percent). Other large sources include seller or take-back financing (16.1 percent), which is related to tax credits, and gap financing (11.6 percent), which includes grants, soft loans, and deferred fees.
- Most projects (83.8 percent) relied on internal resources for their financing needs. About one-half (53.5 percent) of projects used mortgage debt. Only a minority of projects used low-income housing tax credit equity—4-percent LIHTC (28.1 percent) or 9-percent LIHTC (26.5 percent). Projects tended to use mortgage debt and gap financing if they had significant rehabilitation costs. As the scope of project development increased, however, they tended to rely more on tax credits, with new construction projects using the most of those financing sources.
- Although RAD enables converted projects to fund their capital needs, many projects do not use RAD for this purpose. About one-third of closed projects used no external financing. These “no-financing” projects plan little or no rehabilitation. In these cases, PHAs use RAD to convert their housing to Section 8 because, in their view, it provides a more stable source of long-term funding or improved management.
- The planned use of more complex financing strategies, such as 4-percent LIHTC equity and mortgage debt, is associated with a project’s inability to close in a reasonable amount of time and the increased likelihood that the project would drop out of RAD. These outcomes probably reflect the longer timelines and greater complications for mortgage and tax credit transactions, although other reasons could be involved. Use of 9-percent LIHTC equity financing reduces the risk of delayed closing, possibly because that program has

stringent milestones that users are constrained to follow. The program alternatively may attract projects that can meet those milestones because of self-selection bias.

- The types of projects in RAD are affected by the PHAs that participate in RAD, the types of projects in their portfolios, and the factors that influence their selection of projects. RAD projects tend to be managed by large or medium PHAs, so the projects they manage have a significant influence on the types of project in RAD. These projects tend to be occupied by lower-income tenants living in family-sized units and in areas with higher affordable housing needs, which makes them well suited for preservation and improvement. At the same time, RAD projects tend to have higher operating subsidies, which would mean higher rents under RAD, and lower operating costs, which together would give them greater financing capacity.
- In selecting projects for RAD, PHAs consider tenant housing needs, neighborhood stability, and project feasibility. They tend to prefer projects located in areas with less poverty, possibly because of their greater stability. They prefer projects that have higher operating subsidies, which would mean higher contract rents under RAD, and lower expenses. Projects with higher rents and lower expenses are more likely to make RAD conversion a feasible option for financing capital improvements through mortgage debt.
- PHAs that chose not to participate in RAD cited a host of reasons. One is that they do not have the capital needs to justify conversion to RAD. Second, they do not think RAD will work well for their projects because they are in rural areas that would not attract investor interest, or in urban areas with high development costs. Third, they looked at the numbers and concluded that the Section 8 contract rents they would receive under RAD would be too low to finance the capital needs of their projects. Other concerns included lack of administrative capacity, the possible impact of conversion on their tenants, the challenges of LIHTC equity, the reliability of Section 8, and the impermanence of RAD as a demonstration.

8.2. Findings on the Physical and Financial Condition of RAD Study Projects and Non-RAD Comparison Projects

This section summarizes our initial findings on the impact of RAD on the physical and financial condition of projects that closed. The bases for these conclusions can be found in chapter 3. Both chapter 3 and this section discuss how PHAs finance their RAD projects, what they use financing for, and what impact it has on project closing. They also discuss what factors could influence the choice of financing strategy, including the size and experience of the PHA, the choice of conversion to PBV or PBRA, and the development scope of the project. Together these discussion topics offer a preliminary assessment of the success of RAD in enabling projects to achieve their financial objectives up to closing. In addition, this section also briefly discusses how financing strategies, particularly the use of leverage, could impact the financial viability and risk of RAD projects post-closing.

For instance, the RAD program was designed to enable projects to meet their capital needs. Our review of a sample of RAD and non-RAD projects suggests that the program seems capable of achieving that objective for projects that make it to closing. Our sample RAD and matched non-RAD projects have about the same level of total capital needs. RAD projects, however, are able

to meet significantly more of their capital needs in the first year—75 percent of their total capital needs—compared with non-RAD projects, which can meet only 2 percent of their capital needs in the first year, according to Physical Condition Assessment data. By meeting more of their capital needs up front, RAD projects can significantly reduce their longer-term capital needs to 25 percent of total capital needs, versus non-RAD projects, which will have 98 percent of their capital needs remaining.

The bulk of our analysis uses financial data from HUD's RAD program staff for the 185 RAD public housing projects that closed through October 12, 2015, or a subset of closed projects for our original study population. For certain aspects of the analysis, these data were supplemented with survey data collected from our sample of 24 RAD projects and also interviews with 5 financial institutions with RAD lending experience.

8.2.1. What Were Common Sources of Capital Leveraged?

RAD projects are able to meet their capital needs because the RAD program enables them to draw on an array of financing sources for project capital funding, including mortgage debt, tax credits, and other loans and grants, to augment their public housing resources. The 185 conversions that we studied raised $2.5 billion in capital to meet their capital needs.

- The greatest portion—around $977 million (39.4 percent)—came from private investors in LIHTC equity. This amount includes $502.9 million (20.3 percent) from 4-percent LIHTC investors and $473.8 million (19.1 percent) from 9-percent LIHTC investors.
- The second largest portion—around $686 million (27.6 percent)—came from "soft money" sources, including $398.8 million (16.1 percent) from seller or take-back financing and $287.2 million (11.6 percent) from "other sources." Seller or take-back financing represents the as-is value of the property contributed by PHAs to the tax credit entity in LIHTC transactions. Other sources consist of HOME Investment Partnerships Program, Affordable Housing Program, and other grants; deferred developer fees; and other types of "gap financing."
- The third largest portion—around $563.8 million (22.7 percent)—came from lenders. This portion includes $471.6 million (19.0 percent) for first mortgage financing (67 percent conventional and 33 percent with Federal Housing Administration [FHA] insurance) and $92.3 million (3.7 percent) from other third-party debt. Other third-party debt includes subordinate loans, infrastructure loans, construction loans, HOME loans, AHP loans, CNI loans, and other loans.
- The smallest financing category—around $249.9 million (10.1 percent)—comes from the PHA's own resources, including operating reserves, capital funds, Replacement Housing Factor funds, cash on hand, funds from operations, transfers from other RAD projects, and other funds.[126]

[126] A portion of deferred developer fees could also come from the PHA, if the PHA is the developer or co-developer, but in our analysis all deferred developer fees are included under other sources.

8.2.2. How Much External Capital Was Leveraged?

Our analysis found that the 185 closed RAD public housing transactions in this study had an overall adjusted leverage ratio of 8.91:1. This ratio means that for every $1 invested by the PHAs in their RAD projects, external sources invested an additional $8.91. This ratio includes seller or take-back financing, which represents the value of the property contributed by a PHA to the limited liability company (LLC) in a tax credit transaction. If seller or take-back financing is not counted as external funds, the leverage ratio declines to 7.61:1; if it is counted as funds of the PHA, the leverage ratio declines to 2.6:1.[127]

Wide variation exists in leverage ratios for closed RAD projects. Of the closed projects, 62 (33.5 percent, or more than one-third) had no leverage, but 35 projects (18.9 percent) had a leverage ratio of more than 100:1. Projects with extremely high leverage ratios contributed little to no financing from their own resources. The amount of leverage a project used depended on the development scope of the project. New construction projects had the highest adjusted average leverage ratio—19.21:1. Projects that simply converted to Section 8 had an average adjusted leverage ratio of only 3.13:1.

Do high leverage ratios indicate that RAD projects are taking on too much risk? For the RAD program, many capital sources do not increase the financial risk of a project, defined as the probability that a project will become insolvent (debt exceeds asset value), because those capital sources do not require repayment, they allow for flexible repayment terms, or the greater part of the risks are borne by other parties. These sources, however, do carry other risks, such as compliance risk. For instance, in the LIHTC program, tax credits can be canceled and recaptured if the project fails to comply with the requirement to use the housing to support income-eligible tenants. This risk largely impacts private investors and guarantors, which are usually developers, more than it does PHAs and their projects. To assess the financial riskiness of RAD project financing strategies, a useful metric is the amount of mortgage debt used for project financing. Because mortgage debt is underwritten with loan-to-value and debt service coverage ratios, RAD projects would assume as much mortgage default risk as is allowed in FHA-insured or conventional mortgage loans.

Other sources of financing present less ***financial risk*** because they do not require repayment on fixed terms, such as LIHTC equity and grants, or they allow for flexible repayment terms, such as seller or take-back financing; however, these sources of financing may present other types of risk. For example, LIHTC and grants carry ***compliance risk;*** tax credits and grant moneys could be recaptured and canceled if the project fails to comply with the terms under which the credit or grant was provided. To assess the riskiness of RAD project financing strategies, the different risks of each source need to be evaluated.

8.2.3. What Was It About the RAD Program That Brought Those Capital Sources to the Table?

The flexibility that RAD provides is its key feature that accounts for the ability of PHAs to access a wide range of capital sources, including private debt, equity from the tax credit program, grant funding, and deferred developer fees. Some of this flexibility can be found

[127] HUD does not consider seller or take-back financing to represent funds of the PHA.

in other HUD programs, such as CFFP, but currently RAD offers PHAs the widest range of options for financially restructuring and repositioning public housing. For example, under RAD, PHAs can mortgage their public housing projects, without which they would not be

able to access debt. The long-term Section 8 contract provides those projects with a stable and predictable revenue stream that is essential to meeting the underwriting requirements of the lenders who provide that debt.

Our survey and interview results suggest that the lending community has not been an obstacle to PHAs in accessing capital. On the contrary, PHAs that borrowed for their RAD projects reported that their lenders evinced a high level of interest and were "on board from the start." Also, if they choose, PHAs can restructure property ownership under RAD to attract private investors through the tax credit program. LIHTC equity has been a major source of financing for RAD projects. The lenders we spoke with, all of whom had RAD lending experience, said the RAD program was no more difficult to use than other affordable housing financing programs. In their view, Section 8 Housing Assistance Payment contracts provide sufficient security to lend against, in spite of any out-year uncertainty. A rise in mortgage rates, however, could dampen lender interest if loan sizes fall.

The primary factor associated with increased outside financing for RAD projects is a project's degree of total financing need. The simplest RAD projects, which merely convert public housing into project-based Section 8 housing, have minimal immediate financial needs. Many PHAs can absorb those needs using their internal resources. Projects that involve modest rehabilitation have greater financial needs. To meet those needs, PHAs turn to external sources, usually a first mortgage if the project can support it. If a mortgage is not sufficient, for instance, because the property hits its debt capacity limit given its Section 8 rents and projected operating costs, the PHA will add other debt that has more favorable repayment terms and other soft funding sources such as grants. As the developmental complexity of the project increases, the PHA will add tax credits to all other sources. Projects with the greatest need will tend to use tax credits the most. Because 9-percent LIHTC financing has a cap on the amount of credits per project, large PHAs, which tend to have larger projects, will use proportionately more 4-percent LIHTC credits.

8.2.4. Did Different Financing Strategies Produce Varied Levels of Success?

To answer this question, our research team analyzed the financing strategies of RAD projects that were awarded Commitments to Enter into a Housing Assistance Payment Contract by the end of 2013. Comparing those that had closed through the middle of October 2015 with those that had not closed, our analysis found a clear difference in the likelihood that a project will complete closing within that timeframe depending on its use of first mortgage debt financing, 4-percent LIHTC equity, or 9-percent LIHTC equity.[128] Projects that use more first mortgage debt or 4-percent LIHTC equity had a reduced likelihood of completing closing within 22 months after the cutoff date for receipt of a CHAP award. By contrast, the use of 9-percent LIHTC equity (regardless of how much was used) increased the likelihood that a project would close on time.

[128] Other nonfinancing factors associated with a reduced likelihood of closing on time included lower physical inspection score, use of PBRA rather than PBV contracts, and participation in a portfolio application.

The finding that first mortgage debt financing and 4-percent LIHTC equity prolong closing timelines is plausible, because these forms of financing generally have long closing timelines and are complicated enough that the closing process could take even longer as reviews are completed, approvals are obtained, and documents are drafted. As shown in Section 8.3.7, these same two factors—first mortgage debt and 4-percent LIHTC equity—also increase the likelihood that a project will not close at all by having its CHAP withdrawn by the PHA or revoked by HUD.

Why does the use of 9-percent LIHTC equity, which is more competitive and has even stricter timelines, have the opposite effect, namely, increasing the likelihood that a project would close on time?[129] This finding could reflect the selectiveness and rigidity of this program compared with 4-percent LIHTC equity or debt financing. The program's selectiveness favors projects that are more likely to succeed, and its strict deadlines require better management of projects through the closing process. It is also possible that these financing strategies are correlated with other factors that influence closing. For example, a PHA with less development experience may be more likely to pursue 4-percent LIHTC financing rather than 9-percent LIHTC financing or other sources, and because of its inexperience its projects will take more time to close. By contrast, the 9-percent LIHTC program may tend to attract more experienced PHAs that are more capable of managing their projects successfully to timely completion. The Final Report will explore the influence of financing strategies on closing and other measures of success in more detail.

8.2.5. Was the Experience of Obtaining External Capital Different Based on the Choice of PBRA or PBV or on the Particulars of the PHA?

Although PBV contracts may have a shorter contract period than PBRA contracts—because they are automatically set at 15 years for the former and 20 years for the latter, with renewals—the actual term of both types of contracts may be similar. The PHA that issues the HAP contract can extend the initial term of a PBV contract to 20 years. To the extent that PBVs have shorter time periods, the use of such contracts would tend to reduce a project's **capacity** to take on debt, that is, the amount of debt it could carry. Our analysis of closed projects found that those that are converting to PBVs used less first mortgage financing ***as a percentage*** of their total financing than did projects converting to PBRA, although the ***dollar amount*** of first mortgage financing they used was larger per project. Conversion to PBV, however, does not appear to reduce a project's **access** to debt financing. The lenders we spoke with said that PBV contracts provide sufficient security to lend against, in spite of any out-year uncertainty. Our conclusion is that choosing PBV rather than PBRA does not appear to have an impact on access to credit and has an unclear impact on the amount of credit a project assumes.

8.2.6. Did PHA Size and Experience With Mixed-Finance Housing Play Any Factor in Obtaining External Capital?

Smaller PHAs account for the lowest portion of the total amount of financing raised by closed RAD transactions compared with their proportion of projects in the population of closed transactions. Large PHAs account for the largest portion of financing under RAD compared with their proportion of projects in the population of closed transactions. In addition, small and

[129] As shown in Section 8.3.7, 9-percent LIHTC equity increases the likelihood that a project will not close at all by having its CHAP withdrawn by the PHA or revoked by HUD.

medium PHAs tend to use more 9-percent LIHTC financing rather than 4-percent LIHTC financing, in contrast with large PHAs. This discrepancy could be due to that fact that 9-percent LIHTC financing has a cap on the amount of credits per project and it is much less competitive

to obtain credits through the 4-percent LIHTC program. Because large PHAs tend to have very large projects, they may have little choice other than to use the 4-percent LIHTC program and other sources, such as grants.

Our web survey and interviews asked PHAs about their previous experience with borrowing and mixed-finance for public housing. Given the small size of our respondent sample, however, this report cannot be entirely conclusive about how a PHA's previous borrowing experience impacted their ability to obtain external financing. It does appear, however, that mixed-finance housing experience is not a prerequisite for RAD conversions—because PHAs can get outside assistance—though it probably helps. PHAs frequently pointed to the need for technical assistance with these projects. In many cases, however, they were able to use outside consultants to advise them throughout the process of these transactions.

8.3. Findings on the Implementation of RAD

This section summarizes our findings on the implementation of RAD. The bases for these findings can be found in chapters 4, 5, and 6 of this report. RAD is a voluntary program. PHAs decide whether to participate in RAD and what projects to submit. Their collective decisions influence the types of projects in RAD and ultimately the potential scope of RAD's impact. PHAs make their choices about RAD based on a variety of factors, many of which are explored in this report, including subjective factors, such as their knowledge, understanding, and experience with how RAD works compared with alternatives to RAD; their practical interests in RAD; and their strategic objectives for improving the management of their housing assets. PHAs also base their decisions on objective factors, such as the types of projects in their portfolios, the condition and location of their projects, and their calculation of the financial and other advantages of using RAD compared with other mixed-finance options.

8.3.1. Why Did PHAs Choose To Participate in RAD?

The PHAs in our sample that completed the online survey and participated in telephone interviews emphasized one of two motivations for participating in the RAD program: (1) to take their properties away from public housing or (2) to move those properties into the Section 8 program. Often, PHAs cited both motivations in describing their reasons for participating in RAD. These PHAs see RAD enabling them to meet the significant capital needs of their public housing projects, which they have been unable to do under current public housing programs because of the downward trend in public housing funding. For some, it also offered relief from what they perceived as the burden of managing their properties as public housing. As one respondent summarized, "Well, my main reason for actually being interested [in RAD] was because of the condition of my public housing units. We definitely needed to do a lot of rehabilitation and just didn't have the resources to do it." Several PHAs said that Section 8 offered "an opportunity to streamline their operations" and provided more stable project financing and better capital budget planning. For these PHAs, the long-term predictability of a Section 8 HAP contract would better enable them to plan for a project's future capital needs in contrast with public housing's annual funding, which has tended to decline year to year.

Conversion to Section 8 also gave some PHAs the chance to capitalize on their existing capacity and experience with Section 8 program administration.

8.3.2. What Types of Projects Did PHAs Propose for Conversion?

PHAs choose a variety of projects for the RAD program—projects in poor physical condition with significant capital needs and projects in good physical condition with no capital needs; projects in stable neighborhoods and projects in neighborhoods suffering from high levels of poverty, overcrowding, and rent burden. Although we acknowledge this variety in the types of projects that PHAs submit to RAD, our analysis of the RAD versus the non-RAD population of projects nevertheless revealed patterns based on the size of the PHA, the income of the tenants living in those projects, the unit mix of the projects, the urban location of the projects, the condition of the neighborhoods in which the projects are located, and the current revenues and expenses of the projects. We conducted this analysis on the population of projects included in a RAD application (RAD projects) compared with the population of projects not included in a RAD application (non-RAD projects).

For PHA size, our analysis found that projects owned by medium and large PHAs are more likely to be in RAD, and projects owned by small PHAs are less likely to be in RAD. As a result, the type of projects in RAD is determined more by the decisions of large and medium PHAs and the characteristics of their portfolios, rather than those of small PHAs.

The underrepresentation of small-PHA projects is due to two factors. First, by definition, small PHAs have fewer projects in their portfolios compared with medium and large PHAs. Most small PHAs that participate in RAD submit their entire portfolio, which often consists of just a single project. Medium and large PHAs submit a smaller portion of their portfolios, but they tend to submit multiple projects. Second, small PHAs are less likely to participate in the RAD program (7.9 percent) when compared with medium PHAs (29 percent) and large PHAs (51.6 percent). Their lower rate of participation could be because of their relative lack of capacity and mixed-finance experience, to the characteristics of their housing portfolio, or to other factors.

Our analysis did not find that RAD projects typically have greater capital needs than non-RAD projects, as measured by their project performance rating or inspection score. The RAD program does not concentrate on the neediest projects. Instead, it attracts projects across the spectrum of capital needs, including projects with high capital needs and projects with no capital needs. Many closed RAD projects are conversions to Section 8 that require no rehabilitation or new construction.

We also found that projects are more likely to be in RAD if they have a higher mix of larger units (measured by number of bedrooms) and tenants with lower median household incomes. Projects with a greater percentage of larger units meet the housing needs of larger families, which usually represent an underserved segment of the housing market. Households with lower incomes also tend to have greater housing needs. It is possible that PHAs are more likely to apply to RAD if they have projects with these housing needs, or that some other factor is affecting this relationship. Other project-related factors that we examined, including the size of the project (number of Annual Contributions Contract units) and the percentage of elderly tenants in the project, did not have a statistically significant effect.

In addition, several neighborhood characteristics are associated with RAD projects. Projects are more likely to be in RAD if they are located in metropolitan areas and in neighborhoods with lower rates of poverty (percentage of households living below the poverty threshold), higher housing cost burden (percentage of income devoted to housing and utility expenses), and greater overcrowding (percentage of households living in housing with more than one person per room). In general, these characteristics—urban communities that have lower poverty levels, high housing costs relative to income, and a higher proportion of households living in overcrowded housing conditions—describe market areas that are relatively stable and where there is a greater need for affordable housing (demand is high relative to supply). As in the case of lower-income tenants and family-sized units, PHAs may be more likely to apply to RAD to preserve affordable housing where the need exists for such housing and conditions are otherwise favorable.

Finally, projects are more likely to be in RAD if they have higher operating subsidies, lower expenses, and lower other revenue per unit. Per-unit capital funding was not statistically significant. Project operating and capital fund subsidies are important factors in determining contract rents under RAD; operating funds are about 2.5 times more important than capital funds based on their relative magnitudes. Other revenue does not affect contract rents. Rent minus expenses determines the feasibility of using debt to finance capital needs. Many PHAs we spoke with mentioned the importance of RAD rents being high enough to make conversion feasible, as a precondition for applying to RAD. The higher operating subsidies and lower expenses for RAD projects could reflect their relative importance in the determination of project feasibility, or some other reason. The negative association between a project being in RAD and other revenue, which includes provisional income, requires further exploration.

Altogether, these results make sense in light of the basic concept of the RAD program, which is to use Section 8 to preserve affordable housing. To be successful, RAD projects must fill a local need for affordable housing in stable neighborhoods. The Section 8 program therefore has to pay rents at levels that support project costs plus the cost of any mortgage debt. Lower rents result in less mortgage debt and greater use of other sources of financing, such as grants, tax credits, and soft loans, which may be more difficult to obtain.

8.3.3. What Factors Led PHAs To Propose Specific Properties for RAD Conversion?

We learned from our interviews with the PHAs that manage the RAD projects in our sample that PHAs review the properties in their portfolios before deciding which ones to submit to RAD or even whether to submit any to RAD. In making their selection, most PHAs indicated that a project's capital needs are an important factor in a PHA deciding to propose a property for RAD conversion—and are probably the single most important factor for the bulk of the PHAs interviewed. Nonetheless, capital needs are not the decisive factor in all cases. In some cases, PHAs said they were more interested in using RAD to convert their properties to Section 8 to improve project management and administrative efficiency.

PHAs also consider the potential financing challenges in choosing a project for RAD. They take into account what financing strategies are likely to be workable, including how much debt the project can carry, whether they need 4-percent or 9-percent LIHTC to augment resources beyond what they can borrow, and what their prospects would be for obtaining LIHTC financing. Finally, PHAs evaluate the relative advantages of the neighborhood in which the project is located when they decide which

projects to apply for RAD conversion. They recognize that RAD projects operate in a more competitive environment than public housing. As one PHA said, they "determined [if the current location] would be a good place to invest resources in preserving affordable housing, and that would support sustainable redevelopment by enabling the property to maintain a high occupancy rate."

Do objective data support these views? In addition to talking with PHAs, we also analyzed data on RAD applications to determine what factors might influence PHAs to propose particular projects for the RAD program. Our researchers compared RAD projects to the subset of non-RAD projects owned and managed by participating PHAs with a mixed portfolio of RAD and non-RAD projects, defined as PHAs that have submitted at least one RAD application and that have at least one project in their public housing portfolio that was not submitted to RAD. This analysis found that these mixed-portfolio PHAs propose projects for RAD on the basis of most (but not all) of the factors associated with the types of project in RAD, with one additional factor.

As noted previously, projects are more likely to be in RAD if they are owned by large or medium PHAs, compared with small PHAs. For mixed-portfolio PHAs that participate in RAD, however, large PHAs are less likely than small or medium PHAs to select their projects for RAD. In other words, the project-selection rate, defined as the number of projects proposed for RAD divided by the total number of projects in a PHA's portfolio, is inversely related to portfolio size, according to our data. Small PHAs have small portfolios—most have only one project in their portfolio.[130] If they decide to participate, they tend to submit the bulk of their properties but submit fewer projects. Large PHAs have large portfolios. Those that choose to participate in RAD submit a larger number of projects, but their RAD projects comprise a small portion of their overall portfolios.

Our analysis found the following factors to be statistically significant in a PHA's choice of RAD projects.

- **Project size.** Mixed-portfolio PHAs are more likely to select a project for RAD if the project is smaller in terms of the number of ACC units. This preference could be because of the greater challenges a PHA faces when trying to convert a large project, which would have more tenants to relocate, greater rehabilitation needs, and larger financing requirements, or it could be due to some other explanation.
- **Project tenants' median household income.** Participating PHAs with mixed portfolios tend to choose projects with lower tenant median income. This preference could be because lower tenant income indicates greater housing need, or due to some other factor.
- **Lower poverty neighborhoods.** Mixed-portfolio PHAs tend to choose projects in neighborhoods with lower poverty rates. In our discussion with PHAs, some emphasized the importance of neighborhood stability in their decision whether to pursue RAD. Poverty could be an indicator of neighborhood instability, which could explain why PHAs tend to select projects for RAD located in neighborhoods with less poverty.

[130] Several buildings, even if they are in different locations, can be aggregated into a single asset management project. This relationship was sustained even when we used ACC units rather than AMPs.

- **Greater neighborhood overcrowding.** PHAs with mixed portfolios tend to select projects in neighborhoods with greater overcrowding (significant at the 10-percent confidence level). Neighborhoods with more overcrowding have greater need for affordable housing, which may be affecting PHAs' choice of projects for RAD, or there could be another explanation for this relationship.
- **Project revenues and expenses.** Projects with higher operating subsidies and lower current expenses are more likely to be selected for RAD. Because projects with higher subsidies would tend to have higher contract rents under RAD, and projects with higher rents and lower expenses would tend to have greater capacity to carry debt, these findings suggest that PHAs could be choosing projects, at least in part, on the basis of a project's financing ability. As before, projects with higher other revenue are less likely to be selected for RAD.

The other factors did not have a significant influence on project selection by participating PHAs. For instance, mixed-portfolio PHAs do not appear to choose projects for RAD depending on their metropolitan or nonmetropolitan location, even though this factor is a significant predictor of the type of project in RAD. This result could reflect the limited variability in the metropolitan/nonmetropolitan dimension of most PHA portfolios—they are either one or the other—leaving little room for PHAs to make project selection for RAD on this basis.

The types of projects in RAD are affected by the PHAs that participate in RAD, the types of projects in their portfolios, and the factors that influence their selection of projects. RAD projects tend to be managed by large or medium PHAs, so the projects they manage have a significant influence on the types of project in RAD. These projects tend to be occupied by lower-income tenants living in family-sized units and in stable (lower-poverty) neighborhoods with higher affordable housing needs; thus, they are well suited for preservation and improvement. At the same time, RAD projects tend to have higher operating subsidies, which would mean higher rents under RAD, and lower costs. This combination of higher rents and lower costs would give them greater financing capacity for making improvements to the condition of the project under RAD. Thus, in selecting projects for RAD, PHAs appear to consider tenant housing needs, supportive neighborhood conditions, and adequate project subsidies relative to expenses.

8.3.4. What Other Programs (and Forms of Financing) Do PHAs View as Alternatives to RAD?

Most PHAs that took part in our interviews were knowledgeable about alternatives to RAD and had taken these financing alternatives into account when they considered RAD as an option. The alternatives they mentioned included—

- **CFFP.** This program enables a PHA to borrow private capital through either a bond or a conventional bank loan to make improvements to its public housing in return for pledging a portion of its future annual capital funds to cover the debt service payments on the borrowing.
- **LIHTCs.** PHAs whose capital improvement needs exceed their available resources can apply to HUD for approval to use Mixed-Finance Modernization in conjunction with

CFFP. They can bridge this funding gap by obtaining financing through either the 4-percent LIHTC or 9-percent LIHTC program.

- **PHA Mortgaged Transactions.** Under Section 30 of the United States Housing Act of 1937, PHAs may mortgage or otherwise encumber their public housing real estate and other property to secure financing transactions under this program.
- **Community Development Block Grant program.** The CDBG program provides flexible formula grants to states and localities to support the affordable housing needs of low-income families through grants, direct loans, loan guarantees or other forms of credit enhancements, or rental assistance.
- **CNI Grants.** CNI grants are intended to help communities transform distressed neighborhoods and public and assisted projects into viable and sustainable mixed-income neighborhoods by linking housing improvements with appropriate services, schools, public assets, transportation, and access to jobs. PHAs can apply for these grants.
- **Section 18 Demolition/Disposition.** Demolition/disposition is a management strategy option for public housing developments that have difficulties associated with physical deterioration or the overall deterioration of the surrounding community, or that were built to a standard that is no longer acceptable for the general public.

8.3.5. What Factors Influence PHAs To Choose One Rather Than the Other?

PHAs are well aware of the array of options offered by HUD to help PHAs meet the capital needs of their public housing. Like RAD, some of these options allow PHAs to borrow against future cashflows or access LIHTC financing to fund renovation and new construction. Given these similarities between RAD and alternative financing programs, how do PHAs decide which one to use? In interviews with participating RAD PHAs, our research staff asked how RAD compares with other public housing programs that provide capital financing, what its advantages and disadvantages are, whether they would they use RAD again, and whether they would recommend it to other PHAs. Our analysis of their answers identified the following five factors that influence PHAs' choice of RAD rather than other capital financing options.

1. **Relative ease of use.** Although opinion was divided on how easy to use RAD was, this topic invited so much discussion that it is clearly an important factor for PHAs in their decision about which financing program to use. HUD has made a major investment in the RAD program with the development of explanatory materials, guides, webinars, tools, and templates and the recruitment and training of staff. This infrastructure should have made RAD easier to use. RAD, however, was a startup program and, as such, suffered from changes in direction and guidance that could cause confusion and influence PHAs to choose a more stable alternative financing program.
2. **Technical capacity.** PHAs recognized that they needed adequate technical capacity to successfully participate in the RAD program. In particular, they thought they needed the capacity to develop a viable RAD application, work with HUD to obtain CHAP approval of their conversion strategy, secure legal support to complete the closing process, find financing sources and negotiate complicated financing requirements, line up one or more capable developers, manage tenant relocation, oversee contractors in the performance of the required rehabilitation or construction work, and provide for the long-term management of the property under the HAP

contract. Many PHAs hired outside consultants to enhance their capacity to meet all these requirements of RAD.

3. **Perception of Section 8.** Overall, the RAD PHAs that we interviewed saw the advantages of Section 8, compared with other financing alternatives, as one feature of RAD that made it more attractive. In the view of one PHA, RAD provides "the ability to maintain units as low-income housing … [and] to leverage the subsidy coming in to renovate and rehabilitate the properties. [We] did not have the ability to do that with the capital fund and operating fund." PHAs were pleased with Section 8 for giving them the ability to borrow against a property to finance immediate and longer-term capital needs and improvements. In addition, they appreciated Section 8 because it enabled them to use project resources more efficiently by managing their property according to commercial methods, such as building up project reserves to cover future capital needs. Some PHAs also perceived the benefit of simplifying their internal operations by consolidating their assets into a single program—Section 8—with simpler reporting requirements than public housing. PHAs also liked that Section 8 allowed them to engage in more predictable long-term project planning, as the Section 8 subsidy contract offers a long-term and more reliable revenue stream. As one PHA noted, "Previous funding [under public housing] was subject to cuts in funding. RAD allows long-term planning … [and] a more solid financial platform." Finally, some PHAs thought that Section 8 offers tenants more affordable housing options, such as housing choice vouchers, which tenants value. Although most PHAs that we interviewed were pleased with the level of support their project received through Section 8, some PHAs mentioned that Section 8 rents were lower than they expected. Insufficient Section 8 rents seemed to be a more serious problem in higher rent markets.

4. **Access to capital.** Few of the respondents to our web survey appeared to be disappointed with the amount of funding they have been able to raise through RAD. Most respondents think RAD met their funding expectations and think that the funding they received under RAD exceeded their expectations. On the other hand, although some of the PHAs that spoke with us think they have obtained more funding under RAD than they could have obtained through other programs, more think RAD provides the same amount of funding as they could get elsewhere, and some think they are receiving less financing from RAD than they could through other means. These views appear to contradict an objective of RAD, which is to provide additional funding for capital improvements. They may reflect the wider range of reasons that PHAs have for applying for RAD, aside from getting access to more capital funds. As already discussed, these reasons include the ability to take advantage of better planning and asset management opportunities under Section 8. They also reflect the range of conversion options being pursued by our PHAs, not all of which proposed to raise large amounts of capital financing for their projects. Finally, this view could reflect the sense of some PHAs that their RAD contract rents are too low.

5. **Large-scale conversions.** Some PHAs mentioned that a major advantage of RAD over alternative programs was that RAD gave them the ability for large-scale conversions. Several PHAs submitted multiple RAD applications and received

multiple CHAPs, or received "portfolio awards," which are single awards to convert multiple projects to RAD. The goal of these PHAs was to use the RAD program to convert as much of their public housing to Section 8 as they could. As one PHA noted, "It was easier from an operational standpoint to move [all] properties through the RAD conversion."

The PHAs with which we spoke claimed to have evaluated the financial feasibility of their projects before they submitted a RAD application. This financial analysis helped them determine up front whether their projects would benefit from RAD. Consultants who advise PHAs on their RAD applications confirmed that this type of comparative financial analysis is typically performed and is a key factor in a PHA's decision whether to apply for RAD. In our case studies of four RAD closed transactions, our financial specialist modeled alternatives to RAD and concluded for those cases that RAD offered those projects greater capital financing and/or greater financial stability through long-run positive cashflow.

8.3.6. For PHAs That Chose Not To Participate in RAD, What Influenced That Decision?

Most PHAs have elected not to participate in RAD. Many of the non-RAD PHAs that agreed to be interviewed told us that they had attended conferences or information sessions conducted by either HUD or a consulting firm that exposed them to RAD. Several suggested that what they learned about RAD convinced them that it would not be a good program for them, or that, after conducting preliminary analyses of their housing, they still were unable to make RAD work as they would have liked. A small number of PHAs claimed to understand RAD but questioned the long-term viability of the demonstration and therefore chose not to get involved. In general, those PHAs with which we spoke that did not participate in RAD offered three reasons for not participating.

1. **No capital needs.** Several PHAs mentioned that they did not apply for RAD because they had no need for capital improvements. In this view the primary purpose of RAD is to fund capital improvements, and because their projects were in good physical condition, RAD was unnecessary. As one PHA said, "Our apartments are in decent shape and we seem to get by with operating subsidies and capital fund programs."
2. **Lack of capacity.** Some PHAs explained that they did not have the administrative capacity to take on a RAD project. Said one PHA, "Our plate is full." Others thought they did not understand the program well enough. "We had no clear awareness of what the program involves," said another PHA.
3. **Insufficient benefits of the RAD program.** The answer that provoked the most discussion among the interviewed PHAs was that they thought that RAD did not benefit the PHA, their housing stock, or their tenants. These respondents tended to emphasize RAD's disadvantages rather than its advantages as the basis for their decision not to apply for a RAD conversion. Common disadvantages that they mentioned include—
    - ***High transaction costs.*** On the disadvantage of RAD's high startup or transaction costs, one PHA said that RAD "costs a lot of money in consultants and … requires more staff." Another PHA added that RAD is "difficult to implement for staff and [has] multiple regulations depending upon funding."

- ***Insufficient capital.*** One PHA concluded that RAD was disadvantageous for them because it would not enable their projects to generate enough capital. "The disadvantage for my authority would be getting all of the properties ready to sustain themselves for 20 years, and paying for major renovations such as roofing, [utility] line replacement, etc., out of the amount of funds that we would be receiving."
- ***Unworkable for small and rural PHAs.*** Other PHAs expressed a general sense that RAD is disadvantageous for PHAs in small towns and rural areas because it does not work there. One PHA noted hearing "rumors that the numbers don't work as well for smaller housing authorities." Another added, "We don't have investors that come out here and say they'll invest in our properties."
- ***Uncertainty of Section 8.*** Some PHAs saw RAD conversion to Section 8 contracts to be a disadvantage because they doubted if Section 8 subsidies would continue to be funded over the long term. One PHA called it "somewhat theoretical [that] the program would depend on stable rent subsidies over time."
- ***Burden of debt.*** Some PHAs consider the use of debt financing under RAD to be a disadvantage. They expressed concern that project debt could hurt the viability of a project. "It would be just like any mortgage you have … and the priority is always to pay the mortgage first."
- ***Effect on mission.*** In addition, PHAs expressed concerns that RAD would threaten their ongoing operation and mission as a PHA by eroding their tenant base or undermining their control over their housing. One housing director captured this attitude: "It didn't really fit us because I did not understand … the mechanism where you take the tenants in the public housing and give them a Section 8 [voucher] in two years' time …. I understand the benefit of that, but as a housing authority executive director, that would mean more turnover costs that I can't grapple with."
- ***Impact of tax credits.*** Several PHAs thought that the common use of tax credits in RAD projects would change project ownership and weaken the PHA's control. The PHA would transition from wholly owning and controlling its housing to sharing ownership and control with outside investors through an LLC under the management of a general member. As one PHA noted, "If you are packaging [RAD] with tax credits, then [there is] loss of ownership to private partnerships with equity investors."

Almost one-half of our interview respondents said they planned to or might apply for RAD in the future. The main reason why they planned to apply for RAD was because they needed capital improvements and thought they had few alternatives. As one PHA said, "I think new regulations … make it much more difficult for housing authorities …. So I guess the more unfunded mandates that are put upon us, it is driving us to realize we have to do something. RAD might just be the answer." More than one-half of our respondents, however, said they did not plan to apply for RAD or were uncertain about whether they would apply because of the preceding reasons, the upfront cost of outside consultant or staff time to apply for RAD, the uncertainty of being able to meet the long-term RAD commitment to pay back debt, or simply their ability to meet their capital needs without RAD.

8.3.7. What Factors Contributed to Projects Dropping Out of RAD?

To analyze the factors that influence why some RAD projects did not complete closing, our research staff asked our sample of RAD PHAs to describe their perception of the barriers and success factors to completing the RAD conversion process. The primary barrier to successful conversion that they mentioned was lack of the technical capacity to carry the transaction all the way through to closing. The second barrier to success was lack of buy-in from stakeholders, including staff—the most important barrier—and also the board of directors, residents, city officials, and congressional staff. Another barrier was the need to manage the project timeline by starting tasks early and paying close attention to deadlines.

None of the projects in our sample have had their CHAPs withdrawn or revoked. To obtain insight into the factors that could cause a project to drop out of the RAD program, our staff conducted separate interviews with the Executive Directors and Development Directors of seven PHAs that had withdrawn or had their RAD CHAP award revoked. The selected projects represented PHAs that were small, medium, and large in size and located in various parts of the country. Two projects lost their CHAPs when they failed to obtain their LIHTC financing. The other five lost their CHAPs because of local zoning and approval issues.

Our interviewees identified two principal reasons for the withdrawal/fallout of their projects from the RAD process: (1) unworkable milestones and (2) inadequate preparation. Many of these seven PHAs thought that the milestones established by HUD for the conversion process, especially the 180-day financial plan milestone, were too aggressive, and they were unable to meet them. They did not have enough time to complete their financing requirements in time to qualify for a RAD Conversion Commitment. Some of these seven PHAs admitted that in order to compete for the fixed number of CHAP awards, they had applied to RAD before they were certain it would be financially feasible. They had conducted preliminary analyses, but, after receiving the CHAP award, they discovered that their project was financially infeasible or their board of directors was not comfortable with it.

Most of the seven PHAs said they had worked with outside consultants to complete their RAD application and develop their RAD development and financing plans. They also said the HUD RAD program staff and local field office staff were helpful throughout the process, even though they eventually lost their award. They acknowledged that it is the responsibility of the PHAs to conduct their own due diligence, manage their applications and awards, and overcome any obstacles to completion of conversion.

Our statistical analysis of projects that withdrew from RAD produced results that are consistent with the explanations we found that a project is more likely to be withdrawn from RAD or have its CHAP revoked if the PHA plans to use (1) less total financing per unit, (2) more mortgage debt, (3) more 4-percent LIHTC equity, and (4) more 9-percent LIHTC equity. Both LIHTC and mortgage financing present challenges that may increase the risk that a project will not move forward, including the risk that the capital sources withdraw their support during the RAD process. Other factors, such as PHA size, project size, other project characteristics, neighborhood characteristics, choice of PBV or PBRA, or other aspects of their RAD conversion plan did not have a statistically significant effect on the likelihood that a CHAP would be withdrawn or revoked.

9. References

Abt Associates Inc. 2010. *Capital Needs in the Public Housing Program: Revised Final Report*. Report prepared for the U.S. Department of Housing and Urban Development. Washington, DC: U.S. Department of Housing and Urban Development.

Byrne, Gregory A. 2013. "Ten Things To Know About RAD When Advising PHAs." PowerPoint presentation to the RAD Network Partners Workshop, August 28. http://portal.hud.gov/hudportal/documents/huddoc?id=10ThingsToKnow.pdf.

Congressional Budget Office (CBO). 2015. *Federal Housing Assistance for Low-Income Households*. Washington, DC.

Econometrica, Inc. 2014. *The Status of HUD's Rental Assistance Demonstration (RAD) and Results to Date*. Report prepared for the U.S. Department of Housing and Urban Development. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Harvard University Graduate School of Design. 2003. *Public Housing Operating Cost Study*. Report Prepared for the U.S. Department of Housing and Urban Development. Washington, DC: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing. http://portal.hud.gov/hudportal/documents/huddoc?id=DOC_9238.pdf.

Novogradac. 2015. "2015 Federal Tax Credit Information by State." Affordable Housing Resource Center. http://www.novoco.com/low_income_housing/lihtc/federal_lihtc_2015.php.

Office of Management and Budget (OMB). 2014a. *Fiscal Year 2015 Federal Credit Supplement: Budget of the U.S. Government.* Washington, DC.

———. 2014. *Fiscal Year 2015 Budget of the U.S. Government.* Washington, DC.

U.S. Department of Housing and Urban Development (HUD). 2015a. "Rental Assistance Demonstration—Final Implementation, Revision 2." Notice PIH-2012-32 (HA), REV-2. Washington, DC: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing, Office of Housing.

———. 2015b. "HOME Investment Partnerships Program FAQs." https://www.hudexchange.info/home/.

Appendix A: List of RAD Projects in Sample

CHAP Issue Date	PHA Name	PHA Code	Project Name	Development/RAD Code	Units	Conversion Type	PHA Size	Rounded Inspection Score
1/1/2013	Housing Authority of Spartanburg	WA008	ARBOR RIDGE	WA008000512/A	30	PBV	Medium	82
9/30/2013	Tennessee Valley Regional Housing Authority	WA006	GRANDVIEW HOMES	WA006000200	148	PBV	Medium	96
1/1/2013	Mississippi Regional Housing Authority No. VIII	VT001	ELDERLY AMP	VT001000001	209	PBV	Medium	97
1/1/2013	Lucas Metropolitan Housing Authority	OH006	PARQWOOD APARTMENTS	OH006000133	134	PBRA	Large	72
1/1/2013	St. Johnsville Housing Authority	NY098	OLD MEADOW	NY098000001	42	PBV	Small	98
1/1/2013	Ann Arbor Housing Commission	NY034	LIBERTY GARDENS	NY034000006	52	PBV	Medium	82
1/1/2013	Maxton Housing Authority	NC048	SCATTERED SITES	NC048000001	90	PBRA	Small	98
7/19/2013	Housing Authority of the City of Asheville	NC007	CENTRAL ASHEVILLE	NC007000001	330	PBV	Large	89
12/10/2013	Housing Authority of the City of Evansville	MS063	MAGNOLIA HMS/DELTA APTS	MS063000001	86	PBV	Medium	73
12/24/2013	Housing Authority of the City of Salisbury	MS006	JUMPER T/EAST HEI/JAC HEI/WES WO/PW/BY/JY	MS006000015	106	PBRA	Medium	99
12/10/2013	Housing Authority of the City of Evansville	MS006	MIMOSA/WILLOW/ FORT ROBINETT/ CORINTH SCAT	MS006000013	101	PBRA	Medium	91
12/19/2013	Housing Authority of the City of San Buenaventura	MI073	CRESTON PARK	MI073000002	100	PBV	Medium	97
1/1/2013	Plymouth Housing Commission	MI045	TONQUISH CREEK MANOR	MI045000001	104	PBV	Small	88
12/20/2013	Cambridge Housing Authority	MA003	LINCOLN WAY	MA003000357	53	PBV	Large	99
1/1/2013	Housing Authority of Lexington	KY004	PIMLICO APTS	KY004000012	206	PBV	Large	41
8/1/2013	The Housing Authority of the City of Elgin	IL092	CENTRAL PARK TOWERS	IL092000001	149	PBRA	Medium	70
11/25/2013	Menard County Housing Authority	IL028	PETERSBURG	IL028111111	33	PBRA	Small	82
1/1/2013	Hopewell Redevelopment & Housing Authority	GA285	WILLINGHAM VILLAGE	GA285400108	172	PBV	Medium	86

CHAP Issue Date	PHA Name	PHA Code	Project Name	Development/RAD Code	Units	Conversion Type	PHA Size	Rounded Inspection Score
9/27/2013	Housing Authority of the City of Lavonia	GA094	VANDIVER/DANSBY HOMES	GA094000001	180	PBRA	Small	98
1/1/2013	Ann Arbor Housing Commission	GA010	BRANSON WALK	GA010000005	114	PBRA	Medium	85
1/1/2013	Housing Authority of Spartanburg	CA010	TRIANGLE COURT	CA010000004	98	PBV	Medium	77
12/16/2013	The Housing Authority of the City of Biloxi	AR003	NELSON HALL HOMES	AR003000003	288	PBV	Medium	95
11/25/2013	The Housing Authority of the City of Prichard	AL169	HERITAGE ESTATES	AL169000001	197	PBRA	Medium	49
1/1/2013	Lexington Housing Authority	AL125	DAVIS HEIGHTS/ ASBURY HOWARD	AL125000004	198	PBRA	Medium	85

CHAP = Commitment to Enter into a Housing Assistance Payment Contract. PBRA = project-based rental assistance. PBV = project-based voucher. PHA = public housing authority. RAD = Rental Assistance Demonstration.

Appendix B: List of Non-RAD Projects in Sample

PHA Code	PHA Name	Development Code	Property Name	Units	Size of PHA	Rounded Inspection Score
AL063	Housing Authority of Oneonta	AL063000001	HARRIS APTS.	170	Small	81
AL068	Sheffield Housing Authority	AL068000002	ARCHER VILLAGE	154	Medium	88
AL077	Housing Authority of Tuscaloosa	AL077000006	HAY COURT/HAY COURT ANNEX	217	Medium	72
AL177	Housing Authority of Troy	AL177000001	HUBBARD/DUNBAR	168	Medium	48
CA044	Housing Authority of the County of Yolo	CA044000003	LAS CASITAS	139	Medium	83
CA053	Kings County Housing Authority	CA053000001	SUNNYSIDE VILLAGE KINGS COUNTY	168	Medium	83
CA053	Kings County Housing Authority	CA053000002	VALLEY VIEW VILLAGE KINGS COUNTY	100	Medium	83
GA069	Housing Authority of the City of Dublin	GA069000300	SMITH HMS–COLEMAN CT	100	Medium	89
GA086	Housing Authority of the City of Waynesboro	GA086000001	PROJECT UNNAMED	275	Medium	85
GA095	Housing Authority of the City of Newnan	GA095000005	SUMMIT POINT APARTMENTS	38	Medium	90
IA029	Low Rent Housing Agency of Missouri Valley	IA029000001	CULAVIN HEIGHTS	53	Small	90
IL004	Springfield Housing Authority	IL004000005	HOPE VI/MIXED-INCOME	50	Medium	93
IL010	Greater Metropolitan Area Housing Authority of Rock Island County	IL010000007	STREED TOWER	79	Medium	90
IL078	Housing Authority of the County of Bond	IL078000001	ALEX LONG/TALMAGE DEFREES APTS	154	Small	82
IL085	Knox County Housing Authority	IL085000001	MOON TOWERS	181	Medium	95
IN015	Housing Authority of South Bend	IN015000003	NORTHWEST PLAZA	167	Medium	85
IN026	Housing Authority of the City of Elkhart	IN026000001	ROSEDALE HI-RISE	102	Medium	84
KS002	Topeka Housing Authority	KS002000003	DEER CREEK VILLAGE	114	Medium	77
KS002	Topeka Housing Authority	KS002000004	TYLER TOWERS	75	Medium	84
KY001	Louisville Metro Housing Authority	KY001000012	DOSKER MANOR	692	Large	68
KY001	Louisville Metro Housing Authority	KY001000034	HOPE VI SCATTERED SITES	418	Large	72
KY002	Housing Authority of Covington	KY002000013	EASTSIDE REVITALIZATION 3	6	Medium	98
KY006	Housing Authority of Paducah	KY006000004	ANDERSON CT	39	Medium	84
KY037	Housing Authority of Hickman	KY037000001	HOLLY CT–DAVIS PARK	118	Small	94
KY043	Housing Authority of Fulton	KY043000001	NORTH GATE	212	Small	98
KY077	Housing Authority of Harlan	KY077000001	HARLAN HA	181	Small	95
KY079	Housing Authority of Stanford	KY079000001	SKYVIEW HOMES	50	Small	99
KY097	Housing Authority of Mount Vernon	KY097000001	CARTER DR & LOVELL LANE	30	Small	98

PHA Code	PHA Name	Development Code	Property Name	Units	Size of PHA	Rounded Inspection Score
MA002	Boston Housing Authority	MA002002134	WASHINGTON BEECH PHASE 1A	16	Large	98
MA002	Boston Housing Authority	MA002002138	OLD COLONY PHASE I	72	Large	98
ME005	Lewiston Housing Authority	ME005000001	BLAKE STREET TOWERS	97	Medium	99
MI038	Jackson Housing Commission	MI038000003	SHAHAN BLACKSTONE NORTH APTS	121	Medium	81
MI070	Marquette Housing Commission	MI070000002	LAKE SUPERIOR VILLAGE	117	Medium	90
MN038	Housing and Redevelopment Authority of St. Cloud, MN	MN038000002	ST. CLOUD HRA	76	Medium	93
MS107	The Housing Authority of the City of Greenwood	MS107000100	HENRY HOMES	199	Medium	52
NC014	Housing Authority of the City of Lumberton	NC014000001	TUDOR CT., MYERS PK., HILTON HEIGHT	282	Medium	87
NC033	Spruce Pine Housing Authority	NC033000001	SPRUCE PINE	84	Small	95
NC066	Burlington Housing Authority	NC066000001	PROJECT UNNAMED	177	Medium	92
NJ012	Bayonne Housing Authority	NJ012000003	BACK BAY GRDNS	415	Large	89
NJ032	Rahway Housing Authority	NJ032000010	GLENDENNING HMS	112	Medium	83
NV001	City of Reno Housing Authority	NV001000103	SILVERADA MANOR	149	Medium	98
NY005	New York City Housing Authority	NY005003100	LAVANBURG HOMES	104	Large	63
NY014	Port Chester Housing Authority	NY014000001	MIDLAND COURT	119	Medium	89
NY055	Town of Oyster Bay Housing Authority	NY055000004	MASSAPEQUA FAM/SNR CZN	248	Medium	99
OH018	Stark Metropolitan Housing Authority	OH018000610	JACKSON PARK HOMES	340	Large	84
PA006	Allegheny County Housing Authority	PA006000803	CALDWELL STATION	6	Large	58
VA016	Charlottesville Redevelopment & Housing Authority	VA016000003	SCATTERED SITES	83	Medium	76
WI025	City of Edgerton Housing Authority	WI025000001	ELM DRIVE APTS 1	105	Small	93

PHA = public housing authority. RAD = Rental Assistance Demonstration.

Appendix C: List to Date of RAD Projects in Sample for Resident Impact Study

CHAP Issue Date	PHA Name	PHA Code	Project Name	PIC/RAD Development Number	No. Units	Conversion Type	PHA Size	Rounded Inspection Score
11/25/2013	The Housing Authority of the City of Prichard	AL169	HERITAGE ESTATES	AL169000001	197	PBRA	Medium	49
11/25/2013	Housing Authority of Auburn	AL050	RIDGECREST	AL050000001	157	PBRA	Medium	91
10/31/2013	Housing Authority of Scottsboro	AL099	SCOTT/HUNTER HOMES ADDN	AL099000001	166	PBRA	Medium	92
1/1/2013	Housing Authority of Bessemer	AL125	DAVIS HEIGHTS/ ASBURY HOWARD	AL125000004	198	PBRA	Medium	85
12/3/2013	Housing Authority of the City of Lafayette	AL159	HILLTOP	AL159000003	102	PBRA	Small	94
1/1/2013	City of Richmond Housing Authority	CA010	FRIENDSHIP MANOR	CA010000003	58	PBV	Medium	79
12/16/2013	The Housing Authority of the City of Biloxi	MS005	BAYVIEW PLACE	MS005000008	146	PBV	Medium	90
8/14/2013	Housing Authority of the Town of Laurinburg	NC018	LAURINBURG PUBLIC HOUSING AMP 1	NC018000001	227	PBRA	Medium	93
1/1/2013	White Plains Housing Authority	NY042	LAKEVIEW	NY042000001	95	PBV	Medium	97
9/30/2013	Northeast Georgia Housing Authority	GA284	HABERSHAM	GA284000005	129	PBRA	Medium	83
12/10/2013	Housing Authority of Leeds	AL069	LYLE WOODS APTS	AL069000001	158	PBRA	Small	92
1/1/2013	Housing Authority of the City of Roswell	GA099	PELFREY PINES	GA099000001/A	32	PBRA	Small	74
12/24/2013	Staunton Redevelopment & Housing Authority	VA023	FARRIER COURT	VA023000002	150	PBV	Small	80
4/8/2013	Housing Authority of St. Mary's County, MD	MD021	PATUXENT WOODS	MD021000003	32	PBRA	Small	60

CHAP = Commitment to Enter into a Housing Assistance Payment Contract. PBRA = project-based rental assistance. PBV = project-based voucher. PHA = public housing authority. PIC = Office of Public and Indian Housing Information Center. RAD = Rental Assistance Demonstration.

Appendix D: Genetic Matching Methodology

To develop our comparison group of 48 non-Rental Assistance Demonstration (RAD) public housing projects, our statisticians used *genetic matching* to match each of the 24 projects in our RAD sample with 4 non-RAD projects and then selected 2 projects from that group for the final non-RAD sample. They repeated this matching step as the U.S. Department of Housing and Urban Development provided updated data. In total, our statisticians performed eight matching iterations and conducted appropriate statistical tests to validate the results of each matching round. The following explains why our statisticians used genetic matching to construct our comparison sample, how they performed the genetic matching, and what the results were.

D.1. Use of Genetic Matching in Observational Studies

In a typical clinical experiment, a treatment group is given a drug and a control group is given a placebo. Such studies are "double blind" in the sense that neither the research scientist nor the subjects of the experiment know which category each subject has been assigned to—the assignment of treatments and controls is completely random and not revealed. Random assignment allows the researcher to more confidently prove that the introduction of the drug alone caused a patient's condition to improve (or not) because the treatment group and the control group differ only randomly over all background variables, or covariates, that could affect the outcome of the treatment.

Any study that relies on using observational data, such as this evaluation of the RAD program, is disadvantaged because the treatment group and control group have not been randomized. Observational studies can be conducted in a "quasi-experimental" fashion, however, by matching each member of the treatment group with a control based on a set of key covariates that are postulated to have some effect on the outcome being measured. Using this method, the researcher selects a matched group of controls with a similar distribution of covariates to that of the treatment group. A high-quality match will eliminate bias in the same way that a randomized experiment does.[131] The quality of the match is measured by calculating the "bias" for each variable, as follows.

$$Bias = \frac{\bar{X}_T - \bar{X}_C}{\sqrt{\frac{(\sigma_T^2 + \sigma_C^2)}{2}}},$$

where $\bar{X}_T$ and $\bar{X}_C$ are the means of a covariate X for the treatment and control groups, respectively, and σ_T^2 and σ_C^2 are their variances.[132]

[131] This discussion assumes that the correct group of covariates has been chosen. If important unobserved variables have not been matched, our conclusions could still be biased.

[132] The bias is also known as the "standardized difference," because the difference in means is "standardized" by dividing it by the pooled standard deviation.

D.2. Our Approach to Genetic Matching in the RAD Evaluation

In the present study, our research team initially selected a random sample of 24 RAD projects for analysis. To compare RAD projects to non-RAD projects, one could have drawn a simple random sample of more than 6,000 available non-RAD projects; however, this approach would have suffered from ***self-selection bias.*** This bias occurs because public housing authorities (PHAs) ***choose*** to participate (or not participate) in RAD; they are not randomly assigned to RAD. Failing to account for this choice in some way could result in biased estimates that would reduce the reliability of the findings.

At the start of the study, our research team expected that RAD projects could differ systematically from non-RAD projects because of self-selection bias. For instance, PHAs might prefer projects that are better managed for RAD in order to reduce the risk that the project would fail if it converted to Section 8 and had to repay debt. Also, because the goal of RAD is to generate capital for rehabilitation, PHAs might select projects that needed more capital improvements than other public housing developments in order to take advantage of that feature of the program. The size of the PHA could also affect PHAs' participation in RAD if smaller PHAs had less mixed-finance experience and therefore less familiarity with the financing tools that RAD would make available; if they did not understand the advantages of RAD; or if they thought they could not make RAD work for them.

To eliminate potential self-selection biases, such as those described previously, and to give more confidence to our conclusions, our statisticians matched the 24 projects in our RAD sample against non-RAD public housing projects based on observable characteristics that could account for some of these possible differences. The covariates used for this matching are listed in table D-1, along with the rationale for including each covariate as a matching variable and the source of the data.

Table D-1. Covariates Used To Match RAD Properties With Non-RAD Properties

Variable	Description	Rationale	Data Source
ACC_UNIT_CNT	Number of Annual Contributions Contract units in a property.	Indicator of the size of the development. Property maintenance and replacement costs are expected to be commensurate with the number of units in a property.	PIC database
BLDG_TYPE_CODE	Building type of project = 1, 2, 3, 4, 5, where: 1 = ES, Elevator Structure. 2 = RW, Row or Townhouse Style. 3 = SD, Semi-Detached. 4 = SF, Single-Family/Detached. 5 = WU, Walkup/Multifamily Apt.	Property maintenance and replacement costs are commensurate with building type, such that the cost of maintaining or replacing a physical asset such as an elevator will impact the level of capital needs.	PIC database
DEV_TYPE_CODE	Development type of the project = 1, 2, 3, where: 1 = Elderly. 2 = Mixed. 3 = Family.	According to an Abt Associates study (*Capital Needs in the Public Housing Program*), average capital needs vary by type of housing. For example, the average amount of capital needs for an elderly unit is lower than that of a family unit.	PIC database
DOFA	Date of Full Availability for the project.	Indicates the age of the building, which is important for determining replacement needs. DOFA establishes when a development can access the operating subsidy from a PHA's Operating Fund. In most cases this date is the same as the construction date. We also considered the last modernization date, if available.	PIC database
PERCENT_1_2_BED	Percentage of units in the project that are either zero-, one-, or two-bedroom units.	Indicator of the size of the unit. Costs associated with the unit size of individual units are not equally distributed.	PIC database
PHA_SIZE_CODE	PHA size = 1, 2, 3, where: 1 = small, ≤ 250 units. 2 = medium, ≤ 1,250 units. 3 = large, > 1,250 units.	Large PHAs differ from smaller PHAs. A PHA's planning process is unique to the PHA but related to the size of the PHA. The PHA plan includes policies, programs, operations, and strategies for meeting local housing needs and goals. Factors must be consistent with the housing and community development plans of the jurisdiction (as described in the Consolidated Plan); thus, PHA size matters.	PIC database
Rounded_Inspection_Score	Physical inspection score (rounded) for the project.	REAC conducts approximately 20,000 physical inspections on housing properties annually to ensure that families living in public housing have decent, safe, and sanitary housing that is in good repair. Scores range from 0 to 100. Properties that receive a PHAS score greater than 90 are considered high performers; properties that score between 70 and 89 are standard; properties that score lower than 70 are substandard or troubled. High-scoring properties are inspected every 3 years, standard performers are inspected every 2 years, and troubled properties are inspected every year. The inspection score served as a proxy for estimating capital needs; properties with high scores are likely to have fewer capital needs than those with lower scores.	REAC file
VACANCY_RATE	Vacancy rate in the project.	Calculated as the percentage of units occupied. Indicator of both the condition of the development and the quality of PHA management. One would expect that a well-managed development in good physical condition would be 100% occupied.	PIC database

Variable	Description	Rationale	Data Source
cost_burden_rate	Cost-burden rate in the census tract.	Measures the percentage of renters with gross rent greater than or equal to 35 percent of their income. Indicator of both the cost of housing in the local market and of poverty in the neighborhood in which the development is located.	ACS data—Census Bureau; by census tract
overcrowd_rate	Overcrowding rate in the census tract.	Calculated as number of people/number of rooms. A ratio greater than 1 is defined as overcrowded. Indicator of local housing market conditions and poverty in the neighborhood in which the development is located.	ACS data—Census Bureau; by census tract
poverty_rate	Poverty rate in the census tract.	Percentage of neighborhood residents below the poverty level.	ACS data—Census Bureau; by census tract
renter_rate	Renter rate in the census tract.	Percentage of neighborhood housing stock occupied by renters. Indicator of the type of housing available in the neighborhood in which the development is located.	ACS data—Census Bureau; by census tract
vacant_rate	Vacancy rate in the census tract.	Percentage of vacant homes in the neighborhood in which the development is located. Indicator of demand and supply conditions in the local housing market. The vacancy rate determines the choices open to consumers in a market. As housing supply expands, housing vacancies rise, and demand will either remain the same or decrease as more residents find available units; as vacancies decrease, the housing supply either remains the same or contracts while demand grows.	ACS data—Census Bureau; by census tract

ACS = American Community Survey. PHA = public housing authority. PHAS = Public Housing Assessment System. PIC = Office of Public and Indian Housing Information Center. REAC = Real Estate Assessment Center.

One can see the amount of bias in the RAD sample directly by comparing the group of 24 RAD projects with the entire set of 6,644 non-RAD (*NR*) public housing projects. Table D-2 compares the number of projects in each group, the mean value for each variable for the RAD ($Mean_{RAD}$) and non-RAD ($Mean_{NR}$) groups, the standard deviation (*StdDev*) and standard error (*StdErr*) for difference in means, the *t*-value, and the bias. The bias is similar to a *t*-test for the difference in two means.[133] A high bias will often result in a *t*-test that rejects the null hypothesis that the two means are equal. For example, in table D-2, vacant_rate has a bias of -41.9 percent and a *t*-value of -2.05 (which would lead to a rejection of the null hypothesis that the two means are the same at the 95-percent confidence level).

[133] The *t*-value is calculated by dividing the difference in means by the standard error instead of the standard deviation. Loosely speaking, the standard error = (standard deviation) × sqrt(1/*n*). The square root term causes the standard error to approach 0 as the sample size increases. The precise mathematical relationship between the bias and the *t*-value is Bias = *t*Value × sqrt(1/*n*1 + 1/*n*2).

Table D-2. Comparison of Means by Covariates for RAD Sample and Non-RAD Population

Variable	$Mean_{RAD}$	$Mean_{NR}$	StdDev	StdErr	*t*-Value	Bias (%)
ACC_UNIT_CNT	159.6	154.8	208.3	42.6037	0.11	2.3
BLDG_TYPE_CODE	2.5833	2.4104	1.1134	0.2277	0.76	15.5
DEV_TYPE_CODE	2.9167	2.8639	0.4234	0.0866	0.61	12.5
DOFA	1974.5	1976.6	16.9795	3.4722	– 0.6	– 12.4
PERCENT_1_2_BED	0.6204	0.661	0.3103	0.0635	– 0.64	– 13.1
PHA_SIZE_CODE	1.9583	1.9738	0.8351	0.1708	– 0.09	– 1.9
Rounded_Inspection_Score	84.5417	84.8222	12.9316	2.6444	– 0.11	– 2.2
VACANCY_RATE	0.1658	0.0919	0.1868	0.0382	1.93	39.5
cost_burden_rate	44.5833	42.1859	13.1244	2.6838	0.89	18.3
overcrowd_rate	0.0344	0.0375	0.0472	0.00965	– 0.32	– 6.4
poverty_rate	31.475	27.8604	15.1196	3.0918	1.17	23.9
renter_rate	55.6292	51.0282	22.1308	4.5256	1.02	20.8
vacant_rate	10.9125	14.5284	8.6328	1.7653	– 2.05	– 41.9
Average Bias						**4.2**

RAD = Rental Assistance Demonstration.
Sources: HUD PIC data; Census Bureau ACS data

Table D-2 shows that the RAD sample and the population of non-RAD projects are fairly dissimilar. Even though the average bias of 4.2 percent is fairly low, the disaggregated results for each of the covariates show much higher levels of bias: vacancy_rate (within the project) has a 39.5-percent bias, and poverty_rate and renter_rate both have biases greater than 20 percent. Because of the dissimilarity between RAD projects and the population of non-RAD projects, our research team decided to gather a matched sample of non-RAD projects for our control group, with the goal of establishing a control group that has a lower overall bias and also lower bias for individual covariates.

D.3. Genetic Matching Methodology

There are many ways to match treatment and control samples. No consensus has emerged in the matching literature on which matching method is best (Stuart, 2010), and empirical matching is as much art as science. For this study, our statisticians opted to use a flexible matching method—the genetic matching algorithm ***GenMatch***, written in R (Sekhon and Mebane, 1998). Genetic matching is a multivariate matching method that uses an evolving search algorithm developed to maximize the balance of covariates across matched treated and control units (Diamond and Sekhon, 2013). "Balance" means that the treatment and control groups have the same joint distribution of the covariates. Genetic matching minimizes a loss function[134] that combines two statistical tests: (1) a parametric ***t-test*** for the difference in means

[134] The loss function is the maximum *p* value from either the Kolmogorov-Smirnov test or the paired *t*-test over all variables over which we are matching. We can write the loss function, as—

L = max [p*t*-test(var1), pKS-test(var1), p*t*-test(var2), pKS-test(var2),… p*t*-test(var*k*), pKS-test(var*k*)].

The best match is the one that minimizes this loss function. Rather than relying on the *t*-test alone, the GenMatch algorithm combines the *t*-test with the KS test to get results that are as well balanced as possible with respect to both tests. Using *p*-values allows us to compare results from both tests on the same (probability) scale.

of each covariate and (2) a nonparametric ***Kolmogorov–Smirnov test*** (***KS test***) that minimizes the difference between the empirical cumulative distribution functions **(CDFs)** of each covariate.

The *t*-test for the difference in means is familiar, but subject to two crucial limitations. First, the *t*-test is based on a single parameter, the mean, even though distributions with identical means might have widely different underlying distributions. Second, the *t*-test depends on the assumption that both underlying distributions are normal, which may be untrue. The KS test, on the other hand, is nonparametric in that it does not depend on any assumptions about the underlying distributions. It compares the empirical distribution of each variable for RAD projects versus potential matches in the non-RAD population and calculates the maximum difference between the two CDFs. Genetic matching minimizes the largest discrepancy based on *p*-values from KS tests and *t*-tests for all covariates.[135]

GenMatch is written in the R software environment. GenMatch does not match, per se. Instead, it determines the optimal importance of each covariate in determining balance over all covariates. For example, if one is trying to achieve balance on A, B, and C characteristics, the algorithm begins with the assumption that A, B, and C all matter equally in achieving balance across ABC. It assesses this balance by minimizing the *p*-values of the *t*-test and the KS test between treatment and control groups. GenMatch checks multiple weighting schemes—across A, B, and C—to identify which weighting scheme minimizes *p*-values, thereby identifying which variables are most important.

D.4. Genetic Matching Results

The goal of our use of genetic matching was to select two unique matched non-RAD projects for each of the 24 RAD projects in our sample, resulting in a study sample of 24 RAD projects and 48 matched non-RAD projects. To accomplish this task, our statisticians implemented the GenMatch algorithm using a 4:1 match. That is, 4 matches were selected for each of the 24 projects in the sample of RAD projects, resulting in 96 unique non-RAD projects being selected. Our statisticians selected more matching projects than necessary in case a match had to be rejected for some reason. Matches were selected without replacement, so each non-RAD project could be selected as a control only once. When possible, the two best matches were selected for the final study. In many cases, however, matched non-RAD projects had to be rejected for a variety of reasons. For instance, one or two projects were no longer public housing projects and were eliminated. Several projects turned out to be RAD participants (after the cap was lifted) and thus were not appropriate to serve as controls. Another project was rejected because it was a single highrise building that had been matched against a project of scattered townhouse units.

[135] The *p*-value represents the probability of getting a value of the test statistic greater than the one obtained, given that the null hypothesis is actually true. As applied here, the null hypothesis would be that there is no difference between RAD and non-RAD developments. A low *p*-value (below, say 5 percent) would result in rejection of the null hypothesis (with 95 percent confidence.), but a high *p*-value would mean that the null hypothesis cannot be rejected. Using *p*-values enables results for different test statistics to be compared on the same scale. That is, the GenMatch algorithm can directly compare the *p*-value from a *t*-test with the *p*-value from a KS test because both are measured in terms of probabilities.

In other cases, the PHAs declined to participate in the web survey and interviews and had to be dropped from the study. When a potential control was rejected for whatever reason, our staff selected the very next best match in the list. In a few cases, however, the controls ran out. As a consequence, for some of the projects in the RAD sample, our staff had to rerun the genetic matching program to select 4 more controls to complete our final sample of 48 projects.

Results of GenMatch are given in table D-3. One variable, PHA_SIZE_CODE, was a perfect match under both the *t*-test for difference in means and the KS test. What this result means is that the RAD sample and the non-RAD sample could be sorted into equal numbers of projects of the exact same size class. Poverty_rate was a near-perfect match—perfect in terms of the difference in means, but not with respect to the KS test. The worst match in terms of *p*-values was Bldg_Type_Code, at 29.6 percent under the KS test and 48.8 percent under the difference in means test. Another way of describing this result is to say that one can reject the null hypothesis that the distribution of building types in the two samples is the same with 70-percent confidence. Analysts typically demand a higher degree of confidence—in the 90- or 95-percent range. To be prudent, however, we should acknowledge that bias might still be present with respect to building type. Similar caution might be due with respect to the vacant_rate variable for which one can accept the null hypothesis that the means are the same with only 45-percent confidence.

Table D-3. Results of the Genetic Matching Algorithm

Variable	*p*-Values	
	t-Test for Difference in Means (%)	KS Test (%)
ACC_UNIT_CNT	72.8	55.2
BLDG_TYPE_CODE	48.8	29.6
DEV_TYPE_CODE	81.2	92.2
DOFA	67.0	76.3
PERCENT_1_2_BED	77.3	98.4
PHA_SIZE_CODE	100.0	100.0
Rounded_Inspection_Score	76.6	79.0
VACANCY_RATE	84.3	98.8
cost_burden_rate	87.4	81.6
overcrowd_rate	88.9	72.6
poverty_rate	100	99.8
renter_rate	77.3	82.4
vacant_rate	53.3	56.3

KS test = Kolmogorov–Smirnov test.

Table D-4 presents a comparison of the bias of the unmatched set of all non-RAD public housing projects against the final set of 48 matched non-RAD projects in our sample of comparison projects. For all but three covariates, bias decreased after the match. For two covariates—ACC_UNIT_CNT and Rounded_Inspection_score—the bias was higher post-match (in absolute value), but still less than 10 percent. Given the results in tables D-3 and D-4, some further caution might be due with respect to three covariates: BLDG_TYPE_CODE, DOFA, and vacant_rate. Our overall conclusion is that the post-match bias is extremely low. The bias decreased to less than one-third of its original size, from an average of 4.2 percent to just -1.2 percent.

Table D-4. Comparison of the Degree of Bias Before and After Match

Variable	Unmatched					Matched		
	N_{RAD}	$Mean_{RAD}$	N_{NR}	$Mean_{NR}$	Bias (%)	N_{NR}	$Mean_{NR}$	Bias (%)
ACC_UNIT_CNT	24	159.6	6,644	154.8	2.3	48	149.4	8.8
BLDG_TYPE_CODE	24	2.5833	6,644	2.4104	15.5	48	2.3958	17.4
DEV_TYPE_CODE	24	2.9167	6,644	2.8639	12.5	48	2.9375	– 5.9
DOFA	24	1974.5	6,644	1976.6	– 12.4	48	1976.1	– 10.8
PERCENT_1_2_BED	24	0.6204	6,644	0.661	– 13.1	48	0.6378	– 7.3
PHA_SIZE_CODE	24	1.9583	6,644	1.9738	– 1.9	48	1.9583	0.0
Rounded_Inspection_Score	24	84.5417	6,644	84.8222	– 2.2	48	85.5208	– 7.4
VACANCY_RATE	24	0.1658	6,644	0.0919	39.5	48	0.1518	5.0
cost_burden_rate	24	44.5833	6,644	42.1859	18.3	48	44.1458	3.9
overcrowd_rate	24	0.0344	6,644	0.0375	– 6.4	48	0.0332	3.6
poverty_rate	24	31.475	6,644	27.8604	23.9	48	31.4583	0.1
renter_rate	24	55.6292	6,644	51.0282	20.8	48	56.875	– 7.2
vacant_rate	24	10.9125	6,644	14.5284	– 41.9	48	11.7083	– 15.7
Averages					**4.2**			**– 1.2**

D.5. References

Diamond, Alexis, and Jasjeet S. Sekhon. 2013. "Genetic Matching for Estimating Causal Effects: A General Multivariate Matching Method for Achieving Balance in Observational Studies," *The Review of Economics and Statistics* 95 (3): 932–945.

Sekhon, Jasjeet S., and Mebane Jr., Walter R. 1998. "Genetic Optimization Using Derivatives," *Political Analysis* 7 (1): 187–210.

Stuart, Elizabeth A. 2010. "Matching Methods for Causal Inference: A Review and a Look Forward," *Statistical Sciences* 25 (1): 1–21.

Appendix E: Validation of RAD and Non-RAD Samples

This appendix describes several statistical tests performed to validate the methodologies used to draw our Rental Assistance Demonstration (RAD) and non-RAD samples. The RAD sample was drawn using stratified random sampling; the non-RAD sample was drawn using genetic matching (see appendix D). Our goal was to arrive at a sample of 24 RAD projects that fairly represented the population of RAD projects along multiple dimensions and a sample of 48 non-RAD projects that fairly matched our RAD sample along the same dimensions. The results of these tests validate the achievement of our goal for both samples.

E.1. Comparison of RAD Sample to RAD Population

Our project team drew a stratified random sample of 24 RAD projects from the population of 132 RAD applications that had received a Commitment to Enter into a Housing Assistance Payment Contract (CHAP) award by December 31, 2013, and had also received an RAD Conversion Commitment (RCC) or had "closed" by December 31, 2014. The total RAD universe at the time of our sample, which was before the cap on the RAD program had been lifted, consisted of 278 RAD applications that had active CHAPs or had closed (in other words, excluding CHAPs that were withdrawn or revoked). Our reason for sampling from only a subset of the total RAD project universe was to increase the likelihood that projects in our sample would have sufficient time to complete rehabilitation or new construction for inclusion in the Final Report. Because one of this evaluation's goals is to assess RAD impact on the physical and financial condition of projects, our objective was to maximize the amount of sample data that would be available for that assessment. For a related reason, our team did not sample from the population of RAD projects that had had their CHAP withdrawn or revoked.

To what extent is the sample of 24 RAD projects representative of the population of 132 closed and RCC projects? To validate the representativeness of the RAD sample, our analysts used standard statistical analysis tools to determine whether the sample and population are similar. If they are similar, one can conclude that the random sample of 24 RAD projects is representative of the population of 132 closed and RCC projects.

Table E-1 presents the number and percentage distribution by public housing authority (PHA) size and project performance ratings of RAD projects in our sample of 24 projects. Table E-2 presents this information for the population of 132 closed or RCC projects. The sample of 24 RAD projects and the population of 132 closed and RCC projects were divided into 1 of 3 PHA sizes (small, medium, and large) and 1 of 3 project performance rating levels (substandard, standard, and high-standard). The result is a total of nine (3 × 3) groupings, which are the same groupings that were used to stratify our sample.

Table E-1. Distribution of RAD Sample of 24 Projects by PHA Size and Project Performance Rating

PHA Size/Project Performance Rating	Substandard		Standard		High Standard		PHA Size Total	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Small	0	0	2	8	3	13	5	21
Medium	1	4	8	33	6	25	15	63
Large	1	4	2	8	1	4	4	17
Project performance total	**2**	**8**	**12**	**50**	**10**	**42**	**24**	**100**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data.

Table E-2. Distribution of RAD Population of 132 Closed and RCC Projects by PHA Size and Project Performance Rating

PHA Size/Project Performance Rating	Substandard		Standard		High Standard		PHA Size Total	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Small	0	0	10	8	18	14	28	21
Medium	1	1	45	34	34	26	80	61
Large	2	2	13	10	9	7	24	18
Project performance total	**3**	**2**	**68**	**52**	**61**	**46**	**132**	**100**

PHA = public housing authority. RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data

Each category is represented in the sample and population, except for small PHAs with substandard-performing projects. No projects were in that category in the RAD population of 132 closed and RCC projects that had completed the application process and been accepted into the program. As a consequence, this group is not represented in the sample either.

A simple check on whether the RAD sample of 24 is representative of the population of 132 closed and RCC projects is whether the numbers in each category for the population are about 5.5 times (5.5 = 132/24) those of the sample. A glance at tables E-1 and E-2 shows that this result is generally the case; the exception is the substandard-project-performance category, which had so few projects in the population that they are overrepresented in our stratified sample. Another easy check is to compare the percentages in each category for the sample of 24 RAD projects (presented in table E-1) and the population of 132 closed and RCC projects (presented in table E-2) to determine whether they match one another. These tables provide another illustration that the distribution of projects by PHA size and project performance categories for the sample and the population from which it was drawn is approximately the same.

A further assessment of whether the RAD sample is sufficiently representative of the population is to compare the values for five factors that we analyzed to ascertain their impact on the probability that a project will be in the RAD program. These factors are (1) neighborhood poverty rate, (2) neighborhood cost-burden rate, (3) neighborhood overcrowding rate, (4) percentage of units with one or two bedrooms, and (5) number of project units, using American Community Survey (ACS) and HUD Office of Public and Indian Housing Information Center (PIC) data described previously. Tables E-3 and E-4 present the mean averages for each

of these 5 variables for both the sample of 24 RAD projects and the population of 132 closed and RCC projects. We also performed the comparison of means across PHA size and project performance.

In addition to the means, tables E-3 and E-4 also present the *t*-statistics for hypothesis tests to determine whether the mean for each factor and group in the sample is statistically significantly different from the corresponding mean in the population. Of the 30 tests (5 factors for 6 subgroups), **in no case** is a pair of means statistically significantly different from each other. In fact, only 2 of the 30 *t*-statistics have an absolute value greater than 1. This finding supports our conclusion that the sample does in fact represent the RAD population as a whole.

Table E-3. Averages and *t*-Statistics for the Hypothesis Test of No Difference in Means Between the RAD Sample of 24 Projects and the Population of 132 Closed and RCC Projects Across PHA Size

Variable	Small PHA			Medium PHA			Large PHA		
	Sample	Pop	*t*-Stat	Sample	Pop	*t*-Stat	Sample	Pop	*t*-Stat
Sample size	5	28		15	80		4	24	
% one- or two-bedroom units	71	70	0.09	59	58	0.16	61	61	0.05
Neighborhood poverty rate	21	20	0.23	33	30	0.82	39	34	0.49
Neighborhood cost-burden rate	36	40	–0.85	49	47	0.54	37	43	–1.45
Neighborhood overcrowding rate	0.8	2.1	–1.66	4.6	4.5	0.12	2.3	3.1	–0.82
Project ACC units	115	106	0.33	147	141	0.36	262	239	0.22

ACC = Annual Contributions Contract. PHA = public housing authority. RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data; American Community Survey

Table E-4. Averages and *t*-Statistics for the Hypothesis Test of No Difference in Means Between the RAD Sample of 24 Projects and the Population of 132 Closed and RCC Projects Across Project Performance Rating

Variable	Substandard Project Performance			Standard Project Performance			High-Standard Project Performance		
	Sample	Pop	*t*-Stat	Sample	Pop	*t*-Stat	Sample	Pop	*t*-Stat
Sample size	2	3		12	68		10	60	
% one- or two-bedroom units	51	67	– 0.49	70	63	0.94	55	58	– 0.34
Neighborhood poverty rate	40	41	– 0.48	33	30	0.63	28	27	0.22
Neighborhood cost-burden rate	57	58	– 0.06	44	45	– 0.45	43	44	– 0.33
Neighborhood overcrowding rate	4.1	2.7	0.93	3.0	3.9	– 0.82	3.8	3.9	0.17
Project ACC units	201	201	0.03	178	179	– 0.04	129	179	0.52

ACC = Annual Contributions Contract. PHA = public housing authority. RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data; American Community Survey

One final check that we performed is to compare the values for the 31 factors that have been analyzed over the entire sample and population as a whole, rather than at the PHA size and project performance level, to ascertain their impact on the probability that a project will be in the RAD program. In addition to three factors for PHA size (small, medium, and large), these analytical factors include six factors describing the project's and its tenants' characteristics using the U.S. Department of Housing and Urban Development's (HUD's) PIC data on (1) the property's Real Estate Assessment Center (REAC) inspection score, (2) annual operating expenses, (3) median household income of tenants living in the project, (4) percentage of tenant households headed by an elderly person, (5) number of project units covered by an Annual Contributions Contract (ACC), and (6) the percentage of one- or two-bedroom units. Four more factors describe the characteristics of the neighborhood the property is located in, using ACS or Census Bureau data at the census tract level for (1) whether the project is in a metropolitan area, (2) the neighborhood poverty rate, (3) the neighborhood cost-burden rate, and (4) the neighborhood overcrowding rate. The neighborhood characteristics variables used ACS data at the census tract level. The other variables used data from HUD's PIC database. These 13 variables consist of—

1. Three binary variables to account for PHA size: (a) small PHA, (b) medium PHA, and (c) large PHA (the means represent the percentage of projects in each size category).
2. Project performance score (ranging from 1 to 100 points, where a higher score indicates a higher level of quality in the physical condition of the project).
3. Metropolitan status, a binary variable 0–1 indicating whether a project is located in a metropolitan area (value = 1) or nonmetropolitan area (value = 0), where the mean is the percentage of projects that are in a metropolitan area.[136]
4. Bedroom mix of the project (percentage of units in the project that are one- or two-bedroom units).
5. Project size (number of project units covered by ACC).
6. Annual operating expenses of the project in dollars.
7. Median household income of tenants living in the project in dollars.
8. Elderly status (percentage of households living in the project that are headed by a person aged 62 or older).
9. Neighborhood poverty rate (percentage of households in the census tract below the poverty line).
10. Neighborhood cost-burden rate (percentage of households in the census tract paying more than 30 percent of income in rent).
11. Neighborhood overcrowding rate (percentage of households in the census tract with more than one person per room).

[136] This variable follows the U.S. Office of Management and Budget definition of metropolitan and micropolitan statistical areas for use by federal agencies in collecting, tabulating, and publishing federal statistics.

Finally, our analysis examined 18 variables that describe the project's planned financing and conversion strategy under RAD. Four of these variables related to the project's proposed RAD conversion strategy: (1) the proposed per-unit construction costs that the PHA plans for the project, (2) whether the project is part of an application for a PHA's portfolio (this variable is binary, or 0–1), (3) whether the project is proposed for multiple phases (also a binary or 0–1 variable), and (4) whether the proposed Housing Assistance Payment contract is project-based voucher (PBV) (= 1) or project-based rental assistance (PBRA) (= 0) (another binary or 0–1 variable).

1. Proposed per-unit construction costs for the project (dollar amount).
2. Portfolio application, which is a binary variable indicating whether the project is part of an application for a PHA's portfolio (Yes = 1, No = 0).
3. Multiphase project, which is a binary variable showing whether the contract/CHAP application has multiple phases (Yes = 1, No = 0).
4. Type of subsidy contract, which is a binary variable for whether the project intends to use PBV (= 1) or PBRA (= 0) Section 8 contracts.

Of the 18 variables, 14 described the project's proposed RAD financing strategy, including—

- Total proposed dollar amount of project financing, which is the sum of the proposed public housing operating reserves, the public housing capital fund, the Replacement Housing Factor (RHF) fund, the amount of first mortgage debt, the amount of other funding (which includes second mortgages, soft loans, grants, and deferred developer fees), the amount of the 9-percent low-income housing tax credit (LIHTC), and the amount of the 4-percent LIHTC.
- The proposed dollar amount of public housing funds.
- The proposed dollar amount of public housing operating reserves.
- The proposed dollar amount of public housing capital funds.
- The proposed dollar amount of RHF dollars.
- The proposed dollar amount of first mortgage debt.
- The proposed dollar amount of 9-percent LIHTC equity.
- The proposed dollar amount of 4-percent LIHTC equity.
- The proposed dollar amount of other funding sources.

In addition, our analysis also compared the means of the percentage of total proposed financing due to each of the five RAD financing components.

1. Public housing funds.
2. First mortgage debt.
3. LIHTC equity at 4 percent.
4. LIHTC equity at 9 percent.
5. Other sources.

Table E-5 presents the mean averages for each of these variables for both the sample of 24 RAD projects and the population of 132 closed and RCC projects, and the differences in the 2 means (sample minus population). In addition to the means, table E-5 also presents the *t*-statistics for hypothesis tests to determine whether the mean for each variable in the sample is statistically significantly different from the corresponding mean in the population.

Table E-5. Averages and *t*-Statistics for the Hypothesis Test of No Difference in Means Between the RAD Sample of 24 Projects and the Population of 132 Closed and RCC Projects for 31 Variables

Variable	Sample	Population	Difference	*t*-Statistic
Large PHA	16.7%	18.2%	– 1.5%	– 0.18
Medium PHA	62.5%	60.6%	1.9%	0.17
Small PHA	20.8%	21.2%	– 0.4%	– 0.04
Project inspection score	84.5	87.6	– 3.0	– 0.94
Project expenses	$819,553	$843,338	-$23,785	– 0.22
Project tenants' median household income	$10,882	$10,777	$106	0.10
Project tenants' % elderly households	28.1%	27.1%	1.0%	0.19
Project units covered by ACC	159.6	151.4	8.1	0.36
Project % one- or two-bedroom units	62.0%	61.1%	0.9%	0.17
Project is in a metropolitan area	79.2%	75.0%	4.2%	0.45
Neighborhood poverty rate	31.5%	28.7%	2.7%	0.90
Neighborhood cost-burden rate	44.6%	45.1%	– 0.6%	– 0.20
Neighborhood overcrowding rate	3.4%	3.7%	– 0.3%	– 0.32
RAD construction costs per unit	$42,865	$33,140	$9,725	0.73
Part of a RAD portfolio application	8.3%	20.5%	– 12.1%	– 1.79
Part of a RAD multiphase project	0.0%	2.3%	– 2.3%	– 1.75
PBV or PBRA contract	58.3%	51.5%	6.8%	0.61
Public housing operating reserves	$399,062	$420,062	-$21,000	– 0.18
Public housing capital funds	$136,343	$259,014	-$122,671	– 1.84
Public housing RHF funds	$134,412	$96,587	$37,824	0.52
Total public housing funds	$669,817	$778,977	-$109,160	– 0.60
First mortgage debt	$1,560,766	$1,512,102	$48,665	0.08
9% LIHTC equity	$2,498,674	$2,254,750	$243,924	0.23
4% LIHTC equity	$1,434,965	$986,882	$448,083	0.51
Other sources	$3,126,748	$2,398,803	$727,945	0.54
Total financing	$9,290,970	$7,930,166	$1,360,804	0.49
% public housing funds	41%	42%	– 1%	– 0.08
% first mortgage debt	13%	12%	1%	0.25
% 9% LIHTC equity	16%	14%	2%	0.31
% 4% LIHTC equity	5%	5%	0%	0.07
% other sources	20%	24%	– 4%	– 0.76
Number of projects	**24**	**132**		

ACC = Annual Contributions Contract. LIHTC = low-income housing tax credit. PBRA = project-based rental assistance. PBV = project-based voucher. PHA = public housing authority. RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment. RHF = Replacement Housing Factor.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data; American Community Survey

Of the 31 tests, **in no case** is a pair of means statistically significantly different from each other at the 5-percent level. In fact, only 3 of the 31 *t*-statistics have an absolute value greater than 1. The closest to such significance are the mean differences in public housing capital funds (the

t-statistic of 1.84 is significant at the 7-percent level), whether project is part of a portfolio application (the *t*-statistic of -1.79 is significant at the 8-percent level), and whether the project is a multiphase project application (the *t*-statistic of -1.75 is significant at the 9-percent level). Our conclusion, after examining the 24 projects in our sample against the population they were drawn from along multiple dimensions, is that the sample of 24 projects appears to represent the population of RAD projects as a whole.

E.2. Comparison of RAD Subpopulations

At the time our RAD sample was drawn, the entire population of RAD CHAP awards (which represents the first phase of RAD projects before the cap was lifted) totaled 278 projects. This population included the 132 closed and RCC projects from which our sample was pulled, in addition to 146 remaining projects that had been awarded CHAPs but had not withdrawn or been revoked and had not yet closed (the pre-RCC active CHAPs). The preceding section validated that our sample is consistent with the subpopulation of 132 closed and RCC projects. To what extent is our sample consistent with the entire population of awarded CHAPs? The objective of this section is to answer that question. Our approach is to use standard statistical analysis tools to determine whether the subpopulation of 132 closed and RCC RAD projects is similar to the subpopulation of 146 pre-RCC active CHAP awards that had not closed or been withdrawn or revoked by the end of 2014. If the 2 subpopulations are similar, one can conclude that the random sample of 24 RAD projects is representative of the entire population of 278 active and closed CHAP awards.

As before, our analysts classified all RAD projects in the 2 subpopulations of 132 closed and RCC CHAPs and 146 pre-RCC active CHAPs into 1 of 3 PHA size categories (small, medium, or large) and 1 of 3 project condition or performance categories (substandard, standard, or high-standard) that were used to stratify our sample. This step distributed the two subpopulations across a total of nine ($3 \times 3 = 9$) groups. Table E-6 shows the number and percentage of RAD projects for the pre-RCC active CHAP subpopulation, and table E-7 shows the number and percentage of RAD projects for the RAD closed and RCC subpopulation. Both tables are organized by PHA size and project performance rating.

Table E-6. Distribution of RAD Pre-RCC Active CHAP Award Subpopulation by PHA Size and Project Performance Rating, Number and Percent (146 total projects)

PHA Size/Project Performance Rating	Substandard		Standard		High Standard		PHA Size Total	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Small	4	3	13	9	7	5	24	16
Medium	11	8	31	21	27	18	69	47
Large	12	8	23	16	18	12	53	36
Project performance total	**27**	**18**	**67**	**46**	**52**	**36**	**146**	**100**

CHAP = Commitment to Enter into a Housing Assistance Payment Contract. PHA = public housing authority.
RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data

Table E-7. Distribution of RAD Closed and RCC Subpopulation by PHA Size and Project Performance Rating, Number and Percent (132 total projects)

PHA Size/Project Performance Rating	Substandard		Standard		High Standard		PHA Size Total	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Small	0	0	10	8	18	14	28	21
Medium	1	1	45	34	34	26	80	61
Large	2	2	13	10	9	7	24	18
Project performance total	**3**	**2**	**68**	**52**	**61**	**46**	**132**	**100**

PHA = public housing authority. RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data

One difference stands out: the 132 closed and RCC projects have a much lower percentage of substandard-performing projects than the remaining 146 pre-RCC active CHAPs. This difference is to be expected. It is plausible that projects with greater capital needs, such as substandard-performing projects, would take more time to obtain their RCCs and complete the closing process because they have greater financing needs and therefore would have to secure a wider array of financing sources. Getting a conditional commitment and closing will take longer the greater the number of different sources that have to be brought to the table and the more complex the transaction. It is to be expected that projects with a standard or high-standard performance rating would have simpler financing needs and thus would complete the RCC and closing process sooner.

Another difference relates to PHA size. Although both subpopulations have about the same percentage of projects managed by small PHAs, the subpopulation of 132 closed and RCC transactions has a higher percentage of projects managed by medium PHAs and, as a consequence, a lower percentage of projects managed by large PHAs than the subpopulation of 146 pre-RCC active CHAPs. Large PHAs may find it slightly more difficult to complete the RCC and closing process for a variety of reasons, including that they may have more organizational inertia to overcome or more layers of bureaucracy that must approve each project at each step of the process. Another possibility is that, because of their greater financial sophistication, they may be more likely to pursue complicated redevelopment transactions that take longer to close.

Another perspective on whether these groups are sufficiently similar is to compare the values for 5 of the 31 factors used in the preceding analysis: (1) neighborhood poverty rate, (2) neighborhood cost-burden rate, (3) neighborhood overcrowding rate, (4) percentage of project units with one- or two-bedroom units, and (5) project size as measured by the number of project ACC units. Table E-8 presents the mean average values for each of these five factors for both subpopulations across PHA size, and table E-9 presents this information across project performance categories.

Table E-8. Averages and *t*-Statistics for the Hypothesis Test of No Difference in the RAD Subpopulation Means Across PHA Size (for Closed/RCC RAD and Pre-RCC Active CHAP RAD Subpopulations)

Variable	Small PHA			Medium PHA			Large PHA		
	Pop of 146 Proj	Pop of 132 Proj	*t*-Stat	Pop of 146 Proj	Pop of 132 Proj	*t*-Stat	Pop of 146 Proj	Pop of 132 Proj	*t*-Stat
PHA size	22	28		69	80		53	24	
Project % one- or two-bedroom units	60	70	1.74	62	58	– 0.99	58	61	0.47
Neighborhood poverty rate	20	20	– 0.09	33	30	– 1.39	35	34	– 0.27
Neighborhood cost-burden rate	42	40	– 0.48	48	47	– 0.10	41	43	0.62
Neighborhood overcrowding rate	3.2	2.1	– 1.31	5.7	4.5	– 1.02	4.0	3.1	– 0.93
Project units covered by ACC	137	106	– 1.81	179	141	**– 2.79**	305	239	– 1.06

ACC = Annual Contributions Contract. CHAP = Commitment to Enter into a Housing Assistance Payment Contract. PHA = public housing authority. RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data

Table E-9. Averages and *t*-Statistics for the Hypothesis Test of No Difference in the RAD Subpopulation Means Across Project Performance (for Closed/RCC RAD and Pre-RCC Active CHAP RAD Subpopulations)

Variable	Substandard Project Performance			Standard Project Performance			High-Standard Project Performance		
	Pop of 146 Proj	Pop of 132 Proj	*t*-Stat	Pop of 146 Proj	Pop of 132 Proj	*t*-Stat	Pop of 146 Proj	Pop of 132 Proj	*t*-Stat
PHA size	27	3		66	68		50	60	
Project % one- or two-bedroom units	58	67	0.40	61	63	0.39	59	58	– 0.23
Neighborhood poverty rate	38	41	0.61	29	30	0.25	33	27	– 1.94
Neighborhood cost-burden rate	44	58	1.17	43	45	1.01	45	44	– 0.41
Neighborhood overcrowding rate	5.2	2.7	– 1.08	4.5	3.9	– 0.63	4.5	3.9	– 1.06
Project units covered by ACC	239	201	– 1.12	217	179	– 1.20	213	179	**– 2.73**

ACC = Annual Contributions Contract. CHAP = Commitment to Enter into a Housing Assistance Payment Contract. RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; HUD RAD data

In addition to the means, these tables also present the *t*-statistics for hypothesis tests to determine whether the mean for each factor by PHA size and project performance rating for the group of 132 closed and RCC projects is statistically significantly different from the corresponding mean for the group of 146 pre-RCC active CHAP projects. Any variables statistically significantly different at the 5-percent level are in **bold** text and highlighted in yellow. Of the 30 tests (5 factors for 6 subgroups), only 2 pairs of means are statistically significantly different from each other,

and both involve the number of project units covered by the ACC. Because this number is quite correlated with PHA size and the group of 146 pre-RCC active CHAP projects contains many more large PHAs, it is not surprising that the difference between the 2 populations was statistically significant. One finding is that even though the group of 146 pre-RCC active CHAP projects has more substandard-performing projects, the substandard projects comprise such a small percentage of projects overall (less than 11 percent) that no significant differences emerge in these 5 factors between the 2 groups. Thus, the 132 closed and RCC projects are representative of the group of 276 closed and active CHAPs as a whole.

Another check on subpopulation comparability is a comparison of the five pairs of means over the entire subpopulations, rather than at the PHA size and project performance levels. Table E-10 presents the comparison for the two subpopulations **as a whole.**

Table E-10. Averages and *t*-Statistics for the Hypothesis Test of No Difference in the RAD Subpopulation Means (Closed/RCC and Pre-RCC Active CHAP)

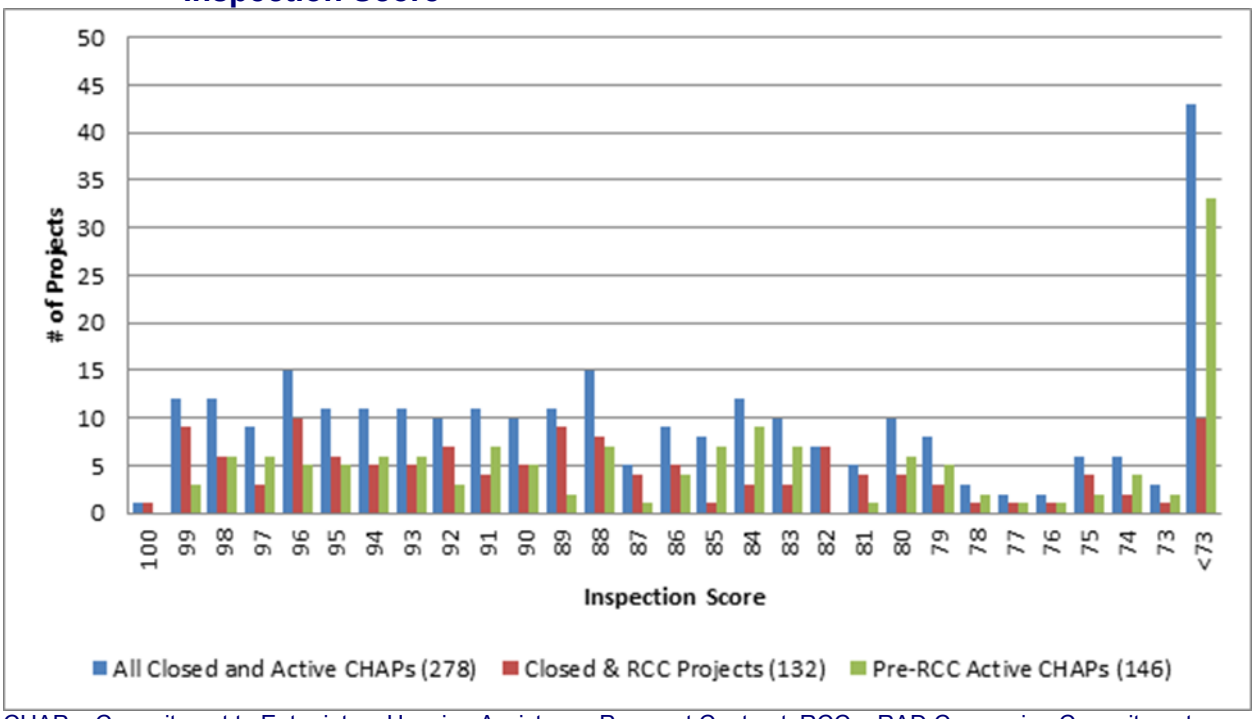
Variable	Pre-RCC Active CHAP	Closed and RCC	*t*-Statistic
PHA size	146	132	
Project % one- or two-bedroom units	60	61	0.38
Neighborhood poverty rate	32	29	– 1.74
Neighborhood cost-burden rate	44	45	0.48
Neighborhood overcrowding rate	4.7	3.7	– 1.44
Project units covered by ACC	219	151	**– 3.28**

ACC = Annual Contributions Contract. CHAP = Commitment to Enter into a Housing Assistance Payment Contract. RAD = Rental Assistance Demonstration. RCC = RAD Conversion Commitment.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; HUD RAD data

Again, only the difference in means for project ACC units is statistically significant. As previously noted, this variable is correlated with projects managed by large PHAs. The conclusion of these hypothesis tests is that the population of 132 closed and RCC projects used to draw the sample of 24 RAD projects is broadly representative of the entire population of 278 active and closed RAD projects, with a slight skewing away from projects managed by large PHAs.

Another comparison of the groups uses the actual PHA inspection score, which was used to categorize PHAs into substandard, standard, and high-standard project performance subgroups. Figure E-1 presents the frequency distribution by REAC inspection score (rounded to the nearest integer) for the entire population of 278 active CHAPs and closed RAD projects, and for the 2 subpopulations of 132 closed and RCC projects and 146 pre-RCC active CHAP projects.

Figure E-1. Number of Projects in Each Subpopulation by REAC Physical Inspection Score



CHAP = Commitment to Enter into a Housing Assistance Payment Contract. RCC = RAD Conversion Commitment. REAC = Real Estate Assessment Center.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data

Although a few more REAC inspection scores at 99 and 100 exist for the group of 132 closed and RCC projects, the scores generally correlate between the 2 groups. For example, 10 projects are in the group of 132 closed and RCC projects scoring at 95, but only 5 are in the group of 146 pre-RCC active CHAPs. Only 3 projects are in the group of 132 closed and RCC projects scoring at 96, but 6 are in the group of 146 pre-RCC active CHAPs. Combining scores of 95 and 96 makes the 2 groups extremely close: 13 projects are in the group of 132 closed and RCC projects and 11 are in the group of 146 pre-RCC active CHAPs. In general, for high REAC inspection scores, there is not much difference between the two groups. For scores of 75 and above, the average for the 119 projects in the group of 132 closed and RCC projects is 89.5; for the 107 projects in the group of 146 pre-RCC active CHAPs, the average is 88.6. The *t*-statistic for the differences in these means is 1.04, which is highly insignificant. The difference emerges with REAC inspection scores below 75. For scores below 75, the average for the 13 projects in the group of 132 closed and RCC projects is 66.3; for the 39 projects in the group of 146 pre-RCC active CHAPs, the average is 56.9. The *t*-statistic for the differences in these means is 2.55, which ***is*** statistically significant. This result confirms our earlier finding of the difference in substandard-performing projects between the two subpopulations.

E.3. Comparison of RAD Sample to Non-RAD Sample

Our project team selected a stratified random sample of 24 projects from 23 PHAs that is intended to be representative of the RAD population. Subsequent to that, using genetic matching

techniques, our team identified 48 projects from 44 PHAs from the non-RAD population that best corresponded with the RAD sample. The non-RAD sample was not randomly selected but rather was chosen to match with the randomly selected RAD sample.

The RAD and non-RAD samples are classified into one of three PHA sizes (small, medium, or large) and one of three project performance levels (substandard, standard, or high-standard) for a total of nine (3 × 3) groupings. The number and percentage of projects by PHA size and project performance rating for the RAD and non-RAD samples are shown in tables E-11 and E-12.

Table E-11. Distribution of Projects in RAD Sample by PHA Size and Project Performance Rating

PHA Size/Project Performance Rating	Substandard		Standard		High Standard		PHA Size Total	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Small	0	0	2	8	3	13	5	21
Medium	1	4	8	33	6	25	15	63
Large	1	4	2	8	1	4	4	17
Total project performance rating	**2**	**8**	**12**	**50**	**10**	**42**	**24**	**100**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data

Table E-12. Distribution of Projects in Non-RAD Sample by PHA Size and Project Performance Rating

PHA Size/Project Performance Rating	Substandard		Standard		High Standard		PHA Size Total	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Small	0	0	2	4	8	17	10	21
Medium	2	4	17	35	11	23	30	63
Large	3	6	3	6	2	4	8	17
Total project performance rating	**5**	**10**	**22**	**46**	**21**	**44**	**48**	**100**

PHA = public housing authority. RAD = Rental Assistance Demonstration.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data

Each category is represented in each sample, except for substandard-performing projects managed by small PHAs. No projects were in this category for the population of 132 RAD projects that had been awarded a CHAP by December 31, 2013, and had closed or received an RCC by December 31, 2014. As a consequence, this group is not represented either in the RAD sample or (because the non-RAD sample is meant to match the RAD sample) in the non-RAD sample.

One preliminary check on whether the non-RAD group is representative of the RAD group is to ascertain whether the numbers in each category for the non-RAD sample are double those of the RAD, because the former is twice the size of the latter. From tables E-11 and E-12, one can see that this two-to-one ratio is generally the case. The percentages in each category for each sample, as presented in these tables, show that the distribution of projects by PHA size and project performance categories is approximately the same with only slightly heavier concentration in the standard project performance category, and correspondingly less in the other two project

performance categories, for the RAD sample as compared with the non-RAD sample. Both samples have identical distributions along the PHA size variable: 21 percent for small PHAs, 63 percent for medium PHAs, and 17 percent for large PHAs.

Another perspective on whether the RAD and non-RAD samples are sufficiently similar is to compare the values for 5 of the 31 factors that are available and were used in the earlier validation analyses: (1) neighborhood poverty rate, (2) neighborhood cost-burden rate, (3) neighborhood overcrowding rate, (4) percentage of units with one or two bedrooms in a project, and (5) number of project units covered under ACC.

Table E-13 presents the means for each of these variables for both populations, and table E-14 presents this information across project performance rating category. The means comparison is made across each PHA size and project performance rating category and by the total (see the PHA size–total column in table E-11 and the project performance–total row in table E-12).

Table E-13. Averages and *t*-Statistics for the Hypothesis Test of No Difference in the RAD and Non-RAD Sample Means for Several Variables Across PHA Size (Non-RAD Minus RAD)

Variable	Small PHA			Medium PHA			Large PHA		
	RAD	Non-RAD	*t*-Stat	RAD	Non-RAD	*t*-Stat	RAD	Non-RAD	*t*-Stat
Sample size	5	10		15	30		4	8	
Project % one- or two-bedroom units	71	73	0.20	59	59	0.01	61	69	0.61
Neighborhood poverty rate	21	23	0.25	33	34	0.22	39	34	– 0.42
Neighborhood cost-burden rate	36	37	0.01	49	49	– 0.18	37	36	– 0.03
Neighborhood overcrowding rate	0.8	1.4	0.91	4.6	4	– 0.26	2.3	2.2	– 0.25
Project units covered by ACC	115	116	0.02	147	132	– 0.77	262	257	– 0.04

ACC = Annual Contributions Contract. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data

Table E-14. Averages and *t*-Statistics for the Hypothesis Test of No Difference in the RAD and Non-RAD Sample Means for Several Variables Across Project Performance Rating (Non-RAD Minus RAD)

Variable	Substandard			Standard			High Standard		
	RAD	Non-RAD	*t*-Stat	RAD	Non-RAD	*t*-Stat	RAD	Non-RAD	*t*-Stat
Sample size	2	5		12	22		10	21	
Project % one- or two-bedroom units	51	72	0.72	70	62	– 1.05	55	64	0.93
Neighborhood poverty rate	40	42	0.47	33	33	– 0.02	28	28	– 0.15
Neighborhood cost-burden rate	57	46	– 0.52	44	44	0.07	43	44	0.15
Neighborhood overcrowding rate	4.1	2.2	**– 2.34**	3.0	4.1	0.88	3.8	2.8	– 0.68
Project units covered by ACC	201	234	0.27	178	176	– 0.05	129	102	– 0.96

ACC = Annual Contributions Contract. RAD = Rental Assistance Demonstration.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data

In addition to the means, these tables also present the *t*-statistics for hypothesis tests to determine whether the mean for each factor in each group in the RAD sample is statistically significantly different from the corresponding mean in the non-RAD sample. Any variables statistically significantly different at the 5-percent level are in **bold** text and highlighted in yellow. Of the 30 tests (5 factors for 6 subgroups), only 1 pair of means—for neighborhood overcrowding—is statistically significantly different from each other. In other words, the non-RAD sample does match well with the RAD sample, providing further evidence that the non-RAD sample serves as an appropriate control group.

One final check was to compare 17 pairs of means over the entire sample rather than at the size and performance level. In addition to variables used previously to validate our samples, four additional financial factors were included in this analysis describing project funding sources: (1) the total dollar amount of operating subsidy, (2) the per-unit dollar amount of operating subsidy, (3) the total dollar amount of capital funds, and (4) the per-unit dollar amount of capital funds.

Table E-15 presents the comparison of means for the 17 factors for both samples. The differences in the means are presented (RAD minus non-RAD), as are the *t*-statistics.

Table E-15. Averages and *t*-Statistics for the Hypothesis Test of No Difference in the RAD and Non-RAD Sample Means (Non-RAD Minus RAD) for Several Variables

Variable	RAD Sample	Non-RAD Sample	Difference	*t*-Statistic
Large PHA	17%	17%	0%	0.00
Medium PHA	63%	63%	0%	0.00
Small PHA	21%	21%	0%	0.00
Project inspection score	84.5	85.5	– 1.0	– 0.27
Project tenants' median household income	$10,882	$10,591	$291	0.28
Project tenants' % elderly households	28.1%	27.9%	0.2%	0.03
Project is in a metropolitan area	79.2%	74.5%	4.7%	0.44
Project units covered by ACC	159.6	149.4	10.2	0.38
Project % one- or two-bedroom units	62.0%	63.8%	– 1.7%	– 0.29
Neighborhood poverty rate	31.5%	31.5%	0.0%	0.00
Neighborhood cost-burden rate	44.6%	44.1%	0.4%	0.14
Neighborhood overcrowding rate	3.4%	3.3%	0.1%	0.14
Project total operating expenses	$819,553	$842,704	– $23,151	– 0.17
Project total operating subsidy funds	$514,498	$507,686	$6,812	0.07
Project per-unit operating subsidy funds	149	147	2	0.07
Project total capital funds	$181,554	$188,786	– $7,231	– 0.22
Project per-unit capital funds	$1,532	$1,294	$238	0.95
Number of projects	**24**	**48**		

ACC = Annual Contributions Contract. PHA = public housing authority. RAD = Rental Assistance Demonstration.
Sources: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing Information Center data; RAD data

None of the 17 pairs of means are statistically significantly different from one another at the 5-percent level. No *t*-statistic is greater than 1.00 (in absolute value)—the closest is per-unit capital funds—and 16 of the 17 have *t*-statistics less than 0.45 (in absolute value). The conclusion from all of our hypothesis tests and supporting analysis is that the sample of 48 non-RAD projects serves as a suitable control group for the sample of 24 RAD projects.

E.4. Conclusions

Using statistical analysis tools, our research team was able to validate that our stratified random sample of 24 RAD projects is broadly representative of the population from which it was drawn, namely, the 132 RAD applications that had received a CHAP award by December 31, 2013, and also had received an RCC or "closed" by December 31, 2014.

The total RAD universe at the time of our sample, which was before the cap on the RAD program had been lifted, consisted of 278 RAD applications that had active CHAPs or had closed (in other words, excluding CHAPs that were withdrawn or revoked). To validate whether our stratified random sample of 24 RAD projects is broadly representative of the entire universe of 278 active CHAPs or closed transactions, our analysts applied our statistical tests to a comparison of the subpopulation of 132 closed and RCC projects and the subpopulation of the remaining 146 pre-RCC active CHAPs to determine whether they were similar to one

another. Because these two subpopulations together comprise the total universe of 278 closed or active CHAPs, their similarity would also substantiate the representativeness of our sample of 24 RAD projects to the universe of 278 active CHAPs or closed transactions.

More substandard-performing projects and more projects managed by large PHAs are in the group of 146 pre-RCC active CHAPs that were not used for selecting the sample of 24 RAD projects. The difference in substandard-performing projects could be because of the longer time it takes to close on substandard projects because of their greater financing needs. Substandard-performing projects, however, comprise only about 11 percent of the total population of 278 active CHAPs and closed RAD projects, so this difference is small. The difference in projects managed by large PHAs could represent the impact of organizational inertia or bureaucracy on the progress of their projects through the conversion process, or a preference for financially sophisticated transactions or complicated redevelopment projects that take longer to close.

In sum, the population of 132 closed and RCC projects that were used to draw the sample of 24 RAD projects is broadly representative of the population of 278 active CHAPs and closed transactions as a whole, with some skewing away from projects managed by large PHAs and a slight underrepresentation of substandard-performing projects.

Using these same statistical tools, our project team also determined that our sample of 48 non-RAD projects serves as a suitable control group for our sample of 24 RAD projects.

Appendix F: Web Survey Instrument

Answer If FLAG_RAD Is Equal to 0

Q1.

Hello. Thank you for agreeing to participate in this data collection to inform an evaluation of the Rental Assistance Demonstration (RAD) program. The evaluation is being conducted by Econometrica, Inc., on behalf of HUD's Office of Policy Development & Research. The data collection is the following survey regarding ${e://Field/PHA_Name}'s experience with the RAD program and with other HUD financing, rehabilitation, and redevelopment programs. We encourage you to be open and candid. Your responses will be used for research purposes and to evaluate the overall RAD program; your responses will not be used for monitoring or to evaluate your PHA's performance. The nature of this evaluation is such that most of this survey is not confidential, but within the Conclusion section there are a series of confidential questions for which you can provide additional information without attribution.

Answer If FLAG_RAD Is Equal to 1

Q2.

Hello. Thank you for agreeing to participate in this data collection to inform an evaluation of the Rental Assistance Demonstration (RAD) program. The evaluation is being conducted by Econometrica, Inc., on behalf of HUD's Office of Policy Development & Research. The data collection is the following survey regarding ${e://Field/PHA_Name}'s experience with the RAD program and with the RAD conversion at ${e://Field/Development_Name}. We encourage you to be open and candid. Your responses will be used for research purposes and to evaluate the overall RAD program; your responses will not be used for monitoring or to evaluate your PHA's performance. The nature of this evaluation is such that most of this survey is not confidential, but within the Conclusion section there are a series of confidential questions for which you can provide additional information without attribution.

Q3.

You will be able to enter data in each section of the survey. You may enter data into the survey in separate sessions. Editing is allowed until completion. You can go back to a previous page while taking the survey or you can go back to the beginning of the survey by closing and re-entering it. Once the [Done] button is clicked, you cannot re-enter the survey. When you click on the [Done] button, the survey will be transmitted to Econometrica and used for the evaluation.

Answer If FLAG_RAD Is Equal to 1

Q4. This survey concerns the ${e://Field/Development_Code}, originally issued on ${e://Field/RAD_Approval_Date}, known as ${e://Field/Development_Name}.

HUD has provided your name as the contact person for the RAD conversion covered by this CHAP. Are you responsible for this CHAP, and can you answer financial and operational questions about this RAD project?

Yes (1)

No (2)

Q5. If “no,” please provide the name, email address, and phone number for the appropriate contact person.

Q6. Has your PHA applied for RAD or do you plan to apply for RAD in the near future?

Yes (1)
No (2)

Q7. Section I - General Information

Q8. Please answer or verify the following information regarding your PHA. If incorrect, please make corrections as needed.

Q9. How would you describe the geography of your PHA?

Urban (1)
Suburban (2)
Rural (3)
Mixed/Other (please describe) (4) _____

Q10. Number of public housing units under your PHA:

Answer If FLAG_RAD Is Equal to 0

Q11. Number of Housing Choice Voucher (HCV) units under your PHA:

Answer If FLAG_RAD Is Equal to 1

Q12. Prior to your participation in the RAD program, the number of HCV units under your PHA:

Q13. Estimated PHA-wide occupancy rate for public housing units:

Answer If FLAG_RAD Is Equal to 0

Q14. At the present time, do you meet HUD’s Section 504 requirements as defined at 24 CFR 8.4, 8.24, and 8.33?

Yes (1)
No (2)

Answer If FLAG_RAD Is Equal to 1

Q15. Prior to your participation in the RAD program, did your PHA meet HUD’s Section 504 requirements (as defined at 24 CFR 8.4, 8.24, and 8.33)?

Yes (1)
No (2)

Q16. Is your RAD conversion responsible for having corrected any Section 504 deficiencies?

Q17. Please verify the following information regarding the specific CHAP ${e://Field/Development_Code} ${e://Field/Development_Name}. If incorrect, please make corrections as needed.

Q18. Number of public housing units covered by this CHAP prior to RAD conversion:

Q19. Occupancy rate for units covered by this CHAP prior to RAD conversion:

Q20. Prior to the RAD conversion, were there lead-based hazards present at this project?

Yes (1)
No (2)

Q21. Prior to the RAD conversion, were there project/unit deterrents such as small units, vandalism, etc., present at units covered by this CHAP?

Yes (1)
No (2)

Q22. HUD records show that the conversion type for this CHAP is ${e://Field/RAD_Convert_Type}. Is this correct?

Yes (1)
No (2)

Q23. Did you consider some or all of the units under this CHAP to be “at risk” prior to the RAD conversion (that is, in urgent need of rehabilitation to remain viable)?

Yes (1)
No (2)

Q24. HUD records show that total combined sources of funding for RAD conversion of this CHAP are ${e://Field/RAD_Total_Funds}. Is this correct? If not, please enter the current total funding for this RAD project.

Yes (1)
No (2) _____

Q25. Please verify the following information regarding the specific project: ${e://Field/Development_Code} ${e://Field/Development_Name}. If incorrect, please make corrections as needed.

Q26. Number of public housing units in this project:

Q27. Project-specific occupancy rate:

Q28. If known, what are this project’s total 20-year capital needs (e.g., based on a PNA or RPCA, or other assessment)?

Q29. Are there lead-based hazards present at this project?

Yes (1)
No (2)

Q30. Are there project/unit deterrents such as small units, vandalism, etc., present at this project?

Yes (1)
No (2)

Q31. Section II - Previous Borrowing Experience

Q32. Has the PHA previously borrowed funds to acquire, rehabilitate, replace, construct, or refinance a public housing project (excluding for RAD)?

Yes (1)
No (2)

Answer If Has the PHA previously borrowed funds to acquire, rehabilitate, replace, construct, or refinance a public housing project? [Excluding for RAD] Yes Is Selected

Q33. How many public housing projects has the PHA sought financing for?

Answer If Has the PHA previously borrowed funds to acquire, rehabilitate, replace, construct, or refinance a public housing project? [Excluding for RAD] Yes Is Selected

Q34. What program(s) did you utilize for development activities? (Check all that apply.)

Capital Fund Financing Program (1)
Low-Income Housing Tax Credits (LIHTC) (2)
HOPE VI and/or Choice Neighborhoods Initiative (3)
Private or Mixed-Financing Under Section 30 or Section 35 (4)
Other Programs (please specify) (5) _____

Q35. How many transactions has your PHA entered into?

Q36. Estimate the average per-project dollar amount of your transactions:

Q37. Estimate the average per-unit amount of your transactions:

Q38. How did the final amount of available financial resources compare to the amount that your PHA expected to receive at the beginning of the} process?

More than expected. (1)
About the same as expected. (2)
Less than expected, but enough to complete the activities as planned. (3)
Less than expected, but enough to complete a scaled-back version of the project. (4)
Less than expected, and we were unable to move forward with the activities. (5)
Other (please explain): (6) _____

Q39. Other than your current RAD plans, do you plan to conduct ${lm://Field/1} financing transactions in the future? Why or why not?

Answer If Has the PHA previously borrowed funds to acquire, rehabilitate, replace, construct, or refinance a public housing project? [Excluding for RAD] No Is Selected

Q40. What are some of the reasons the PHA has not borrowed funds for public housing projects? (Check all that apply.)

- Lack of capacity to repay. (1)
- Lack of knowledge/experience with available programs. (2)
- Lack of need. (3)
- Unable to find financing (e.g., a participating lender). (4)
- Public housing program rules and regulations are not conducive to borrowing. (5)
- Probably should add: Unable to compete for tax credits due to high level of competition
- Other reasons (please describe): (6) _____

Q41. Section III - RAD Program Experience

Q42. How familiar are you with HUD's RAD Program?

- Very familiar (1)
- Somewhat familiar (2)
- Hardly familiar (3)
- Not at all familiar (4)

Q43. When you first heard about RAD, did you consider applying for it?

- Yes, the initial presentation of RAD appeared to be a good match for my PHA and we sought out application information and materials. (1)
- No, my PHA structure and operations do not fit well with RAD. (2)
- RAD was a possibility, but we needed to do more research before deciding to apply (e.g., comparing RAD to other financing programs we had used in the past). (3)
- No, the initial presentation of RAD was not attractive to my PHA. (4)
- No, my PHA is satisfied with our current financing arrangements and RAD was not an attractive alternative. (5)
- No, my PHA does not have a capital needs backlog that fits well with RAD. (6)
- This is the first that I have heard about RAD. (7)

Q44. Are there "at-risk" units in your portfolio (that is, in urgent need of rehabilitation to remain viable)?

- Yes (1)
- No (2)

Answer If Are there "at-risk" units in your portfolio? Yes Is Selected

Q45. Briefly describe your strategy to address your "at-risk" units:

Q46. RAD Application

Q47. How many projects/AMPs did you consider converting under RAD?

Q48. How many RAD applications did your PHA submit?

Q49. If applicable, briefly describe why your PHA considered but decided not to apply for RAD for some projects.

Q50. Did your PHA complete its own RAD application(s)?

- Yes, in its entirety. (1)
- Yes, partially (with outside assistance). (2)
- No, we relied on an outside entity for completion. (3)

Answer If Did the PHA complete its own RAD application? Yes, partially (with outside assistance). Is Selected Or Did the PHA complete its own RAD application? No, we relied on an outside entity for completion. Is Selected

Q51. Please select the outside assistance received (check all that apply):

- HUD Field Office (1)
- HUD Headquarters (2)
- Consultant/Vendor (3)

Answer If Please select the outside assistance received (check all that apply): Consultant/Vendor Is Selected

Q52. Please indicate your level of satisfaction with the assistance you received from the consultant/vendor.

- Very Satisfied (5)
- Satisfied (4)
- Neutral (3)
- Dissatisfied (2)
- Very Dissatisfied (1)

Q53. How many CHAPs did your PHA receive?

Q54. Did your PHA receive a portfolio award?

Q55. What activities have you conducted or do you plan to conduct as part of your RAD conversion? (Check all that apply.)

Rehabilitation (1)
Replacement (2)
New Construction (3) R
Refinance (4)
Transfer RAD Subsidy to Other Project(s) (5)
Demolition (6)
Temporary Relocation (7)
Permanent Relocation (8)
Other: (9) _____

Q56. Did your PHA pursue primarily Project-Based Vouchers (PBV) or Project-Based Rental Assistance (PBRA) for your RAD projects?

PBV (1)
PBRA (2)

Q57. At the time you applied, were you aware of the differences between PBV and PBRA (e.g., term, contract rent calculations)?

Yes (1)
No (2)

Q58. What were the key factors in your choice of PBV or PBRA?

Q59. Financing for RAD CHAP ${e://Field/Development_Code} ${e://Field/Development_Name}

Q60. What sources of capital did your PHA pursue or commit for this RAD conversion? (Check all that apply.)

FHA Insurance (1)
Public Debt (2)
Private Debt (3)
9% LIHTC (4)
4% LIHTC (5)
Other Available Public Housing Funds (e.g., RHF, operating revenues, or unobligated capital funds) (6)
Other (please list): (7) _____

Q61. If applicable, what lender(s) did you work with or are you currently working with (name and contact information)? We may contact your lender)s) to discuss their experience with RAD in general.

Q62. If applicable, were you able to find a lender easily, or did some lenders hesitate or decline to be involved in a RAD transaction?

Q63. How does the total combined sources of funding for${e://Field/Development_Code} ${e://Field/Development_Name} compare to your PHA's expectation at the beginning of the RAD process?

More than expected. (1)
About the same as expected. (2)
Less than expected. (3)

Q64. How do you think this amount would compare to financing available through other programs (e.g., CFFP, HOPE VI, or other mixed-finance programs)?

More than available through other programs. (1)
About the same. (2)
Less than available through other programs. (3)

Q65. Has your PHA faced any of the following challenges with financing following the RAD award? (Check all that apply.)

Barriers to accessing awarded funds. (1)
Issues with other financing sources and programs tied to the RAD award (please specify the source/program). (2) _____
Unexpected or onerous repayment terms such as schedules, requirements, or fees. (3)
Unrelated PHA financial issues that directly or indirectly impact the RAD project. (4)
Other challenges (please describe): (5) _____

Q66. Has your PHA faced any of the following challenges with meeting debt service obligations following the RAD conversion? (Check all that apply.)

Late payments. (1)
Insufficient cash flow to fully fund reserves for replacement. (2)
Unexpected expenditures related to the RAD project. (3)
Unexpected expenditures or cash flow shortfalls unrelated to the RAD project. (4)
Other challenges (please describe): (5) _____

Q67. RAD Expectations and Results for CHAP ${e://Field/Development_Code} [Not a question] ${e://Field/Development_Name}
The questions in this section are specific to the CHAP for ${e://Field/Development_Code} [Not a question] ${e://Field/Development_Name}

Q68. Did you have to scale back plans during the RAD approval/financing process, or were you able to carry out the work you envisioned?

Carried out the work as envisioned. (1)
Scaled back the number of units. (2)
Scaled back energy efficiency and “green” improvements. (3)
Scaled back physical improvements. (4)
More repairs/refurbishments; fewer replacements/fewer new installations. (5)
In progress. (6)
Other: (7) _____
Able to expand the scope of work beyond what was originally envisioned.

Q69. Were you able to complete the rehabilitation or redevelopment activities proposed in your RAD application?

Yes. (1)
No. (2)
In progress. (3)
Not applicable. (4)

Q70. What, if any, delays did you encounter? (Check all that apply.)

No notable delays. (1)
Financial delays (e.g., delays in loan approvals or release of funds). (2)
Construction delays (e.g., delays due to ordering materials or overly optimistic schedule). (3)
Unanticipated construction issues (e.g., discovery of underground storage tanks, asbestos or lead paint). (4)
Unanticipated regulatory/permitting delays (e.g., historic preservation). (5)
In progress with no delays so far. (6)
Other: (7) _____

Q71. What is the current financial condition of ${e://Field/Development_Name}?

Generating significant income (consistent positive cash flow). (1)
Viable (consistent break-even cash flow). (2)
Borderline (slight negative cash flow with expectations for improvement). (3)
Not viable (consistent negative cash flow). (4)
Too soon to tell/RAD conversion and related rehabilitation work in progress. (5)

Q72. After completing the RAD conversion and related construction/rehabilitation, if any, has the occupancy rate increased, decreased, or stayed the same as at the time of application?

Increased. (1)
Decreased. (2)
Stayed the same. (3)
Not sure/too soon to tell/ rehabilitation in progress. (4)

Q73. After completing the RAD conversion, has the delinquency rate in rental payments increased, decreased, or stayed the same?

Increased. (1)
Decreased. (2)
Stayed the same. (3)
Not sure/too soon to tell/ rehabilitation in progress. (4)

Q74. After completing the RAD conversion, has the turnaround time (time between a tenant moving out and the unit being ready for a new tenant) on units increased, decreased, or stayed the same?

Increased. (1)
Decreased. (2)
Stayed the same. (3)
Not sure/too soon to tell/ rehabilitation in progress. (4)

Q75. After completing the RAD conversion, has the time on the market for vacant units increased, decreased, or stayed the same as at the time of application?

Increased. (1)
Decreased. (2)
Stayed the same. (3)
Not sure/too soon to tell/ rehabilitation in progress. (4)

Q76. Can any of the following savings or cost reductions at ${e://Field/Development_Name} be attributed to the RAD conversion? (Check all that apply.)

Decrease in project management costs (including savings from management restructuring). (1)
Restructured maintenance staffing or contracts. (2)
Reduced maintenance costs due to having addressed backlog of capital needs.
Decrease in energy bills. (3)
Decrease in insurance premiums. (4)
Decrease in security/safety costs. (5)
Other (please describe): (6) _____

Q77. If you checked any of the above, what are your estimated total annual savings for all savings/cost reductions?

Q78. Section III D – PHA Experience With RAD
This section covers all of your PHA's RAD projects.

Q79. Did you encounter any of the following barriers in participating in RAD? (Check all that apply.)

Local political challenges. (1)
Soft local market demand. (2)
Lack of understanding of program/requirements. (3)
Lack of information from HUD. (4)
Lack of ability to obtain additional necessary funding. (5)
Resident resistance (Advisory Board or independent). (6)
PHA Board resistance. (7)
Internal resistance (PHA staff level). (8)
Other (please describe): (9) _____
None. (10)

Q80. Did you modify your approach to RAD based on any of these barriers?

Q81. Have the social/demographic characteristics of the neighborhood/community immediately adjacent to the RAD project(s) changed after the conversion was completed (e.g., less crime, more diversity of incomes)? If so, did the RAD conversion play a role in these changes?

Q82. Do you think neighborhood/community changes would have occurred if a different program [other than RAD] had been used to make improvements to the project? Would such changes have occurred if no improvements were made to the project?

Q83. Section IV – Conclusion

Q84. Is your PHA looking to pursue RAD conversions in the future?

Yes (1)
No (2)
Not sure (3)

Q85. Has your opinion of RAD changed as more projects in the RAD program have reached post-conversion status?

Yes (please describe): (1) _____
No (2)

Q86. Overall, what has been your impression of the HUD RAD Program?

Q87. Responses in this section are confidential. While we encourage your candor and thoroughness in completing this survey, we understand that you may be reluctant to share some of your opinions. Your answers in this section of the survey are confidential and will not be shared with HUD or attributed to you in any identifiable way. Our goal is to evaluate the RAD, so please provide additional information and comments that you believe would help us understand your experience with RAD.

Q88. (Confidential) Do you have any additional information or comments on your previous borrowing experiences?

Q89. (Confidential) What characteristics or factors of ${e://Field/Development_Name} led you to select that project for RAD conversion, or affected the RAD conversion process?

Q90. (Confidential) What characteristics or factors particular to your project impacted your RAD experience?

Q91. (Confidential) Do you have any additional information or comments on the RAD application process, including on interaction with HUD staff?

Q92. (Confidential) Do you have any additional information or comments on the financial aspects of RAD conversions?

Q93. (Confidential) Are there additional aspects of your RAD expectations and outcomes that you would like to share?

Q94. (Confidential) Do you have any additional comments on the overall RAD program? Do you have anything to add about your experience that has not been covered above?

Q95. Responses in this section are confidential. While we encourage your candor and thoroughness in completing this survey, we understand that you may be reluctant to share some of your opinions. Your answers in this section of the survey are confidential and will not be shared with HUD or attributed to you in any identifiable way. Our goal is to evaluate the RAD, so please provide additional information and comments that you believe would help us understand your experience with RAD.

Q96. (Confidential) Do you have any additional information or comments on your previous borrowing experiences?

Q97. (Confidential) Do you have any additional comments on the overall RAD program? Do you have anything to add about your experience that we have not covered here?

Q98. May we call you to follow up on any questions that may need further explanation?

Yes (please provide your telephone number): (1) _____

No (2)

Q99. This is the end of the survey. Click the “Submit” button below to save and record your answers. Thank you for your cooperation.

Appendix G: Interview Discussion Guides

RAD EVALUATION TELEPHONE INTERVIEW GUIDES

OMB Control Number: 2528-0304

Guides for three types of interviewees are provided on the following pages: RAD projects, non-RAD comparison projects, and other RAD stakeholders. The goal of these interviews is to probe experience with RAD. For RAD projects, this focuses on implementation of RAD (why RAD; why this specific project; issues with the RAD process). For non-RAD comparison projects, this focuses on their knowledge of RAD (why did they not pursue it) and alternatives (if not RAD, how will you address your capital needs). For other stakeholders, this focuses on their knowledge of and experience with RAD and alternatives to RAD.

For RAD and non-RAD projects, the completed Web survey will provide a baseline for the interview—you can use their responses to probe deeper on certain issues. The note taker will also be given a template for data collection—basically a Word document with space to record answers to specific/quantitative questions and to write notes under qualitative prompts—customized for each interview based on the type of interview and the Web survey responses.

General Opening Script

This script should be used at the beginning of each interview and adjusted as needed to meet the specific interviewee. RAD and non-RAD interviewees should be aware of the data collection process from the notice letters and the Web survey; other stakeholders will need more information about the evaluation and data collection process (e.g., why they are being interviewed).

Hello, thank you for agreeing to be interviewed as part of this Congressionally mandated evaluation of HUD's Rental Assistance Demonstration or RAD program. My name is [*name*] and I am joined by my colleague(s) [*name(s)*]; we work for Econometrica, Inc., a consulting firm selected by HUD to carry out this RAD evaluation.

Our main goal with this interview is to explore your knowledge of and experience with the RAD program, with a particular focus on how HUD has implemented RAD from your point of view. This interview is for research purposes only, not for monitoring or to evaluate your performance, and we encourage you to be open and candid. We will not share your responses directly with HUD, but because we are conducting a small number of interviews with a group of fairly unique organizations there is a possibility that HUD could tie your comments that we include in the evaluation report back to your organization. Thus we request that you indicate when a response should be considered confidential and not attributed to you or your organization in any way.

As part of our interview process, we would like your consent to record the conversation. This recording is to ensure we are accurately capturing your response and comments. It will not be shared with HUD and will be erased after the report is completed. Do we have your permission to record the conversation? [Wait for response] [If they do not consent, inform them that at the end of the interview we may need to review some of the answers given in order to ensure we have accurately captured your responses.]

[Thank the respondent and begin the interview]

For RAD Projects

1. Why did you apply for the RAD program?

2. In your opinion, what are the advantages and disadvantages (if any) of the RAD program?

3. What other public housing programs have you used or would have used, if not for RAD?

4. If you had to do it again, would you still apply for RAD? Yes _____ No _____

5. What, if anything, would you like to change about RAD to make it better?

6. Did you select one or more properties for RAD? What factors influenced the PHA to select certain properties for conversion rather than others in their portfolio?

7. Were there any other options open to you to continue to provide safe, decent, affordable housing? Yes _____ No _____
    a. If yes, discuss…

8. What factors influenced you to apply for PBV or PBRA?

9. Were there any procedures in the RAD application process that presented significant barriers? Yes _____ No _____
    a. If yes, discuss…

10. Was the PHA equipped to undertake the RAD process by itself, or did you hire consultants?

11. If you have used other public housing programs to fund improvements, how does the RAD program compare?

12. Was the RAD program useful? Yes _____ No _____

13. What does the PHA believe are the key factors necessary to successfully convert to RAD?

14. On a scale of 1 to 10 (1 being worst, 10 being best), how would the PHA rate the implementation (conversion) process to RAD? _____

15. Were all initial RAD application renovations completed? If not, what was not completed and why?

16. What mechanisms did the PHA employ to ensure completion of initial RAD goals?

17. Were any changes made throughout the RAD conversion process to ensure completion of the initial RAD goals? If yes, what changes were made?

18. What was the most difficult aspect of completing the RAD conversion?

19. What was the easiest aspect of completing the RAD conversion?

20. What changes would you recommend HUD make to the RAD conversion process?
    a. How would these changes impact the implementation of RAD?

21. If nothing changed about the RAD program, would you convert additional property to RAD? Why or why not?

22. Would you recommend another PHA convert to its properties to RAD?
    a. If yes, what advice would you give them?
    b. If no, why not?

23. Now that you have converted to RAD, do you have any concerns about operating your property? If yes, what are your concerns?

Thank you for taking the time to talk with us. Your input will be very helpful

For Non-RAD Projects

1. Describe your knowledge of and experience with the RAD program.

2. In your opinion, what are the advantages and disadvantages of the RAD program?

3. Why did you choose not to apply for the RAD program?

4. Would you apply for the RAD program in the future?

   If so, why?
   If not, why not?

5. What, if anything, do you believe HUD needs to change about RAD to make it better?
   a. If these changes were made, would you apply for RAD?

6. How would you compare RAD to other programs available to help finance rehabilitation (e.g., CFFP, HOPE VI, Choice Neighborhoods)?
   a. *[reference experience with these programs as indicated in the Web survey]*

7. How do you intend to address your immediate (<1 year), short-term (2–5 years), and long-term (5–20 years) capital needs?

8. [*Ask only if applicable*] Why do you think/believe no PHA from your state submitted an application for RAD?

Thank you for taking the time to talk with us. Your input will be very helpful

For Other PHAs, Lenders, and Other Stakeholders

General Topics

- Knowledge of RAD – does the respondent know about RAD; how did they hear about it; do they know PHAs that applied for RAD?
- Experience with RAD – has the respondent been involved with RAD (e.g., PHA that considered applying for RAD; lender involved in a RAD transaction)?
- Alternatives to RAD – what strategies does the respondent have experience with for addressing capital needs; what financing approaches does the respondent have experience with; are these alternatives effective in addressing PHA's needs?

Other PHA Topics

- Current Conditions – what are the PHA's capital needs; how many units, vouchers, etc.?
- Thoughts on RAD – did the PHA consider applying for RAD (and, if applicable, why did the PHA decline to pursue RAD); what changes would make RAD more attractive to the PHA?
- Approach to addressing capital needs
- Approach to financing capital repairs and construction

Lender Topics

- Lender Characteristics – size; type of institution; geographic area.
- Multifamily Experience – what types of multifamily financing are available; what are the most popular types of multifamily financing provided by the institution; what is the respondent's experience with HUD and/or PHAs?
- Thoughts on RAD – what changes would make RAD more attractive (to both the institution and to its clients)?

RAD PHAs That Fell Out of the Conversion Process

- When, why, and how did the property fall out of the RAD process.
- What efforts were made to prevent fall-out by the PHA, HUD RAD program staff, and HUD Field Office staff?
- Would you consider applying for RAD again for this property or for a different property?
- What, if anything, would you recommend HUD change about the RAD process given your experience?

Appendix H: Tenant Enrollment

The second phase of the Rental Assistance Demonstration (RAD) evaluation will include an analysis of the impact of RAD on tenants using data gathered through a survey of residents who were living in RAD properties before conversion. Of interest will be whether residents were relocated, their experience with relocation, Choice-Mobility voucher use, and whether residents believed the project was a better place to live when they came back. The analysis will not include a comparison against a control group consisting of tenants in non-RAD projects.

Because a successful analysis of resident outcomes requires inclusion of former residents who do not return to converted units, the first phase of the evaluation built in a component to enroll residents in the study. The U.S. Department of Housing and Urban Development (HUD) recognized that enrollment and tracking needed to begin as early as possible after properties begin the RAD process to ensure residents' contact information is obtained before they leave the RAD property.

H.1. Original Design

The original design for resident enrollment required selecting a sample. The sampling for the resident study would occur in two stages. The first stage of sampling would use the 24 RAD projects selected for the physical and financial condition component of the study. In the second stage, a random stratified sample of residents living in each of the 24 RAD projects at the time of closing would be drawn from a total of 2,000 units. Residents would be selected using HUD's administrative data. It was estimated that the universe of 24 RAD projects would include approximately 3,300 units. The original schedule assumed that enrollment would begin in the fall of 2014.

The strategy assumed that enrollment in the study would be 20 percent of targeted households, or at least 400 units, and that enrollment would result in a high response rate at the time of the survey, for at least 300 completed surveys.

Enrollment attempts would be made by mail. An initial letter under HUD letterhead would explain the study to residents and alert them to expect the actual enrollment letter, which would include a short notice to request their informed consent and a form to collect their contact information, including phone numbers, emails, and alternate contact names. The mailing would include a modest financial incentive to encourage participation.

Following the first letter, a reminder postcard would be sent out 2 weeks later. A new enrollment package would subsequently be sent to those who had still not enrolled. A final recruitment packet would include a second modest financial incentive. If enrollment fell short of targets, followup by telephone would be attempted.

H.2. Revised Design

Two circumstances required changes to the original design. First, U.S. Office of Management and Budget (OMB) approval was not received until December 9, 2014, and OMB approval was needed before tenant enrollment could commence. By the time OMB had provided its approval

and issued OMB Control Number 2528-0304, a number of projects had already proceeded to closing, some of them months earlier. This circumstance was not an issue for the other parts of the RAD evaluation. After a project had closed, however, residents could be temporarily relocated at any time, making contact more difficult, and the original strategy required contacting residents quickly following closing. Therefore, after conferring with HUD, our project team decided to draw a separate sample of 24 properties for the resident enrollment effort.

The second circumstance was brought to our attention during consideration of the list of properties from which to draw our sample. HUD program staff and outside RAD consultants advised that residents in some cases were temporarily relocated very soon after closing, not giving the enrollment operation enough time to draw administrative data, prepare and mail letters, and complete the full set of enrollment attempts before residents moved. Our project team also learned that projects that received RAD Conversion Commitments (RCCs) as a major step before closing were likely to eventually proceed to closing and not be withdrawn or drop out. There was usually a gap of several months between RCC and closing.

The new design, which has been implemented, has been to draw the resident sample for enrollment from properties with RCCs that have not yet gone to closing. Properties are selected using the same sampling frame as the other components, based on public housing authority (PHA) size and PHA performance. This method makes use of the time gap between RCC and going to closing to contact and enroll residents before temporary relocation. Contact is therefore on a rolling basis, as eligible projects for the sample enter this final phase before closing.

The revised sample design for resident enrollment is shown in table H-1.

Table H-1. Distribution of RAD Projects for Selecting Sample for Tenant Enrollment Study

PHA Performance	Universe	%	Sample	%
Large PHA				
High standard	27	10.4	3	12.5
Standard	36	13.8	3	12.5
Substandard	12	4.6	1	4.2
Medium PHA				
High standard	57	21.9	5	20.8
Standard	72	27.7	6	25.0
Substandard	8	3.1	1	4.2
Small PHA				
High standard	23	8.8	2	8.3
Standard	21	8.1	2	8.3
Substandard	4	1.5	1	4.2
Total	**260**	**100.00**	**24**	**100.0**

PHA = public housing authority. RAD = Rental Assistance Demonstration.

Properties eligible for sampling will be identified through monthly updates from HUD. The fielding methodology for enrollment forms and reminders is unchanged from the original design.

H.3. Enrollment Progress

The RAD project universe in January 2015 included 21 properties that met the RCC criteria. HUD requested dropping one property from the list. Several PHAs had multiple properties on the list, as the pipeline tended to clump approvals within PHAs. In consultation with HUD, the project team decided to restrict the sample to one property per PHA to get a better random sample. After these cuts, the list consisted of 14 properties. This list was submitted to HUD with a request for full contact information for all residents.

While we waited for the contact information from HUD, six projects went to closing, and one project was found to be empty. All seven projects were dropped from the sample. The remaining 7 properties had 1,115 residents according to HUD records, from which our staff drew a sample of 749 residents, stratified by race/ethnicity, gender, elderly or not, and disabled or not. Stratification of the sample makes it more likely that our final sample of survey respondents is representative of RAD-affected residents as a whole.

The first mailing occurred in early June 2015. The reminder postcard and second letter have also been mailed. As of August 7, SSRS has received 153 signed and completed enrollment forms. They have received several unsigned or otherwise incomplete forms, which they may be able to convert to enrollments. The rate of enrollments so far is slightly better than the expected 20 percent.

Analysis of completed enrollments to identify potential nonresponse bias in the first draw has not yet begun, as SSRS is still receiving enrollments.

Following the initial draw, a gap of several months occurred when no new projects became eligible for sampling, possibly resulting from delays caused by the RAD expansion. In early August, however, an additional nine eligible properties were identified. Administrative data for the properties have been requested from HUD.

As table H-2 indicates, if residents from all nine of the recently added properties can be enrolled, our sample will have been drawn from two-thirds of the properties needed. The major gap remaining to be filled is a selection of properties from large PHAs. Our research team will consult with HUD on whether large PHAs represent a special circumstance that will require a change in our strategy.

Table H-2. Comparison of RAD Project Population and Sample for Tenant Enrollment Study by PHA Size and Project Performance

PHA Performance	Universe	%	Sample Design	%	Sample	
					First Draw (fielded)	Second Draw (pending)
Large PHA						
High standard	27	10.4	3	12.5	—	—
Standard	36	13.8	3	12.5	—	—
Substandard	12	4.6	1	4.2	—	—
Medium PHA						
High standard	57	21.9	5	20.8	3	2
Standard	72	27.7	6	25.0	2	3
Substandard	8	3.1	1	4.2	1	—
Small PHA						
High standard	23	8.8	2	8.3	1	1
Standard	21	8.1	2	8.3	—	2
Substandard	4	1.5	1	4.20	—	1
Total	**260**	**100.0**	**24**	**100.0**	**7**	**9**

PHA = public housing authority. RAD = Rental Assistance Demonstration.

Appendix I: Acronyms and Key Terms

ACC	**Annual Contributions Contract**, a contract between the U.S. Department of Housing and Urban Development (HUD) and a public housing authority under which HUD agrees to provide funding for a program (for example, public housing or the Housing Choice Voucher program), and the public housing authority agrees to comply with HUD requirements for the program.
ACS	**American Community Survey**, an annual survey conducted by the U.S. Census Bureau that provides statistical insight into the lives of U.S. citizens.
AHP	**Affordable Housing Program** grants are awarded by Federal Home Loan Banks through a competitive application process to bank members working with housing developers or community organizations to create rental or homeownership opportunities for lower-income households.
AMP	**Asset management project**, a group of public housing developments designated by a public housing authority as an operating affinity group.
cashflow	Cash that property investors or owners receive after deducting operating expenses, replacement reserve deposits, and debt service payments from the effective gross income for a rental property.
Capital Fund	Program administered by HUD's Office of Public and Indian Housing that provides annual grants via formula to all public housing authorities for public housing development, financing, modernization, and management improvements. High-performing public housing authorities receive a bonus under the formula.
capital improvements	An outlay of funds for the improvement of a fixed asset that extends the life or increases the productivity of the asset. In the context of a building, capital improvements typically refer to the replacement of major structural elements and mechanical equipment.
capital repairs	Repairs made to a building system during its useful life to extend its useful life, improve its efficiency, or cure a maintenance issue.
CBSA	**Core Based Statistical Area**, which consists of the county or counties or equivalent entities associated with at least one core (urbanized area or urban cluster) of at least 10,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties with the counties associated with the core.
CDBG	**Community Development Block Grant**, a flexible program administered by HUD that provides communities with resources to address a wide range of unique community development needs.
CFFP	**Capital Fund Financing Program**, an initiative of HUD's Office of Public and Indian Housing that allows a public housing authority to borrow private capital (through a bond or conventional bank loan) to make improvements to its public housing in return for pledging, subject to appropriations, a portion of its future-year annual capital funds for debt-service payments.

CHAP	**Commitment to Enter into a Housing Assistance Payment Contract**, a document executed by HUD and the public housing authority or owner for projects that have been selected during the Rental Assistance Demonstration competition under the first component of the Demonstration. The CHAP describes the terms under which HUD will enter into a Housing Assistance Payment contract. It could also be understood as HUD's authorization to the public housing authority to continue with its plan to convert one or more projects or asset management projects from public housing to project-based Section 8 assisted housing.
closing	The step in the transaction during which any converting units are released from legacy contracts (that is, the public housing Annual Contributions Contract), the new project-based rental assistance or project-based voucher contract and Rental Assistance Demonstration (RAD) Use Agreement are executed, any debt and/or equity financing agreement is entered into, and the terms and conditions of the RAD Conversion Commitment are recorded. The closing is the event at which conversion of subsidy takes place; conversion has not occurred until the completion of closing.
CNA	**Capital Needs Assessment**, the name given to Physical Needs Assessments as used by HUD's Rental Assistance Demonstration program.
CNI	**Choice Neighborhoods Implementation**, a program administered by HUD to fund local collaborative initiatives to transform high-poverty areas into mixed-income neighborhoods.
contract rent	The total amount of rent specified in the Housing Assistance Payment contract as payable to the owner for a unit occupied by an eligible family.
CR	**Contribution to reserves**, a type of account on a real estate project's balance sheet that is reserved for long-term capital investment or any other large and anticipated expense(s) that will be incurred in the future. This type of reserve fund is set aside to ensure that the project has adequate funding to at least partially finance the investment.
DDTF	**Demolition and Disposition Transitional Funding**, a program administered by HUD to replace the Replacement Housing Factor program that provides 5 years of funding for units removed from a public housing authority's (PHA's) inventory due to demolition or disposition on or after October 1, 2013. This funding is included in the PHA's annual Capital Fund grant and follows the same obligation and expenditure requirements as that program. (See RHF.)
Declaration of Trust	The restrictive covenant on projects assisted through a public housing Annual Contributions Contract (ACC) that obligates public housing authorities to operate developments in accordance with the ACC, the National Housing Act, and HUD regulations and requirements.
DSC	**Debt service coverage**, a measure of the cashflow available to pay current debt obligations, measured as the ratio of net operating income to total debt service.

DSP	**Debt service payment**, a payment of interest and principal on a debt (such as a mortgage), typically made on a monthly basis. For Federal Housing Administration-insured loans, debt service also includes the monthly mortgage insurance premium.
EGI	**Effective gross income**, the gross income of a property if fully rented, less an allowance for estimated or actual vacancy, plus miscellaneous income such as laundry revenue and tenant late charges. HUD calculates the EGI as the gross potential rent minus the vacancy loss plus other income.
EPC	**Energy Performance Contract**, a HUD financing technique that allows public housing authorities to contract with performance contractors to fund the installation of energy conservation measures in public housing in return for future cost-savings from reduced energy consumption, in lieu of the public housing authority's incurring upfront capital expenses for energy improvements. The savings in future operating costs becomes available to repay the loan.
Federal Home Loan Banks	A system of 11 government-sponsored enterprises involved in housing and community economic development.
FHA	**Federal Housing Administration**, a HUD agency that insures single-family, healthcare, and multifamily mortgage loans originated by FHA-approved lenders. Multifamily loans can be used for construction, rehabilitation, acquisition, and refinancing of nonluxury apartments.
gap financing	Also known as soft funding; refers to funding in the form of subsidies from federal, state, and local governments. Affordable housing providers often rely on these subsidies to fill in the funding gaps that appear for the majority of transactions.
gross income	The total income derived from the operation of a property, calculated before deducting costs such as routine maintenance, debt service, and so on.
gross rent	The contract rent plus any tenant-paid utility allowance.
HAP	**Housing Assistance Payment** contract, which is used in the Section 8 voucher program and constitutes the legal agreement between a Section 8 project's ownership entity and either HUD or the public housing authority that manages the Section 8 vouchers to provide housing assistance payments on behalf of eligible tenant households. The HAP contract specifies the number and bedroom count of covered units as well as the terms and procedures by which HUD subsidy payments are made to the property.
HCV	**Housing Choice Voucher**, a program of the Office of Public and Indian Housing through which public housing authorities (PHAs) receive federal funds from HUD to administer HCVs locally. A family who is issued a housing voucher is responsible for finding a suitable housing unit of the family's choice where the owner agrees to rent under the program. This unit may include the family's present residence. Rental units must meet minimum standards of health and safety, as determined by the PHA. Maximum rents are set by HUD and the PHAs, and tenants pay 30 percent of the adjusted income.

HDAP **Housing Development Assistance Program**, which provides financing for eligible affordable housing developments to expand, preserve, and/or improve the supply of decent, safe, affordable housing for very low- to moderate-income persons and households. HDAP funds are made available through HOME Investment Partnerships program funds and also typically local housing trust funds. Recipients may use funds as low-interest, deferred-payment loans or in some cases as grants.

HFA **Housing finance agency**, a state or local organization that provides housing assistance through low-interest mortgage loans financed by the issuance of tax-exempt agency bonds or low-income housing tax credits, based on their allocation by the U.S. Department of the Treasury.

HOME **HOME Investment Partnerships Program**, administered by HUD's Office of Community Planning and Development to provide housing funds to units of general local governments and states for new construction, rehabilitation, acquisition of standard housing, assistance to homebuyers, and tenant-based rental assistance.

HOPE VI A HUD program administered by the Office of Public and Indian Housing to provide grants to public housing authorities to fund capital costs of major rehabilitation, new construction, and other physical improvements; demolition of severely distressed public housing; acquisition of sites for offsite construction; and community and supportive-service programs for residents, including those relocated as a result of revitalization efforts. The Office of Public and Indian Housing is no longer providing new HOPE VI grants.

HUD **U.S. Department of Housing and Urban Development**, the primary federal agency responsible for administering programs to support affordable housing, fair housing, homeownership, and community development nationally and on Native American lands, as well as research on housing and development issues.

HVAC **Heating, ventilation, and air-conditioning.**

IRS **Internal Revenue Service.**

LIHTC **Low-Income Housing Tax Credit**, a program established in Section 42 of the Internal Revenue Code that allows projects to receive a credit against federal tax owed. Project owners bring in investors as limited partners in return for the investor(s) providing funds to the owners to help build or renovate housing that will be rented to lower-income households for a minimum period of years. Two types of credits are available during a 10-year period: a 9-percent credit on construction and rehabilitation costs and a 4-percent credit on acquisition costs and all development costs partially using below-market financing.

LLC **Limited liability company.**

LTV **Loan to value**, calculated as the ratio of the balance of a loan divided by the value of the collateral, which is usually the appraised fair market value of the property for an acquisition loan, the improved value of the property for a rehabilitation loan, and the total cost of construction for a new construction loan.

mixed-finance project	A public housing project that has been developed with a combination of private financing and public housing development funds in accordance with 24 CFR Part 941 (Subpart F).
Mod Rehab	**Section 8 moderate rehabilitation program**, administered by public housing authorities to provide project-based rental assistance to low-income families living in privately owned rental properties previously rehabilitated pursuant to a Housing Assistance Payment contract between the owner and the public housing authority. The conversion of Mod Rehab projects to the Rental Assistance Demonstration is part of the second component of the program and is not part of this study.
NOI	**Net operating income**, which equals all revenue from the property minus all reasonably necessary operating expenses.
OCAF	**Operating cost adjustment factor**, established by HUD and applied to the existing contract rent, less the portion of the rent paid for debt service. The OCAF may not be negative. It is also known as the annual rate of increase in Section 8 housing contract rents as determined and published by HUD.
OE	**Operating expense**, an expense incurred in carrying out a real estate project's day-to-day activities, including utilities, maintenance expenses, security, insurance, asset management, and other short-term costs.
OMB	**U.S. Office of Management and Budget**, which oversees the management of the federal budget.
Operating Fund	Established for the purposes of the operation and management of public housing. In addition, all maintenance activities specifically listed in Section 9(e) of the United States Housing Act of 1937 are eligible Operating Fund activities. Public housing authorities (PHAs) also may use operating funds for unforeseeable and unpreventable emergencies that include damage to the physical structure of the PHA's housing stock, such as damage as a result of a natural occurrence such as a windstorm or flood. Although damages caused by unforeseen emergencies may eventually be covered under a warranty, with insurance proceeds, or through disaster funds, PHAs may use operating funds to cover the expenses incurred before receipt of warranty, insurance, or disaster proceeds. After receipt of warranty, insurance, or disaster proceeds, the PHA must reimburse their operating account for any expenses that were initially covered with operating funds up to the amount received.
PBRA	**Project-based rental assistance**, a Section 8 program administered by HUD's Office of Multifamily Housing Programs. Under the terms of a PBRA contract between HUD and a project owner, HUD provides a housing assistance subsidy that makes up the difference between what an eligible tenant household can afford and the approved contract rent for an adequate housing unit in a multifamily project. Eligible tenants must pay the highest of 30 percent of adjusted income, 10 percent of gross income, the portion of welfare assistance designated for housing, or the minimum rent established by HUD. PBRA contracts are attached to specific housing units and are not portable for the tenant. Public housing authorities are not party to a PBRA contract unless the authority is a project owner.

PBV **Project-based voucher**, a Section 8 voucher that is attached to specific housing units and administered as part of a public housing authority's (PHA's) Housing Choice Voucher program. Under the PBV program, a PHA enters into an assistance contract with the project owner for a specified number of units and for a specified length of time. The PHA refers families to the project owner to fill project vacancies. Because PBV assistance is tied to the unit, when a family moves from the PBV unit, the assistance remains with the unit.

PCA **Physical Condition Assessment**, an instrument that HUD uses to capture data on the physical condition of public housing properties in order to project a project's future capital investment needs in the short and long terms. Submitting a PCA is required for the Rental Assistance Demonstration, except where new construction is proposed. (See PNA.)

PHA **Public housing authority**, a public housing agency (which can be any state, county, municipality, or other governmental entity or public body) that administers programs which could include public housing and the Housing Choice Voucher program. Note that many PHAs also act as local Redevelopment Authorities and are then referred to as Redevelopment and Housing Authorities.

PHAS **Public Housing Assessment System**, the HUD system to measure the performance of all public housing authorities administering the public housing program, per 24 CFR Part 902. It includes components for assessing the physical, financial, and management performance of each public housing authority.

PIC **Office of Public and Indian Housing Information Center**, an online data-tracking system.

PIH **Office of Public and Indian Housing**, HUD office responsible for the development and maintenance of public housing and Native American housing programs.

PMT **PHA Mortgaged Transaction**, which occurs when public housing authorities mortgage or otherwise encumber their public housing real estate and other property to secure financing transactions, as allowed under Section 30 of the United States Housing Act of 1937.

PNA **Physical Needs Assessment**, an instrument that HUD uses to capture data on the physical condition of public housing properties in order to project a project's future capital investment needs in the short and long terms. (See PCA and CNA.)

PRA **Paperwork Reduction Act of 1995.**

public housing A type of housing assistance administered by the Office of Public and Indian Housing that was established to provide decent and safe rental housing for eligible low-income families, elderly people, and people with disabilities. Public housing comes in all sizes and types, from scattered single-family houses to highrise apartments for elderly families. Approximately 1.2 million households live in public housing units, managed by some 3,300 public housing authorities that manage the housing for low-income residents at rents they can afford. HUD furnishes technical and professional assistance in planning, developing, and managing these developments.

RAD	**Rental Assistance Demonstration**, established under the Consolidated and Further Continuing Appropriations Act of 2012 to stem the potential loss of public housing and other subsidized housing units due to the growing backlog of unfunded capital needs. The program has two components: the first component focuses on the conversion of existing public housing to project-based Section 8 assistance, and the second component focuses on existing Section 8 projects that are being phased out.
RAD Use Agreement	The document specifying the affordability and use restrictions on the covered project, which will be coterminous with the Housing Assistance Payment contract and will be recorded before the lien of the first mortgage and structured to survive foreclosure. The RAD Use Agreement is used only in connection with public housing conversions under RAD.
RAP	**Rental Assistance Payment**, a housing assistance program that preceded and is similar to the Section 8 housing assistance program and the Rent Supplement program. The conversion of RAP projects to the Rental Assistance Demonstration is part of the second component of the program and is not part of this study.
RCC	**RAD Conversion Commitment**, a commitment provided by HUD to an active RAD project to officially convert the public housing to Section 8 under the RAD program. The RCC is provided when HUD completes its underwriting of the project and approves the conversion's financing plan.
REAC	**Real Estate Assessment Center**, a HUD office that conducts inspections of properties that are owned, insured, or subsidized by HUD, including public housing and multifamily assisted housing, to determine whether the affordable housing stock is meeting the standard of being decent, safe, sanitary, and in good repair. REAC inspection scores range from 0 to 100 points. REAC also reviews the financial performance of the projects and provides Financial Assessment Subsystem scores.
Rent Supp	**Rent Supplement**, a program similar to Rental Assistance Payment and Section 8 in which HUD makes payments to owners of private housing on behalf of qualified low-income tenants. The conversion of Rent Supp projects to the Rental Assistance Demonstration is part of the second component of the program and is not part of this study.
RHF	**Replacement Housing Factor** funds are Capital Fund grants in two 5-year increments that are awarded by HUD to public housing authorities that have removed units from inventory for the sole purpose of developing new public housing units. RHF is being replaced by the Demolition and Disposition Transitional Funding program. (See DDTF.)

Section 8	The Section 8 Housing Choice Voucher and Project-Based Rental Assistance program is the federal government's major program for assisting very low-income families, elderly people, and people with disabilities to afford decent, safe, and sanitary housing in the private market. In both types of Section 8 program, rental units must meet minimum standards of health and safety. A housing subsidy is paid directly to the landlord on behalf of the participating family. The family then pays the difference between the actual rent charged by the landlord and the amount subsidized by the program. (See HCV and PBRA.)
Section 18 Demolition/ Disposition	A management strategy option for public housing developments that have difficulties associated with physical deterioration or the overall deterioration of the surrounding community, or that were built to a standard that is no longer acceptable for the general public.
Section 221 (d)(4)	Section 221(d)(4) of the National Housing Act is a Federal Housing Administration program that insures lenders against loss on mortgage defaults. This program assists private industry in the construction or rehabilitation of rental and cooperative housing for moderate-income and displaced families by making capital more readily available. The program allows for long-term (up to 40 years) mortgages that can be financed with Government National Mortgage Association (better known as "Ginnie Mae") mortgage-backed securities.
take-back financing	Also known as "seller take-back financing"; in RAD and other public housing mixed-finance transactions, take-back financing is a cashflow loan used to generate additional tax credit equity in rehabilitation transactions by enabling the taxable entity that receives the property from the PHA to declare the as-is value of the PHA's contributed property for tax purposes.
TDC	**Total development cost**, generally per a development project's sources and uses budget. In the case of HUD-funded development projects, HUD determines the TDC for a public housing project based on unit construction costs (as listed in nationally recognized residential construction cost indices), number of bedrooms, and structure types for all of the public housing units in the project. HUD also sets a maximum TDC that restricts the amount of HUD funding that can be contributed to a unit (but other funding can be added from private sources).
Total Tenant Payment	The minimum amount a family must contribute toward rent and utilities.
utility allowance	Estimate of utility costs (except cable television and telephone) for an average family occupying a unit of a particular size in a specified geographic area. Utility allowances apply to HUD-assisted multifamily rental housing that receives rental subsidy assistance, in which all or some of the utilities are paid directly by the resident. In HUD-assisted multifamily rentals with Section 8 contracts, the residents in units assisted with Section 8 may pay no more than 30 percent of their adjusted gross monthly income toward rent and utilities. The balance is covered by the Section 8 payment.

U.S. Department of Housing and Urban Development
Office of Policy Development and Research
Washington, DC 20410-6000

September 2016