



Energy Efficiency as a Tool for Preservation of Affordable Rental Housing

Evaluation of the Efficiency Emphasis in the
MacArthur Foundation's Window of Opportunity
Initiative

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Foreword

For nearly two decades, the MacArthur Foundation¹ has been part of a community working to provide that essential element of life—a place to call home. Our mantra “housing is a platform” signaled how important decent, safe, and reasonably priced housing is to positive outcomes in virtually every aspect of life and to the vitality of local communities. We saw our role as helping to create a policy and market environment conducive to sustaining high-volume preservation of affordable rental housing and an essential part of balanced national, state, and local housing policies. Our Window of Opportunity: Preserving Affordable Rental Housing program invested more than \$200 million in grants and program-related investments to preserve affordable rental housing across the country, including a capstone effort to help advance energy efficiency in multifamily rental properties nationwide.

The increasing importance of energy efficiency in public policy and in the real estate and capital markets made energy efficiency a central rather than peripheral concern of our preservation strategy. We concluded that the long-term success of Window of Opportunity was at risk if we did not deepen our focus on energy efficiency and address its potentially disastrous consequences for affordable rental housing. We saw that the imperative to raise energy-efficiency standards could undercut the preservation of affordable rental housing.

Multifamily buildings are generally older and less energy-efficient than other U.S. real estate assets. From our work on preservation more generally, we knew that owners of affordable rental housing, who operate on the slimmest margins, were often unable to invest in or borrow for building upgrades. Moreover, the “split incentive” that exists in any commercial real estate leasing situations, including multifamily rentals, further complicated and sometimes prevented such investments. Also, key government housing programs, particularly the

¹ MacArthur seeks impact, including policy change where appropriate, in accordance with identified goals for each program area and subject to legal limitations imposed on private foundations by law. Ongoing evaluation by a learning partner is integral to MacArthur’s work throughout the strategy life cycle and periodic reports, case studies and other assessments are issued to track our progress toward milestones and assess impact.

This report assesses the policy and other impacts achieved by MacArthur grantees toward increasing energy efficiency of affordable multifamily rental housing in service of preservation. Grantees also received funds from other sources and attribution of results or impact to specific sources of funds is not generally possible. MacArthur carefully reviews proposed grants to be sure that MacArthur grant funds are used only for permitted purposes. No MacArthur grant funds were used to influence legislation except as permitted by applicable regulations and MacArthur’s grant agreement and no MacArthur grant funds were used by grantees to participate in any political campaigns.

As permitted by law, on occasion MacArthur made general operating support grants to eligible organizations that were not earmarked for lobbying but that could be used for lawful advocacy purposes as determined by the organization. MacArthur funds may also have been appropriately used for other lawful advocacy and educational purposes, including non-partisan analysis and research as permitted under the grant agreement.

Low-Income Housing Tax Credit, were distinguishing among competing housing projects based on energy-efficient designs and upgrades.

This report's conclusions, which we embrace, reflect well the challenges we faced and the tools we used most effectively. The Foundation's convening power, for instance, was noted as helping raise awareness about the potential for energy efficiency in the multifamily market and for encouraging more collaboration across sectors. As an organization dedicated to policy development based on evidence, we were heartened by even the limited impact our grantmaking had on the data used by building owners, utilities, policymakers, and financiers when considering energy-efficiency improvements, incentives, and ideas. While the report concludes that the pace and level of investment in multifamily energy efficiency has increased, we know much more is possible in terms of savings for building owners, tenants, and government programs.

Critically, our experience in working to improve the energy efficiency of the affordable rental housing stock in this country and lessons learned from this evaluation informed directly the Foundation's new program to advance climate solutions. We came to better understand the evolving utility sector, state-level decisionmaking around energy issues, and, most important, the intersection between climate policy and efforts to address racial and economic inequality. The design and practice of our climate program has benefitted greatly from key relationships and the grantmaking in the energy-efficiency portfolio.

By helping reduce operating costs in affordable rental housing, improve tenant living conditions, and position government-assisted housing to benefit from evolving utility programs incenting energy conservation, our efforts related to energy efficiency deliberately focused on the housing supply. However, over the course of the Window of Opportunity, and particularly since the Great Recession, demand for decent, affordable rental housing has increased, a troubling trend that, as this report notes, raises important questions about what public policies and interventions philanthropy should support.

The Window of Opportunity: Preserving Affordable Rental Housing initiative is one of the MacArthur Foundation's most important efforts to support families and communities across the country. It is our hope that the organizations and activities we supported continue to help secure one of the essential elements of economic and social well-being: safe, decent, affordable rental housing.

—Mijo Vodopic
Senior Program Officer, MacArthur Foundation

Preface

In 2016, the MacArthur Foundation engaged RAND Corporation’s Infrastructure Resilience and Environmental Policy Program to evaluate its Window of Opportunity—Energy Efficiency initiative (WOO-EE). WOO-EE operated from 2012 to 2015 as a part of the Window of Opportunity initiative (WOO), which launched in 2000 with the purpose of preserving privately owned affordable multifamily rental housing. The MacArthur Foundation identified seven desired intermediate outcomes for WOO-EE, each related to improving the energy efficiency of existing housing stock to improve its financial viability, as a means of furthering the preservation of affordable rental housing.

In the WOO-EE initiative and in this evaluation, the term *energy efficiency* (EE) refers to technologies and measures aimed at using less energy (at less cost) to provide the same level of service, without necessarily modifying the behavior of end users. Activities under WOO-EE aimed to increase the deployment of energy-efficiency technologies to reduce electricity and heating demand in affordable multifamily rental housing. At a time of rising energy costs and increasing policy emphasis on energy efficiency, the foundation hypothesized that EE was an important way to capture near-term cost savings for tenants, landlords, and building owners and to improve the financial viability of existing affordable multifamily rental housing.

The purpose of the WOO-EE evaluation is to assess whether the initiative achieved its goals, as well as to provide MacArthur Foundation with lessons about the strategies of WOO-EE that could be applied to future philanthropic initiatives. To assess whether the foundation achieved its objectives, this report draws on interviews of individuals from 36 organizations working in the energy, environmental, real estate, and public sectors, as well as on two case studies. The report also summarizes trends in energy efficiency from 2000 to today. Through this evaluation, RAND determined that the WOO-EE activities had a positive influence on five out of seven of its desired outcomes for the initiative.

The report is intended for several audiences. The first is the MacArthur Foundation itself as it assesses lessons learned from what will be a 20-year initiative focused on preservation and applies them to the design and management of its future philanthropic efforts. Affordable housing developers/owners, advocates, utility companies, and those working on energy efficiency may also be interested in the report’s summary of investments in the energy efficiency of multifamily rental buildings in the United States. Finally, the report may help other philanthropies apply relevant lessons to their own philanthropic initiatives, even if they do not pertain to housing.

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Summary

In 1999, anticipating the loss of substantial numbers of affordable rental homes as a result of the expiration of federal subsidies, the MacArthur Foundation identified preservation of the existing stock of affordable multifamily rental housing as a pressing need. Consequently, the foundation launched the Window of Opportunity initiative (WOO) in 2000. The initiative would expand to become a 20-year effort, during which the foundation awarded \$214 million in grants and loans to a wide range of organizations, including nonprofit owners of affordable rental housing, state governments, researchers, financial institutions, industry associations, and advocates.

By 2011, the foundation and its WOO borrowers and grantees had increasingly recognized that energy costs of multifamily rental properties could be better controlled. To this end, the foundation opted to extend WOO with an explicit focus on increasing the energy efficiency (EE) of multifamily affordable housing. Between 2012 and 2015, the foundation awarded \$27.5 million through 39 grants and loans as a part of what we term the Window of Opportunity: Energy Efficiency initiative (WOO-EE). The loans were program-related investments (PRIs), which were low-interest loans intended to create new business models or to grow mission-oriented businesses. The WOO-EE activities comprised a little over 10 percent of the overall \$214 million WOO initiative. The foundation identified seven desired outcomes for the WOO-EE awards that related to the improved energy efficiency of multifamily affordable rental housing, which in turn was intended to enhance preservation.

This report evaluates the 39 WOO-EE awards to gauge if MacArthur's investments helped to achieve the desired outcomes the foundation identified for WOO-EE. It also documents the evolution in MacArthur's conceptualization of WOO-EE and highlights strategies in WOO-EE that are relevant for other philanthropic initiatives, even those not pertaining to housing. We label the seven desired outcomes as "intermediate" to indicate that they were intended as a means toward the end of preserving more affordable rental housing, which was the desired impact of WOO at large. The scope of this study is to examine the intermediate outcomes rather than the impact of WOO-EE on preservation. A 2016 study of the overall WOO initiative examined numbers of homes preserved through the philanthropic initiative.

Absent the appropriate research design to quantify the energy-efficiency innovations and activities that occurred solely because of the MacArthur Foundation's philanthropic initiative, we rely on WOO-EE grantee reports and activities as well as grantee- and nongraantee views about MacArthur's contributions. More specifically, to reach our conclusions about the intermediate outcomes, the research team reviewed academic and industry literature on energy efficiency, interviewed individuals from 36 organizations (including both WOO-EE recipients

and others in the field), conducted two case studies on grant- and PRI-recipient organizations, and reviewed grant briefs and grantee reports for all WOO-EE grant and PRI recipients.

Key Findings

Table S.1 presents our assessment of the seven outcomes WOO-EE sought to attain. In the second column of the table, we draw on research and industry data plus expert opinion to indicate whether there was progress in the field at large. In the third column, we draw on WOO-EE grantee reports, examples of WOO-EE activities, and expert opinion to gauge if WOO-EE influenced the change. Dark green indicates that there was notable progress between 2010 and 2018 (when this report was written), light green indicates that there was some progress, and red indicates that there was no substantial progress.

As the second column in Table S.1 indicates, we found positive changes across the board in energy-efficiency investments in multifamily rental housing in the past decade, with the exception of increased share of energy efficiency, which we were unable to determine. The MacArthur Foundation rightly predicted in 2011 that energy efficiency would be a growing area of investment for housing in the United States. In terms of WOO-EE influence on these intermediate outcomes, we found the strongest evidence that MacArthur’s investments positively influenced cross-sector collaboration in multifamily affordable rental housing, followed by increased awareness of energy efficiency as a preservation tool. We found weaker evidence that

Table S.1
Intermediate Outcomes from the Energy-Efficiency Focus of the Window of Opportunity Initiative

Desired Outcome	Has There Been Progress 2010?	If So, Was Progress Partially Attributable to WOO-EE Investments?
1. Increased awareness of energy efficiency as a tool for preservation	Yes	Yes
2. New and more energy-efficiency public policies focused on accommodating the needs of affordable multifamily rental housing	Yes	Somewhat
3. New and more financing practices and vehicles that accommodate the affordable rental housing sector	Yes	Somewhat
4. Increased cross-sector (e.g., between affordable housing and energy-efficiency sectors) awareness and collaboration	Yes	Yes
5. Increased share of energy-efficiency incentives/subsidies/policies/regulatory reforms for affordable rental housing stock	Unknown	Unknown
6. New data and benchmarking practices and resources targeted at the affordable multifamily rental sector	Yes	No
7. Increased pace and volume of energy-efficiency improvements in the stock of affordable multifamily rental housing	Yes	Somewhat

SOURCE: Outcomes were articulated in the foundation’s 2011 document conceptualizing WOO-EE (Schwartz, Vodopic, and Lamond, 2011).

NOTES: Color codes are the authors’ judgments using information described in the report.

the foundation positively influenced financing vehicles, increased public policies for EE, and increased pace and volume of energy-efficiency investment in multifamily rental housing.

What Worked in WOO-EE

Looking across the WOO-EE grants and loans, we identified five aspects of WOO-EE that worked well.

- **MacArthur effectively used its convening power.** As in the evaluation of the WOO initiative, the dominant way experts think MacArthur had influence was through its ability to convene influential organizations that work across sectors. MacArthur's reputation as a market leader boosted its convening powers.
- **There were a sufficient number of years from WOO through WOO-EE for networks to form.** WOO-EE lasted only three years, but it benefitted from building on the much longer WOO initiative. The foundation announced at the outset of WOO that it would invest for a decade, which ultimately extended to 20 years. Interviewees commented on this unusually lengthy philanthropic initiative and credited MacArthur with building a metaphorical runway that was long enough to allow organizations to build capacity, networks to form, and ideas to be piloted and then enacted.
- **Like WOO, WOO-EE helped build the capacity of organizations to ready them for loans from commercial banks.** Although the business models that the foundation funded are still nascent and may not all work, the foundation knowingly took larger risks than it had done in prior WOO lending to develop new businesses. Grantee documentation and interviews indicate that loans from MacArthur helped organizations obtain subsequent commercial loans.
- **Program staff had enough content knowledge to select effective grantees.** As in the WOO evaluation, interviewees stressed that the foundation had the requisite depth of technical knowledge of the field to pick generally the right organizations that could be effective in promoting cross-sector solutions affecting the utility, housing, and finance sectors.
- **A focus on Chicago led to a significant and enduring impact.** Among other benefits, the foundation's considerable investments in the Preservation Compact helped to grow Elevate Energy, which has gone on to be a leading organization in energy efficiency and which nearly half of the interviewees mentioned as a top example of MacArthur's influence on the field.

What Did Not Work in WOO-EE

We also identified three aspects of WOO-EE that did not work as well.

- **Several of the PRIs did not work out as originally intended.** The foundation intentionally took risks with its WOO-EE PRIs, so it is not surprising that not all have worked as planned. For example, Network for Oregon Affordable Housing's (NOAH's) on-bill financing work stalled because they could not reach an agreement with utility companies, so its PRI may be repurposed.

- **The foundation’s data and benchmarking-activity area was underrealized.** The foundation originally conceived of the availability and use of energy data as a “lynchpin” for expanding investment in energy efficiency. However, we did not identify direct ways in which MacArthur contributed to the availability of data and the practice of benchmarking multifamily buildings’ energy use. Neither of the two organizations that received WOO-EE grants related to data or benchmarking created tools that have gained wide use.
- **Few energy-efficiency programs for affordable multifamily rental housing have gone to scale.** Elevate Energy now operates in eleven states, but we are not aware of any other WOO-EE recipients whose business or model has expanded as much. We note, however, that several more-recent awardees, such as New York City Energy Efficiency Corporation (NYCEEC), have expanded beyond their initial geographic scope.

In summary, we found that the focus on energy efficiency within the Window of Opportunity had a positive influence on most of the intermediate outcomes that the foundation had set for WOO-EE. In the chapters that follow, we document how spending on energy efficiency within multifamily rental housing has grown since approximately 2010, and we describe the foundation’s WOO-EE activities, including two case studies that profile two mission-driven energy-service firms that the foundation has invested in. We conclude the report with a more detailed discussion of what did and did not work in WOO-EE, what barriers remain for energy efficiency, and the future directions of energy-efficiency investments in privately owned multifamily affordable rental housing. We also distill the successful aspects of the WOO-EE initiative that could be relevant to other philanthropic initiatives.

Acknowledgments

We wish to thank the individuals who contributed their time and expertise to this evaluation. These include MacArthur Foundation staff members Allison Clark and Mijo Vodopic, who provided documentation, sat down for interviews, met monthly with RAND staff, and reviewed and provided feedback on the draft document. Debra Schwartz and Julia Stasch also took time to be interviewed. Maurice Samuels in MacArthur's evaluation group managed the project and provided helpful input and direction throughout. We also thank the 48 individuals (from 36 organizations) whom we interviewed; they are listed in Appendix B. Without remuneration, they each gave an hour or more of their time and shared additional documentation with us.

This report greatly benefitted from the reviews performed by our RAND colleague Dr. Debra Knopman and by Dr. Carlos Martín of the Urban Institute. We also thank Kathryn Edwards (RAND) for providing access to energy-expenditure data (shown in Figure 2.2) while it was being used in an analysis, and Karishma Patel (Pardee RAND) for sharing the early results of a literature review for the same analysis. Finally, we would like to acknowledge Kelley Blewster for editing the report. Any remaining errors and omissions are the sole responsibility of the authors.

Introduction

Overview of Energy Efficiency in the Window of Opportunity

In 2000 the John D. and Catherine T. MacArthur Foundation launched the 20-year Window of Opportunity initiative (WOO) with the goal of preserving privately owned affordable rental housing in the United States. Preservation of existing low-cost rental housing generally involves refinancing and renovating individual properties to improve and extend their useful life while also maintaining their affordability. As documented in the 2016 evaluation of WOO, the foundation began the initiative in response to the anticipated loss of nearly a million affordable rental homes due to the expiration of federal subsidies (Schwartz, Bostic, et al., 2016).

A decade into WOO, the foundation saw an opportunity to deepen its focus on energy efficiency in multifamily rentals as a means of preservation. Affordable housing owners had become increasingly savvy asset managers, recognizing more clearly that energy costs were variable and could be lowered, thus improving the financial bottom line and sustainability of affordable rental housing. At the same time, fast-changing energy-efficiency practices in the commercial and higher-end residential sectors offered some promise for multifamily rental housing. Consequently, in 2012 the foundation launched a four-year energy-specific strand of Window of Opportunity that we term Window of Opportunity—Energy Efficiency (WOO-EE) throughout this report.

Energy efficiency (EE) refers to technologies and measures aimed at using less energy (at less cost) to provide the same level of service. Activities under WOO-EE were intended to increase the deployment of energy-efficiency technologies to reduce electricity and heating demand in affordable multifamily rental housing; WOO-EE did not focus on water use or waste reduction and did not explicitly include renewable energy, although in practice many of the organizations funded by WOO also work on these activities.

At a time of rising energy costs and increasing policy emphasis on energy efficiency, the foundation hypothesized that EE could aid preservation by improving the financial viability of privately owned affordable rental housing. Furthermore, they hypothesized that *not* focusing on EE could potentially lead to this sector missing broader market trends, undercutting efforts to preserve affordable rental housing.

Between 2012 and 2015 the foundation awarded 39 grants or loans through WOO-EE that totaled \$27.5 million. The loans took the form of program-related investments (PRIs), which are typically low-interest loans the foundation issues to germinate new business models or grow mission-oriented businesses. With these funds, a range of recipients—including nonprofit specialty finance companies, researchers, environmental and energy advocates, and developers of affordable rental housing, among others—used WOO-EE funds to form new energy-services

companies, create loan funds, develop standards for energy efficiency, conduct research on a variety of applied energy-efficiency topics, and hold convenings to foster cross-sector collaboration. WOO-EE intentionally focused on connecting actors that work within the affordable rental housing sector, such as large nonprofit owners and advocates, with those that work outside it, such as utility companies, environmental-advocacy groups, and for-profit developers.

With an overall goal of the WOO initiative to increase the number of affordable rental homes that are preserved, the foundation set out seven intermediate outcome areas for the subset of WOO that focused on energy efficiency. These were to increase awareness of energy efficiency among multifamily rental owners, to foster more public policies promoting EE, to encourage the development of more financing options for EE, to increase cross-sector collaboration, to increase the share of subsidies for EE, to create new data along with protocols to standardize its use, and, ultimately, to increase the pace and volume of energy-efficiency improvements in affordable multifamily rental housing.

Purpose of the Evaluation and Overview of the Report

In 2016, the MacArthur Foundation selected RAND to evaluate the seven intermediate outcomes for the WOO-EE initiative. This evaluation has four purposes:

1. to understand how the foundation's focus evolved over the course of the four-year WOO-EE initiative
2. to explain what organizations and activities were funded in WOO-EE
3. to identify whether the WOO-EE funded organizations and activities had an influence on the seven intermediate outcome areas
4. to identify what worked and what did not in WOO-EE, the future directions for EE in affordable multifamily rental housing, and what strategy elements of WOO-EE, if any, are worth sharing or repeating.

To set the stage, we first describe in Chapter Two the broad trends in EE as it pertains to multifamily rental housing in 2000 and beyond, which were the years immediately leading up to WOO-EE. Chapter Two establishes whether the intermediate outcomes MacArthur desired happened in the field at large during the years of WOO-EE, which we broadly define as 2010 and beyond. Then, to address the first and second purpose of the evaluation, we describe in Chapter Three the WOO-EE initiative: the impetus for its creation, how it evolved, and its activity areas. To meet the third objective about WOO-EE influence, we discuss in Chapter Five each of MacArthur's seven desired outcomes. In that chapter, we summarize the evidence about trends presented in Chapter Two and add a synthesis of experts' views of changes in that outcome area as well as grantees' accomplishments. In the concluding chapter we examine what worked and what did not and what strategy elements are worth repeating, noting future directions for energy-efficiency investments in multifamily rental housing.

There are several intended audiences for this evaluation. The primary one is the MacArthur Foundation itself as it assesses lessons learned from WOO-EE to influence the design and management of its other philanthropic initiatives. The report is also intended for developers/owners, advocates, and policymakers who work on energy efficiency in affordable rental housing.

Finally, the report may be of interest to other philanthropies as they consider how to design their own philanthropic initiatives, even in areas not related to housing.

Study Methods and Limitations

To achieve the four objectives of the evaluation, the research team conducted multimethod analyses. These research methods are described briefly here, and relevant methods are summarized in the introduction of each chapter.

- We conducted literature reviews and searched gray (nonscholarly) literature, such as reports from industry and nonprofit organizations, to describe the broad trends in energy efficiency of multifamily rental housing presented in Chapter Two. We also looked at trends in retail energy costs (using U.S. Energy Information Administration [EIA] data) and in energy costs as a share of income (using American Community Survey data from the U.S. Census Bureau). Additionally, we drew on the National Housing Trust's (NHT's) Prez-Cat database to catalog changes to states' Qualified Allocation Plans (QAPs) and on the DSIRE database to tally state and local EE programs for residential buildings over time. We also used American Council for an Energy Efficient Economy's (ACEEE's) Energy Efficiency Scorecards to catalog state and local building energy-efficiency policies, American Housing Survey data, and initial analysis from the U.S. Department of Energy's (DOE's) EIA's Residential Energy Consumption Survey 2015.
- To document the design of the philanthropic initiative, its context, and the grants and loans made, we reviewed the approximately 60 documents that the MacArthur Foundation provided to us about WOO-EE. These documents included individual grant reports, briefings, annual reports, and strategy documents. Using the information gained from our document review, we summarized the key activities of each grantee in Chapter Three, described case study organization accomplishments in Chapter Four, and gauged each intermediate outcome area in Chapter Five.
- To understand changes to energy efficiency in affordable rental housing as a whole from 2000 to the present, we interviewed experts from 36 organizations, including employees of nonprofit and for-profit real estate developers, utility companies, and federal agencies. In addition, we interviewed four staff from MacArthur. Our methods for analyzing the interviews are contained in Appendix A, and the list of those we interviewed appear in Appendix B.
- To understand if WOO helped build the field of preservation, we conducted case studies of two WOO-EE recipient organizations about two types of activities they undertook: providing loans to owners of multifamily housing for energy-efficiency upgrades, and the launch of a public-purpose energy-services company (PPESCO). We aimed to select activities that had the potential for sustained activity post-WOO-EE and to identify lessons learned that might inform other jurisdictions interested in replicating similar initiatives.

There are several limitations to this evaluation. The most important one is that its scope did not include an impact evaluation to determine whether WOO-EE caused more multifamily rental homes to be preserved than would have occurred without WOO-EE. Increased preservation was the primary and ultimate desired outcome for the WOO initiative at large, and

it was an outcome examined in the evaluation of the larger initiative (Schwartz et al., 2016). A second limitation is that the design of the research study does not allow us to definitively say if WOO-EE caused the intermediate outcomes to occur. For example, we lack counterfactual examples of housing markets that are comparable to the ones where WOO-EE grantees primarily worked to compare rates of local cross-sector collaboration or data about EE policies. WOO and WOO-EE grantees worked across many regions and sometimes with nationally available tools or resources, making it hard to cleanly separate geographies where WOO-EE beneficiaries did and did not work.

To best approximate the influence of WOO-EE on the intermediate outcomes, we rely on three data sources. First, we draw on interviewees' examples and grantee documents to identify concrete activities that WOO-EE caused or funded. Second, we present data about the volume of investment on energy efficiency in the multifamily rental sector to identify the breadth of EE activity in that sector. Third, we present experts' perceptions of the impacts of WOO-EE. We note that 62 percent of the 36 organizations we interviewed are or were WOO-EE grantees. Consequently, we report both the rate of agreement among all interviewees and also among just those whose organizations had not received WOO funds. The specificity of examples and views among interviews across a fairly narrow field lead us to believe that the findings presented in this report about the influence of WOO-EE are sound and reasonable.

Energy Efficiency as a Tool for the Preservation of Affordable Multifamily Rental Housing

This chapter provides context for how energy efficiency (EE) can be a supporting tool to preserve affordable multifamily rental housing. It includes information on relevant trends during two time periods: (1) pre-WOO-EE years dating back to approximately 2000, and (2) the years during and after WOO-EE. We selected this date range to provide the context of early WOO years and what led the MacArthur Foundation to focus on EE, and to show changes that occurred during the four-year period of intense focus for WOO-EE. Where possible, we distinguish activity that took place in the WOO-EE years of 2012–2015, but for years when data were collected less frequently, we use a slightly earlier year, such as 2010, as the proxy for the second time period.

The chapter is organized into five sections:

- how EE relates to the preservation of multifamily affordable rental housing
- recent trends in energy prices and residential energy expenditures
- public-sector EE funding and policies relevant to multifamily affordable rental housing
- nongovernmental investments in EE for multifamily rental housing
- growth in energy-advising and energy-service firms.

We do not summarize technological advances in the energy efficiency of building materials and building technologies; for a summary of the relevant advances in technology and technology policy, we refer readers to recent reviews by U.S. Department of Energy (DOE, 2015) and ACEEE (Nadel, Elliott, and Langer, 2015).

For this chapter we draw on published research, information found online about specific EE programs, administrative datasets as noted, and our interviews of MacArthur staff and of experts in energy and affordable housing from 36 additional organizations. In Chapter Five, we draw on the information in this chapter to identify changes to energy-efficiency practices in the seven outcome areas MacArthur identified for WOO-EE.

Throughout this chapter we focus on policies, funding sources, and services that are relevant, but not necessarily isolated, to EE investments in existing affordable multifamily rental housing. Where possible, we focus on policy and financing changes for retrofitting or upgrading existing multifamily affordable buildings.

Overview of Energy Efficiency as a Tool for the Preservation of Affordable Rental Housing

For the purposes of the WOO-EE initiative and this evaluation, the term *energy efficiency* (EE) refers to the deployment of technologies and infrastructure upgrades aimed at reducing energy use (presumably at less net cost) while providing the same level of service. It does not include efforts to modify the awareness or behavior of end users, such as energy-conservation programs. Energy-efficient renovation and retrofitting measures include insulating, reducing air infiltration, and other approaches to weatherization; replacing or updating heating, ventilation, and air conditioning (HVAC) systems; replacing or updating water heaters; updating appliances like washing machines, clothes dryers, or dishwashers; and installing more energy-efficient lighting.

EE is distinct from renewable energy (RE); the former implies a reduction in energy use whereas the latter refers to the production of energy from “renewable” resources like wind, solar, biomass, and geothermal rather than “nonrenewable” sources like fossil fuels such as natural gas and coal. The WOO-EE initiative (and consequently this evaluation) did not focus on RE upgrades, like the installation of rooftop solar panels, although in practice some grantee and PRI recipients in WOO-EE have increasingly been incorporating RE into their projects and portfolios, either in conjunction with EE or as entirely new efforts (for example, see the case studies in Chapter Four).

Energy-efficiency investments in affordable multifamily rental housing can help lower energy consumption and thus lower energy costs, which can improve net operating costs and thus the longevity of affordable housing. This is because affordable rental housing tends to operate on narrow margins due to either low rents or limited subsidies—or both. The foundation hypothesized that improved financial viability afforded by measures like improving the energy efficiency of a multifamily rental property can help to preserve affordable housing by preventing the building from being converted to market-rate housing or falling into obsolescence due to limited funds for renovation.

Energy Use in Multifamily Residential Buildings

Energy costs for the residential sector in general, and within multifamily affordable rental housing in particular, vary by climate, age of the building, size of the rental unit, condition of the building, exposure of the building to the four cardinal directions, location of the rental unit within a building (top floors consume more energy than units in lower floors), and the type of fuel used for energy (Brown and Wolfe, 2007; Carliner, 2013). Heating costs are often the largest portion of energy expenditure in cooler climates, followed by costs for water, lighting, and appliances; in warmer regions of the country, air conditioning is a substantial portion of energy use.

The energy to cool, heat, and provide electricity to residential buildings accounts for about 20 percent of energy use¹ in the United States and contributes about 20 percent of the greenhouse gas emissions associated with fossil-fuel combustion.² Energy expenditure per square

¹ This is a percentage of total residential energy and includes both primary energy (e.g., natural gas burned in the home for cooking or heating) and electricity. The commercial sector accounts for another approximately 20 percent, largely for buildings and associated energy use. See 2017 data (EIA, 2017a).

² The greenhouse-gas footprint of energy sources varies widely, so it is not necessarily true that 20 percent of energy use would correspond to 20 percent of greenhouse gas emissions from fossil-fuel combustion for the given sector. And when

foot of multifamily rental housing is 37 percent higher than in owner-occupied multifamily housing and 76 percent higher than in single-family owner-occupied homes (Pivo, 2012). Furthermore, energy use in affordable rental housing is higher than in multifamily rental housing overall because affordable rental housing is typically older and was built with less efficient building technologies (Green for All and National Housing Trust, 2013). So the potential for energy savings within the affordable multifamily rental housing sector is large.

Implementation of weatherization and efficiency measures in affordable rental units has historically been lower than in higher-end rental stock or in owned homes. There is a measurable and growing “energy-efficiency gap” between multifamily rental housing relative to other housing types, resulting in an estimated \$200–\$400 per year more being spent by lower-income renters (Raziei, Hallinan, and Brecha, 2016). U.S. Department of Housing and Urban Development (HUD) estimates that utility costs account for roughly 21 percent of public-housing operating budgets and a similar share in the assisted-housing sector (Bartolomei, 2017). This implies a substantial potential benefit to owners and to low-income tenants from the implementation of energy-efficiency measures in affordable multifamily rental units (Bird and Hernández, 2012; Johnson and Mackres, 2013). A 2016 report estimated that if low-income housing stock were brought up to the efficiency level of the average home, it would cut the energy-cost burden on low-income families by one-third (Drehobl and Ross, 2016).³

The low-income housing sector is therefore an important focus for climate-change mitigation, and it is a sector that states and cities are increasingly focused on, in part because much of the policy related to it is largely within their control. There remains a large potential for climate-change mitigation through renovations and improvements to existing residential and multifamily buildings. However, owners and tenants of affordable multifamily housing often fail to take advantage of existing EE programs due to “lack of capital, lack of credit, and aging housing stock that may need health and safety improvements” (Gilleo, Nowak, and Drehobl, 2017).

Even if EE upgrades are completed, there is a possibility that consumers will simply increase their spending on new goods or services (e.g., more electronic devices or appliances, greater use of existing devices) with the money saved via EE. This “rebound effect” has been documented and studied, although not without controversy. There is lingering debate in the literature over the magnitude and longevity of the effects (Azevedo, 2014; Gillingham, Rapson, and Wagner, 2016). To the extent that rebound occurs, it erodes the benefits of EE, for example by reducing the net environmental benefits from reductions in greenhouse-gas emissions. In the context of preservation, the rebound effect could reduce and complicate multifamily building owners’ incentive for investing in EE technologies and upgrades.

Split Incentives in Multifamily Rental Housing

In both the affordable and more upscale rental markets, there are several utility costs that accrue to either occupants or owners of multifamily rental housing, including water, electricity, and

considering other types of greenhouse gases (e.g., methane emissions from agriculture), the residential sector’s contribution to overall emissions is significantly less than 20 percent. See EPA, 2017.

³ This is consistent with observations of one of our study interviewees who operates multifamily buildings primarily in the Midwest. This interviewee’s rule of thumb was to invest about \$3,000 per household in energy upgrades and retrofits to save about 30 percent on energy utility costs. The interviewee also said that a roughly \$500 investment in water efficiency yields 20 percent savings on water utilities. The interviewee noted that these figures are local, and stated that investing in the Northeast would cost more (due to higher labor costs), but would be likely to save more money in terms of total utility expenses (due to generally higher energy costs).

natural gas.⁴ In unsubsidized and most privately owned affordable multifamily rental housing, properties are typically “tenant-metered,” meaning that renters typically pay for electricity and gas via individual accounts with utility companies, and landlords typically pay for water usage for the building as well as for energy usage in common areas like lobbies, hallways, or laundry rooms (Eggers and Moumen, 2008). There are also “master-metered” multifamily rental buildings, where the owner pays for all utility costs and passes them on to tenants within the rent.⁵ In both types of metering, there is a lack of alignment between the landlord’s and the tenant’s interests, a situation called a split incentive.

For tenant-metered housing, the split incentive is that tenants bear utility costs, but they have little control over energy-efficiency improvements that affect the entire property; they can only control their own energy use through actions like setting the thermostat or turning off lights. The split incentive in tenant-metered housing reduces landlords’ motivation to invest in the up-front capital costs of energy-efficiency improvements because the landlord does not directly reap most of the financial benefits from the improvements. For master-metered properties, the tenants have little to no financial incentive to limit energy consumption. The split-incentive problem was one motivating factor for MacArthur’s investment in WOO-EE to spur solutions for increasing energy-efficiency investments in multifamily rental buildings.

The split incentive can take a different form for federally subsidized rental housing. In some federal affordable housing programs, such as project-based Section 8 and the Low-Income Housing Tax Credit (LIHTC) program, the rent charged to a tenant must be reduced by a utility allowance, which is meant to reflect typical utility costs that a tenant would pay directly to the utility company in their tenant-metered housing. In some but not all of these federally subsidized rental programs, owners can take a series of steps to lower the utility allowance due to energy-efficiency investments while increasing tenant contribution to the rent by an equivalent amount as a way to pay for energy-efficiency upgrades. But even where this is possible, in practice it has proven cumbersome and little used. In programs like Section 8 project-based rental assistance, landlords have no incentive to reduce the utility allowance (by investing in energy efficiency and thus lowering utility costs) because a lowered utility allowance simply reduces the subsidy amount HUD pays the landlord each month (Waite et al., 2016).

Energy Prices and Residential Energy Expenditures Since 2000

Although energy prices increased in the years leading up to the inception of the WOO-EE initiative, in general energy has been getting less expensive in the United States over the last decade.⁶ For example, expenditures for delivered energy—which is the money spent by end-use consumers on things like gasoline for cars and electricity delivered to homes—had decreased

⁴ Note that we do not include sewer and waste collection in our consideration of utility costs because these are most commonly communal payments. We also exclude the cost of phone, cable, and internet.

⁵ Metering arrangements are also regionally dependent. For example, one of our interviewees operating in the Midwest had the following rules of thumb: “old Midwestern cities” are “more than half” master-metered for heat (e.g., Chicago is approximately two-thirds); water is “almost always” master metered; most to “99 percent” (e.g., in Chicago) is tenant-metered for electricity. But in Northern California, for example, heat is often electrical and tenant-metered.

⁶ There are several macroeconomic trends that we do not explicitly cover in this chapter, including the Great Recession and sustained historically low interest rates. While important, these trends were either covered in the previous WOO evaluation or are beyond the scope of our work.

by 20 percent in 2015, in real terms, relative to 2014. Adjusted for inflation, total energy expenditures in 2015 were the lowest since 2004, peaking in 2008.⁷

These declines in expenditures were largely attributable to decreases in the price of domestically produced natural gas and liquid petroleum. The former is more directly relevant to the housing sector, because natural gas is used for home heating, water heating, and cooking and is also used to produce electricity. Wholesale natural gas prices were the lowest in 2015 since 2002, and dramatically so. It is notable that these downward trends in overall energy costs were occurring despite a growing economy (EIA, 2017b).

Several interviewees for this evaluation mentioned the decline in energy prices as a contributing factor to the erosion of perceived benefits for EE, and as a reason that focus on EE was not as pronounced as it might have otherwise been in the last several years. Especially in terms of natural gas and heating expenses, as one interviewee commented, “the urgency of the very high utility bills has gone away.”⁸ However, the declines in energy prices that have been significant at the aggregate economy level and that have likely eroded some of the policy focus on energy efficiency more broadly have not dramatically changed utility costs for renters (especially low-income renters), as we explain below.

The benefits of reduced wholesale natural gas prices have translated into retail price declines, as shown by the blue line in Figure 2.1. Inflation-adjusted average residential prices for natural gas, overall, were on the rise in the early 2000s, peaking in 2006. These rising prices coincided with the early years of the broader WOO initiative. However, natural gas prices were already on the decline by the time WOO-EE launched, a price decline that has continued since that time. This has reduced the incentive for building owners and operators to invest in EE measures that reduce the use of natural gas.

Over the same period of time, retail electricity prices have slightly risen, as shown by the orange line in Figure 2.1. These slight increases in retail prices are a confluence of a number of factors, including the retirement of cheap but polluting coal-fired power plants, which has increased prices, and the greater use of natural gas-fired electrical power, which has counteracted that increase.

Figure 2.2 shows that, for renters who pay their natural gas bills directly, expenditures as a percentage of total income have mostly declined since 2000. This was true for low-income renters⁹ living in multifamily buildings (as shown by the gray line) as well as for all other renters (as shown by the yellow line). Electricity, however, continues to command a little over 10 percent of income for low-income renters living in multifamily rental buildings (as shown by the green line), while electricity as a share of other renters’ income has declined somewhat to a little over 3 percent as of 2016 (as shown by the blue line).

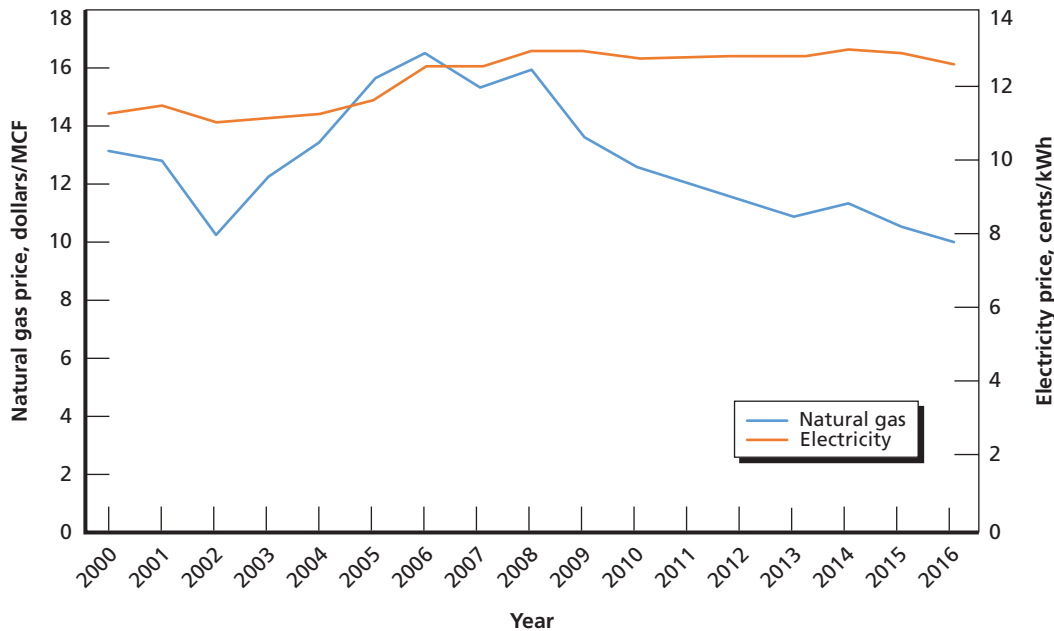
Despite drops in natural gas retail prices, the economic burden of utility bills continues to weigh more heavily on low-income tenants than on renters overall (Hernández and Bird, 2010). For example, low-income households in multifamily rentals were spending 5.4 percent

⁷ As a percentage of the U.S. gross domestic product, total energy expenditures were 6.2 percent in 2015, the lowest percentage since 2002.

⁸ The same interviewee, however, also noted that “people are turning more attention to water; . . . the water prices are skyrocketing.”

⁹ We define a family as “low-income” if they indicate that they participated in the Supplemental Nutrition Assistance Program (SNAP) or if their household income was less than the Census Poverty Threshold for a family of four in that year (for example, \$24,563 in 2016).

Figure 2.1
Average U.S. Residential Natural Gas and Electricity Prices, 2000–2016



SOURCE: EIA, Bureau of Labor Statistics.

NOTES: EIA data were inflation-adjusted to 2016 prices using BLS annual inflation values.

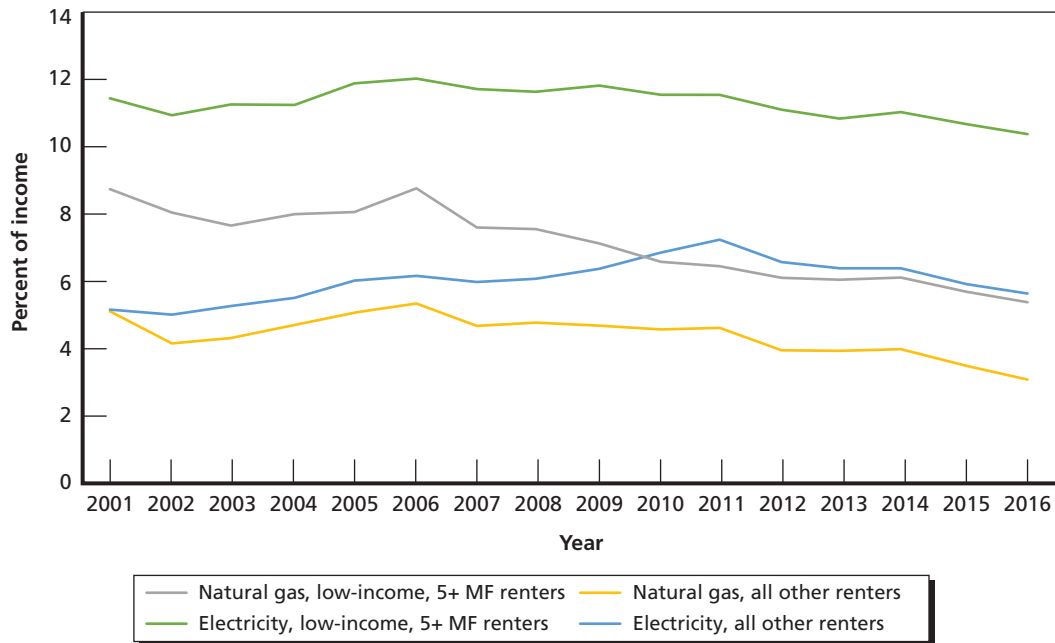
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of their income on gas in 2016, down from 8.5 percent in 2005 (gray line in Figure 2.2). This 3.1 percentage-point decrease was slightly larger than for other renters (2.0 percentage points; yellow line in Figure 2.2), but other renters were also paying a smaller percent of their income in natural gas bills in the first place. Furthermore, lower natural gas prices do not directly affect the majority of renters because the majority of renters are not billed separately for natural gas (in 2016, 76.8 and 55.6 percent, respectively, of low-income and other renters). Similarly, low-income renters that spent 11.8 percent on electricity in 2005 were still spending more than 10 percent of their income on electricity in 2016 (green line in Figure 2.2), a decline of 1.5 percentage points or 0.76 percent (U.S. Census Bureau, 2018).

Additionally, nearly one in three American households (31 percent) in 2015 reported facing difficulty paying their energy bills or sustaining adequate home heating and cooling. About one in five reported reducing or foregoing basic necessities like food or medicine to pay an energy bill. Among low-income survey participants (households with an income of \$20,000 or less per year), more than 50 percent experienced energy insecurity in 2015. Challenges with energy affordability were more likely for households in homes built before 1990, and there was minimal variation from respondents across geographic regions or for urban versus rural areas (U.S. Energy Information Administration [EIA], undated). This suggests that the problem is linked to structural features and demographic characteristics rather than to geography and the associated climatic variability.

Against this backdrop of decreasing energy prices and expenditures but lingering financial burden, interviewees told us of growing awareness among owners of affordable multifamily rental buildings that building energy costs were more variable than previously understood, and

Figure 2.2
Energy Costs as a Share of Income for Low-Income and All Other Renters, 2001–2016



SOURCE: American Community Survey (ACS) (U.S. Census Bureau, 2018).

NOTE: "Low-income" indicates households that received Supplemental Nutrition Assistance (SNAP) or with income under the Census Poverty Threshold; "5+ MF" refers to multifamily buildings with five or more units per building.

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were one of a few operating expenses they could control. As noted earlier, in the years leading up to WOO-EE, energy prices had been rising. Additionally, there was an increase in the availability of more cost-effective energy-efficient building technologies that could meaningfully lower energy consumption. These developments, coupled with an increased push for data and benchmarking, which could provide more timely information about energy consumption and enhance people's ability to compare with their peers, meant that owners and tenants were becoming more aware of EE as a tool for managing costs. In the next section we turn to a number of relevant trends in EE policy, finance, and tools that contributed to awareness and action related to EE as a tool for preservation of affordable multifamily housing.

Public-Sector Policy for Energy Efficiency in Multifamily Rental Housing

Trends in Energy-Efficiency Policy for Multifamily Rental Housing at the Federal Level

Federal funding for EE has played an important role in the creation of state, local, and utility EE programs for residential housing. Three laws have been particularly influential, prompting state and local activity in the years leading up to and during WOO-EE. These were the Energy Policy Act (EPA) of 2005, the Energy Independence and Security Act (EISA) of 2007, and the federal stimulus American Recovery and Reinvestment Act (ARRA) of 2009.

Although EPA contained several measures to encourage energy efficiency across multiple sectors—such as setting standards and applying tax incentives—its provisions for residential energy

efficiency went largely unfunded, rendering them relatively ineffective (Gold and Nadel, 2011). However, the bill's passing was the first time some agencies, particularly HUD, were required to articulate energy-reduction goals and strategies toward those goals. EISA superseded EPCa and included standards for energy conservation; for regionally specific efficiency of heating and cooling products; and for energy-efficiency labeling of products such as home appliances and boilers (White House Office of the Press Secretary, 2007).

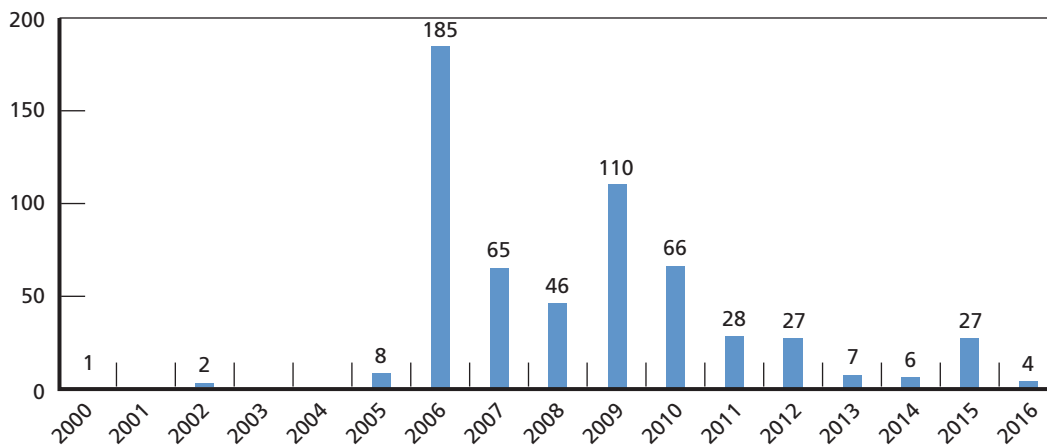
ARRA further advanced these provisions with a substantial investment in EE. Of the \$831 billion that Congress allocated for the act, \$11.3 billion was dedicated to energy-efficiency funds administered via DOE programs, which included but were not limited to EE investments in affordable multifamily housing. The \$11.3 billion consisted of

- \$5 billion for DOE's Weatherization Assistance Program, including an agreement with HUD to direct energy-efficiency measures in public housing by streamlining verification of tenants and the Weatherization Innovation Program (Bamberger, 2011), which has awarded \$90 million in grants from ARRA to local pilot projects, some of which address multifamily housing
- \$3.1 billion for the State Energy Program, which provided state energy offices with annual funding for energy efficiency, including for multifamily housing, but also other energy needs
- \$2.7 billion for Energy Efficiency and Conservation Block Grants, which were allocated by a large majority of mayors who received them to municipal projects like "improving city-owned buildings, upgrading streetlights, or deploying renewable energy" (United States Conference of Mayors, 2014)
- \$454 million for Retrofit Ramp Up competition, which provided grants to approximately 25 state and city grantees, of which six have a focus on retrofits for affordable multifamily housing specifically (Bamberger, 2011).

HUD administered \$13.6 billion of the \$831 billion ARRA stimulus package (Executive Office of the President Council of Economic Advisers [PECAST], 2014). The funds most relevant to EE investments in affordable multifamily housing included \$3 billion for the public-housing capital fund that HUD distributed across the 3,000+ public-housing authorities to build or modernize public housing, such as by replacing roofs, HVAC systems, or plumbing systems. HUD competitively awarded an additional \$1 billion of capital funds in 2009, of which \$600 million was allocated to public-housing authorities to create more energy-efficient public housing units (U.S. Department of Housing and Urban Development [HUD], 2009). Finally, HUD also used ARRA funds to competitively award \$250 million via the Green Retrofit Program in grants and low-cost loans to affordable housing owners located in 37 states (Executive Office of the President Council of Economic Advisers [PECAST], 2014).

Figure 2.3 shows the timing and number of new state, local, and utility EE programs for residential use in the years since 2000, revealing a correlation with major federal regulations such as EPCa and EISA. For example, Section 124 of EPCa of 2005 authorized DOE to supplement energy-efficiency rebate programs in eligible states (109th Congress, 2005, p. 25), and many states created their own rebate programs in 2006. Although allocations were mandated to be used in their entirety within a specified timeframe, EISA and ARRA extended

Figure 2.3
Number of State, Local, and Utility Residential Energy-Efficiency Programs,
by Year in Which They Were Created, 2000–2016



SOURCE: NC Clean Energy Technology Center, DSIRE database (Leventis et al., 2016).

NOTES: Programs include financial incentives, tax deductions, grant programs, loan programs, PACE financing, performance-based incentives, rebate programs. Programs do not include building codes or RE programs. Authors tallied EE programs with “residential” or a variant in their names. Programs are not exclusive to existing multifamily affordable rental housing; they can be for new construction or single-family housing.

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eligibility in the following years, allowing more states to create programs between 2007 and 2010. As discussed below, the amount of spending through these programs has increased over time even as the number of new programs created has declined.

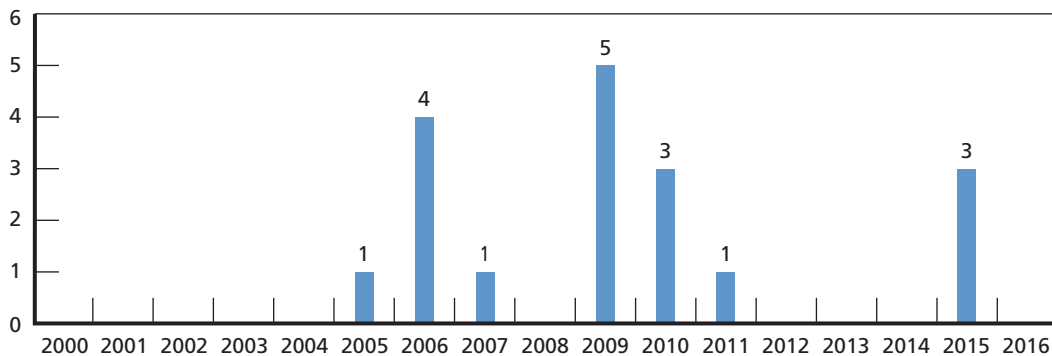
The number of EE multifamily-only programs are far fewer than the broader category of residential EE programs, as shown in Figure 2.4. Examples included in Figure 2.4 include utility programs like the Puget Sound Energy’s Multi-Family Efficiency Retrofit Program, and loan programs like Connecticut Housing Investment Fund’s Multifamily Energy Conservation Loan Program. As we describe in the section on utilities below, spending on multifamily rental-housing EE upgrades has been increasing year after year, including during years with no new multifamily EE program.

HUD and Government-Sponsored Enterprises’ EE Investments for Multifamily Rental Housing

In the years following ARRA, HUD has continued to invest in EE for multifamily housing, along with the government-sponsored enterprises (GSEs) Fannie Mae and Freddie Mac. As interviewees discussed, and as we describe below, HUD-Federal Housing Administration (FHA), Fannie Mae, and Freddie Mac have been the primary drivers of the steep growth in so-called “green lending” for multifamily rental buildings since 2009. Table 2.1 lists HUD-FHA and GSE financial products that incentivize green lending for EE investments in multifamily rental property.

Thanks in large part to the green financial products offered by Fannie Mae and Freddie Mac, the volume of green loans for multifamily rental has substantially increased. As of 2017, Fannie Mae and Freddie Mac held 37 percent of the mortgage debt outstanding in the

Figure 2.4
Number of State, Local, and Utility Multifamily Residential Energy-Efficiency Programs,
by Year in Which They Were Created, 2000–2016



SOURCE: NC Clean Energy Technology Center, DSIRE database (Leventis et al., 2016).

NOTES: Programs include grant programs, loan programs, and rebate programs. They do not include building codes or RE programs. Authors tallied EE programs with “multifamily” or a variant in their names. Programs are not exclusive to existing multifamily affordable rental housing; they can include new construction, although programs designated for new construction only are excluded.

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United States for multifamily housing.¹⁰ With the introduction of the financial products in 2012 shown in Table 2.1, the two GSEs alone have made significant inroads in improving EE for multifamily housing. Note that, with the exception of Green Refinance Plus (which was offered in 2012 only) and Green Preservation Plus, these loan products are not exclusive to, but can include, the preservation of affordable multifamily rental housing.

Although the banking, GSE, and government officials we spoke with stressed the challenges of green multifamily loans coming to scale, they also noted significant promise. An interviewee told us that the collection of green financing “turned it from something specialized into a market movement.” This same interviewee noted that the examples have helped to “prove that these things are cost effective so the market and investors and lenders are no longer spooked by that concept”—a sentiment affirmed by two other nongrant interviewees who worked in finance.

Based on a 2011 scan of EE financing market, ACEEE concluded that commercial banks were not lending in the multifamily rental sector for EE. The multifamily rentals that obtained funds for EE upgrades did so primarily through financing arranged by large energy-service companies (ESCOs) with public-sector projects such as with public-housing authorities (PHAs). Outside the municipal and public sector, it was “nearly impossible” to obtain commercial loans for retrofits of multifamily rentals due to low operating margins and already high levels of leverage on affordable multifamily rental housing (Freehling, 2011).

Commercial banks’ EE lending for multifamily rental housing increased tremendously due to the GSEs’ and FHA’s creation of loan insurance and mortgage-backed securities products, as the volume of issuances in Table 2.1 show. But, with the exception of a Bank of America program described below, we were unable to identify any stand-alone loan products created by national commercial banks for EE loans for multifamily residential owners. Put another

¹⁰ For more information see Fannie Mae, 2018.

Table 2.1
HUD-FHA and GSE Multifamily-Rental Green Financial Products Created After 2009

Entity	Name of Fund/Program	Years of Operation	Description	Volume
Fannie Mae	Green Mortgage Backed Securities (includes Green Rewards, Green Preservation Plus, Green Building Certification Price Break, and Green Refinance Plus, which was offered in 2012 only for affordable housing with expiring tax credits)	2012–present	Fixed-income single-asset security generally backed by one loan and one property. To access multifamily green financing, owner must either have green building certification or make property improvements to reduce energy or water consumption by 25 percent.	Green MBS issuances: 2012: \$29M 2013: \$58M 2014: \$20M 2015: \$111M 2016: \$3.5B 2017: \$26.3B
Freddie Mac	Green Advantage (includes Green Up, Green Up Plus, Green Certified, and Green Rebate)	2016–present	To access Green Advantage, multifamily owner must do green assessment and commit to property improvements to reduce energy or water consumption by 25 percent. Freddie Mac will underwrite up to 50 or 75 percent of projected energy saving, depending on the type of green assessment done.	2016: \$3.3B 2017: \$18.9B
FHA	Mortgage insurance premium reductions for energy efficiency	2009–present, with enhancements in 2016	Via its 2016 MAP Guide, FHA explicitly recognizes and underwrites projected utility savings resulting from energy-efficiency improvements. FHA also provides mortgage insurance premium (MIP) reduction for existing affordable rental housing, and for EE properties. As of 2016, MIPs for green and energy-efficient housing were reduced to 25 basis points, a reduction of 20 to 75 basis points. Projects demonstrating affordability will qualify for reduced rates, as do substantial rehabilitation projects that meet energy-efficiency requirements: an Energy Star score of 75 or higher is needed, as is an ASHRAE Level 2 energy audit and green building certification.	Unknown

SOURCES: Fannie Mae: <https://www.fanniemae.com/multifamily/green-initiative-financing>; Freddie Mac: https://mf.freddie.com/docs/mf_securitization_investor-presentation.pdf; FHA: MIP reductions: <https://www.hud.gov/sites/documents/MFHOUSINGNEWSISSUE7.PDF>

NOTES: ASHRAE=American Society of Heating, Refrigerating and Air-Conditioning Engineers; GSEs=government-sponsored enterprises. Green loan funds refer to funds that cover activities like energy efficiency, water efficiency, green building certification, renewable energy investments.

way, although many lenders such as Citi, Bank of America, Wells Fargo, and JP Morgan Chase Bank invest in affordable rental housing, we did not identify specific loan products for EE in privately owned multifamily rental housing.

The exception is Bank of America's Energy Efficiency Finance Program, which operated in the three years (2011–2013) leading up to WOO-EE (Barrett and Stickles, 2016). Through this program, 12 community development financial institutions (CDFIs) borrowed a combined

total of \$55 million at 1 percent interest to relend to customers for energy-efficiency projects. Several CDFIs targeted multifamily rental housing. Bank of America Charitable Foundation also provided \$5 million in grants to CDFIs to help offset their operating costs. The participating CDFIs pooled Bank of America funds with \$37 million in other funds to issue 700 loans.

The dearth of EE financial products by commercial banks comports with interviewees' views that transaction costs make stand-alone loans for EE impractical, unless they are very large loans for PHA-sized portfolios, as opposed to small loans such as for a ten-unit rental building. Instead, interviewees endorsed the inclusion of the cost for EE retrofits within larger loans originated at the time of a first purchase or at refinancing.

This was the primary lesson interviewees stressed about green lending. But, reflecting on the reason for the growth in the volume of green lending, interviewees cited seven additional reasons.

- **Lenders' greater confidence in savings from EE.** Lenders have developed more standardized practices to provide borrowers underwriting credit for future energy savings. For the development of Fannie Mae's multifamily green loans, this was a seven-year process where lenders and green-industry professionals worked together to revise and refine Fannie Mae green products. They found ways to "meet in the middle," such as by speeding up an energy audit report to take two weeks instead of months, and "finance people understand[ing] how they can underwrite projected cost savings safely into a loan." Underwriting projected cost savings relies on the accuracy of the data and the development of standardized practices for projecting energy-efficiency savings as described above.
- **New incentives.** The availability of reduced fees from FHA and from the GSEs for green loans makes lending more profitable.
- **Educating and incentivizing lenders.** Whereas older-generation loans such as FHA's Energy Efficient Mortgages and PowerSaver loan programs had lower demand than anticipated from lenders, newer green products from Fannie Mae and Freddie Mac have reached higher volume not only because of the two reasons mentioned above, but also because of a focus on educating and incentivizing loan originators through reduced fees, marketing, and simplification. As a GSE interviewee told us, "We've really had to simplify energy efficiency, simplify the process, simplify the benefits, and really knock it out of the park with the incentives that would make it worth the while of the originator to learn about the new products." This same person also said, "If the guy at the lender shop who talks to the borrower doesn't understand the product, that product is going nowhere." These changes comport with a 2011 ACEEE report of 18 EE loan programs that recommended they be simplified, be better marketed to lenders, and offer better loan terms (Hayes et al., 2011).
- **Green lending exempted from GSE lending caps.** The Federal Housing Finance Agency, the regulator of Fannie Mae and Freddie Mac, excluded green financing from the lending caps placed on the two GSEs. This created an incentive for Fannie Mae and Freddie Mac to increase their green-lending activity.
- **Spread of ideas among federal funders of mortgages.** Collaboration among HUD, Fannie Mae, and Freddie Mac helped spur refinements and expansion of green practices. As an interviewee told us, when one required benchmarking, the other did the same.
- **Incremental change through repeated practice.** A CDFI funded by Bank of America's Energy Efficiency Finance Program and working with Stewards of Affordable Housing for the Future (SAHF) was able to obtain an exception from HUD that changed the way

HUD calculated utility allowance to realign incentives to allow an energy-efficiency loan to proceed for a project-based Section 8 property. That exception has since been repeated, which an interviewee told us was “chang[ing] the game for that type of [federally subsidized] property in terms of incenting owners to make improvements when normally the tenants would just get to benefit.”

- **More gap funding available.** Although interviewees stressed that the market was not built out, they pointed to more predevelopment and gap financing, such as that available from NHT and Enterprise, to help finance energy retrofits in affordable multifamily properties. One interviewee credited MacArthur’s WOO PRIs with “prov[ing] out” the usefulness of gap financing.

Notwithstanding these successes, interviewees stressed that EE financing for multifamily rental still has a long way to go. They mentioned two challenges in particular:

- **Need for scale.** Large lenders look for large intermediaries such as ESCOs, CDFIs, or third parties who can take out loans and whose credit worthiness the lenders can efficiently gauge. These intermediaries need to be able to bundle EE projects to reach volume so the bank can obtain economies of scale on soft costs like legal and loan-origination fees as the bank connects the intermediaries’ bundled projects to capital markets.
- **Split incentives continuing to “dog everybody.”** Because of the split-incentive problem, financing EE for multifamily rentals is still challenging, no matter whether the property is luxury or affordable. Several people told us this was the “hardest nut to crack,” and no one yet had meaningfully done it. As an interviewee who works in finance said, “It’s not like we’ve solved it for well-to-do [multifamily] property owners, and now it’s just a matter of figuring out how to do it for less well-to-do property owners.” The one partial solution we heard was related to explicitly factoring in not only owner but tenant EE savings. An interviewee credited Fannie Mae for increasing multifamily owners’ incentive to invest in EE by factoring in tenant energy-efficiency savings: “If you can prove that the tenants will see that benefit, we [Fannie Mae] will include it in the underwriting for your loan. There is your [owner] incentive to do improvements in the tenant units. It’s great. I don’t know how they have penciled it out, but they did.”

HUD Grants and Programs for EE in Multifamily Affordable Rental Housing

In addition to the financial services listed in Table 2.1, HUD has also created grant programs and voluntary initiatives to promote EE in multifamily rental housing. These started with ARRA-funded PHA green-fund programs in 2009 (described in the section above) and have continued since. For example, two years prior to WOO-EE, in 2011, HUD created the Multifamily Energy Innovation Fund to help catalyze a home energy retrofit market in the United States by accelerating private investment in cost-saving energy-efficiency retrofits in the residential sector. Via this fund, HUD awarded \$25 million in grants (U.S. Department of Housing and Urban Development [HUD], 2013).

In 2013, which was the first year of WOO-EE, HUD partnered with DOE to expand the Better Buildings Initiative to include the multifamily sector. The DOE had launched the initiative two years prior with a goal of making commercial buildings 20 percent more energy efficient by 2020. The multifamily challenge invited building owners to voluntarily “commit to improving the energy and water efficiency of their property portfolios by 20 percent over ten

years and to share their annual progress and lessons learned with the public” (U.S. Department of Housing and Urban Development [HUD], undated). Owners of HUD-assisted housing got access to technical assistance and program-specific incentives. For example, PHAs could get expedited processing of Energy Savings Performance Contract (ESPC) applications. HUD also offered add-ons to HUD-funded management fees for PHAs for activities like creating a green operations and maintenance plan, benchmarking, and data collection.

As of 2018, 128 multifamily owners who operated more than 700,000 rental homes had entered the Better Building Challenge (U.S. Department of Energy [DOE], 2018). Of these, about 70 have participated in utility benchmarking, providing whole building energy and water consumption costs with technical assistance and tools from HUD (Zarker, 2017). An interviewee told us that owners of approximately 20 percent of HUD’s privately owned portfolio have volunteered to participate in that program, and about one-third of its PHAs had. Although the incentives are “modest” in size, the interviewee thought the program sent “a strong message [that], one way or another, we want to get your [the multifamily owner’s] interest in this field.” Since that time, HUD has strengthened the Better Buildings Challenge with a rule change in 2017 requiring certain HUD-insured or -assisted properties to use benchmarking (HUD, 2016).

Trends in Energy Policy for Multifamily Rental Housing at the State and Local Levels

As shown in Table 2.2, many states and localities have adopted laws and regulations that either enable or incentivize EE investment in multifamily rental housing. Many of these state and local changes emerged or gained momentum during or since the period of WOO-EE, and we discuss each of these policies in the next few sections.

As Table 2.2 shows, a large majority of states and many cities have policies in place to incentivize the construction and ongoing operation of energy-efficient multifamily residential buildings. Many city policies are part of broader sustainability initiatives, such as Chicago’s 2015 Sustainable Chicago Action Agenda, and contribute to overall energy and climate goals (City of Chicago, 2015). Relying primarily on ACEEE’s annual scorecards about building-related EE policies starting in 2006 for states, and their biannual scorecards for 51 cities starting in 2013, we discuss trends in state and local action for each of the policies presented above. As described in the corresponding sections below, we found that the emergence of state energy-efficiency resource standard (EERS) requirements and on-bill financing were correlated with the most substantial impacts in utilities’ EE spending during the WOO-EE years for EE investments in multifamily rental housing.

Increased Focus on Energy Efficiency Within the Low-Income Housing Tax Credit Program

Because the LIHTC program is the largest affordable rental housing program in the United States, the prioritization of energy-efficient measures in the scoring system for developers to obtain these highly competitive tax credits is one of the most significant ways to increase the share of resources for energy efficiency within affordable multifamily rentals. Created in 1986, LIHTC has created or preserved approximately 2.2 million affordable rental homes. The U.S. Department of Treasury allocates an amount of tax credits to each state based on population. In almost all states, a state housing-finance agency (HFA) distributes the tax credits on a competitive basis to developers who submit proposals once per year.

The state HFA scores developers’ proposals using a rubric called the Qualified Allocation Plan (QAP), which the HFA writes to reflect its priority areas for development. The highest-scoring proposals obtain tax credit allocations. Developers then sell these tax credits to investors,

Table 2.2
State and Local Legislation, Programs, or Regulations That Enable or Incentivize in EE Investment in Multifamily Residential Housing

Entity	Policy or Incentive	Description	States and Localities as of 2017
State government and state-chartered organizations			
Low-Income Housing Tax Credits (LIHTCs)	Although LIHTCs are federally funded, they are generally administered by state housing finance agencies, which are state-chartered nonprofit organizations.	33 states have requirement or incentive for LIHTC buildings to obtain third-party EE certifications as of 2016.	
Minimum energy-efficiency standards	Energy standards that apply to specific products and appliances or that restrict the sale of low-efficiency products, separate from the 55 products federally regulated	AZ, CA, CO, CT, DC, GA, MD, MA, NH, NJ, OR, RI, TX, VT, WA	
Energy building codes	Mandatory energy codes that apply primarily to newly constructed residential building.	47 states have mandatory building energy codes. Of these, 19 have adopted standards that exceed those required by ARRA stimulus funds.	
Mandatory (m) or voluntary (v) building energy disclosures	Requires the release of utility data for residential buildings. Required timepoints of release of data vary from time of sale or rental of building to ongoing disclosure.	AL (m), CA (m), CO (v), CT (v), DC (m), HI (m), KS (m), ME (m), MA (m), MO (v), NY (m), OR (v), SD (m)	
Energy-efficiency resource standards (EERSs)	Also known as efficiency portfolio standards (EPSs). "A binding 3+ year energy savings target for utilities or third-party program administrators." ^{8a} As of 2017, 26 states have EERSs related to electricity savings, and 16 of the 26 have EERSs that apply to both electricity and gas. "They serve as an enabling framework for cost-effective investment, savings, and program activity. EERS policies can catalyze increased energy efficiency and its associated economic and environmental benefits." ^{8a}	26 states had functioning EERSs: AZ, AR, CA, CO, CT, HI, IL, IA, ME, MD, MA, MI, MN, NV, NH, NM, NY, NC, OH, OR, PA, RI, TX, VT, WA, WI	
On-bill financing	A loan offered in partnership with or by a utility company, such that an owner of multifamily housing can repay the upfront costs of EE improvements through their existing monthly utility bill.	As of 2015, 13 MSAs in 11 states offered low-interest financing or on-bill financing to multifamily owners.	
C-PACE	Commercial PACE (C-PACE) is a property tax financing mechanism to fund energy-efficiency upgrades to multifamily residential and commercial properties.	Since 2009, 32 states have passed C-PACE-enabling legislation.	

Table 2.2—Continued

Entity	Policy or Incentive	Description	States and Localities as of 2017
Cities and localities			
Energy building codes and enforcement ^b	Many local jurisdictions have adopted residential building energy codes either in lieu of or in addition to state building energy codes. ACEEE rated 51 large cities to assess if they had a voluntary or mandatory compliance program, if they had staff to enforce energy-code compliance, if energy-code training was required for building-code officials, and if they offered support for compliance.	Of 51 large cities, 47 had one or more of: energy code stipulations, staff, or support for energy codes. Highest-rated cities were New York, Seattle, Austin, Boston.	
Benchmarking, ratings, disclosure ^b	Some communities require release of energy-consumption data, typically at time of sale of the building, but sometimes also for annual benchmarking. ACEEE rated 51 large cities on whether they require or have a voluntary benchmarking policy, training, reporting, and means of disseminating data via the Multiple Listing Service (MLS).	18 cities adopted multifamily benchmarking policies. ^c In ACEEE's scan of 51 large cities, 12 had mandatory residential benchmarking policies; 48 had some data-transparency feature, most often a data field in the MLS for energy-related data. Highest-rated cities were Boston, Seattle, Chicago, New York, Washington DC, Philadelphia, Austin.	

SOURCES: Unless otherwise noted, ACEEE State and Local Policy Database located at <https://database.aceee.org/>.

^aBerg, Nowak, et al., 2017.

^bRibeiro et al., 2017.

^cInstitute for Market Transformation Benchmarking Map located at <http://www.imt.org/resources/detail/map-u.s.-building-benchmarking-policies>.

who reduce their tax liability in exchange for providing equity to the LIHTC development. In short, the QAP is the rulebook by which proposed developments win tax credits. State HFAs generally include numerous set-asides and preferences in the QAP; for example, a QAP might set aside some portion of the tax credits for transit-oriented development, or for housing to serve special populations, or for EE-related investments. The intense competition for tax credits has made set-asides and requirements for energy efficiency an important mechanism for LIHTC developments to include energy-efficient measures.

A 2016 review by the NHT of HFAs' QAPs confirms that "most HFAs are taking seriously the importance of ensuring that LIHTC properties are energy and water efficient" (Bartolomei, 2017). QAPs set threshold requirements that all applicants must meet to qualify for tax credits, and they also often set points or preferences as incentives to encourage certain types or locations of development. In its review of QAPs as of June 2016, the NHT identified ten strategies in QAPs that relate to energy efficiency. They range from green capital needs assessments, to energy audits, to meeting green building standards, to energy and water benchmarking, to renewable energy. The most common of these ten strategies is the requirement or incentive for properties to meet the criteria of a third-party building standard (33 states). The least common is a threshold requirement to benchmark the energy and water use of the property (six states). This most common strategy—meeting third-party building standards adopted by 33 states as of 2016—was implemented by only ten states in 2008. A 2016 report from Global Green USA notes annual increases in QAP priority for energy efficiency from 2005 to 2013, when the total number of points for energy efficiency plateaued, fluctuating marginally from 2013 to 2016 (Green Urbanism Program of Global Green USA, 2016).

Energy Standards for Appliances

These standards for appliances promote the energy efficiency of affordable multifamily rental housing by requiring that appliances used in the home meet certain efficiency thresholds. The first state to adopt appliance standards was California, which it did in 1976. Many other states followed suit, and then Congress first adopted national appliance standards in 1987. As of 2017, 55 products were subject to national efficiency standards. States cannot set standards higher than federal ones unless they obtain a waiver, but they can regulate products that are not on the federal list of 55 products.

ACEEE notes an inverse relationship in which the more active the federal government is in regulating appliances, the less active states are, and vice versa (Berg, Gilleo, and Molina, 2017). Because the DOE was active in regulating appliances under the Obama administration, state activity in this area declined. ACEEE authors anticipate an increase in state regulations in this area under the Trump administration (Berg, Gilleo, and Molina, 2017). For example, several states, including Vermont, Massachusetts, and Rhode Island, adopted policies in 2017 stipulating that the state will enforce any appliance regulations that the federal government rolls back.

Building Energy Codes

Although most building codes apply to newly constructed rather than existing homes and are thus not a preservation tool, we list them because more stringent energy codes for buildings can create a market for advances in EE building technologies and help bring costs down for retrofits (Vaughan and Turner, 2013).

The enforcement of building energy codes creates demand for code-compliant EE technologies, while lack of enforcement softens that demand. Local jurisdictions enforce the energy

codes that states adopt, except in home-rule states, where localities can adopt their own, and in some cases where localities adopt building energy standards that exceed those required by their state (Eldridge et al., 2007). ACEEE rated 51 large cities in 2013, 2015, and 2017 to gauge whether they had voluntary or mandatory compliance programs for building energy codes, whether they had staff to enforce energy-code compliance, whether energy-code training was required for building-code officials, and whether they had support for compliance. Although ACEEE's rating system has changed over time, which prevents direct comparisons, the number of cities devoting resources to building energy-efficiency compliance has grown; by 2017, 47 of the cities achieved some points in ACEEE's rating metric on these measures (Ribeiro et al., 2015; Ribeiro et al., 2017).

Benchmarking and Disclosure

Benchmarking policies encourage or require owners or builders to compile data about their property's energy use and disclose it either to a centralized database or to prospective buyers at the time of sale (Berg, Nowak, et al., 2017). ACEEE calls energy-use transparency requirements "a fairly recent policy innovation" (Berg, Nowak, et al., 2017) and thus one that largely postdates WOO-EE. As of 2017, 12 of 51 large cities in its biannual scan had mandatory residential benchmarking requirements, which was double the number of cities that had such policies in 2015 (Ribeiro et al., 2015; Ribeiro et al., 2017). Additional cities have voluntary benchmarking for multifamily buildings; the Institute for Market Transformation (IMT) counts 18 as of 2017.

An industry report using data from 50,000 multifamily buildings found that benchmarking and corresponding technical supports were associated with a 4 percent reduction in energy and water use after one year (WegoWise, 2017). Recent research has shown that in New York City the combination of disclosure of both energy use and Energy Star scores led to a 6 percent reduction in building energy-use intensity three years later and a 14 percent reduction four years later. Disclosure of Energy Star scores led to a 9 percent decline in building energy-use intensity three years later and 13 percent decline four years later (Meng, Hsu, and Han, 2017). However, IMT reports from 2012 and 2016 found that multifamily building owners underuse benchmarking data for reasons that we discuss below (Krukowski and Burr, 2012; Houston et al., 2016).

These data can be used in several ways. First, they can help owners of multifamily affordable rental housing better manage energy costs through comparisons. Numerous interviewees noted that increased data from building technologies (e.g., connecting the control on the boiler to wi-fi to send real-time data about energy use), plus whole-building data that compare energy use in one building to energy use in others, have spawned "far more sophisticated portfolio management." For example, real-time data allow property managers to be notified earlier when systems are "out of whack" and to fix them, thus better maintaining buildings and preventing more costly repairs down the road. Second, the public availability of energy-use data can encourage building owners to reduce energy consumption. As one developer told a MacArthur program officer, "I don't want my building to be on the front page of the paper as the biggest energy hog in the city."

Third, the data have also been useful for lenders to quantify savings from EE investments for loan-underwriting purposes. For example, the Community Preservation Corporation's *Underwriting Efficiency: A Mortgage Lender's Handbook*—the publication of which a lender told us was one of the "biggest accomplishments" in energy-efficiency investments in multifamily

residential housing in the past decade—is premised on quantifying how EE investments improve cash flow (Community Preservation Corporation [CPC], 2017). As an interviewee put it, the data have helped make the value proposition of EE investments become clearer: “It could benefit your tenants maybe. It could help keep the housing affordable. It could be good for an investment [because it lowers operating costs].”

Fourth, the data have the potential to help policymakers identify underperforming buildings and better target incentives and programs to a narrower, more cost-effective segment of the multifamily rental market. As one interviewee mused, “In a perfect world if we had every multifamily building, both affordable and market rate, in the country benchmarked, it would be incredibly valuable for all of us on the policy . . . side to think about how do you now direct programs and incentives and resources toward the underperformers.”

But as the limited number of states and localities that mandate benchmarking attests, there are numerous barriers to building energy-data sharing. For example, when the utilities are split between the property owner and the tenants, as they often are, owners need tenant authorization (to access account information) to obtain whole-building utility data. That said, cities and states are developing standard practices for utilities to release whole-building energy-use data that aggregate and thus anonymize tenant data. An interviewee credited ACEEE with convincing Georgia Power in 2018 to agree that it will make anonymized whole-building data available to multifamily building owners throughout the state. The mere availability of data does not ensure its effective use, so budget for staff and training of local code-enforcement departments is important (and is improving in numerous cities, according to ACEEE) for mandatory measures to be enforced effectively.

Energy-Efficiency Resource Standards

An EERS generally establishes binding three-plus year energy-savings targets for utilities and third-party program administrators. EERSs are typically administered by state utility commissions. As of 2017, 26 states have EERSs related to electricity savings, and 16 of the 26 have EERSs that apply to both electricity and gas. Although EERSs apply to more than just housing, they are increasingly an important driver for focus on the building sector. States that have an EERS policy typically achieve more than three times as much spending by utility companies on EE programs than states without an EERS policy (Molina and Kushler, 2015). We discuss utilities’ EE programs, including ones for multifamily programs, in the next section.

As ACEEE notes, an additional benefit of EERSs, beyond saving consumers energy costs, is that the energy targets create certainty for producers of building technologies, encouraging investment in research and development (R&D) to improve technologies and services. As of 2006, when ACEEE produced its first state energy scorecard, 12 states had or were in the process of adopting EERSs or an EERS-like policy. Only six of the 12 were fully operational as of 2006 (Eldridge et al., 2007). The number of states with operational EERSs has gone up and down over time and plateaued at 26 states as of 2013, which is the same number of states with the program as of 2017 (Berg, Nowak, et al., 2017). Efficiency-program spending by utilities, however, has increased annually, including during each year of WOO-EE (Gilleo et al., 2015) and is described in more detail below.

On-Bill Financing

On-bill financing refers to a loan offered in partnership with or by a utility company. It allows the owner of a multifamily building to repay the up-front costs of EE improvements over time through their existing monthly utility bill. It is one way that utilities can help meet energy-saving

targets, if they have them. According to the National Conference of State Legislatures, as of 2015, 12 states had enacted legislation to pilot programs, create loan funds, or require utilities to offer on-bill financing (National Conference of State Legislatures [NCSL], 2015). In another 18 states, some utility companies offered on-bill financing, even though the states had no legislation requiring it. This is ten more states than ACEEE identified as offering on-bill financing as of 2011 (Bell, Nadel, and Hayes, 2011).

Due to split metering, on-bill financing can be more complex for multifamily housing, and a minority of on-bill financing programs allow multifamily owners to participate. As of 2014, 20 states had residential on-bill financing programs. Of these, five allowed multifamily property owners to participate (Zimring et al., 2014). Two of the five programs were exclusively for owners of multifamily properties. This is the only year for which we could find counts of states with exclusively on-bill programs that parsed multifamily owner eligibility. However, as of 2015, ACEEE documented 13 metropolitan statistical areas in 11 states that offered on-bill or low-interest financing for EE investments in existing multifamily housing (Samarripas, York, and Ross, 2017). According to an Energy Efficiency for All (EEFA) toolkit for EE in multifamily housing, on-bill financing works best in master-metered buildings or in scenarios where the owner pays for a large portion of the building's energy usage so that both the savings and repayment installments appear on the same utility customer's bill (Henderson, 2015).

Several interviewees with whom we spoke thought that on-bill financing, like Property Assessed Clean Energy (PACE), had hit substantial operational barriers for multifamily rentals, but that it was growing and had potential over time to come to scale, after models to address barriers are worked out.

Property Tax Financing/Property Assessed Clean Energy (PACE)

PACE is a property-tax mechanism to finance energy-efficiency upgrades. Residential PACE programs, where they exist, apply to residential properties of one to four units. Commercial PACE (C-PACE) programs often include multifamily homes of five or more units as well as commercial properties (ACEEE, undated). Since 2009, 32 states have passed C-PACE-enabling legislation. Where there is a local PACE program, building owners can work with the program as a one-stop-shop to do an energy assessment, arrange for contractors, and create a repayment plan. Depending on the program, PACE borrowers typically pay back the loan through a lien on the property.

Although C-PACE transactions have doubled every two years since 2012, with approximately \$450 million in cumulative transactions as of 2016, multifamily participation is very low (Adamczyk et al., 2018). Of 1,151 C-PACE transactions that EEFA examined, 42 were for multifamily properties. Fifteen of the 42 were for affordable multifamily rental housing. Among the 15 properties, eight were not subsidized, and seven were federally subsidized (Adamczyk et al., 2018). EEFA authors concluded that the complexity of the financing for affordable housing and C-PACE administrators' lack of experience with that complexity were the main barriers for uptake.

Nongovernmental Investments in EE for Multifamily Rental Housing

Here we describe some illustrative activities and investments in EE outside the public sector. This is not an exhaustive list because there are numerous private-sector initiatives in EE

(e.g., private-sector EE benchmarking), a complete accounting of which is beyond the scope of this work. Note that commercial lending for EE investments in multifamily rental housing is described above in the section on GSE and HUD-FHA financial products for green lending.

Utility Companies and Utility Regulators' Policies Dedicated to Multifamily Housing

Utilities and the state-level public utility commissions that regulate them have increasingly focused on EE and RE, in no small part due to state-level laws, policies, and regulations (Heeter et al., 2014; Barbose, 2017).

Utilities in each of the 50 states implement energy-efficiency programs that include “financial incentives, such as rebates or loans [such as on-bill financing]; technical services, such as audits, retrofits, and training for architects, engineers, and building owners; behavioral strategies; and educational campaigns” (Berg, Nowak, et al., 2017). Although funding for energy-efficiency programs declined throughout the 1990s, utility commissions thereafter renewed their focus and spending on energy efficiency, as prompted by federal energy investments described above. For example, total spending on utilities' electricity-efficiency programs rose from \$900 million in 1998 to \$3.9 billion in 2010 to \$6.3 billion in 2016 (Berg, Nowak, et al., 2017). Spending on natural gas efficiency programs is much less, but it also grew over time, reaching \$1.4 billion by 2014.

Consistent with these overall trends, activities in the subset of utility EE programs that are specific to multifamily owners and residents have grown significantly over the past decade. State EERS requirements, as described above, have prompted increased spending so that utilities can meet the EERS targets.

ACEEE estimated that in 2015 the number of utility-sector multifamily EE programs had grown to 38 metropolitan statistical areas (MSAs), as compared to 30 in 2013. (The 2013 figure counted multifamily programs for direct installation of basic energy-efficiency measures [Samarripas, York, and Ross, 2017]). These programs ranged from direct installation of EE equipment, to rebates for equipment, to comprehensive retrofits, to low-interest or on-bill financing. Of the 38 MSAs with multifamily EE programs, 25 offered comprehensive retrofits for existing buildings as of 2015, compared to 16 in 2011.

EE spending on all these programs had grown to \$290 million in 2015 from approximately \$110 million in 2011 (Samarripas, York, and Ross, 2017). The authors attribute the growth to the combination of state regulators setting the terms for the efficiency programs and local governments increasingly requiring multifamily buildings to benchmark their energy use against that of other buildings, as shown in Table 2.2.

Philanthropic Initiatives

In the years leading up to and during WOO-EE, there were also other philanthropic initiatives with overlapping or complementary objectives. We asked interviewees what other philanthropies they were aware of that worked on EE in ways that were directly relevant to the affordable housing sector; we were told of programs run by the JPB Foundation, the Surdna Foundation, the Kresge Foundation, the Citi Foundation, the Energy Foundation, and the Home Depot Foundation. Here we provide some illustrative examples of these philanthropic efforts.

The JPB Foundation has funded the EEFA partnership between the Energy Foundation, Elevate Energy, NHT, and Natural Resources Defense Council (NRDC). Started in fall 2013, the partnership engages stakeholders on a state-by-state basis to expand and improve utility

EE programs and to support building owners and operators in implementing EE upgrades and retrofits to benefit low-income residents. The program currently operates in 12 states.

The JPB Foundation has also recently funded the Natural Resources Defense Council's Center for Market Innovation, started in 2017, to accelerate the adoption of new approaches to finance and investment for increasing energy efficiency and renewable energy in affordable multifamily housing properties. Other funders included the Goldman Sachs Center for Environmental Markets, and the David and Heidi Welch Foundation.

In 2008, the Home Depot Foundation and Habitat for Humanity launched a pilot program to build 263 energy-efficient homes according to Energy Star guidelines or better. The following year, they expanded the program with \$30 million in funding aimed at building 5,000 more homes over five years. In 2017, a call for proposals by the Home Depot Foundation was focused on supporting veterans and their families with new construction or rehabilitation of permanent supportive housing and transitional facilities (Home Depot, undated).

Some initiatives are aimed at leveraging the emergence of the “green economy” to the benefit of low- to moderate-income households more broadly than for the purposes of affordable housing preservation. The Rockefeller Foundation, for example, has supported energy-efficiency programs, including the Building Retrofit Industry and Market (BRIM) Development Project and Sustainable Employment in a Green U.S. Economy (SEGUE). BRIM was started in 2010 to help develop a broader philanthropic investment strategy among stakeholders in EE. It included a roundtable of multifamily-housing experts and market research about subsegments of the energy-retrofit industry, including for single and multifamily homes and several types of commercial and institutional buildings. Among the philanthropies that collaborated on the initiative were the MacArthur Foundation, Doris Duke Charitable Foundation, Energy Foundation, Kresge Foundation, and Living Cities (Faesy and Kramer, 2013). In 2012, the Rockefeller Foundation coauthored a report with Deutsche Bank Climate Change Advisor to explore new or underutilized financing models for overcoming historical barriers to energy-efficiency retrofits (Fulton et al., 2012).

SEGUE, a \$15 million initiative that was active from 2009 to 2012, focused on investing in a green economy and creating demand for green jobs. Initially, its focus was meant to be on the energy-retrofit market in the construction industry, but it expanded to include water infrastructure and waste management. Among its grantees was Elevate Energy (then part of the Center for Neighborhood Technology [CNT]), which aimed at replicating existing full-service building energy retrofit programs for multifamily housing. A program evaluation pointed out that SEGUE recognized building retrofit programs, including for multifamily housing, as part of a larger construction industry with its own long-standing institutions, organizations, and practices. This status, in combination with the challenge of anticipating policies, investments, and incentives at the local and national level (especially as ARRA wound down), required a continued need for long-term public or philanthropic funding in industry-building endeavors for efforts to become self-sustaining (Martín et al., 2013).

Multifamily Affordable EE Certification: Enterprise Community Partners' Green Communities Initiative

In 2004, Enterprise Community Partners created the Green Communities Initiative,¹¹ which is a national framework for green affordable housing. It provides a set of criteria for green projects

¹¹ See the Enterprise Green Communities *Resource Guide* (undated).

and a certification process, including for multifamily housing. Among the resources Enterprise includes are compiled model specifications for multifamily rental housing, training materials for green operations and management, and small grants of up to \$5,000 for design and sustainability training. Unlike other certifications such as LEED, the Green Communities Certification is specific to affordable rental housing. According to their website, Enterprise has worked with 550 housing organizations in Green Communities since 2004. A (nongrant) interviewee described the program as one that “exploded and has done really well.” It is among the certified properties that Fannie Mae and Freddie Mac recognize in their green funding programs described above.

Growth in Energy-Advising and Energy-Service Firms

The emergence of new policies encouraging or mandating efficiency, and the evolution of increasingly cost-effective technologies to get the job done, has led to a new demand for project-level energy expertise and has presented new business opportunities. Consequently, the number and types of entities providing energy advising and energy services has grown. For example, private for-profit ESCOs, which are described below, have grown from approximately \$1 billion in total annual revenue as of 1994 to \$5.3 billion as of 2014 (Stuart et al., 2016). Although the number and size of ESCOs have grown, they typically do not service the affordable multifamily residential sector, with some exceptions that we note below, and alternative services that support this sector have emerged.

Although the models vary, the purpose of the service firms remains the same: to help a building owner simplify, outsource, and/or obtain technical advice for some or all of the steps in an EE upgrade. These steps might include: (a) performing energy audits to assess the buildings’ EE needs and determining which EE upgrades would break even or improve cash flow, (b) contracting with an EE installation firm, (c) assembling the financing to pay for the EE upgrades, and (d) monitoring and verification of the installed upgrades and/or providing long-term operations, maintenance, and repair. Depending on the model, the financing often takes the form of a loan to the owner, which the owner pays back in the future out of energy savings.

There are a number of challenges that have discouraged or slowed the development of energy-advising and service firms for the affordable multifamily rental sector. One important challenge is scale: Smaller or heterogeneous multifamily residential EE projects carry some of the same fixed costs and time required for a retrofit as does a much larger building or a portfolio of many similar buildings. This reduces the profitability of small-scale EE retrofits for service firms.¹² A second challenge is the complexity of financing, especially in subsidized properties, which drives up transaction costs and can erode already thin margins—in addition to split incentives that reduce landlords’ motivation to finance EE. This complexity is directly related to the third challenge: risk. As an interviewee summarized, “Existing properties are always harder than doing new construction because you don’t know what’s behind there. You are sometimes doing work while tenants are in place. You are stuck with the legacy infrastructure

¹² One interviewee estimated that the minimum size to break even was above 50 or even 100 units per building/owner, but this is dependent on region and on a building’s age and condition. Specifically, it was noted that in NY, EE investments in the “five to 49 [unit]” market have been hard to implement, and compliance has not been good, despite New York State Energy Research and Development Authority emphasis on and requirements for EE.

of the project.” Fourth, as energy-service firms have grown, so have the number of firms that are potentially predatory in nature. For example, the New York Public Service Commission cited three energy-service companies in 2016 for deceptive practices like charging customers inflated rates for utilities, signing up customers who did not know what they were receiving, or falsely telling customers they were from the local utility (Waldman, 2016).

But interviewees pointed out areas of progress in the past decade on several of the challenges, for example:

- An interviewee told us that the capital-needs assessment tools for property assessment have improved in the past ten years, allowing owners to better understand what the needs and opportunities are for their properties to become more efficient. The tools help owners frame their expectations and also increase their buy-in because they better understand if and when there will be financial returns from the EE investments.
- Contractor training is improving in some states, meaning virtually any contractor will be able to install the highest-efficiency equipment so, as an interviewee expressed to us, “the market is providing close to the most efficient stuff that’s available” as a default.
- Some new models are emerging to perform the core functions of ESCOs but tailored to the scale and complexity of multifamily affordable housing. For example, third-party advisers that can help with financing, look for “free money,” or provide guidance and second opinions on technical quotes are increasing in some places. The combination of a properly trained contractor, a third-party adviser, and a willing financial partner to fund EE investments can functionally replace an ESCO.
- Finally, to reduce risk and cost, several interviewees pointed to trends in aggregating smaller multifamily residential EE investments to achieve economies of scale. One example is the Pratt Center’s Retrofit Standardization Initiative, which focuses on one building type that is particularly common in the New York City metropolitan area: two-family gas-heated brick homes. The initiative provides incentives to skip the energy audit and offers a standard package of five EE measures (Pratt Center for Community Development, undated).

Energy-Service Companies and Energy-Service Performance Contracts

Private, for-profit energy-service companies, also known as ESCOs, generally offer energy-efficiency retrofits and upgrades via Energy Savings Performance Contracts (ESPCs).¹³ ESPCs can vary in structure but generally offer guaranteed minimal energy (or water) savings, up-front financing of capital costs that are designed to be paid for over time with the energy savings,¹⁴ initial monitoring and verification after installing, and long-term operations and maintenance.

ESCOs have primarily worked in the large-scale government and investment-grade municipal/university/school/hospital (MUSH) sectors (Stuart et al., 2016). Their clients have also included PHAs, many of which have sufficiently large portfolios that they can realize deep EE

¹³ ESPCs are also known as “energy-performance contracts,” or EPCs. Additionally, many utilities offer utility energy services contract (UECS), which again allow up-front capital costs to be financed and paid for with long-term energy (or water) savings.

¹⁴ Savings come in the form of both energy savings and operation and maintenance savings.

savings to enable the economics of ESCOs to work.¹⁵ At this scale, large ESCOs can employ their own engineers to project cost savings from energy-efficient investments and, on the strength of that projection, work with banks and insurance companies to provide loans to owners to finance EE investments done on a large scale. Partly because there is less certainty about the projected savings when done on a small scale and because of fixed costs, ESCOs typically do not work on EE in multifamily affordable rental housing.

Energy-Services Agreements (ESAs)

An alternative to ESPCs are energy-services agreements (ESAs). Instead of securing a loan to finance capital improvement or new EE building technology, the owner enters into an ESA. A third party installs and owns the EE improvements, and the building owner pays a service fee to the third party for ongoing use of those improvements. The benefit of an ESA is there is no additional lien on the property.

An example of an ESA is New York City Energy Efficiency Corporation's (NYCEEC's) \$1.2 million loan to Demand Energy to add solar energy with battery storage at the affordable multifamily Marcus Garvey project (NYCEEC, undated). NYCEEC issued the loan in 2016, and it has a ten-year term. Another example is the newly launched Clean Energy Fund (Holbrook, 2018), which will provide loans of up to \$3 million with up to 15-year terms. The focus of the fund will be to finance EE retrofits for multifamily buildings with ESAs (as well as clean-energy generation projects backed by Power Purchase Agreements). The fund provided its first loan to Affordable Community Energy Services Company for EE and water conservation investments at Mercy Housing, a large nonprofit affordable housing developer and owner. The fund is capitalized by a \$10 million loan from MetLife and \$2.5 million from Reinvestment Fund.

Energy-Service Organizations Targeted to Increasing EE in Affordable Multifamily Rental Housing

As mentioned above, ACEEE reports that 38 MSAs in 2017—as compared to 30 MSAs in 2013—had multifamily programs for direct installation of basic energy-efficiency measures (Samarripas, York, and Ross, 2017). Of these, 25 MSAs also had “comprehensive retrofit options,” which was an increase from 16 MSAs in 2011. Many of these are funded through utility companies. One example that is explicitly targeted to affordable rental housing is the Massachusetts Low Income Multi Family Retrofits program, which helps PHAs, nonprofit owners, and for-profit owners make EE upgrades to affordable multifamily rental properties (Mass Save, undated).

The number of organizations targeting EE in affordable multifamily housing is small but growing. For example, Community Investment Corporation (CIC) and Elevate Energy offer a nonprofit model of a multifamily EE service and loan program. (Elevate Energy is the subject of a case study in Chapter Four.) A private-sector example is the previously mentioned mission-oriented Affordable Community Energy Services Company (ACE), which is a one-stop shop for

¹⁵ Denver Housing Authority is an example of a PHA that contracted with a large ESCO, Honeywell, to implement EE projects in its affordable housing portfolio (EPA, 2011). HUD has issued guidance for PHAs to contract with ESCOs (HUD, undated-b).

EE upgrades to multifamily affordable rental housing.¹⁶ Using BrightPower energy scorecards to benchmark historical energy consumption, ACE designs an EE plan, arranges for contractors to install EE upgrades, and assembles the financing, which requires no loan to or guarantees from the owner. A third example is the nascent New Energy Model Organization (NEMO), which intends to serve as a national intermediary for energy-performance contracts that are too small for commercial banks for EE upgrades to affordable multifamily rental housing. They are specifically targeting LIHTC properties that are reaching the 15-year point, when the initial affordable restriction period ends and there might be a change in ownership and financing. NEMO will rely in part on philanthropic financing to reach this particular segment of the residential EE market. A final example is the emergent public-purpose energy-service company Commons Energy, a for-profit limited liability corporation (L3C) and a wholly owned subsidiary of the Vermont Energy Investment Corporation (VEIC), described in a second case study in Chapter Four.

Conclusion

There has been substantial growth since 2000 in the volume and activity of finance and policymaking for energy-efficient multifamily rental properties. Federal legislation and funding, most notably EPA's Act of 2005 and ARRA of 2009, instigated a large number of state, local, and utility programs for energy efficiency in residential housing. The levels of investment and activity to make multifamily rental housing, particularly affordable housing, more energy efficient trailed investments in the commercial and single-family housing sector, although multifamily EE work has increased over this decade. Lower levels of EE investment in affordable multifamily housing have been due to both the split incentives in multifamily housing and the greater financing and regulatory challenges from rental-subsidy programs.

During the WOO-EE years, the most remarkable changes have been the exponential growth in green lending for multifamily rentals thanks to the GSEs and HUD-FHA, and the increased spending by utility companies on multifamily rental EE programs. There is also a small but growing number of energy-service organizations that service affordable multifamily rental buildings, although most have not gone to scale.

For affordable rental properties in particular, there is potential to realize deep EE savings, indicating promise for more growth in this asset class in spite of the complexities of financing those improvements. The high rates of uptake among owners of affordable multifamily rental buildings for the voluntary Better Buildings Challenge, despite its modest incentives, is an indication of the interest and potential demand. In short, there are emerging models of energy services and financing that show promise, and they offer hope of identifying creative ways to aggregate properties and standardize EE upgrades to lower cost and risk, which is a future direction for the field that we discuss in the concluding chapter.

¹⁶ Affordable Community Energy Services (ACE), "Our Story," undated.

Energy Efficiency in the Window of Opportunity Initiative

This chapter provides an overview of the energy efficiency–focused grants and PRIs (i.e., low-interest loans to create new business models or grow mission-oriented businesses) that the foundation made under the Window of Opportunity Initiative starting in 2012. We refer to these as WOO-EE funds. We provide an overview of WOO-EE and summarize its investments by types of activities. Chapter Four provides two case studies of innovative approaches grantees took with WOO-EE funds,¹ and Chapter Five examines whether the foundation achieved its desired outcomes for WOO-EE. In this chapter, we draw on four interviews with MacArthur staff, documentation MacArthur provided about WOO-EE, and grantee reports.

Overview of WOO-EE

MacArthur’s focus on energy efficiency was the last of three phases of WOO. The first phase of what would later be called Window of Opportunity began in 2000 with a loan to a new joint venture between the NHT and Enterprise Preservation Corporation. WOO became a 20-year, \$214 million initiative to preserve affordable rental housing.² The second phase of WOO began in 2007, when MacArthur increasingly focused on “policy through practice,” and when a larger group of nonprofit owners were funded with the explicit aim of becoming ambassadors for preservation and public-sector organizations, especially at the state level in a few key geographic regions of focus. Finally, in late 2011, reflecting on their successes to date and on the remaining and emerging challenges for the affordable multifamily rental sector, the foundation launched a strategy to “deepen the Window of Opportunity Initiative,” specifically through investing in energy efficiency (Schwartz, Vodopic, and Lamond, 2011).

Impetus for and Goals of WOO-EE

A core point about WOO-EE is that its goals and design emerged from program officers’ experience implementing WOO. As such, it is an example of one philanthropic initiative growing organically out of another. Specifically, the WOO-EE initiative stemmed from the direct experience program officers had with developers and owners of multifamily affordable rental housing in WOO. Although the WOO initiative had included investments in energy-efficiency activities from its inception, in a 2011 memo provided to the MacArthur Foundation’s board

¹ The organizations profiled in these case studies received both grant and PRI support.

² At the time of RAND’s first, broader evaluation, \$186.2 million had been awarded. An additional \$27.5 million was awarded under activities in the scope of this evaluation, as described in the next section of this chapter.

of directors, foundation staff identified EE as a “central concern” and a potentially powerful tool to support the WOO initiative’s goal of creating a “policy and market environment capable of sustaining high-volume preservation of affordable rental housing” (Schwartz, Vodopic, and Lamond, 2011). The Great Recession of 2007–2009 and the ensuing foreclosure crisis had exacerbated already widespread housing-affordability issues, and the fraction of renter resources being spent on fuels and utilities had also been on the rise. As a foundation employee told us, “Some of the owners of affordable housing began to realize that they couldn’t control their taxes, they could not control their property taxes or their insurance, and they could not control the cost of capital, and those are big cost drivers. But they could control their energy costs.”

Meanwhile, a theme that had emerged in WOO was the growing sophistication and importance of asset management for controlling operating costs and thereby sustaining the financial viability of affordable rental housing, which operates with revenues that barely exceed costs. The foundation staff had a further “aha” moment that “asset management involved monitoring of energy costs, not just the physical condition of the buildings.” With this realization during the second phase of WOO came another: “a need for a taxonomy and a system by which energy efficiency of buildings could be assessed.”

Yet the experience from WOO was that, in terms of financing for energy efficiency, multifamily properties were “falling between the cracks” of commercial real estate and single-family residential, with these other asset classes having better access to capital and clearer incentives for investing in energy efficiency. So a goal of WOO-EE was to determine if multifamily rental housing could be included in some of the existing programs, and whether EE programs could be created for that asset class. Around 2011, program staff spent approximately one year attending conferences and workshops and speaking with a variety of real estate investors, developers, and nonprofits in the energy and environment sectors to learn the specifics and the “pain points” for owners of multifamily rental housing to invest in energy efficiency.

Concurrently, trends in energy efficiency that we describe in Chapter Two—including an increase in more stringent local and state building-code standards, a push toward more transparency and benchmarking in building energy use, and an uptick in investors and lenders explicitly including EE in “green” underwriting, products, and pricing—pointed to an opportunity to leverage EE for increasing rental affordability for tenants and for broader preservation of multifamily rental properties.

Foundation staff also noted the risk of the affordable multifamily rental sector *not* taking advantage of the momentum in EE, which could cause fewer multifamily affordable rental homes to be preserved. In other words, “buildings that are energy *inefficient* will expose their owners and investors to new reputational and financial risks” due to the fact that multifamily buildings were generally older and less energy efficient³ and that these owners tend to have the least ability to invest in upgrades, increasing the potential for units to be lost (Schwartz, Vodopic, and Lamond, 2011).

In the face of risk and opportunity, foundation staff hypothesized in 2011 that “by firmly inserting affordable rental housing into the fast-evolving energy efficiency arena, the foundation can advance its longstanding goal of preserving affordable rental housing” and thus both mitigate the risk of the affordable sector being left behind emerging trends and seize the opportunity to leverage new technology, resources, and incentives.

³ MacArthur Foundation noted that half of multifamily housing at the time was more than 38 years old, predating energy-efficiency products and standards, and were also less likely to have been updated than more upscale properties.

Components of WOO-EE

Three themes distinguish the approach the foundation staff took to designing WOO-EE: (1) connect groups working on energy efficiency to groups working on multifamily affordable rental preservation, (2) concentrate work at the state and local level rather than at the federal level, and (3) expand the focus to include both for-profit as well as nonprofit developers, in part because for-profit owners control approximately 85 percent of privately owned affordable rental housing (Schwartz et al., 2016).

The foundation recognized that a diverse range of stakeholder industries and groups were important actors in the evolving energy-efficiency policy landscape and in the associated emerging energy-efficiency markets. These include:

- **utilities**, which were facing new regulatory requirements and looking for opportunities to increase end-use efficiency
- **building-technology and energy-services firms**, with access to new technologies and interest in leveraging new financial incentives and cultivating new markets
- **tenants**, who often pay for some or all of their utility bills directly but do not have a direct means to influence efficiency
- **owners and operators**, operating on slim margins and often unable to realize the savings of efficiency investments directly⁴
- **investors**, interested in developing new “green” financial products but inherently risk-averse.

These actors had diverse and often disparate goals and incentives. The foundation’s resulting theory of change was to work across these stakeholders to find common ground and both deepen and broaden reach and influence. To do so, MacArthur developed a two-part strategy:

- (1) Working **inside the affordable rental housing field**, the foundation sought to:
 - align housing and energy regulations, create new financing tools, advance industry-wide data and benchmarking practices
 - document and broadly share best practices and innovations
 - shape a common agenda around energy-efficiency policy and practice.
- (2) Working **outside the traditional affordable housing sector**, in the broader commercial real estate, finance, and environmental sectors, the foundation aimed to:
 - raise awareness of affordable housing EE accomplishments, gaps, and potential
 - raise awareness of for-profit developers and owners and investors in multifamily rental housing
 - promote partnerships across traditionally siloed sectors
 - encourage investment and creation of affordable-housing-appropriate products, practices, and policies.

⁴ The common mismatch between the party that pays for efficiency upgrades (owners/operators) and the party that benefits from efficiency measures (tenants) is referred to as the “split-incentive” problem, as discussed in Chapter Two.

To enact change both inside and outside the affordable housing sector, at the outset of the initiative the foundation articulated the following seven activity areas where it intended to allocate grants and loans (in the form of PRIs):

1. **Housing and energy policy:** Support policy research, advocacy, and public education projects to increase the alignment and effectiveness of housing and energy-efficiency programs.
2. **Multifamily real estate finance:** Provide research and development grants and PRIs to support the development and scaling up of new financial products and financing programs.
3. **Energy data and benchmarking:** Support the creation of a new national data warehouse and of clear protocols for cross-sector data collection and sharing.
4. **Utility regulation:** Support policy research, advocacy, and public education projects that (a) increase the availability and use of public benefit charges and other funds for energy-efficiency upgrades of multifamily housing and (b) encourage more utilities to provide free, web-based access to energy data.
5. **Industry outreach:** Provide funding for sponsorship of energy-efficiency conferences, meetings, and projects that address affordable rental housing issues and include speakers and participants qualified to speak on those topics.
6. **Intermediary development:** Support the development of social enterprises and for-profit firms to provide energy-efficiency services and products to the multifamily housing market.
7. **Evaluation and assessment:** Provide funding for studies of existing and new energy-efficiency demonstration projects involving multifamily housing and for periodic scans of local, state, and federal energy-efficiency programs and regulations. Track progress toward the strategy's two principal outcomes, which were: "(1) averting new threats that may arise as a new energy imperative transforms the U.S. commercial real estate market and (2) maximizing access to new resources and incentives that are becoming available to improve the energy efficiency of existing commercial and residential buildings."

A complete list of WOO-EE grants and PRI recipients and the primary activities targeted by each is provided in Appendix C. Grant and loan making in these seven activity areas were the foundation's intended means to achieve WOO-EE's seven desired outcomes (listed in Table 3.1). We label the outcomes as "intermediate" in the sense that they were in service of the ultimate outcome of the Window of Opportunity initiative, which was to preserve affordable rental housing. All seven outcomes are drawn from a 2011 document that MacArthur staff wrote to conceptualize the launch of WOO-EE (Schwartz, Vodopic, and Lamond, 2011).⁵ Specifically, how grantmaking by MacArthur aimed to span the set of projects and activities is described in the next several sections of this chapter, in which we categorize the specific, multidimensional activities of WOO-EE grant and PRI recipients.

We examine these intermediate outcomes in Chapter Five.

⁵ Five of the seven outcomes are verbatim from the 2011 memo, and the remaining two—increased awareness and increased cross-sector collaboration—were noted elsewhere in the same memo. In a discussion with the foundation at the outset of the WOO-EE study, the foundation program officers affirmed they were also desired outcomes for WOO-EE.

Table 3.1
The Seven Intermediate Outcomes the Foundation Identified for WOO-EE

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1. Increased **awareness** of energy efficiency as a tool for preservation among actors working outside the traditional affordable housing sector
 2. New and more energy-efficiency **public policies** focused on accommodating the needs of affordable multifamily rental housing
 3. New and more **financing practices and vehicles** that accommodate the affordable rental housing sector
 4. Increased **cross-sector** (e.g., affordable housing and energy efficiency) awareness and **collaboration**
 5. Increased **share of energy-efficiency incentives/subsidies/policies/regulatory reforms** for affordable rental housing stock
 6. New **data and benchmarking practices and resources** targeted at the affordable multifamily rental sector
 7. Increased **pace and volume** of energy-efficiency improvements in the stock of affordable multifamily rental housing
-

SOURCE: Schwartz, Vodopic, and Lamond, 2011.

Evolution of Focus in Energy-Efficiency Activities in WOO

Because WOO-EE came at the end of the decade-plus WOO initiative, program officers told us that the bar was higher for WOO-EE design and grants. In other words, program officers had to justify and clearly articulate the rationale for creating an additional phase of WOO. The rationale also including taking intentional risks with the PRIs to see if models that had worked in other localities (e.g., Cook County) or with other asset classes, like commercial property, could be adapted to multifamily affordable rental housing.

Prior to the launch of WOO-EE in 2012, MacArthur program officers “dug in” for about one year to educate themselves about trends and practices in energy efficiency within commercial real estate and in high-end multifamily residential, where EE investments were expected to be more common. The idea was to apply lessons from those asset classes and to potentially tweak or mimic financial vehicles and EE practices to see if they could work for affordable multifamily rental housing. From those sectors, there were early signs that EE investments could help improve the financial bottom line for resource-starved affordable rental housing. For example, foundation staff noticed that some developers had mentioned getting grants from a utility company for energy-efficiency work. In a separate conversation with a developer of Chicago-area luxury buildings, the developer noted that there was “a taste for” EE in properties that commanded the highest rents, not just for marketing purposes to tenants but also for ongoing property management. This implied to the program officer that a developer submitting an LIHTC proposal to a state housing agency might be able to distinguish his or her application by showing that, via EE, the affordable housing owner would “manage this property right.” The developer might therefore be more competitive for tax credits and for obtaining more funds from lenders.

The trajectory in MacArthur program officers’ approach to energy efficiency grew successively more holistic over the course of the four years of WOO-EE in the attempt to narrow in on and tighten energy usage costs. As grantees’ and foundation staff’s knowledge and experience grew, so too did the foundation’s focus on going “deeper in [EE] savings” and execution. EE upgrades viewed as low-hanging fruit, like changing lightbulbs, had definite advantages, especially for certain buildings and electricity markets. But the foundation’s focus shifted to more “major” work like making “deep retrofits,” installing entirely new systems like boilers or HVAC, and addressing ongoing operations and maintenance issues. By the end of the four-year

WOO-EE initiative, a foundation officer told us, “You know what? It isn’t just enough to do the energy efficiency. . . . How do we figure out that you could do renewables [like rooftop solar] on site?” And the lessons learned from WOO-EE related to energy use have informed the foundation’s newest initiatives to address climate change.

Investments Made Through WOO-EE

MacArthur began making WOO investments in organizations that explicitly employed energy efficiency as a tool for preservation around 2007. These investments took the form of grants and PRIs, which were low-interest loans intended to either create new business models or build up mission-oriented businesses. Between 2007 and the first of several grants in 2012, the foundation had awarded \$5,365,000 in grants and \$6,000,000 in PRIs, a total of \$11,365,000 for initial efforts under WOO that focused on “preservation through energy efficiency.” Between 2012 and 2015 an additional \$7.5 million was awarded in the form of 33 grants to 22 separate organizations.⁶ An additional \$20 million was awarded as six low-interest PRIs to five separate organizations, for a total allocation of \$27.5 million between 2012 and 2015. These 33 grants and six PRIs are the scope of this WOO-EE evaluation. (See Appendix C for a complete list of the grants and PRIs.) The period of performance for all grants has now completed, but all of the PRI terms are still active, with the first to end after a five-year term in 2019. As noted, the grants were initially issued pursuant to the seven activity areas, although some grants and loans may be repurposed.

Table 3.2 shows the number of grants and PRIs the foundation awarded under WOO-EE by the recipients’ sectors. To avoid double-counting, we assigned each recipient to a primary sector, which we distilled from the original seven activities listed above into the five areas listed in Table 3.3. However, we note that, by design, several of these recipients were already cross-sectoral in their work, or became more so as a direct result of their engagement in WOO-EE. For example, ACEEE is a well-known “energy and environment” organization, but due in no small part to WOO-EE funding, the nonprofit now has a specific focus on EE for affordable housing. Similarly, Green Building Council has always been an energy-efficiency organization that focuses on the building sector, including housing, but they sharpened their focus on affordable housing due to the infusion of WOO-EE funding and due to interactions with other WOO-EE awardees and affiliates.

Table 3.3 tallies the number of grants and PRIs the foundation made according to primary sector and primary activity. Also included is the total dollar amount provided to each of these activities, which were: (1) financial innovations and new financing vehicles; (2) program development and business planning; (3) data and benchmarking; (4) policy analysis, program evaluation, and research; and (5) outreach and convenings. Note that we narrowed the seven types of projects and activities originally articulated by MacArthur at the outset of the initiative and listed above into the five categories shown in Table 3.3 based on the WOO-EE recipients’ own accounts of their activities from final reports to MacArthur and from our interviews. As above for sectors, to avoid double-counting awards, we assigned each of the 33 grants and six PRIs to a primary activity. But, in practice, we observed that approximately one-third of recipients used

⁶ According to foundation records, \$7,135,000 was approved and \$7,000,000 was awarded, although a portion of one \$200,000 grant was subsequently returned after early completion of the work.

Table 3.2
Investments in WOO-EE Activities by Primary Sector of Awardee

Period and Award Type	Primary Sector of Recipient	Awards	Amount Awarded
Pre-WOO-EE Years (2009–2011)			
Grants + PRIs	Affordable Housing Owners and Advocates	6	\$1,465,000
	Energy and Environment	1	\$500,000
	Finance	4	\$8,500,000
	Other	3	\$900,000
Total across all sectors		14	\$11,365,000
WOO-EE Years (2012–2015)			
Grants	Affordable Housing Owners and Advocates	9	\$2,150,000
	Energy and Environment	22	\$5,050,000
	Finance	0	\$0
	Other	2	\$300,000
PRIs	Affordable Housing Owners and Advocates	3	\$10,000,000
	Energy and Environment	2	\$5,000,000
	Finance	1	\$5,000,000
Total across all sectors		39	\$27,500,000

NOTES: Authors' categorization of foundation WOO-EE grants and PRIs.

Table 3.3
WOO-EE Grants and PRIs, by Primary Sector of Grantee and Primary Activity of Award

Sector	Affordable Housing Owners and Advocates	Energy and Environment	Finance	Other	Total Awards	Total Amount Awarded
Primary Activity						
Financial innovations and new financial vehicles	4	7	1		12	\$21,925,000
Program development and business planning	2	2			4	\$1,150,000
Data & benchmarking	1	2			3	\$700,000
Policy analysis, program evaluation, and research	1	5		1	7	\$1,200,000
Outreach and convenings	4	8		1	13	\$2,525,000
Total Awards	12	24	1	2	39	
Total Amount Awarded	\$12,150,000	\$10,050,000	\$5,000,000	\$300,000		\$27,500,000

NOTES: Authors' categorization of foundation WOO-EE grants and PRIs.

their funding to engage in more than one activity and employed more than just the one-out-of-seven types of activity to which the foundation had originally assigned them. As an example, ACEEE used a 2014 grant to both conduct research *and* host a conference. We classified this grant as primarily a research activity, although it also related to outreach and convenings. In the next several subsections, we describe and provide examples of each of the five activities.

Financial Innovations and New Financial Vehicles

The foundation made six grants and six PRIs totaling \$21,925,000 in this activity area. A program officer characterized many of these as “reimagin[ing] or reformulat[ing] what’s already being offered in the private sector, and making it work for housing that has to take on government subsidy.” For example, the foundation awarded a \$5 million PRI to Connecticut-based Housing Development Fund in 2015 to create three loan funds. The loan funds were used to finance the cost of predevelopment and EE upgrades in multifamily affordable rental properties, with the goal of increasing the number of rental projects able to make energy-system upgrades and reduce operating expenses. Other grants in this activity area included two to the VEIC to design and launch a PPESCO to make capital available to building owners for comprehensive efficiency, alternative fuels, and renewable energy services. Two additional grants were made to pilot on-bill financing in Oregon and California, respectively. All constituted new innovations rather than extensions of existing programs, which were included under the next activity as “Program Development” even if financial in nature.

Program Development and Business Planning

The foundation invested \$1,150,000 in grants to help primarily four organizations to expand or deepen their ongoing work. Several of these grants were to create new platforms for providing financial or technical support to owners and operators of affordable multifamily housing interested in EE. For example, the foundation provided a \$300,000 grant to ACTION Housing to plan for a Pennsylvania-wide multifamily energy-efficiency enterprise, a “one-stop shop” modeled in part on Elevate Energy’s activities in this space (see the Elevate Energy case study in Chapter Four). This activity category also included \$500,000 for Enterprise Community Partners to develop a business plan to deliver EE services to the affordable multifamily sector. While each of the five activity areas described here is arguably in service of the others, the program-development activity area particularly overlaps with financial innovations, in that these grants to expand the capacity of organizations or to spawn new platforms were made to some of the same organizations (e.g., VEIC) that also received grants or PRIs to test or expand *new* financial vehicles for investments in EE for building technologies.

Data and Benchmarking

The foundation made three grants totaling \$700,000 for activities related to improved data and benchmarking for energy efficiency, making this the smallest WOO-EE activity area in terms of total financial investment. A foundation officer described data as the “lynchpin” for energy efficiency because, without it, it is not possible to quantify use, cost, and savings, and to capitalize future savings to fund up-front costs in energy efficiency. In this area, the foundation allocated two grants to the Environmental Defense Fund (EDF) for the Investor Confidence Project, which assembled existing energy-efficiency standards and practices into Energy Performance Protocols. The purpose of the protocols was to standardize a system for developing and measuring energy-efficiency projects for adoption by government agencies, project developers, inves-

tors, and banks. The third grant was to the New Buildings Institute, which created a new tool called Virtual Energy Assessment via FirstView to address utility program barriers to energy efficiency. These derived from the insight described in the first section of this chapter that there was the need for a system by which the energy efficiency of buildings could be assessed.

We note that several data-related activities that the foundation funded or took part in fell outside of official WOO-EE activities and awards, some of which are still ongoing. For example, before WOO-EE had officially started, MacArthur awarded a grant through WOO to SAHF for the development of what became the Bright Power energy scorecards, to which MacArthur provided WOO nonprofit owners/developers a subscription. Another example is that MacArthur program officers, awardees, and affiliates participate in, both formally and informally, numerous convenings and task forces that discuss or directly work on data standardization. Some of these have fallen outside the formal WOO-EE initiative and funding stream. For example, building on their knowledge from WOO-EE, MacArthur staff have participated in a task force of approximately 30 members, including representatives of lenders, borrowers, foundations, and federal agencies, that meets twice yearly and discusses, among other related topics, standardization of the data taxonomy for energy efficiency. Finally, at least two of the grants that we classified herein as falling primarily under the “outreach and convenings” activity (which were made to the Institute for Market Transformation) were directly related to data and benchmarking.

Policy Analysis, Program Evaluation, and Research

The foundation made seven grants that totaled \$1,200,000 in this area. Grants ranged from \$125,000 to \$200,000 and were primarily for research papers on applied topics such as net metering, utility EE programs for multifamily rental housing, and financing models for retrofits.

For example, the Energy Foundation created a series of reports on scaling up the building-retrofit and industry market as applied to multifamily and other sectors. The Citizen’s Utility Board worked with the state of Illinois on smart-grid roll out. The Fuhrman Center published a research report documenting the regulations governing utility costs in subsidized housing and conducted an empirical analysis of the utility consumption levels of subsidized housing in New York City (Pazuniak, Reina, and Willis, 2015). ACEEE led a utility working group, composed of electric and gas utilities interested in implementing programs to reduce energy use in multifamily buildings within their service areas. As a part of the working group, ACEEE created technical resources for utilities (among other groups) to help administer multifamily EE programs, and produced a study exploring ways to measure the benefits of EE retrofits in multifamily buildings (Cluett and Amann, 2015). Reflecting the foundation’s emphasis on cross-sector collaboration and policy through practice, many of these reports or policy analyses were done in concert or shared with working groups, or were presented on panels of experts at industry meetings, in working groups, or to policymakers such as at HUD.

Outreach and Convenings

In the final activity area, the foundation made 13 grants totaling \$2,525,000 for outreach and convenings, including peer exchange and advocacy activities. The general purpose of this activity category was to make multifamily property owners, advocates, and utilities more aware of the savings available to property owners from energy-efficient appliances and building technologies, and more aware of each other as organizations and technical resources. MacArthur also sought to increase awareness of financing for up-front costs of energy-efficiency upgrades. To effect these

goals, MacArthur Foundation supported organizations that organized summits, conventions, road shows, and workshops. A sampling of these activities is listed below:

- In 2013, the Urban Land Institute held a series of sessions on energy efficiency at its conference *Building the Resilient City: Risks and Opportunities*. The purpose of the sessions was for attendees to share how communities can be resilient in the face of adverse events caused by climate change.
- In 2014, the Energy Foundation held Multifamily Advocates meetings to develop state-level strategies in multiple states, and to connect housing and energy organizations.
- In 2014, ACEEE hosted the second Small Lenders' Energy Efficiency Community (SLEEC) meeting. Later that year, ACEEE's Buildings and Finance Teams presented their upcoming work on these topics to the Multifamily Utility Working Group. ACEEE was an "anchor grantee" (according to a program officer) based on their ability to identify and bring utility-sector representatives from around the country to work with affordable housing owners and advocates. These cross-sector conversations identified what service utilities could offer to owners (e.g., technical engineering support) and helped work out ways to realistically design energy-efficient upgrades for multifamily rental owners.
- In 2014, the U.S. Green Building Council organized an Affordable Housing Summit focused on the cross-sector convergence of community sustainability. It also incorporated affordable rental housing into the program of what is the largest conference in the United States on green building and design.
- In 2015, the National Housing and Rehabilitation Association hosted a series of "road shows" about energy efficiency for multifamily affordable housing owners, managers, and developers across the country and created an online forum where participants can access resources and connect with peers and vendors.
- In 2015, the Passive Housing Institute hosted its tenth annual passive housing conference, which thematically focused on multifamily building topics. Whereas the foundation originally went into WOO-EE thinking that LEED standards would dominate the market, the Passive Housing grant reflects the maturation of thinking around EE and the development of new ways to approach energy use. In this case, the passive housing approach emphasized design techniques for energy use.

Conclusion

The MacArthur Foundation awarded 39 grants or PRIs that totaled \$27.5 million between 2012 and 2015 for the specific purpose of increasing energy-efficiency investments in multifamily affordable rental properties. With the grants and loans, WOO-EE recipients undertook activities that we classified into seven activity areas, ranging from innovating new financial vehicles, to creating methods to standardize energy-efficient investments, to research and convenings. To foster cross-sector collaboration, the foundation awarded grants to groups that traditionally work in affordable rental housing, such as owners/developers and affordable housing advocates, as well as to groups not traditionally working in affordable rental housing, such as energy companies, utilities, and environmental advocates.

WOO-EE was a direct product of program officers' experience with and learning from WOO. The seed for WOO-EE was the realization on the part of WOO affordable housing

owners that energy costs were both more variable and more controllable than previously understood. But WOO-EE also diverged somewhat from WOO by working more explicitly outside (as well as inside) the affordable rental housing industry. Namely, WOO-EE focused on both the for-profit and nonprofit developer sectors (e.g., by making grants to Urban Land Institute, U.S. Green Building Council, New Building Institute, and Home Performance Coalition) and on bringing together the industries of energy and affordable housing (e.g., by making grants to IMT and ACEEE as well as to grantees previously involved in WOO, such as Network for Oregon Affordable Housing [NOAH] and Enterprise Community Partners). Consequently, WOO-EE devoted a greater share of its investments to cross-sector collaboration than did the WOO initiative overall. Finally, in WOO-EE, the foundation took risks in its PRIs by not only creating loan funds, as had been done in WOO, but also by issuing PRIs to organizations to form new energy-service companies, to develop and implement on-bill repayment structures, and to install rooftop solar panels at affordable multifamily properties. Two examples of how recipients put PRIs to use are described in the next chapter.

Case Studies of Energy Efficiency in Affordable Housing in Window of Opportunity

In this chapter, we present two case studies of WOO-EE recipients that illustrate two different approaches to developing, financing, and deploying EE in affordable multifamily rental housing. We selected these in consultation with the MacArthur Foundation to highlight two types of businesses in which the foundation substantially invested via multiple grants and loans. These case studies therefore represent a sizable proportion of the overall investments made via WOO-EE, providing insight into the types of activities and approaches that the foundation was most interested in supporting. The purpose of the case studies is to document the business approach taken by each organization and the lessons learned by each about EE investment in multifamily rental housing. These lessons contribute to the concluding chapter about future directions for EE in multifamily rental housing.

The first case study is of Elevate Energy, a widely recognized success story from the MacArthur Foundation's broader investment in WOO and in WOO-EE in particular. Elevate Energy was the creation of another long-time MacArthur-supported organization, CNT. As one foundation staff member put it, placing a bet on the newly formed Elevate Energy "paid off big."

The second case study is of the nation's first public-purpose energy-service company (PPESCO), called Commons Energy and located in Vermont. It was launched in 2014 to serve the multifamily affordable rental market, among other mission-oriented sectors, which are typically not served by for-profit ESCOs, as described in Chapter Two. The PPESCO has had some accomplishments, which we note, but is still in the stage of testing the new business model.

These two case studies illustrate the types of activities undertaken by PRI recipients, with a focus on the practical or structural aspects that enabled or hindered successes. Although they are somewhat unique in the sustained level of support they received from the foundation, the lessons learned from them can still usefully inform other jurisdictions or organizations interested in replicating similar initiatives.

For these two case studies, we draw on prior published reports about the organizations, the grantees' reports to the MacArthur Foundation, and interviews of staff at the two organizations. We note that although the activities of both the organizations in these case studies have previously been documented and profiled,¹ the case studies included here are focused spe-

¹ For example, previous case studies have focused on Elevate Energy's multifamily efficiency program more broadly and include a profile in a 2011 HUD newsletter (HUD, 2011), a 2011 ACEEE blog post (Mackres, 2011), and a feature as a Better Buildings Residential Network case study in 2016 (DOE, 2016).

cifically on MacArthur-funded activities and their alignment with and support of the specific objectives of the WOO-EE initiative.

The Rise of a Nonprofit Industry Leader from an Ecosystem of Organizations: Elevate Energy

Foundation Investments in the Preservation Compact

In 2007, the foundation identified Chicago as one of two “key cities” in which it concentrated WOO and, subsequently, WOO-EE investments. Much of the WOO funding for Chicago-area work supported, directly and indirectly, the Preservation Compact (TPC) in Cook County.² TPC is an initiative that included “government agencies, nonprofits, building owners, tenant advocates, and other housing stakeholders in a public/private-sector partnership. . . . It was a staging ground to foster sustained interagency collaboration to identify local needs for preservation, develop policies and instruments to address those needs, and then implement and refine them” (Schwartz et al., 2016). Community Investment Corporation (CIC) serves as the coordinator for the Preservation Compact. Elevate Energy is an energy-focused organization that spun off from the CNT.

The TPC partners identified energy use early on as a key variable cost that can impact the viability of affordable rental housing. To help control energy costs in affordable rental housing, Elevate Energy and CIC created an energy saving program and complementary loan product in 2007. Elevate Energy is a “full service” organization that guides owners and managers from energy assessment to completed retrofit. The companion Energy Savers Loan program provides low-interest loans to cover the costs of retrofitting that are not covered by utility incentives or rebates. Although initially Chicago-focused, both programs have since expanded statewide. The program and corresponding low-interest loan was one of two “key accomplishments” highlighted in the previous evaluation of the broader WOO initiative (Schwartz et al., 2016), and “Energy Retrofits” is one of six “key activity areas” today for TPC.³

All combined, the foundation awarded Chicago-based organizations approximately \$37 million of the initial WOO funding⁴ and \$1.65 million of WOO-EE funding.⁵ This \$38.7 million comprised 18 percent of the total funding for WOO and WOO-EE. Table 4.1 shows that 20 percent of these Chicago-area investments went directly to Elevate Energy and CIC. The table summarizes the EE-related funding over all the phases of the WOO initiative. More specifically, direct resources for EE included \$700,000 in grants for CNT and \$6 million

² A majority of the nongovernment organizations that are TPC members have received financial support from the MacArthur Foundation for activities related to TPC and, in some cases, for other complementary initiatives not within the WOO initiative.

³ TPC key activity areas are listed at TPC (undated).

⁴ The initial \$187.6 million investment was awarded as 207 separate grants and PRIs, of which 44 separate grants and PRIs went to Chicago-based, and largely Chicago-focused, organizations. The total Chicago investment constituted 16 percent of PRI (\$20 million) and 30 percent of grant (nearly \$17 million) funding.

⁵ In addition to Elevate Energy, Illinois-based Citizen’s Utility Board (CUB) received a \$500,000 grant under WOO-EE. CUB worked directly with Elevate Energy in a number of efforts (e.g., development of draft legislation).

Table 4.1
Direct Funding to CNT, CIC, and Elevate Energy for Energy-Efficiency Activities in WOO

Recipient	Amount	Year	Purpose
Pre-WOO-EE Years (2007–2011)^a			
Center for Neighborhood Technology (CNT)/Elevate Energy	\$300,000	2007	Grant to create a program to improve EE of nongovernment-assisted multifamily housing
CNT/Elevate Energy	\$400,000	2010	Grant to create a program to improve EE of nongovernment-assisted multifamily housing
Community Investment Corporation (CIC)	\$1,000,000	2008	PRI to create a program to improve EE of nongovernment-assisted multifamily housing, specifically in support of a new Energy Savers Loan Fund for the Preservation Compact of Cook County
	\$5,000,000	2011	PRI to increase the lending capacity of the Energy Savers Loan Fund
<i>Total WOO</i>	<i>\$6,700,000</i>		
WOO-EE Years (2012–2015)			
CNT Energy/Elevate Energy ^b	\$500,000	2012	Grant in support of capacity building for Energy Savers
CNT Energy/Elevate Energy	\$75,000	2012	Grant to support Wisconsin's Focus on Energy initiative for affordable housing
Elevate Energy	\$100,000	2014	Grant to support research and presentation for National Governors' Association on EE potential and ways to scale
Elevate Energy	\$250,000	2014	Grant to expand EE financing options for affordable multifamily housing
<i>Total WOO-EE</i>	<i>\$925,000</i>		
Total WOO+WOO-EE	\$7,625,000		All funds for Elevate Energy, CNT Energy, and CIC which were specific to EE activities in WOO+WOO-EE

SOURCES: MacArthur Foundation grant and PRI documentation provided to authors.

^aAll grants and PRIs in this period were specifically in support of/coordinated with the efforts of The Preservation Compact.

^bCNT founded CNT Energy, which rebranded as Elevate Energy in 2014.

in PRIs for CIC for initiatives specifically targeting EE as part of the Preservation Compact's broader suite of activities.⁶

Grants and Activities of Elevate Energy under WOO-EE

As noted, Elevate Energy was spun off from CNT, a move made possible in part by MacArthur Foundation support. Through their multifamily energy efficiency program, Elevate Energy has provided Illinois multifamily residential owners technical services that include building audits and assessments, technical advice and strategies to save energy, consulting on accessing financing, construction oversight and postretrofit building inspections, and annual reports showing utility-bill savings. Additionally, owners that need help with retrofit financing can obtain resources from CIC through the Energy Savers Loan Fund (Schwartz et al., 2016).

⁶ Additionally, under WOO, CIC received four grants (\$1.65 million in total) and a \$2 million PRI for activities that supported housing preservation more broadly beyond EE. A few years after its inception in 2007, CIC became the coordinating organization for the Preservation Compact in 2011, and Jack Markowski (president/CEO of CIC) became the chair of the TPC Leadership Committee.

In short, the funding received by Elevate Energy under WOO-EE was intended to reinforce and build on momentum in Cook County and to provide lessons learned and technical support to other states interested in expanding the share of resources and attention dedicated to energy efficiency to the affordable multifamily sector.

Key Accomplishments of Elevate Energy

Elevate Energy originally started work in Chicago, then expanded its efforts statewide, and has since spread its work to ten other states (EPA, undated), as described below. Elevate Energy estimates they have kept more than 35,000 apartment units affordable with efficiency improvements, implemented nearly \$58 million in energy saving building improvements, and avoided more than 65,000 metric tons of carbon pollution.⁷ They have also had an influence on other markets and organizations in other regions of the country. Here we provide examples of both direct and indirect accomplishments. Across the full slate of grants and support provided to Elevate Energy and its close affiliates, a few themes regarding Elevate Energy's impact emerge and are described in the next several subsections.

Elevate Energy Has Directly Implemented Significant Numbers of Efficiency Upgrades in Chicago and Illinois

Two of the four WOO-EE grants to Elevate Energy provided resources for activities in the state of Illinois. The \$500,000 grant in 2012 was focused on the Preservation Compact's multifamily affordable housing program in the Chicago area. The second, \$250,000 grant in 2014 also had an emphasis on Illinois, along with neighboring midwestern states. Specific products that were a direct result of this 2014 grant included:

- a loan fund to provide on-bill financing and technical assistance to nonprofit building owners in Northern Illinois
- a shared-savings partnership with water-efficiency performance contractors to include both one-time water-fixture retrofits and ongoing leak detection and repair.

The impact of the multifamily energy program has been quantitatively evaluated on multiple occasions. For example, one technical assessment in 2013 found that the most cost-effective energy savings of the program occurred with measures that addressed heating (e.g., improving the thermal envelope, upgrading or replacing heating and heating distribution systems) (Farley and Ruch 2013). A second evaluation in 2013 found that between January 2010 and September 2012 average natural gas savings for 21 buildings that completed energy efficiency upgrades through the Energy Savers program was nearly 20 percent, with savings reaching 26 percent during the peak heating season months of November through March (Navigant Consulting, 2013). In 2016, an assessment of thirteen Chicago-area multifamily buildings improved through Elevate Energy's program (Philbrick, Scheu, and Brand, 2016) found that:

- Net operating income increased by 2.95 percent (\$55.96/unit) by one year post-improvement.
- Rental incomes increased by almost 2.39 percent (\$227.48/unit) in the year after energy-efficiency improvements were completed.

⁷ Emily Robinson, Elevate Energy, email communication to Aimee Curtright, July 25, 2018.

Both energy and water retrofits completed under the Elevate Energy's program have been found to be cost-effective (Braman, Kolberg, and Perlman, 2014).

Overall, the program has provided EE retrofits to more than 35,000 units in 800 buildings,⁸ financed with more than \$16 million from the Energy Savers Loan administered by CIC.⁹ Participants are estimated to achieve an average utility savings of 30 percent, primarily via reduced gas consumption but with additional savings from electricity and water reduction (DOE, undated).

Elevate Energy Has Influenced the Policy Landscape

Consistent with the discussion in Chapter Two, much of the relevant policy change affected and influenced by Elevate Energy occurred at the state level. For example, in 2009, the Illinois General Assembly created an on-bill financing program for building owners to invest in energy efficiency. This new legislation allowed building owners to invest in EE measures with no up-front costs and to repay the loans over time through surcharges added to their electricity or natural gas utility bills. However, it was available only to owner-occupied buildings containing one to four units, and the program had not seen widespread use. In August 2013, Illinois Senate Bill 2350 was signed into law, modifying sections of the on-bill financing program to expand the program and specifically to allow multifamily building owners to participate. In particular, buildings of up to 50 units became eligible, coordination between gas and electric utilities was increased, and the allowable EE measures were expanded, including enabling them to be bundled with other measures in new ways.

The coalition of organizations that was instrumental in engaging stakeholders, building support, and developing consensus included Elevate Energy and multiple other MacArthur awardees under WOO or WOO-EE (Elevate Energy, 2013; Illinois State Assembly Bill 2350, 2013). More than one interviewee mentioned this particular legislative success. One characterized the progress as obtaining a process for on-bill repayment for retrofits that includes multifamily housing in Illinois. A second interviewee stated that it “really did kind of move the market on [on-bill financing] and really opened up a possibility and . . . it has been pretty successful.” The interviewee further explained that while the state-level EERS is the foundation that “provides the bulk of the funding,” the legislation that Elevate Energy and their affiliates helped create was able to further shape “what types of programs are run and specifically for the multifamily sector.” Elevate Energy continues to encourage broader use of on-bill financing, and to provide resources and advice for building owners to take advantage of this financing mechanism (Keenan, 2015).

Elevate Energy Has Expanded Direct Reach to New Markets and Has Influenced and Educated Peer Organizations in Other Regions

Elevate Energy has expanded their work from the Cook County area to the whole state of Illinois and more broadly in the Midwest. Although still headquartered in Chicago, today Elevate Energy has offices in Springfield, Illinois; Columbus, Ohio; East Lansing, Michigan; and Kansas City, Missouri; the organization engages in significant activities in these four states as well as in Indiana, Delaware, Iowa, and Wisconsin.¹⁰ Elevate Energy has worked in eleven states in total (EPA, undated).

⁸ As of the original WOO evaluation, the estimate was that 20,000 units had been retrofitted, with 5,000 financed through the Energy Savers Loan Fund, totaling \$17.6 million in loans or grants. Average energy-bill savings was estimated to be 26 percent. Elevate Energy's final grant report to the foundation in January 2016 stated that Elevate Energy had “catalyzed upgrades in nearly 25,000 units in 600 buildings.”

⁹ Emily Robinson, Elevate Energy, email communication to Aimee Curtright, July 25, 2018.

¹⁰ Elevate Energy, “Where We Work,” undated.

With their second 2012 grant of \$75,000, Elevate Energy was able to identify and test models to deliver rate-payer funded cost-effective energy efficiency programs to affordable multifamily housing projects in the state of Wisconsin.¹¹ Elevate Energy aimed to increase participation in Wisconsin's statewide EE program, Focus on Energy, by understanding barriers and opportunities unique to this sector. Key outcomes and products made possible by this grant included:

- **Market research.** A review of past experiences for affordable housing owners under Focus on Energy, including data collection and analysis and direct stakeholder interviews.
- **Stakeholder convening.** A meeting to identify the strategies and best practices to increase engagement in Focus on Energy by the affordable housing sector. This included representatives from, and presentations by, organizations from other states (e.g., New York State Energy Research and Development Authority) and at the national level (e.g., ACEEE).
- **Pilot programs to estimate cost effectiveness.** Elevate Energy worked directly with Focus on Energy and its partners to initiate eight pilot activities to engage and serve affordable housing providers in Wisconsin (e.g., On-Bill Finance Pilot).
- **Report summarizing findings of market research.** Elevate Energy produced a report titled *A Snapshot of the Affordable Housing Market in the Badger State, Barriers to Accessing Energy Efficiency Services, and Opportunities for Energy Efficiency Upgrades*.

While the second grant in 2014 was noted above for having some Illinois-focused outcomes, another direct product of this grant included working with the Michigan State Housing Finance Authority and a regional affordable multifamily lender, Cinnaire, to help design a PRI for Cinnaire to finance implementation of energy and water upgrades during the redevelopment process. And with the resources from the first grant in 2014, Elevate Energy developed a publicly available report titled *Multifamily Energy Efficiency Opportunities in the States* that served as a roadmap for states. Building on previous MacArthur-funded research and reports, the roadmap describes why governors and executive-branch agencies would want to encourage and support multifamily energy efficiency in their own states (McKibbin, 2015). As part of this effort, Elevate Energy staff and their partners met directly with officials in eight states.

Elevate Energy's status as a nationally recognized success story is a model and aspirational example for other organizations. In the interviews conducted for this evaluation, we spoke with 36 separate organizations,¹² and individuals from 17 of these 36 (47 percent) specifically mentioned the influence and importance of Elevate Energy, or cited Elevate Energy as an example of MacArthur's success or enduring impact on this sector. Elevate Energy was described as a "forerunner" and a "key player" that has had "a big influence" in this sector. Most of these mentions were responses to general queries about influential organizations or successful models for bringing energy efficiency to the affordable rental market. And several of the organizations that cited Elevate Energy's influence and success came from regions of the country where it does not directly work.

In addition to expanding direct reach into new markets, Elevate Energy—in partnership with Boston-based New Ecology, Inc.—has provided support to other organizations so they can expand their reach. Examples include Michigan Energy Options, ACTION Housing (Pittsburgh, Pennsylvania), and Green Coast Enterprises (Louisiana). One interviewee described Elevate Energy as having "a massive footprint" in that they have created a "network

¹¹ From Elevate Energy's final grant report to MacArthur.

¹² This was in addition to four interviews with MacArthur staff.

of contractor-type firms” working in the affordable multifamily housing sector in multiple markets outside of where they directly serve. In this way, they have been instrumental in “the evolution, the learning that’s going on” and have brought this knowledge to a larger group of “niche service providers that really understand this sector.”

Factors That Enabled the Success of Elevate Energy

Substantial and Sustained Investment by MacArthur for Elevate Energy and Affiliated Organizations

As Table 4.1 demonstrates, Elevate Energy has received sizable investment over approximately ten years from the MacArthur Foundation. This has supported Elevate Energy’s direct involvement in the Preservation Compact, which appears to have been a key ingredient for TPC’s success, and vice versa. Elevate Energy was a direct beneficiary of the sustained infrastructure, partnerships, and knowledge base that were built in the TPC ecosystem. CIC’s Jack Markowski credits the ecosystem that MacArthur funded, saying that it became clear over time and through practice that EE was a tool for the preservation of affordable rental housing. In short, Elevate Energy undoubtedly benefitted from the foundation’s direct investments in them and in the foundation’s focus on the Chicago area and on TPC, but they also used that momentum to build on that regional success to expand their influence and work and become a national leader.

Elevate Energy’s Knowledge of and Appreciation for Place-Based Programming

A key to Elevate Energy’s success has been an understanding of the importance of place-based programming that accounts for local conditions. This is because as an interviewee told us “there is no one-size-fits-all solution for financing multifamily energy-efficiency projects.” This is for both technical reasons (i.e., understanding local markets and customizing products and services accordingly) and relationship reasons (i.e., understanding the importance of a strong reputation and the establishment of trust with customers).

However, the localized nature of Elevate Energy’s business model may make further expansion more challenging. As one interviewee put it, “Elevate Energy has a model that works in the Midwest” but that may not translate as well to coastal states.¹³ Another interviewee noted the regional variation in the split-incentive problem: In the Midwest substantial utility burdens fall on building owners and operators due to pervasive master metering, whereas the West Coast, for example, tends to have tenant-metered utilities, such as for electric heat.

Establishing trust was noted by multiple interviewees to be an important ingredient for success, and this is only possible through a hands-on, place-based approach. Because of a lack of trust in utility companies (as one interviewee put it, “We all love to hate our utilities”), Elevate Energy’s status as a third-party nonprofit is beneficial. Elevate Energy’s long-time collaborator, CIC, stressed that “word of mouth among owners is the most powerful. . . . You know the examples of who’s installed a retrofit, and how much it’s benefited them and their building. I mean that’s the most powerful marketing that we have.” This trust leads to expansion of projects, with the same owners and new ones. As Elevate Energy’s CEO Anne Evens said, “This only happens if they know and trust you. Once you’ve worked with a building owner and they see the benefits . . . they may come back and work with Elevate Energy.”

¹³ As noted in the closing section below, this interviewee asserted that the Elevate Energy model was applicable only to “non-rent-restricted properties, to market-rate properties, where there’s no pressure, it doesn’t give the landlords that investment, it doesn’t give the landlords a leg up to raise rents in all the low-income renters after the retrofit.”

The importance of a local intermediary is one that a national lender stressed. Even as loan products or types of services may go to a national scale, this lender underscored the continued need for face-to-face, hands-on services from a trusted local entity, pointing out that it is something a national intermediary would not be able to provide.

Elevate Energy's Cross-Sectoral "One-Stop Shop"

Elevate Energy described the different types of expertise that need to come together to make energy-efficiency projects happen in affordable housing as a “bag of tricks.” These elements span traditional silos of expertise: technical expertise by private-sector contractors, well-aligned policy or regulatory incentives that need to be established by policymakers, financial-sector players willing to risk an investment in the affordable housing sector, and building owners’ and operators’ awareness of EE services. In short, “you need requirements and incentives and information,” but they are “not sufficient.” Building owners and operators also have to know about these things and be able to connect those dots.

Several unaffiliated interviewees praised Elevate Energy for appreciating and attending to the cross-sectoral nature of the task. In other words, success in bringing energy efficiency to the affordable housing sector is not just about energy audits and data collection, but is equally “about real estate” and “about mortgage processes.” Elevate Energy’s own grant report summarized it as follows: “Implementation and financing need direct and strong links. A willing and able financial partner requires a strong implementer to realize project execution. This is the fundamental nature of the ‘One Stop Shop’ approach to project planning, financing, and execution.”

The head of CIC noted that many financial entities such as CIC “don’t necessarily have a partner like Elevate Energy.” In the CIC-Elevate Energy relationship there is a “merger” of “information and energy expertise on the one hand, along with the financing.” This kind of partnership “takes the risk out” of the investment for the financial agency. He stressed the “importance of the technical energy assistance. And there is no built-in source for that. I’ve seen many finance agencies like ours around the country who don’t have the . . . expertise of an Elevate Energy . . . and it’s not easily supportable in a financing program to incorporate that.”

Elevate Energy's Ability to Find a Simple, Practical Approach

Elevate Energy was described by one interviewee as one of a small number of organizations that “exemplify practical approaches to energy efficiency.” As the interviewee put it, in the energy and environmental sectors, “being practical is cutting edge.” As Elevate Energy’s long-time financial partner CIC said, “our program has been very unexotic . . . very pedestrian nuts and bolts . . . meat-and-potatoes-type programs; we do not have exotic technologies.” It is only in recent years, as solar costs have come down, that Elevate Energy has begun making solar energy part of their portfolio, in combination with the more mature, highly cost-effective EE technologies.

One of the most basic services provided by Elevate Energy is to bring expertise and to eliminate “the cost of buying that information.” As one foundation staff member noted, “A very high percentage [of building owner clients] never use the financing. They just use the free audit [to learn what they] needed to do and then they used a contractor. So, Elevate Energy provides a free audit that’s funded by the utilities, and then they also have all these approved contractors. And so they took a lot of complexity out and people would say, ‘Oh, that’s all I need to do and I can get those savings?’”¹⁴

¹⁴ The MacArthur staff member estimated that only about one-third have used the financing, out of ~20,000 apartments, through CIC.

Future Directions for Elevate Energy

Elevate Energy continues to expand its programs and move into new markets. Notably, Elevate Energy is increasingly engaging in advocacy and projects related to renewable energy for low-income households in general, and community solar in particular. Recognizing the inability of most individuals to install rooftop solar panels on their homes—for example, because they cannot afford the up-front capital costs or because they rent or live in multifamily homes—community solar is gaining interest in general and has become a focus for Elevate Energy in particular (Elevate Energy, 2015).

The Illinois Future Energy Jobs Act was passed in 2017, in part due to the advocacy and input of Elevate Energy, their affiliates (e.g., fellow-MacArthur WOO-EE grantee Citizens Utility Board), and an even broader coalition of stakeholders (Elevate Energy, 2017b; Future Energy Jobs Act, undated). The act promises to expand community solar and to bring job training to a broader, more diverse set of individuals. Both elements directly target the goals of increased equity and access to the benefits of solar deployment. In addition to executing community solar projects, Elevate Energy is a recipient of one of four awards from the state to engage in contractor training (Citizens Utility Board, undated; Elevate Energy, 2018). Elevate Energy’s annual report for 2017 noted that they had identified 15 pilot sites for community solar installations (Elevate Energy, 2017a).

This work will build on Elevate Energy’s previous experience and reputation in energy efficiency, and will enable expansion of more benefits to owners and residents of affordable multifamily housing. In a continuation of the place-based work that Elevate Energy performs, an interviewee told us, “Maybe [the building owner has] worked with us before and . . . their building works better and they notice that, and they want to then work with us across their portfolio of buildings . . . and . . . identify a plan to . . . green their entire portfolio. And then we’ll go back to them five years later when there’s a new, better technology for whatever it is, or . . . there’s a new policy [or] a better economic case to make to install solar on their building that wasn’t there five years ago.” In this way, the cycle of investment and improvement in multifamily affordable housing can continue.

Lessons Learned by Elevate Energy

Some of the key take-aways that are potentially applicable for other organizations and localities interested in leveraging energy efficiency as a tool for preservation include the following:

1. Relationships are important, and there is no substitute for being a trusted partner. Local intermediaries like Elevate Energy are so valuable because the relationship underpins and supports execution of the other lessons learned.
2. Building owners and operators in general, but of multifamily rental housing in particular, do not have the expertise or bandwidth to execute EE upgrades and retrofits. The process is time consuming, and it takes attention away from more salient concerns such as keeping buildings fully occupied.
3. Upgrades, especially deep retrofits, are best timed with natural transaction points and in the life cycle of scheduled (and unscheduled) maintenance.
4. Relatedly, success is more likely when EE implementation and financing have direct and strong links. A willing and able financial partner requires a strong implementer to realize project execution.

5. There is no one-size-fits-all solution for financing energy-efficiency projects in multifamily residential buildings. For example, loan products must be tailored to the needs of the specific market, including local and regional regulations, utility markets, and real estate pricing.

An Experiment in Bringing a For-Profit Model to Affordable Multifamily EE Finance: VEIC, Commons Energy, and the PPESCO

Overview of VEIC and Commons Energy

Through WOO-EE, the MacArthur Foundation was explicitly interested in developing and piloting new models for financing EE in affordable housing. Providing funding for the non-profit Vermont Energy Investment Corporation (VEIC) and their for-profit subsidiary Commons Energy was one of six experimental projects in which the foundation invested. VEIC's mission and work were well aligned with the objectives of the WOO-EE initiative. It was launched in 1986 with a mission of

the promotion and encouragement of conserving precious natural resources, reducing energy costs for consumers, particularly low-income consumers and entities serving low-income consumers, and engaging in economic development activities which benefit the community as a whole and promote the well-being and self-determination of its low-income members.

In 1989, VEIC entered into one of the nation's first public-purpose, nonprofit energy performance contracts with the Burlington, Vermont, Housing Authority. In 1999, VEIC won a contract with the Vermont Public Service Board to launch Efficiency Vermont, the first energy-efficiency utility in the United States. As one unaffiliated interviewee put it, VEIC and Efficiency Vermont "achieved load reduction [i.e., reductions in consumer demand] before anybody else did." VEIC celebrated their twentieth anniversary with a goal: "Our work will result in reducing 20 million tons of greenhouse gas emissions per year by the year 2027. . . . We will ensure that at least 10% of the greenhouse gas emissions and fiscal savings we create in 2027 will be from work that benefits low-income people" (<https://www.veic.org/company/our-story>).

MacArthur's first investments in VEIC were explicitly intended to launch the public-purpose energy-services company (PPESCO) experiment, taking a proven private-sector EE concept into the mission-oriented work of preservation of affordable housing. As one non-VEIC-affiliated interviewee told us, "Unless and until there's a solution to the financing [for nonsubsidized affordable multifamily housing], ESCOs won't go anywhere near the market segment."

MacArthur Foundation's initial investments made the launch of Commons Energy possible by serving as the anchor support, with additional funding from several other organizations, including the Kresge Foundation, the National Housing Trust (NHT), and the Vermont Housing and Conservation Board. Commons Energy was launched in 2014 as "a public purpose energy services company designed to reduce energy costs for multifamily housing and other public-serving buildings" (VEIC, 2014). Commons Energy was created to be "the nation's first public-purpose Energy Services Company," with the goal of increasing options for building owners interested in EE upgrades and not well served by the traditional ESCO market. Commons Energy's goal was to support investment in 90 multifamily affordable rental housing projects (approximately 4,500 units) by the end of its first five years of operation.

Table 4.2
Funding for VEIC and Commons Energy Under WOO-EE

Recipient	Amount	Year	Purpose
VEIC	\$400,000	2012	Grant to support development of PPESCO
VEIC	\$350,000	2014	Grant to support PPESCO operations
Commons Energy	\$4,750,000	2014	PRI, 15-year, 1% interest rate
Commons Energy	\$250,000	2014	PRI, 5-year, 2% interest rate
Total	\$5,750,000		

SOURCES: Grant and loan documentation provided by MacArthur Foundation to the authors.

Grants and Activities Under WOO-EE

Although MacArthur did not provide nearly the same size and duration of investment in VEIC as it did in Chicago for the Preservation Compact, the foundation did provide four separate awards to VEIC and Commons Energy; these are shown in Table 4.2.¹⁵ Direct investment by MacArthur in VEIC first occurred in 2012, and the two PRIs awarded to Commons Energy in 2014 are still ongoing. Specifically, in late 2012, VEIC received a two-year grant for \$400,000 to develop a PPESCO business model that “yields greater customer savings, substantially reduced energy use, and dramatically lower carbon emissions” (Table 4.2). In our interviews with VEIC staff, they described this as their “R and D period,” in which they identified four sectors for experimenting with the PPESCO model: affordable housing, health care, education, and municipal/community.

After this initial period of market research, VEIC obtained a second, one-year grant for \$350,000 to launch the PPESCO. Then in the fall of 2014, the MacArthur Foundation awarded two PRIs to the newly formed Commons Energy, a low-profit limited liability corporation (L3C)¹⁶ and wholly owned subsidiary of VEIC. Although the new PPESCO was intended to serve a variety of public purposes, MacArthur’s PRI resources were earmarked specifically to address the unmet needs in the affordable multifamily sector. The two loans were to be used as follows: (1) the first PRI (\$4.75 million) was for working capital for operations and to provide direct loans to client business owners for property upgrades; (2) the second PRI (\$250,000) was for an initial reserve for the start-up to mitigate risk in the event that actual savings from an EE upgrade fell short of projected, guaranteed savings.

¹⁵ As described in the original WOO evaluation, the foundation funded a \$35 million initiative called State and Local Housing Preservation Leaders to “improve state and local context for large nonprofit owners by funding public-sector partnerships to develop state preservation strategies and infrastructure.” Under this initiative, the Vermont Housing and Conservation Board and the Vermont Housing Finance Agency received a \$600,000 grant and a \$2 million PRI, respectively, to “Accelerate preservation of and reinvestment in affordable rental housing through targeted outreach and technical assistance for private owners and nonprofits, energy efficiency, predevelopment, bridge loans, and a demonstration using Medicare/Medicaid for supportive services for senior housing.”

¹⁶ According to MacArthur documentation, “An L3C, also called a Low Profit Limited Liability Company, is a for-profit, social enterprise venture that has a stated goal of performing a socially beneficial purpose, not maximizing income. It is a hybrid structure that combines the legal and tax flexibility of a traditional LLC and the branding and market positioning of a social enterprise. The L3C was created to help organizations attract investment capital from socially minded investors, including private foundations.”

Accomplishments to Date for VEIC and Commons Energy

VEIC staff and other interviewees view the PPESCO experiment as a story that is still unfolding. Their main accomplishments thus far include the following:

- Publication of a report documenting their research and experience, and development of an online, open-source site to share information and exchange ideas about the PPESCO concept and their initial experience to date, available at <https://www.ppescohowto.org/about-ppesco>.
- Successful execution of a number of initial projects, including a renewable-energy biomass fuel-switching project in an affordable multifamily building in Montpelier, Vermont.¹⁷

Commons has been able to distinguish itself from its ESCO competition in three ways:

- First, by capitalizing on trends in social investing to distinguish VEIC as a more trusted adviser than an ESCO seeking to sell its own technology. Commons has been able to use its status as an L3C to obtain “significant participation from CDFIs . . . social entrepreneurs, private investors.” Because Commons is a mission-oriented organization, an interviewee told us it is seen more as a “trusted adviser” that is “technology indifferent” and can thereby better talk to customers “about what their best options are. Not what we’re trying to sell them.”
- Second, by serving smaller clients. The “sweet spot” for Commons deals is in the \$200,000 to \$1 million range, which is smaller than ESCOs typically participate in (see discussion in Chapter Two).
- Third, by investing in more EE than its ESCO competitor. For example, not only do they implement standard technology fixes like lights and fans; they also address insulation and air infiltration.

Key Challenges for VEIC and Commons Energy

The first challenge, which was hardly unique to Commons Energy, is the risk not only of starting a new business, but of starting one that is the first of its kind. As with most new businesses, clients often do not want to be the first. Rather, they would prefer to wait for Commons Energy to test out their products and services on others and “come back to me then.”

There are also the challenges in serving affordable multifamily rental housing that have kept traditional ESCOs away from working with this sector (with the exception of public-housing authorities). VEIC’s feeling was “if we could make it there [working in affordable multifamily rental], we could make it anywhere. . . . It has proven to be a very difficult market.”

With smaller projects than ESCOs, the PPESCO lacks economies of scale, which means that VEIC needs to aggregate larger, more profitable projects with smaller, less profitable ones. Recognizing this, the MacArthur Foundation anticipated that the PPESCO’s focus on smaller projects and its multisystem approach would mean that Commons Energy’s clients would require a repayment period of ten to 15 years, as compared to the more typical five- to ten-year repayment period that ESCOs seek. To address this challenge, the foundation issued a 15-year rather than a ten-year PRI, and it also provided the second PRI as a cash reserve so that, as a new

¹⁷ This project was able to convert the 36-unit River Station LIHTC project from oil heat to pellet-fueled biomass heating (Commons Energy, undated).

business, Commons could assure customers they would be still operational in future years to pay the customer should EE investments reap smaller savings than originally projected. VEIC sought and obtained financial backing from MacArthur and Kresge, both of which have “proven to be absolutely pivotal” because their backing has “generated more willingness for people to keep talking and be willing to provide capital than . . . anything else.”

In addition to the challenges of working on smaller deals, the fact that energy prices have come down reduces the profitability of EE upgrades. Staff quipped that, when VEIC launched Commons, “fuel prices were twice” as high as they were at the time of our interviews. Figure 2.1 indicates that the magnitude of this change was not quite so dramatic at the retail level, but the change was nevertheless substantial. Energy costs are still disproportionately burdensome for low-income households (Figure 2.2), but lower overall energy costs have hurt the business case for EE in the short run and have eroded margins for EE upgrades that reduce the use of natural gas (e.g., natural gas boilers or water heaters, installing building insulation in colder climates).

The main competition for Commons has turned out to be other models for funding EE upgrades and local service providers of energy services, not ESCOs. For example, one interviewee told us that CDFIs are figuring out ways to finance EE retrofits in multifamily rental housing themselves rather than partnering with the PPSECO, as was originally assumed would occur. In this person’s words, they “use their own service providers, use their own financing, fold it into their capital budgets and figure it out.” As described in Chapter Two, ESAs are newly emerging alternatives to ESPCs. The advantage of an ESA is that, unlike an ESPC, it does not add a liability to the balance sheet of a housing deal. Also, at the time the PPESCO had started, there were fewer service organizations, which have since grown in number and in the amount of territory they cover. Although Commons Energy guarantees its clients that the benefits it provides will equal or exceed the costs of EE upgrades, the availability of a service-provider network suggests less demand for Commons than originally projected.

Lessons Learned Thus Far for Commons

Commons is in its fourth year of a 15-year PRI from MacArthur, so it is too early to tell if PPSECOs like Commons can find a unique, successful place in the market. Early signs, however, are that the market is going in a different direction. For example, the trend of commercial lenders underwriting EE savings and bundling the cost of EE investment into first or second mortgages is a sign that energy finance could become “business as usual.”

Although the experiment is still in an early stage, interviewees identified the following initial lessons thus far:

1. **Trust is important.** A key selling point for Commons has been its ability to be a neutral adviser to clients that does not profit from placing or selling technology in which Commons has a financial stake.
2. **Pairing organizations with core competencies in each aspect of the business is important.** As illustrated by the Elevate Energy case study—which highlighted the importance of a partnership being formed by two organizations that have financing and energy expertise (CIC and Elevate Energy in that example)—a key ingredient for Commons to obtain investment has been to partner with other organizations that have core competencies in each aspect of the sectors in which Commons works. For example, Commons partners with NHT, which is the lead underwriter for Commons’s housing loans. Similarly, within the organization, it has been important to pair individuals with

“complementary . . . expertise and background and decades of business in the private sector with a very, very strong personal commitment historically to mission wrapped in a mission organization.”

3. **Standardizing smaller projects is a way to find economies of scale.** Given that fixed costs render smaller projects more difficult to make economically viable, Commons figured out a way to lower the fixed costs of scoping out EE projects and raising capital for them by creating what they call a “conforming transaction.” The idea is that Commons has a way to easily describe for funders and for their own level of effort a typology of transactions, where that typology specifies sector, scope of work, oversight, verification, and projected savings.
4. **Offering financing is optional.** Commons has been surprised by how many clients have sought other services from them, such as technical advice, while obtaining financing elsewhere. A lesson learned from other businesses was to avoid relying too heavily on transactions in which a loan from Commons would be essential to making the investment occur. In their words, “Leading with financing is not a winning strategy.” Instead, Commons divides its services into four activities that can, but need not, be bundled together: technical assistance, general-contracting oversight, commissioning (i.e., verifying that the project is complete and the savings will endure), and financing.
5. **Interacting with and educating the client is important.** Working with smaller clients who are in nonprofit or mission-oriented sectors means working with clients who do not necessarily have in-house energy expertise. Instead of “leading with financing,” Commons has found that “patience over time, understanding their needs, educating, and getting folks comfortable . . . at the owner level has been enormous.”

Conclusion

In WOO-EE, MacArthur invested in a portfolio of approaches to energy efficiency and has realized thus far a range of outcomes. The continued investment in what has now been ten years of sustained funding of the Preservation Compact has helped Elevate Energy expand in size and influence as it now works in eleven states. The PPESCO model is in its fourth year of a 15-year PRI, but early signs are that other types of energy-service firms may prove more popular for EE investment in multifamily affordable rental housing.

In spite of the business-model differences between Elevate Energy and Commons Energy, several similar lessons emerge. Both cases suggest the importance of a local intermediary that is able to interact with owners of multifamily rental housing at the level needed to build trust and educate the consumer. Both have stressed the importance of pairing energy technology and engineering expertise with finance expertise. Both have found that many of their transactions do not involve financing at all; the client may need or want only the free energy audit, technical assistance, oversight of the installation, or ongoing operations and maintenance. Finally, both signal that there is growth in energy services, and that more options and combinations are being used to enact energy-efficiency upgrades in multifamily rental housing. This was a market direction that MacArthur recognized in its infancy. The foundation was therefore able to provide some of the initial critical resources to the organizations willing to venture into this new territory.

Outcomes from WOO-EE

Introduction

This chapter examines whether WOO-EE achieved the seven intermediate outcomes that the MacArthur Foundation identified for the four-year initiative. Because it was a shorter initiative that was a subset of a larger, 20-year one, the foundation viewed these outcomes as an aid to preserving affordable rental housing, and thus we term them “intermediate” to indicate their intended relationship to the desired impact of preservation.

Absent the appropriate research design to quantify the EE innovations and activities that occurred solely because of the MacArthur Foundation’s philanthropic initiative, we rely on grantee reports and activities as well as grantee and nongrantee views about MacArthur’s contributions. Specifically, the conclusions we present in this chapter about MacArthur’s role in improving energy efficiency for multifamily housing are drawn from our analyses of interviews, WOO-EE grantees’ reports, and changes in EE investments and activities for multifamily rental housing as described in Chapter Two.

We interviewed individuals from 36 separate organizations¹ between May and December of 2017. Twenty-two of the 36 organizations (61 percent) were WOO-EE recipients, and the remaining individuals were from 14 unaffiliated organizations not funded by MacArthur. Interviewees worked in the fields of real estate development, banking, government, and utilities. (A complete list of interviewees is included in Appendix B.) Using a semistructured interview protocol, we asked interviewees about the outcome areas listed below with both direct and indirect questions, in addition to asking them broader questions about the topic of energy efficiency in multifamily rental housing. We thematically coded interview transcripts as described in Appendix A.

Table 5.1 provides a summary of the seven key intermediate goals of the MacArthur Foundation’s WOO-EE initiative of grants and PRIs awarded between 2012 and 2015 (Schwartz, Vodopic, and Lamond, 2011). We used a stoplight chart to indicate the level of success for each: dark green indicates that the intermediate outcome was achieved, light green indicates that it was somewhat achieved, and red indicates that it was not achieved. In the second column of Table 5.1, we draw on research and industry data presented in Chapter Two plus expert opinion and grantee documentation to indicate whether there was progress at all (not necessarily due to MacArthur) in 2010 and beyond, drawing distinctions where we can between 2010 and 2012, since 2012 was the first year of WOO-EE. In the third column, we indicate whether at least part of that progress was attributable to MacArthur’s activities.

¹ Many interviews included more than one individual from a given organization; in one instance, two individuals from an organization were interviewed separately but are being counted as a single interview. Additionally, MacArthur staff were interviewed (in May 2017) and are not included in this total. The bulk of the interviews were conducted between July and October 2017.

Table 5.1
Intermediate Outcomes from the Energy-Efficiency Focus of the Window of Opportunity Initiative

Desired Intermediate Outcome	Has There Been Progress Since 2010?	If So, Was Progress Partially Attributable to WOO-EE Investments?
1. Increased awareness of energy efficiency as a tool for preservation	Yes	Yes
2. New and more energy-efficiency public policies focused on accommodating the needs of affordable multifamily rental housing	Yes	Somewhat
3. New and more financing practices and vehicles that accommodate the affordable rental housing sector	Yes	Somewhat
4. Increased cross-sector (e.g., between affordable housing and energy-efficiency sectors) awareness and collaboration	Yes	Yes
5. Increased share of energy-efficiency incentives/subsidies/policies/regulatory reforms for affordable rental housing stock	Unknown	Unknown
6. New data and benchmarking practices and resources targeted at the affordable multifamily rental sector	Yes	No
7. Increased pace and volume of energy-efficiency improvements in the stock of affordable multifamily rental housing	Yes	Somewhat

SOURCE: Outcomes were articulated in the foundation's 2011 document conceptualizing WOO-EE (Schwartz, Vodopic, and Lamond, 2011).

NOTES: Color codes are the authors' judgments using information described in the report.

Our team qualitatively formed our judgments based on the following three sources of information:

1. **Interviewee opinion.** In the interviews, we asked experts to judge whether there had been progress in a given outcome area since 2010, and then to separately judge whether WOO-EE had any kind of influence on the outcomes, and to provide examples. Although WOO-EE started in 2012, not 2010, we asked interviewees to consider if there has been progress in this decade and, if so, what the progress consisted of (this choice was based on our assumption that interviewees would be unable to reliably recall events by year).
2. **Evidence from Chapter Two about the level of EE activity in multifamily affordable rental housing.** We note that we sometimes do not know which portion of EE activity is attributable to the specific subset of multifamily rental housing that is both affordable and existing (as opposed to newly constructed or nonaffordable housing).
3. **Grantee reports of their WOO-EE-funded activities.**

We considered these three sources in combination to arrive at the summary judgments shown in Table 5.1, as follows:

- *For overall progress determinations:* To determine if there has been progress overall since 2012 (regardless of WOO-EE), we drew on evidence from Chapter Two about EE activity in multifamily rental housing, examples cited by interviewees of positive or negative changes

since 2010, and interviewees’ “yes/no/I don’t know” responses when asked whether progress has occurred. Because our questions asked interviewees to consider the outcomes overall (without yet factoring in whether MacArthur contributed to them), we included the opinions of staff from all 36 grantee and nongrantee organizations we interviewed.

- *For WOO-EE influence determinations:* We based these judgments on the presence or absence of concrete examples of WOO-EE grantee activity or actions directly ensuing from WOO-EE-sponsored events or products. The examples came from grantee documentation and from interviewee transcripts. We secondarily considered interviewees’ yes/no opinions about WOO-EE influence. The reason we relied almost exclusively on examples of WOO-EE activity and ensuing actions rather than the yes/no opinions for WOO-EE influence was because of concern about two types of bias from the interviews. The first is that grantees would likely *overcredit* their sponsor’s influence. The second is that, in the case of this particular study, nongrantees would likely *undercredit* WOO-EE influence because MacArthur intentionally kept a low public profile for WOO and for WOO-EE. In every case,² when we asked nongrantees if MacArthur had influenced the overall changes or trends that the interviewee had just described for a particular outcome area, grantees said either yes or “I don’t know”; none said no. For completeness we report the overall agreement rate both among all 36 interviewee organizations and among the subset of 14 that were nongrantees.

Intermediate Outcome 1: Awareness of Energy Efficiency

Based on interviews, we found that awareness of energy efficiency as a tool for preservation of multifamily affordable rental housing has increased among actors working outside and within the traditional affordable housing sector. The combination of WOO-EE grantee activity and the fact that several WOO-EE environmental and utility-sector grantees have continued their work on multifamily rental housing after WOO-EE ended indicates that MacArthur’s WOO-EE activities contributed to that increase.

Change Overall Since 2010

Through WOO-EE, the MacArthur Foundation sought to increase the awareness of EE in groups working within and outside the affordable rental housing sector. Specifically, the foundation sought to increase the awareness of (1) owners of affordable multifamily rental housing and of (2) utility companies, for-profit real estate developers, commercial, and environmental nonprofits that had not traditionally worked with affordable multifamily rental housing.

Because “awareness” of EE as a preservation tool is a qualitative measure, we rely primarily on interviewee opinion to gauge if it increased overall since 2010. Twenty-seven of 36 interviewees (75 percent) answered affirmatively that awareness of energy efficiency as a tool for preservation had increased. They cited examples such as greater contact and collaboration among nonprofit and for-profit stakeholders in the housing sector, increased participation at conferences and summits related to energy efficiency, and greater demand for retrofits and green

² Outside of questions about the seven intermediate outcome areas, one interviewee was critical of MacArthur Foundation and philanthropies generally for giving large amounts of money to “a few giant NGOs,” which he contrasted to the private sector, where he said recipients would spend the money more efficiently.

construction as a result of increased awareness among those in and outside the affordable rental housing sector.

Indicating that energy efficiency has “fully integrated” into practitioners’ understanding of preservation, one interviewee told us, “It’s rare to hear people having a serious policy discussion about affordable housing or preservation of affordable housing without it including an energy-efficiency component to it.” This aligns with our scan of trends in energy efficiency reported in Chapter Two, in which we found notable growth in EE policies and investments relevant to this sector.

WOO-EE Influence

The WOO-EE activity area that is most directly relevant to raising awareness (see Table 3.3) is outreach and convenings, which consisted of 13 grants totaling \$2.5 million. Collectively, these grants funded a dozen organizations to educate peers or other stakeholders, or both, on topics related to the costs and opportunities of energy efficiency in multifamily housing via workshops, summits, and road shows. As an example of influence, several of these grantees are high-profile organizations such as ACEEE that have gone on to work on EE in multifamily rental housing beyond the end of WOO-EE in 2015. Several organizations funded under WOO-EE—the Energy Foundation, Elevate Energy, NHT, and NRDC—subsequently came together in the fall of 2013 to launch the Energy Efficiency for All (EEFA) Project. Nine interviewees (of which two were nongrantees) mentioned the EEFA partnership as a torchbearer for EE for affordable housing in general and multifamily rental housing in particular.

Further examples of influence are the WOO-EE grant-funded convenings. MacArthur funded in part the U.S. Green Building Council’s Affordable Housing Summit at Greenbuild in 2012 and 2013, as well as the Affordable Green Homes and Sustainable Communities Summit at Greenbuild in 2014. These large conferences brought together stakeholders and nonprofits and for-profits from around the country to learn about community sustainability through speakers and exhibit booths. Over the same period, interest in the summit grew. In 2014, total registration for the summit reached 439 individuals, up from 242 registered individuals in 2013. According to the U.S. Green Building Council, in 2014, 179 individuals were able to attend the summit thanks to MacArthur’s support.

In addition to the conferences mentioned above, many of the initiatives’ awardees used MacArthur funds to host workshops and road shows and to produce published reports to advance the reach and awareness of their activities in technical areas like data benchmarking and housing finance. These activities helped to connect groups already deeply engaged in affordable housing (such as large owners of affordable housing) and groups not traditionally involved in affordable housing (such as for-profit developers, environmental groups, and utility regulators).

Twenty-one of the 36 interviewees (58 percent) believed that the increased awareness of EE as a preservation tool was in some way due to MacArthur’s funding and engagement in this topic. Among the 14 unaffiliated experts we interviewed, five (36 percent) attributed increasing awareness to MacArthur’s efforts. Those who thought MacArthur was at least partly responsible for increased awareness generally cited two reasons. First, the respondents credited MacArthur as a “thought leader,” and as a “big name moving into an important space [i.e., multifamily housing energy efficiency].” MacArthur’s focus raised the credibility of smaller nonprofits and organizations that had been working on multifamily energy efficiency. An unaffiliated expert credited MacArthur for putting “energy efficiency in affordable multifamily housing on the

map” with investors and nonprofits operating in the housing sector. In short, as one grantee put it, “Convening power matters, and MacArthur used its convening power to further these goals.” The second thing interviewees cited as evidence of MacArthur’s influence were the specific convenings funded by MacArthur WOO-EE grants.

Intermediate Outcome 2: More Public Policies Promoting Energy Efficiency for Multifamily Affordable Rental Housing

Based on evidence described in Chapter Two, we found an increase since 2010 in relevant state and local regulations and policies—for example, utility programs’ spending on EE upgrades in multifamily housing, energy-efficiency portfolio standards, federal incentives for green lending, and EE priority for LIHTCs. We find that that WOO-EE activity somewhat contributed to these changes.

Change Overall Since 2010

Our assessment that there were new and more policies for EE in affordable rental housing is based on the combination of evidence from Chapter Two and interviewee opinion. As documented in Chapter Two, there was an increase in state and local policies after 2010 for EE investments in multifamily rental housing. Progress includes more benchmarking, more EE set-asides for LIHTCs, and greater use of utility EE programs such as on-bill financing for multifamily rental housing. A majority of states (33) require or encourage LIHTC applications for buildings that will meet third-party EE certifications like LEED, which is up from 15 states in 2010, but has plateaued since 2013.

Thirty-two of the 36 organizations (89 percent) that we interviewed agreed that public policy has been moving in a positive direction since 2010. In addition to the examples we listed, interviewees also mentioned that these new policies have motivated owners to upgrade their buildings and utilities, and related program administrators have increased annual spending on multifamily programs.

While many interviewees agreed that public policy has been moving in a positive direction, they typically added that there remained much work to be done. For example, no interviewee indicated a clear path to solving the split-incentive problem that lowers landlords’ financial incentives to invest in EE upgrades within their multifamily rental properties (see Chapter Two). Also, there are numerous barriers to enacting financial vehicles like on-bill and PACE financing to help pay for EE investments in multifamily housing, despite some growth. Interviewees also cited the potential risk of losing ground even at the state and local levels due to changing directions in federal policy. Finally, the decentralized nature of EE policymaking at the state and local level means that effecting change across the country is an especially large task.

WOO-EE Influence

The two most relevant WOO-EE activity areas (see Table 3.3) to this outcome are peer exchange and convenings (\$2.5 million of foundation investment), and data and benchmarking (\$700,000 of foundation investment). Secondarily, the financing practices and vehicles (\$21.9 million) and policy analysis and research (\$1.2 million) are also relevant, because production of data, new financial models, and research can all provide a means for advocates like NHT, EDF,

ACEEE, or National Consumer Law to convey important ideas to policymakers, state regulators, utility companies, and investors in multifamily rental housing, potentially encouraging greater investment in energy efficiency.

Examples of WOO-EE influence include the fact that WOO-EE recipients impacted EE policy in several states. For example, due in part of the work of grantee Elevate Energy, the state of Illinois passed two significant pieces of legislation: first creating an efficiency portfolio standard (EPS), which significantly increased the resources for EE, and then in 2013 expanding its on-bill financing program to allow multifamily properties to participate. ACEEE's WOO-EE grants to launch the Multifamily Energy Savings Project funded the creation of a group of electric and gas utilities to collaborate to increase programs and spending for the reduction energy use in multifamily buildings. Out of this project, ACEEE has developed eight forms of technical resources, ranging from a regulator's guide to a best-practices reports, and eight reports, of which the most recent was published in 2018.

Fifteen of the 36 organizations (42 percent) we interviewed credited MacArthur as partly accountable for this change. Among the 14 unaffiliated experts who answered this question, four (29 percent) credited MacArthur. Two interviewees mentioned WOO-EE recipients' (including NHT's) successful advocacy of state housing finance agencies to include energy-efficiency incentives within states' QAPs, but we note that the number of states placing priority on EE within the QAPs plateaued during the WOO-EE years and thus do not consider EE change within LIHTC a WOO-EE influence.

Intermediate Outcome 3: More Financing Practices and Vehicles for EE

We found a marked increase in funding from several sources for energy efficiency in multifamily rental housing, as documented in Chapter Two and summarized below. MacArthur somewhat influenced this change through funding effective conveners that promoted cross-sector sharing and through PRIs, although the overall performance of the PRIs was mixed.

Change Overall Since 2010

As described in Chapter Two, there have been multibillion-dollar increases in green lending for energy-efficient multifamily rental buildings, which includes but is not limited to affordable rental housing, since 2010. In 2017, Fannie Mae and Freddie Mac alone purchased \$45 billion in green mortgages from lenders that issued its green loan products to owners of multifamily rental housing. This compares to \$29 million in 2012, when Fannie Mae introduced its green lending products for the multifamily rental sector. Because Fannie Mae and Freddie Mac collectively own approximately a third of multifamily rental property debt in the United States, their influence is profound. As lenders have learned about and accepted the practice of underwriting credit for future energy savings, and with reduced fees from the two GSEs and from FHA for green loans, green lending has gone more to scale.

Other types of EE investments in multifamily rental (not necessarily affordable) housing have also increased. As described in Chapter Two and in outcome area 2, utility companies have significantly increased spending on multifamily EE investments, from \$110 million in 2011 to \$290 million in 2015. More localities offer comprehensive retrofit services for multifamily rental housing, and there is little—but increasing—utilization of PACE and on-bill financing for affordable rental housing. Also, early signs indicate that energy-service firms are finding new

ways to reach the affordable multifamily rental segment of the market with financing arrangements like ESAs and narrowly targeted standardized products for segments of affordable rental housing that put these investments within financial reach of small multifamily owners.

Citing several of these changes, interviewees strongly endorsed the view that positive changes have occurred in this outcome. Thirty-one out of 36 organizations whom we interviewed (86 percent) indicated positive changes in the field of energy-efficiency financing. As one interviewee put it, compared to a decade ago, today “everybody’s got energy-efficiency programs in their financing, so that it’s been incorporated as . . . normal business practice.” One interviewee mentioned the increased sophistication of energy financing, stating that lenders “have definitely invested more and more actively in building energy efficiency into their mortgage-lending products.” Interviewees credited this to HUD and Fannie Mae leadership in green lending, and to the increased availability of precedents and information—for example, better and more standardized data to quantify the financial benefits of energy-efficiency investments, case studies, and underwriting guidance like Community Preservation Corporation’s 2017 *Underwriting Efficiency: A Lender Handbook*.

WOO-EE Influence

The foundation invested \$21.9 million in five grants and six PRIs for the promulgation of new or innovative financing vehicles for energy efficiency. These funds helped to pilot on-bill financing, launch a PPESCO, create loan funds for energy-efficiency improvements to affordable multifamily rental housing, and create an affiliate organization to fund the installation of solar power systems in affordable multifamily properties.

We judge that WOO-EE somewhat influenced this outcome because the overall performance of the PRIs and grants was mixed. With some exceptions that we note in this paragraph, the planned activities to be funded by the PRIs took longer to launch, and only a few appear to be models that could go to scale. Positive examples of WOO-EE PRIs that offer early signs of future influence are NYCEEC’s PRI, which has capitalized loan funds for innovative EE retrofits at multifamily rental housing projects (such as the Marcus Garvey project described in Chapter Two), and the PRI to create NHT Renewable, a company that funds the installation of solar power systems in affordable multifamily properties. NHT Renewable was profiled in a 2018 ACEEE report on the growing trend of combining EE with solar investments in affordable rental housing (Samarripas and York, 2018). As described in the case study in Chapter Four, the combined finance and service model developed by Elevate Energy and their partners is widely regarded as an exemplary approach that has gone to scale as Elevate Energy now works in eleven states (including Illinois).

But not each risk has paid off. Foundation staff explained that, in general, the PRIs took longer than planned to enact for a host of idiosyncratic reasons specific to each circumstance. For example, NOAH’s on-bill financing work in Oregon could not reach agreement with utility companies, and so its loan may be repurposed. As described in the case study in Chapter Four, a second PRI recipient, Commons Energy, has had a slower start than planned in providing investment capital to owners of small and medium-sized buildings that are generally left out of the traditional ESCO marketplace. Twenty-four of the 36 interviewees (67 percent) credited the foundation with helping this change in innovative financing and new finance vehicles. Among the 14 unaffiliated experts who answered this question, seven (50 percent) cited the foundation’s efforts. An interviewee dated the origin of Freddie Mac’s decision to offer green mortgages (see Table 2.2 for details) to meetings that the foundation grantee Institute for

Market Transformation hosted in 2013 to bring together experts on energy performance data and underwriting and lending. Notwithstanding the Freddie Mac example, interviewees generally felt that the impact of WOO-EE was greater on state and local financing practices—and specifically in the localities in which they focused their resources—than at the national level. MacArthur supported several organizations’ effort to test, evaluate, and advance the practice of multifamily housing finance in predefined geographies within states and regions. As mentioned in Chapter Three, through grants supporting the organizations Green for All and the California Housing Partnership, the initiative advanced energy-financing practices, including on-bill financing in Oregon and California. Additionally, MacArthur funds helped the International Center for Appropriate and Sustainable Technology (ICAST) transition its Triple Bottom Line Fund into a full-fledged CDFI. This move has permitted ICAST to offer more integrated financial services to clients in the region and to “grow their in-house lending operations targeting subsidized housing,” according to an interviewee. Finally, the PRI recipients we interviewed felt that MacArthur’s loans provided their organizations running room to take risks and establish credibility within the community of finance and housing organizations.

Intermediate Outcome 4: Increased Cross-Sector Collaboration

We found concrete examples of increased cross-sector collaboration related to energy efficiency since 2000, and we found that this was one of the outcome areas where MacArthur had the greatest influence.

Change Overall Since 2010

We take as evidence of increased cross-sector collaboration: (1) the increased spending of utility companies in EE investments in multifamily rental properties (as documented by ACEEE and described in other outcome areas in this chapter and in Chapter Two), (2) the increased number of working groups and interdisciplinary work on EE in housing among environmental and utility company convenings and conferences (described in outcome area 1), and (3) the development and expansion of green lending products for multifamily rental housing, which are the product of cross-sector collaboration to refine products that “work” for the owner, the EE retrofit provider, the and lender.

Cross-sector cooperation was explicitly discussed in 27 of 36 interviews (75 percent), and 100 percent of the 27 interviewees who mentioned it agreed that there has been an increase in cross-sector cooperation over the last decade. Interviewees mentioned increased collaboration among utilities, affordable housing providers, financing organizations, and EE experts through working groups, conferences, and road shows.

Referencing a multiyear iterative process of refining green loan products, one interviewee described the trajectory of cross-sector collaboration that grew over time:

One of the challenges of preserving affordability in multifamily housing is that the stakeholders have siloed perspectives: I’m a houser; I’m an energy-efficiency person; and I’m a finance person. . . . They speak different languages. They have different priorities, different timelines. . . . One of the very positive trends in recent years is they have slowly come over and started to dance with each other. It has been [an] education: lenders speaking energy, and energy auditors and green industry speaking finance. It’s a slow integration of processes.

Also referencing these silos, another interviewee told us that combining “affordable housing with preservation with energy efficiency” has successfully taken hold, with EE now fully embedded in preservation conversations.

WOO-EE Influence

WOO-EE funded cross-sector collaboration through its outreach and convenings activity area (\$2.5 million invested), but also secondarily via its financial innovations (\$21.9 million invested) and data and benchmarking (\$700,000 invested) activity areas (see Table 3.3 for a list of all activity areas). One of the main goals that program officers outlined for WOO-EE was to engage actors traditionally involved in affordable housing, such as owners/developers of multifamily affordable rental, and also nontraditional actors, such as utilities and environmental groups. Unlike in WOO at large, WOO-EE recipients crossed all of these groups, as shown in Table 3.2.

Twenty-four of the 27 interviewees who answered the cross-sector collaboration question (89 percent) credited the MacArthur Foundation with helping to increase cross-sector cooperation and collaboration. Among the ten unaffiliated experts who answered, eight (80 percent) explicitly credited MacArthur. As they did with the first outcome area, awareness of energy efficiency, interviewees referred to the foundation as a “convener” and “catalyzer” for cross-sector cooperation. A number of interviewees mentioned the 2014 Multifamily Advocates Meeting, which was held in Chicago, as particularly effective at fostering cross-sector cooperation. Additionally, the ACEEE-convened Utility Working Group (which was a part of the Multifamily Energy Savings Project mentioned in outcome area 2) was cited as one of the best WOO-EE examples of information sharing among actors that then influenced multifamily retrofit policy among utility programs. One interviewee commented, “I think the ongoing, targeted focal point that the Window of Opportunity invested over a period of time had really pretty astronomical impact collectively. It created a cohort around the country that networked together, shared best practices, and shared innovative ideas to raise the collective impact of the work that was happening rather than just these one-off funding opportunities.”

Intermediate Outcome 5: Increased Share of Energy-Efficiency Subsidies and Policies for Affordable Rental Housing

We rated this outcome as unknown for reasons we explain below.

Change Overall Since 2010

We found an increased volume of EE investment in affordable multifamily rental housing since 2010 due to the increased priority of EE for awarding of LIHTCs, and due to the increased number of owners of HUD-subsidized multifamily rental units participating in EE-related activity to realize potentially deep savings. We also found marked growth in the volume of green lending for multifamily rental housing, as we document in outcome areas 3 and 7 in this chapter. The share of utility-sector spending on energy efficiency that was dedicated to multifamily programs also increased from 2011 to 2015 in many cities. But we lack evidence to conclusively say whether affordable rental housing’s *share* has grown with respect to the overall volume of investment in energy-efficient multifamily rental housing. We therefore score this outcome area as unknown.

Twenty-three of 36 interviewees (64 percent) reported that the number of channels for energy-efficiency funding for affordable rental housing increased between 2010 and 2015. They cited some of the increase in the number of states prioritizing EE within QAPs for LIHTCs, HUD's multifamily Better Buildings Challenge, and EE becoming more normalized within ongoing lending, such as for Citi's affordable housing loan portfolio.

WOO-EE Influence

Because we rate the change overall as unknown, we also rate WOO-EE influence as unknown. The activities listed in Table 3.3 most relevant to this outcome area are the peer-exchange activity (\$2.5 million invested), financing practices and vehicles (\$21.9 million invested), and policy analysis and program evaluation (\$1.2 million invested). These activities involved loans to organizations to create outreach to government officials working on affordable rental housing as well as nontraditional actors.

Eighteen of the 23 organizations (78 percent) who answered whether part of the changes were due to foundation activity answered affirmatively. Four among the 18 interviewees answered the question about MacArthur's influence on the share of funding. Of these, three out of four nongrantees (75 percent) credited the foundation's WOO-EE activities as making a positive impact. Interviewees cited the same examples mentioned before, including working out on-bill financing in Illinois for multifamily properties in 2013,³ and EE-related preservation activities resulting from MacArthur's PRIs. As an example of increased share, an interviewee estimated that \$15 million (an increase over the previous level of \$500,000) of Illinois's \$250 million in funds spent on energy efficiency now went to affordable multifamily rental housing thanks to changes that made multifamily properties better able to take advantage of on-bill financing. That amounts to an increase from less than 1 percent to 6 percent of total utility on-bill spending. Likewise, the increased spending by utility companies on EE in multifamily rental, which we attribute partly to ACEEE's Multifamily Energy Project, could have increased the *share* of overall utility EE spending that goes toward affordable multifamily rental housing.

Intermediate Outcome 6: New Data and Benchmarking Practices for Affordable Rental Housing Sector

We note increased production and use of residential building energy-use data in the field at large, but we did not find that MacArthur's WOO-EE activities appreciably contributed to that trend. Despite the primacy of data to the foundation's initial conceptualization of WOO-EE, grants for data accounted for the smallest amount of the foundation's investment (\$700,000) among the five WOO-EE activity areas. Data-related grantmaking did not include the creation of a national data warehouse as originally envisioned, and neither of the two tools that MacArthur funded in this area seems to have taken hold or had a widespread influence.

Change Overall Since 2010

Twenty-two of 36 interviewees (61 percent) felt there were more data about energy usage and more benchmarking data available to owners of and investors in multifamily affordable rental

³ On-bill financing programs were authorized in Illinois in 2009 but were only extended to include residential buildings up to 50 units (and owner-occupied buildings of one to four units) in 2013 (Keenan, 2015).

housing. Their examples were ones we mention in Chapter Two, including the increasing number of states and cities that require owners or builders to disclose building energy use to buyers at the time of sale of the property, and the increasing use of data to benchmark building energy use against other buildings' energy use. We also note in Chapter Two the growth in whole building energy and water data within the Better Buildings Challenge.

Interviewees noted that ACEEE's energy scorecards—now in their eleventh year for the state scorecard—have also been an influential ranking system of states' and cities' EE regulations and laws related to energy efficiency for buildings. The scorecards have stirred competition among localities and, by making the “hidden” nature of energy efficiency visible, helped to spread EE practices. (Although ACEEE was a WOO-EE grantee, MacArthur's grants related to their Multifamily Energy Savings project and not specifically to their scorecards.) A MacArthur staff person indicated that a lesson learned from the scorecards was the importance of “ratcheting up the [EE] regulations, [and] more importantly exposing [them] so people know what they are.”

WOO-EE Influence

The data and benchmarking activity described in Chapter Three is the one directly related to this outcome. As shown in Table 3.3, the foundation awarded three grants to two organizations that totaled \$700,000, making this activity the smallest of the five categories for philanthropic activity.⁴ The grantees were the EDF and the New Buildings Institute. Two of the three grants went to EDF's Investor Confidence Project, which assembled existing energy-efficiency standards and practices into Energy Performance Protocols. The purpose of the protocols was to standardize a system for developing and measuring energy-efficiency projects for adoption by government agencies, project developers, investors, and banks. The use of the protocols, however, so far appears limited, and among interviewees only the grantee mentioned the protocols. Another grant was to the New Buildings Institute, which created a new tool called Virtual Energy Assessment via FirstView to address utility program barriers to energy efficiency. It failed to gain traction, according to a MacArthur staff person.

While there was limited progress made on the data and benchmarking goal, eighteen of the 36 interviewees (50 percent) attributed at least some of the progress to WOO-EE investments. Of the 14 unaffiliated interviewees who answered this question, six (43 percent) agreed.

Intermediate Outcome 7: Increased Pace and Volume of Energy-Efficiency Improvement

The volume and pace of EE improvements for multifamily rentals increased over the past decade as evidenced by increases in the volume of “green” loans, increased utility company spending on multifamily rental energy efficiency, and LIHTC requirements or preferences for energy-efficient multifamily rental projects. Activities funded through WOO-EE activities somewhat influenced that trend.

⁴ Note that a grant MacArthur made to SAHF for the development of what became the Bright Power energy scorecards is not included within WOO-EE because it was made prior to 2012.

Change Overall Since 2010

The volume and pace of EE improvements for multifamily rentals at large has clearly increased over the past decade. The most direct evidence of increased pace and volume of EE improvements in privately owned multifamily affordable housing are the increase in green loans, increased utility-sector spending on the energy efficiency of multifamily rental housing, and LIHTC allocations for energy-efficient affordable multifamily rentals. Second-order changes that promote EE include data-related activities like benchmarking and disclosure of building energy use, as described in Chapter Two.

Twenty-five of 36 interviewees (69 percent) felt that the pace and volume of energy-efficiency improvements for affordable multifamily rental housing had increased over the last decade. They attributed energy-efficiency improvements in the affordable housing stock to a variety of factors, including:

- improved technologies and “green products,” such as LED lighting and use of renewables (e.g., solar photovoltaics)
- growth in number of energy-efficient strategies to retrofit buildings
- more access to financing to implement/incentivize energy-efficient improvements in multifamily rental housing stock
- increased utility participation and offerings of energy-saving programs and/or subsidies
- more expansive local, state, and/or federal government incentives.

WOO-EE Influence

To gauge the WOO-EE influence on pace and volume, we looked across the prior six outcome areas, because we believe that all five WOO-EE activity areas were intended to collectively increase this desired intermediate outcome area. We conclude that MacArthur somewhat contributed to the increase in pace and volume of EE improvements. We label MacArthur’s overall success as “somewhat” due to limited success or unknown influence in some of the seven outcome areas. The overall size of the multifamily sector is huge and diffuse, making it hard for any one philanthropic initiative to sway national trends. Several of the notable EE changes since 2010, such as those to LIHTC requirements or incentives for energy efficiency, were well underway prior to WOO-EE and did not notably increase during the four-year period. Also, as noted above, several of the MacArthur-funded PRIs took longer to get off the ground than anticipated, and thus far not all appear to be models that will go to scale. Data and benchmarking investments by the foundation did not align with the original intent to create a national data warehouse.

The influence we attribute to WOO-EE traces back mostly to the convening power of MacArthur, which led to fortuitous outcomes and effectively connected sectors like utilities that had not previously been as active in affordable rental housing. For example, we have noted ACEEE’s continued active work on multifamily rental housing, tracing back to the WOO-EE Multifamily Rental Housing Project. The WOO-EE workshops and road shows also helped to connect nontraditional actors to the topic, such as a Freddie Mac official’s decision to offer green mortgages after attending meetings that the WOO-EE grantee Institute for Market Transformation hosted in 2013. We also conclude from interviews that WOO-EE helped effect a change in attitude among siloed actors, enabling them to move beyond simply articulating barriers to EE investments in multifamily rental (such as split incentives) to proactively working together with an attitude of “let’s solve the barriers and let’s just do it.”

Twenty of the 36 interviewees (56 percent) attributed this change at least in part to MacArthur. Among 14 unaffiliated experts, four (29 percent) attributed the progress to MacArthur. Core reasons related to MacArthur's convening power to connect the for-profit and nonprofit sectors, and multifamily building owners generally to finance, utilities, and environmental groups working on energy efficiency.

In addition to the influence the foundation had on cross-sector engagement, we also note the activities WOO-EE caused through its PRIs. For example, the PRIs and grants from the financial innovations category to create new loan funds, a new PPESCO, and piloting of on-bill financing were ways to increase EE investments in multifamily rental properties that might not have happened in the absence of MacArthur funding. Interestingly, the two PRIs we highlighted in outcome area 3 (NYCEEC and NHT Renewables) combine EE investments with renewable energy, which is the direction many WOO-EE recipients (and home-energy market players more broadly) were heading by the end of the four-year period of WOO-EE and is a future direction of the field at large that several interviewees noted.

Conclusion

The MacArthur Foundation rightly identified energy efficiency as a rapidly evolving growth area for multifamily rental housing. We have noted growth overall in six of seven outcome areas since 2010. The exception was in increasing the share of overall spending on energy efficiency in multifamily rental housing for affordable housing. In this area, we lack evidence to say definitively what that share was, and we therefore scored this outcome as unknown.

Gauging the influence of WOO-EE on the growth of EE for affordable multifamily rental is less direct. Based primarily on examples and secondarily on interviewee opinion, we conclude that WOO-EE has influenced the growth in EE investments for affordable multifamily rental housing in particular. It accomplished this through its grantmaking to influential, connector organizations such as ACEEE, EDF, and Institute for Market Transformation, as well as through its funding to organizations like National Housing Trust-Enterprise and NYCEEC to start or expand programs of their own. A summary discussion of what worked and did not work, as well as future trends for EE in multifamily rental housing, are the subject of the next chapter.

Conclusion

In this chapter, we summarize what worked and what did not work in WOO-EE, drawing on the outcomes presented in Chapter Five. We then discuss what barriers remain for EE in multifamily housing and potential next directions for the field. Finally, we conclude by calling out the strategies and elements of WOO-EE that could be generalized to other philanthropic initiatives and could help inform their design.

Summary of WOO-EE Outcomes

From 2012 to 2015 the MacArthur Foundation made 39 grants or loans totaling \$27.5 million for a broad range of activities and organizations that aimed to enhance energy efficiency as a tool for preservation of affordable multifamily rental housing. With these grants and loans, the foundation hoped to break down silos between the real estate, energy, and financial sectors, and within the affordable housing sector between for-profit and nonprofit owners. By funding organizations that work in these sectors to enact a wide range of activities—spanning lending, advocacy, tool development, and research—the foundation hoped to spur innovation, and was aware of the inherent uncertainty and risk in this approach. Across the portfolio of investments, MacArthur awardees learned several lessons and had varying degrees and types of success. For some WOO-EE borrowers, the long-term outcome of the investment has yet to be determined because the experiment is still unfolding.

In 2011, when the foundation conceived of WOO-EE, MacArthur staff correctly forecast that EE would be a growing area of activity for multifamily rental housing in the United States. In Chapter Five, we examined the evidence for each of the seven desired outcome areas MacArthur outlined, finding that WOO-EE positively influenced five of them, did not significantly influence a sixth area, and had unknown effect on the seventh (which was whether the *share* of EE resources dedicated to affordable multifamily rental housing had grown as a proportion of total EE resources). The foundation primarily accomplished this through its grantmaking to influential organizations that successfully connected sectors that previously had been siloed. We turn next to a more general discussion of what did and did not work well in WOO-EE.

What Worked in WOO-EE

We identified five elements that worked in WOO-EE. We derived these from our analyses of interviews for this report, documentation of WOO-EE grants and loans, and a comparison

with themes we drew out in the 2016 evaluation of the larger WOO initiative. We note that several of the strategies MacArthur adopted for WOO-EE—such as funding cross-sector collaborations to spur innovation, rewarding innovation with PRIs, and general grantmaking to attempt to create incentives for end users (in this case, owners of multifamily rental housing) to invest in EE—align with the more general strategies recommended in an earlier RAND report about innovation in housing (Hassell et al., 2003).

MacArthur Effectively Used Its Convening Power

More than one-third of the WOO-EE grant funding was expressly for convenings, outreach, and peer-to-peer sharing—including conferences, road shows, and working groups—so this constituted a substantial investment by the foundation.¹ This appears to be an investment that paid off, as it was the convening power of MacArthur that interviewees most frequently mentioned as the main driver of MacArthur’s influence. As an interviewee told us, “MacArthur being at the table incentivizes other people to join. . . . Being at the table actually does mean something. Those conversations are intangible, but are valuable.”

In the case of WOO-EE, program officers intentionally distributed grants and loans across the three sectors of affordable housing owners/advocates (expanding their focus to include for-profit developers), energy and environment, and finance to foster cross-sector networks and idea sharing. The main benefit we heard was achieved by some, although not all, of the various convenings that MacArthur funded was that they helped expose people to new ideas. In a similar way, policy reports and research helped to demonstrate to practitioners which ideas could work or go to scale. As an interviewee explained, “Somebody comes up with a good idea, they try it out, see if it works, and then we all want to copycat it, so I think that [convening] has had a big influence.” Cross-sector pollination of ideas was a core function of not just WOO-EE, but WOO overall. Thinking holistically about WOO, an interviewee said:

The ongoing, targeted focal point that the Window of Opportunity invested [in] over a period of time had really pretty astronomical impact collectively. It created a cohort around the country that networked together, shared best practices, and shared innovative ideas to raise the collective impact of the work that was happening rather than just these one-off funding opportunities.

MacArthur’s reputation as a market leader boosted its convening powers. Similar to the finding in the WOO evaluation, interviewees stressed not only the importance of MacArthur’s convening powers, but also that these convening powers were enhanced by the foundation’s reputation as a “market leader.” In the words of an interviewee, “When MacArthur stepped into this [energy-efficiency] space in a very meaningful way, and this is a big financial commitment, I think it caught a lot of people’s attention.” The foundation’s reputation as a leader derives primarily from the foundation’s extensive PRI activity, where the PRIs are early-stage loans to allow businesses to incubate and prove ideas.

And as with the broader WOO initiative, organizations we interviewed lamented MacArthur’s departure from multifamily housing energy efficiency. Some expressed concern that the momentum gained over the past decade might be lost without the imprimatur of the MacArthur Foundation. Although organizations mentioned other actors working on this topic (e.g.,

¹ This was about one-tenth of the total investment of grants and PRIs.

JPB Foundation), interviewees thought few could match the skills, reputation, and resources associated with MacArthur. We note, however, that the growing level of investment in energy efficiency for multifamily housing since 2010 now far surpasses resources that any one foundation could provide, suggesting a promising future for progressively more energy-efficient multifamily rental housing.

There Were a Sufficient Number of Years from WOO Through WOO-EE for Networks to Form

For grantees' convenings to be effective, we also heard there had to be sufficient time to allow for recipients to test ideas and to develop strong networks that have common language, personal relationships, and trust so that ideas can flow across disparate industries (e.g., real estate, finance, energy). WOO-EE benefitted from being an extension of a long-term philanthropic initiative rather than a stand-alone four-year initiative. By the year 2012, when WOO-EE started, WOO recipients had already had the "running room" and foreknowledge that the foundation was going to invest in preservation for a decade or more. Knowing that the foundation would focus for a relatively long period of time on the topic helped WOO-EE recipients organize convenings that changed the collective mindset from a stalled position of simply enumerating barriers for EE in multifamily housing to a proactive commitment to solving them. As an example of the time required, an interviewee who works in finance spoke of the seven years it took for a working group composed of representatives from real estate, finance, and energy to develop a shared language and successively revise green loan products to meet both energy and finance needs. This in turn allowed for an effective green loan product that lenders could successfully sell to owners of multifamily buildings. As in the WOO evaluation, numerous interviewees offered variants on the theme that "consistency [in philanthropic giving] over time is really important."

Like WOO, WOO-EE Helped Build the Capacity of Organizations That Were Then Ready for Loans from Commercial Banks

Although the performance of the PRIs issued through WOO-EE was somewhat mixed, we note that the foundation used the PRIs to take real risks in developing new businesses, such as solar installations at affordable rental housing and the formation of a PPESCO. And several of the PRIs were objectively successful, such as the series of loans described in Chapter Four for the Loan Savers Program, and NYCEEC's loan funds to expand EE retrofits. As MacArthur intends with its PRIs, a PRI recipient described the early investment from MacArthur as "set[ting] the stage" for their loan fund to obtain future investments. Funding ideas that are as yet unbankable was a function that this interviewee described as one that MacArthur did and that "foundations do best." A lender we interviewed noted that some of the organizations their bank had lent to were those that had previously received PRIs. For the lender, the PRI recipient's loan performance and activities were the way of testing the capacity and loan-worthiness of the organization for commercial loans. In other words, MacArthur had provided "the seed money and so you had a little bit of a proof of concept and just sort of a little bit of faith that this organization knew what they were doing and were moving in the right direction."

Program Staff Had Enough Content Knowledge to Select Effective Grantees

The foundation's effectiveness at raising awareness and increasing cross-sector collaboration relied not only on the prestige of the institution, but also on MacArthur program officers having the depth of knowledge of the policy problems and the organizations involved to identify and

fund the influential organizations who had sway and connections to host convenings that the “right” people would attend. In addition to the substantial experience program officers obtained from administering WOO for more than ten years, they also devoted a year at the outset to getting deeply embedded in EE issues before launching WOO-EE. This time helped to identify which professional associations and which advocacy groups, for example, could best connect the numerous siloed groups of nonprofit and for-profit “housers,” the “energy-efficiency people,” and the “finance people.”

The Focus on Chicago Led to a Significant and Enduring Impact

MacArthur has invested over the long term and at significant scale in the Chicago area through the Preservation Compact. Among these investments, the foundation provided \$7.6 million (in grants and PRIs) to support the energy-efficiency activities of Elevate Energy and its partner CIC between 2007 and 2014. From their initial work in the Chicago area, Elevate Energy then expanded its services throughout Illinois and now works in eleven states. Almost half of the 36 organizations we interviewed mentioned Elevate Energy as an example of MacArthur’s success or enduring impact on energy efficiency in multifamily rental. Elevate Energy, in partnership with CIC, is considered “a big influence” on energy-efficiency work with small and medium-sized owners of multifamily housing, and its example has generated some of the lessons and next directions that we discuss below.

What Did Not Work in WOO-EE

We have also identified three areas that did not work as well as hoped in WOO-EE.

Several of the PRIs Did Not Work Out as Originally Intended

As noted in Chapter Five, several PRI recipients took longer than anticipated to perform the intended activity. One theme that emerged from interviews is that the transaction costs of loans make it often impractical to issue stand-alone, small loans for phases of energy-efficiency upgrades or for small, stand-alone energy-efficiency projects. The foundation and grantees learned throughout the duration of WOO-EE that financing for energy-efficiency investments is most economically done when rolled into regular financing for the building. As applied to preservation, this means including costs of EE investments at the time of refinancing a building because this is when costs are already incurred for the property condition report, appraisal, and, in some cases, a green needs assessment. Small loans that finance only EE improvements are less efficient because they will incur fees that larger loans such as a first mortgage better absorb.

The Foundation’s Data and Benchmarking Activity Area Was Underrealized

Also as noted in Chapter Five, although the foundation originally conceived of data and benchmarking as a “lynchpin” for EE upgrades to go to scale in affordable multifamily rental housing, it wound up being the smallest area of investment for the foundation. ACEEE notes that most local government benchmarking activities are recent and occurred at the end of or after WOO-EE. In WOO-EE MacArthur awarded three grants to two organizations; neither tool that the organizations created was mentioned by interviewees, and our online scan suggests they are not in wide circulation. In its 2011 memo in which the foundation conceptualized WOO-EE, staff also described the intent to support the creation of a national data warehouse, which

did not materialize. In short, the grant to SAHF for the creation of the Bright Power energy scorecards, which predated WOO-EE, proved more influential for standardizing the measurement of building energy consumption than any WOO-EE grantmaking.

Few EE Programs for Affordable Multifamily Rental Housing Have Gone to Scale

With the exception of Energy Savers, no MacArthur-sponsored tool or program has yet gone to scale. The adage that all real estate is local has applied as grantees have struggled with replication across communities. Even when borrowing ideas across relatively similar markets (e.g., across the Midwest), state and local conditions and idiosyncrasies often require fine-tuning before they can be executed. Reflecting on the Preservation Compact in Chicago, a MacArthur program officer noted the need to adapt rather than exactly replicate the model in other areas, noting, “You’re just not going to create the exact same circumstances.” Yet standardization and aggregation are precisely the direction in which EE practices are going as they come to scale. As regionally specific as energy costs and building codes and conditions are, the trends in the broader multifamily market suggest that MacArthur grantees and borrowers will need to develop ways to standardize activities to lower transaction costs and broaden their reach.

Remaining Barriers to EE Investment for Multifamily Affordable Rental Housing

The Savings from Energy Efficiency Can Aid Preservation, but Are Unlikely to Equal Federal Subsidy Levels That Have Kept Housing Affordable in High-Cost Housing Markets

WOO-EE is a part of the WOO initiative, which has the goal of preserving affordable rental housing. While MacArthur staff did not hypothesize that savings from EE investments could supplant federal subsidy, it is important to bear in mind the continued importance of federal subsidy for preservation, since savings from EE alone would be unlikely to approach the amounts needed to preserve affordable housing for very low-income families. Improved energy efficiency can increase a building’s cash flow, which certainly helps the long-term viability of a property, and it could potentially preserve naturally occurring or shallowly subsidized affordable rental housing. Equally important, it can reduce tenants’ utility costs, which are especially burdensome for low-income families, as we discuss in Chapter Two. But its savings will not likely equal the amount of funding provided to federally subsidized rental housing when those properties approach expiration of subsidy, especially subsidy levels required in high-cost housing markets. For example, the average monthly subsidy per unit in 2016 was \$715 for the approximately 1.2 million homes that receive Section 8 project-based assistance (Hoffman, 2017).

Split Incentives Continue to “Dog” EE Investments in Multifamily Rental Housing

A notable and enduring challenge is that the industry has not resolved the split incentives experienced by landlords and tenants related to their energy consumption in multifamily rental housing. Interviewees told us that financing EE for multifamily rentals at any price point—high-end or affordable—is still challenging. A partial solution we heard was related to factoring not only owners’ EE savings when underwriting a loan but also those of the tenants. The growing practice of aggregating tenant data to anonymize it and thus allow multifamily owners to view whole-building energy-use data is a related achievement that also holds promise to mitigate the split-incentive problem. All other solutions of which we are aware relate to lowering the costs

of EE upgrades to fit within the benefits reaped by owners (exclusive of tenants) of multifamily properties. Those solutions pertain to scale—for example, aggregating similar properties or upgrades in bundled EE transactions—and standardization, as we discuss next.

Serving Small and Medium-Sized Owners of Multifamily Rentals Is Still Financially Challenging

Another challenge is the difficulty of crafting services and financing that work economically to reach small and medium-sized owners of multifamily rental housing. The Pratt Institute’s model of developing a standardized EE upgrade package that is specific to two-unit, brick, gas-heated buildings offers promise. By creating a simplified EE retrofit package for a highly specific type of building, consumers of this package skip the energy audit and thus lower the overall cost. In regions with high numbers of uniform building types, such a model might be replicable. Other groups working with small and medium-sized owners have found other ways to standardize and lower transaction costs, as illustrated in the two case studies in Chapter Four.

Serving Small and Medium-Sized Owners of Subsidized Multifamily Rental Units Is Harder

Adding another layer to the difficulty of small transactions is the heightened complexity of EE investments within the context of highly regulated subsidized rental housing that drive up transaction costs or, in some cases, reduce financial incentive for landlords to invest in EE upgrades. A 2017 study finds that regulatory change is needed for EE retrofits in subsidized multifamily rental housing to occur (Reina and Kontokosta, 2017). Yet the potential is there for substantial savings in subsidized multifamily rental housing from EE investments. For example, HUD estimates that utility costs account for roughly 21 percent of public-housing operating budgets and a similar share in the assisted-housing sector (Bartolomei, 2017). And when there is the scale that public-housing authorities can offer with thousands of rentals located in dozens of buildings, then ESCOs or other energy-services firms can and do provide financing for EE investments.

The segment of the affordable subsidized market that will be hardest to serve is medium- or small-sized subsidized rental properties, because of the smaller number of units across which to spread fixed costs of EE upgrades combined with the complexity of regulations and multiple sources of funds. NEMO, described in Chapter Two, is a brand-new, as yet untested model that will target LIHTC properties, but aided initially with philanthropic funds. The Commons Energy PPESCO that is the subject of a case study in Chapter Four is another model targeting multifamily affordable rental housing. Time will tell if NEMO, Commons Energy, and other organizations can develop scalable ways to serve the subsidized segment of the multifamily rental market.

How to Serve Small and Medium-Sized Owners of Multifamily Rentals That Are Not “Energy Hogs”

As the energy-efficiency field matures, it will progress beyond addressing the “low-hanging fruit”—such as the highly inefficient master-metered properties built in the 1970s—to finance EE upgrades in multifamily housing that has been more recently built. The next tier of multifamily rental buildings offers reduced EE savings due to factors such as split metering, building technologies that are not wholly inefficient, or being located in climates or markets where energy costs are lower. The general point is that not all multifamily rental housing deals offer similar economic returns, and the challenge for preservation of affordable rental housing will

be to find profitable or break-even ways to finance EE investments in buildings that promise a smaller amount of savings from up-front EE investments.

Next Directions for Energy Efficiency in Multifamily Affordable Rental Housing

Energy efficiency has been successfully woven into preservation, which was one of the aims of MacArthur. We heard from interviewees that energy efficiency is no longer an addendum, but rather a natural part of the preservation process, and now is routinely included in policy conversations about preservation. As a nongrantee told us, “Any halfway sophisticated multifamily owner today who is looking at doing renovation or preservation . . . would be foolish not to at least look at whether going to a green energy-efficiency standard is worth their while. And it in fact probably is worth their while. . . . That’s all new in the last ten years.” Similarly, a lender commented, “If you are peeling back the envelope to do preservation work, we should also be making it the most efficient we possibly can. It’s almost always part of the conversation, and that was not true even ten years ago.”

Part of the reason why EE has successfully hooked into preservation conversations is that consensus formed around the case for energy efficiency. Put simply, the case is that EE investments help the bottom line. Several interviewees mentioned that making a business case for EE helps to avoid climate-change “controversy” and obviates the need to appeal to altruism over financial self-interest. For example, one interviewee told us, “The good news is that we . . . have proven now that this [EE for multifamily rental] is not just a save-the-earth kind of thing. . . . You can approach this from a fiscal responsibility perspective.”

Coming to consensus on the case for EE is notable because we found that the same did not happen for preservation at large. In the WOO evaluation, we found that no one justification for preservation (of the 15 articulated) had emerged as dominant. The lack of an easy justification stymied advocates’ efforts to make preservation of affordable rental housing resonate with policymakers and lenders. Now that the general case for energy efficiency is largely made and EE lending has substantially increased, interviewees were looking ahead for ways to take EE upgrades for multifamily rental housing to greater scale. To help address the barriers we list above, interviewees mentioned three future directions for the field.

Specialization Is a Way to Segment the Market Efficiently and Thereby Reach Scale

Ironically, we heard of the need to bin the multifamily rental market into smaller, more standard categories as the means of achieving greater scale. The Pratt Institute’s EE retrofit package for two-unit, brick, gas-heated buildings is an example of specialization. Whether for loan products, service firms, or benchmarking, the general theme was greater specificity and specialization as the way to achieve the efficiencies of standardization but still serve what is a highly varied market. An interviewee summarized it as follows:

Circumstances are very different depending on what kind of property you are, what part of the country, how deep the work you are doing is, whether you have a subsidy coming in, what your primary mortgage financing looks like, and whether they are going to allow subordination of a second mortgage . . . there are so many questions to be answered that are different for literally every property that I think specialization within the finance and

within the policy arena[s] is going to have to happen to allow for all of those variations to happen.

The Need for Local Intermediaries Will Continue

Commercial banks and investors look for intermediaries to bundle EE transactions and thus make lending more cost effective. As a lender told us, “What we’re coming to learn is that it’s so important to have [an intermediary] work with owners to help them understand . . . why you should do energy-efficiency improvements and to take the time and to have some sort of philanthropic support to help pay for that, because it’s a lot of hand-holding.” Even if a national intermediary existed to create uniform guidance, checklists, or service models, several interviewees still felt that local partners were needed to directly interact with owners in person. “You need someone who’s with them. . . . Wherever you roll out a lending program, you’re going to need a local presence.” While there are some such intermediaries currently, such as Elevate Energy, which works in eleven states, many markets lack them.

Energy Efficiency Will Likely Continue the Turn Toward Renewable Energy

As the costs of RE come down and the benefits are better quantified, on-site energy generation is likely to become more common. MacArthur’s WOO-EE lending and grantmaking itself moved in this direction toward the end of WOO and are consistent with the foundation’s most recent focus on climate change. An ACEEE 2018 report highlights cases of combining EE and RE, including WOO-EE grantee NHT-Enterprise. Cities that have adopted climate goals will likely drive these trends, which is where a number of the more comprehensive retrofit service programs for multifamily housing that ACEEE has noted are located.

Strategy and Design Elements Worth Sharing

Evidence of MacArthur’s influence clusters around the general theme that the foundation’s program officers had sufficient knowledge of the industries they were funding to pick influential organizations to fund and to fund them for long enough to foster genuine networks. These are four design elements of a philanthropic initiative that also emerged in the WOO evaluation (Schwartz et al., 2016), and we summarize them below.

Program-Officer Expertise in the Subject Matter Improves the Philanthropic Initiative

As described in Chapter Three, MacArthur program officers each had over a decade of experience administering the larger preservation initiative by the time WOO-EE launched; furthermore, two MacArthur program officers spent about a year learning about energy efficiency before WOO-EE launched. As with WOO, several interviewees mentioned that they noticed and appreciated the depth of experience of MacArthur staff relative to that of other philanthropic organizations. Attending industry events and listening to expert panels, among other activities, helped the foundation’s program officers learn the technicalities of the subject and learn which individuals were viewed as “critical players” who could best connect the housing and energy sectors.

Stability Is Key

The length of the MacArthur Foundation's commitment to the topic of preserving affordable rental housing, and its later initiative to do so via energy efficiency, has contributed to the success of its efforts. In the WOO evaluation, we noted that the foundation's public commitment to long-term investing in preservation enhanced its effectiveness. Although WOO-EE ran from 2012 to 2015, it involved PRIs that often had ten-year or longer terms, and, as an extension of the larger WOO initiative that launched in 2000, it benefitted from that initiative's longevity. WOO-EE grantees noted that the financial support from MacArthur provided their organization stability and credibility within the community of finance and housing organizations. One interviewee stated, "Frankly, the length of tenure of their focus on that sector is highly unusual in the philanthropic world; that is also something worthy of note. I think both for peer foundations as well as for the beneficiaries of their funding . . . absolutely unequivocally I think MacArthur has been a really important leader in this space."

The Foundation Should Continue to Leverage Its Convening Powers in Other Initiatives

The ability to get people from different sectors to meet on a recurring basis and thereby germinate ideas has consistently been the contribution interviewees rank highest from both the WOO and WOO-EE evaluations. One-time meetings in and of themselves would not necessarily achieve this effect. The ingredient we noticed was the sufficient time elapsed with consistent funding to allow networks of practitioners and advocates to form.

Philanthropic Initiatives Can Build on One Another, Even as the Topics Shift

The insights from WOO helped shape and improve WOO-EE, which in turn can help shape the foundation's newer climate-related programs. For example, an evolution in WOO was the increasing focus on state- and local-level policy, which was a starting point for WOO-EE. Plus, learning from WOO loan recipients that energy bills were one of the few costs that affordable multifamily rental owners could better control was the germ of an idea that grew into WOO-EE. In WOO-EE, the foundation learned about energy markets and the important role that public utility commissions play in utility investment strategies and incentives policies, which in turn is important in the foundation's ongoing Climate Solutions program (MacArthur Foundation, undated). Even as topics have changed from preservation to energy efficiency to climate change, the substantive lessons, and not only the craft of lending and grantmaking from the preceding philanthropic initiative, have helped shape the next philanthropic initiative.

Interview Methods

In this appendix, we describe the methods used to code and analyze interviews. With the exception of interviews of MacArthur staff, which were in person, each interview occurred over the phone and followed a structured protocol. We recorded the interviews, which each lasted 60 to 120 minutes and were conducted by one or two RAND researchers. We then transcribed the audio interviews, applying a coding scheme to the transcripts that we describe below. All interviewees were informed that the interviews were voluntary and confidential. Thus, in the report, we do not attribute comments and opinions to specific individuals.

Interviews of MacArthur Staff

From April to May 2017, we conducted four structured interviews with current MacArthur staff. The four individuals are listed in Appendix B. The interview protocol focused on the following areas:

1. The foundation's theory of change and its evolution over time in WOO-EE
2. Emphasis and intent with organizations and activities funded
3. EE innovations and trends in multifamily residential housing from 2010 to today
4. Key barriers facing the field of affordable rental housing preservation
5. Lessons learned

We asked each interviewee to recommend any additional documents for our review—such as grantee reports, briefings, internal memoranda, planning documents, and other relevant information—that would help to understand the context and projects supported.

Interviews of Awardees and Unaffiliated Experts

The study team conducted interviews of 36 organizations from June to October 2017. The individuals and organizations are listed in Appendix B. Sixty-two percent of the interviewees worked at organizations that had received a grant or loan from MacArthur through WOO or WOO-EE; the rest of the interviews were of unaffiliated experts. All interviewees were asked about the following topic areas:

1. EE innovations and trends in multifamily residential housing from 2010 to today
2. MacArthur's influence on EE trends in multifamily affordable rental preservation

3. Key barriers facing EE in the field of affordable rental housing preservation
4. Interviewees' knowledge of the MacArthur Foundation and the WOO initiative
5. Lessons learned

In addition, we asked interviewees who were WOO borrowers or grant recipients about their organization's use of WOO-EE funds and the impact of MacArthur's grants or loans on their organization.

Qualitative Analysis of Interviews

We developed a codebook that corresponded to the main topics covered in our interview protocol and to the outcomes identified in Chapter Five, namely innovations and trends, barriers, cross-sector cooperation, data and benchmarking, financing practices, increased awareness of EE for multifamily rental buildings, increased share, pace and volume, and public policies to encourage or mandate EE investments in multifamily buildings. The interview protocols are included in Appendix D.

We applied these codes to the interview transcripts using Dedoose, a cross-platform application for analyzing qualitative and mixed-methods research. We coded instances where each theme occurred in our interview transcripts. We also assigned codes to each interviewee to identify whether they had received a WOO-EE grant or loan from MacArthur, their geographic location, and their industry sector (finance, housing, energy) to allow us to compare opinions across each of these dimensions. Finally, we coded interviewees' characterization of outcomes as one of the following three categories: positive, negative, or neutral. To aid in drawing our conclusions for Table 5.1, we also coded each outcome according to the color scheme of dark green (yes, the desired outcome happened), light green (yes, the desired outcome *somewhat* happened), or red (no, the desired outcome did not happen).

Experts Interviewed

We interviewed the individuals listed below, who represented a total of 36 separate organizations plus the MacArthur Foundation. We developed an initial list of interviewees to capture a cross-section of grantees from each activity type and representing different sectors among awardees and nonawardees. The foundation then reviewed and augmented our list.

As shown below, many interviews included more than one individual from a given organization; in one instance, two individuals from one organization were interviewed separately but are being counted as a single interview for the purpose of the evaluation. We interviewed the four MacArthur staff in May 2017, but the rest of the interviews were conducted between July and October 2017. Individuals listed below appear in alphabetical order under the primary category for which they were associated for our evaluation purposes.

MacArthur Foundation Staff

Allison Clark: Associate Director, Impact Investments
 Debra Schwartz: Managing Director, Impact Investments
 Julia Stasch: President
 Mijo Vodopic: Senior Program Officer

Interviewees Whose Organizations Received a Grant or PRI from WOO-EE

Peter Adamczyk: Vermont Energy Investment Corporation (VEIC) and Commons Energy
 Thom Amdur: National Housing and Rehabilitation Association
 Michael Bodaken and Jared Lang: National Housing Trust (NHT)
 Sue Coakley: Northeast Energy Efficiency Partnerships (NEEP)
 Ralph DiNola: New Buildings Institute
 Anne Evens: CNT Energy/Elevate Energy
 Matt Golden: Investor Confidence Project (Environmental Defense Fund, EDF)
 Charlie Harak: National Consumer Law Center
 Susan Hom: International Center for Appropriate and Sustainable Technology (ICAST)
 Bill Kelly and Rebecca Schaaf: Stewards for Affordable Housing for the Future (SAHF;
 note: SAHF was a WOO grantee, but it was not a WOO-EE grantee)
 Julie Klump: Preservation of Affordable Housing (POAH)
 David Kolata: Citizen's Utility Board

Susan Leeds and Jay Merves: New York City Energy Efficiency Corporation (NYCEEC)
Ravi Malhotra: International Center for Appropriate and Sustainable Technology (ICAST)
Jack Markowski: Community Investment Corporation (CIC)
Linda Metropulos, Acting Deputy Director for Sustainability and Housing Development,
Sarah Ralich, Energy and Construction Manager, and Larry Swanson, Executive Director: ACTION Housing
Cliff Majersik: Institute for Market Transformation
Steven Nadel: Executive Director, American Council for an Energy Efficient Economy (ACEEE)
Rob Prasch and Faith Graham: Network for Oregon Affordable Housing (NOAH) and
Network for Energy, Water and Health in Affordable Buildings (NEWHAB)
Vincent Reina: University of Pennsylvania (formerly Furman Center)
Matt Schwartz: California Housing Partnership Corp. (CHPC)
Esther Toporovsky: Enterprise Community Partners
John Wilson: Energy Foundation

Interviewees Whose Organizations Have Not Received a WOO Grant or Loan

Conrad Asper, Energy Efficiency Residential Portfolio Management, and Al Gaspari: Pacific Gas and Electric (PG&E)
Jessica Boehland, Senior Program Officer, Environment, and Kim Dempsey, Deputy Director, Social Investment Practice: Kresge Foundation
Dave Borsos and Eileen Lee: National Multifamily Housing Council (NMHC)
Dana Bourland: Vice President, Environment, JPB Foundation (formerly Enterprise)
Jeff Brodsky: The Related Companies
Amy Brusiloff: Bank of America
Gina Ciganik: Chief Executive Officer, Healthy Building Network (formerly Aeon)
Val Jensen: ConEd
Donald Gilligan: National Association of Energy Service Companies (NAESCO)
Michael Mayhugh, Pre-Construction and Design Manager, Alan Mileti, Manager, Energy and Capital Planning, and Eric Walker, Director, Affordable Housing Development: National Church Residences
Chrissa Pagitsas: Fannie Mae
Bruce Schlein: Director, Community Reinvestment Act Business Strategy, Citi Bank
Cai Steger: Director, Energy Efficiency for All (EEFA), and Senior Adviser, Urban Solutions, NRDC
Theodore (Ted) Toon: U.S. Department of Housing and Urban Development (HUD)

Complete List of WOO-EE Grant and PRI Recipients

This appendix provides a complete list of awardees. Grant and PRI recipients are listed in Tables C.1 and C.2, respectively.

Table C.1
WOO-EE Grants in Chronological Order

Grant #	Recipient	Amount Approved	Award Year	Multiple Grants?	Primary Sector	Primary Activity
1	Institute for Market Transformation (IMT)	\$50,000	2012	Yes	E	Peer exchange, communications, convenings
2	U.S. Green Building Council (USGBC)	\$200,000	2012	Yes	E	Peer exchange, communications, convenings
3	Center for American Progress	\$200,000	2012	No	Z	Policy analysis, program evaluation, and research
4	Enterprise Community Partners	\$300,000	2012	No	A	Program development and business planning
5	New Buildings Institute	\$300,000	2012	No	A	Data & benchmarking
6	Urban Land Institute	\$150,000	2012	No	A	Peer exchange, communications, convenings
7	American Council for an Energy Efficient Economy (ACEEE)	\$600,000	2012	Yes	E	Peer exchange, communications, convenings
8	Citizen's Utility Board	\$200,000	2012	No	E	Policy analysis, program evaluation, and research
9	CNT Energy	\$75,000	2012	Yes	E	Financial innovations and new financial vehicles
10	Energy Foundation	\$125,000	2012	Yes	E	Policy analysis, program evaluation, and research
11	ACTION Housing	\$300,000	2012	No	A	Program development and business planning
12	California Housing Partnership Corp.	\$400,000	2012	No	A	Financial innovations and new financial vehicles
13	Green for All	\$200,000	2012	No	E	Financial innovations and new financial vehicles
14	International Center for Appropriate and Sustainable Technology (ICAST)	\$300,000	2012	No	E	Program development and business planning
15	Vermont Energy Investment Corp. (VEIC)	\$400,000	2012	Yes	E	Financial innovations and new financial vehicles
16	Environmental Defense Fund (EDF)	\$200,000	2013	Yes	E	Data & benchmarking

Table C.1—Continued

Grant #	Recipient	Amount Approved	Award Year	Multiple Grants?	Primary Sector	Primary Activity
17	National Consumer Law Center	\$100,000	2013	No	Z	Peer exchange, communications, convenings
18	National Housing & Rehabilitation Association (NH&RA)	\$200,000	2013	Yes	A	Peer exchange, communications, convenings
19	Furman Center for Real Estate and Urban Policy	\$200,000	2013	No	A	Policy analysis, program evaluation, and research
20	National Home Performance Council	\$200,000	2013	No	A	Peer exchange, communications, convenings
21	ACEEE	\$100,000	2014	Yes	E	Policy analysis, program evaluation, and research
22	Elevate Energy (formerly CNT Energy)	\$100,000	2014	Yes	E	Policy analysis, program evaluation, and research
23	USGBC	\$100,000	2014	Yes	E	Peer exchange, communications, convenings
24	VEIC	\$350,000	2014	Yes	E	Financial innovations and new financial vehicles
25	Energy Foundation	\$100,000	2014	Yes	E	Peer exchange, communications, convenings
26	EDF	\$200,000	2015	Yes	E	Data & benchmarking
27	Elevate Energy (formerly CNT Energy)	\$250,000	2015	Yes	E	Program development and business planning
28	NH&RA	\$100,000	2015	Yes	A	Peer exchange, communications, convenings
29	ACEEE	\$275,000	2015	Yes	E	Policy analysis, program evaluation, and research
30	Passive House Institute US	\$200,000	2015	No	E	Peer exchange, communications, convenings
31	Northeast Energy Efficiency Partnerships (NEEP)	\$350,000	2015	No	E	Peer exchange, communications, convenings
32	IMT	\$175,000	2015	Yes	E	Peer exchange, communications, convenings
	<i>Total</i>	<i>\$7,135,000</i>				

SOURCES: MacArthur Foundation grant documents provided to authors.

NOTES: Primary sector codes: E=Energy and environment. A=Affordable housing owners and advocates. Z=Other.

Table C.2
WOO-EE PRI Recipients

Recipient	Amount	Year	Purpose
NOAH	\$2,500,000	2011	Expansion of an on-bill repayment program to finance energy-efficiency improvements to multifamily affordable rental housing in Oregon
Commons Energy	\$4,750,000	2014	First PPESCO, subsidiary of VEIC; working capital for Commons Energy's operations and to provide direct loans to client business owners who will undertake property upgrades
Commons Energy	\$250,000	2014	Initial reserve to pay out on guarantees it provides to building owners in the event that projected savings from an energy-efficiency upgrade fall short of the minimum level needed to cover financing costs
National Housing Trust (NHT)/ Enterprise Preservation Corporation	\$2,500,000	2014	Creation of NHT Renewable, a new affiliate that will fund the installation of solar power systems in affordable multifamily properties.
Housing Development Fund, Inc. (HDF)	\$5,000,000	2015	Three loan funds
New York City Energy Efficiency Corporation (NYCEEC)	\$5,000,000	2015	Finance projects in residential buildings located in low- or moderate-income tracts, or residential buildings that qualify for affordable housing programs administered by the municipal agencies with which it partners. The PRI will capitalize several loan funds that have been created to support expanded access to energy-efficiency retrofits.

SOURCES: MacArthur Foundation grant documents provided to authors.

Interview Protocols

This appendix includes copies of our interview protocols used with nongrantees and grantees.

D.1. Interview Protocol for Nongrantees

Part 1. Informed Consent

[To be read verbally to interviewee prior to interview for obtaining verbal consent to participate]

I work for RAND, which is a nonpartisan, nonprofit research organization. We've been asked by the MacArthur Foundation to conduct an evaluation of the energy-efficiency program within the Window of Opportunity (WOO) initiative as an approach to preserving affordable multifamily rental housing in the United States. Today we are hoping to hear your views on this subject as *[foundation staff who administered this program; a grantee/PRI recipient; an expert in the field]*. The interview will take approximately 60 minutes *[or 90 minutes for some MacArthur staff]*.

The information you provide will be kept strictly confidential. We will not share your responses with anyone else outside of the RAND research team, and we will not identify any individuals by name in any resulting study reports or in any way to the foundation. If we use any quotations from these interviews, we will not attribute them to any individual, and we will do our best to ensure anonymity. Please feel free to tell us if you want to share something “off the record,” in which case we will not include it in any of our reports.

Your participation in this interview is voluntary. You may choose not to participate, decline to answer any question, or stop the interview at any time.

We plan to audio record our conversation, solely for our internal note-taking purposes. The audio recording will only be accessible to project staff, and we will destroy the recording when the project is completed.

If you have any questions regarding this research, please contact study Principal Investigator Aimee Curtright at (412) 683-2300 x4989 or acurtrig@rand.org.

If you have questions about your rights as a research participant or need to report a research-related injury or concern, you can contact RAND's Human Subjects Protection Committee toll-free at (866) 697-5620 or by emailing hspcinfo@rand.org. If possible, when you contact the committee, please reference Study #2017-0314.

Do I have your permission to proceed with the interview?

[IF NO:] Thank you anyway.

[IF YES:] **Do I also have your permission to audio record the interview?**

Part 2. Interview Protocol

Interviewee's Role and Relationship with the MacArthur Foundation and the WOO Initiative

- 1) What is your relationship with and knowledge of the MacArthur Foundation? Are you familiar with their WOO-EE initiative?
- 2) Has your organization been a grantee or borrower of MacArthur funds?
 - If so, was it a PRI or grant, and in approximately what year was it issued, and for what purpose?

General EE Innovations and Trends in Multifamily Residential from ~2010 to Today

- Before talking specifically about MacArthur and their role in energy-efficiency investments in affordable rental housing, we want to start with the big picture of EE in rental housing of any type—this includes both subsidized and “naturally affordable” housing, as well as both low-income households and more affluent ones living in multifamily housing. *We define multifamily residential buildings as those that consist of five or more rental units.*
 - We are interested in *innovations and trends over this period of time*, including but not limited to ones that might be linked to MacArthur’s WOO initiative.
- 3) What are the most important **benefits** for multifamily residential buildings to becoming more energy efficient?
 - To whom do these benefits accrue?
 - How do these benefits differ for retrofit preservation projects versus new construction?
 - Do the benefits differ by type of owner? For example, if we compare “mom and pop” owners, local community development corporations, city-specific nonprofit developers, regional developers, national nonprofits, and for-profit developers/owners, are the nature and magnitude of benefits different for these different types of owners?
 - 4) What are the major **barriers and challenges** for *existing* multifamily residential buildings to becoming more energy efficient?
 - Who faces these challenges?
 - Do challenges differ by type of property, age of property, owner type, region, or income bracket targeted?
 - Are there regulatory or practical barriers that prevent or hinder subsidy streams from being directed to affordable rental housing?
 - 5) What **progress**, if any, was made in the 2010s in the United States to address the barriers and challenges, and leverage the opportunities, for making multifamily residential buildings more energy efficient?
 - Have there been any specific innovations with regard to financing practices; generating and/or utilizing new data; reforming policy and/or regulatory frameworks (at the local, state, or federal levels)?
 - Are you aware of any innovative models from states/localities, and/or innovations regarding collaborative partnerships between EE stakeholder groups?
 - Which innovations/trends in EE market progress are most promising or most likely to spread?
 - Where did these innovations germinate and why? For example:

- Were these innovations more prevalent in one type of rental housing stock compared to others (i.e., new builds versus preservation projects)?
 - Was there more sophisticated portfolio management by certain types of owners?
 - Are there better tracking systems that yield better information?
 - Did physical geography have an impact (i.e., urban versus rural markets; coastal versus inland markets)? Did this have effects on certain types of regulatory environments?
- 6) Are there topics or areas in which ground was lost?

MacArthur's Influence on EE Trends in Multifamily Affordable Rental Preservation

- 7) *[For interviewees familiar with MacArthur's WOO-EE initiative]* Besides the MacArthur Foundation, who have been the primary actors involved on a national, state, or regional scale in energy-efficiency practices as a way to preserve affordable housing since 2010?
- For example, did these include: Other foundations? State PUCs? Utilities? State housing finance agencies (HFAs)? Treasury? HUD? Banks? Nonprofit/private-sector networks or consortia?
 - How have they been influential?
 - What is the relative nature and magnitude of their influence, compared to MacArthur's?
- 8) Do you think MacArthur's EE grantmaking and lending has influenced EE trends in multifamily affordable rental housing? If so, how? If not, why not?
- 9) Prior to the start of MacArthur's initiatives in this area (ca. 2005–2010), how well understood was the potential for energy efficiency to enhance the preservation of affordable multifamily housing? How visible were activities in this space?
- How has awareness and visibility for these issues changed in the last five to ten years?
 - What has been MacArthur's role in raising the visibility of the topic of energy efficiency for the preservation of affordable housing? Of raising the visibility of specific projects, activities, and tactics? Can and should MacArthur do more to raise visibility?

Lessons Learned and Wrap-Up

- 10) *[For interviewees familiar with MacArthur's WOO-EE initiative]* Do you think that your activities, or those of other awardees in the WOO-EE program, enhanced the preservation of affordable housing, and how?
- What worked, what did not work, and why?
 - What successful approaches might be broadly applicable and worth sharing?
 - What activities or approaches do you wish you had been able to do that you couldn't or didn't, and why were you not able?
 - Were there any unintended consequences or unexpected events? If so, what were they?
- 11) *[For interviewees familiar with MacArthur's WOO-EE initiative]* Overall, what do you see as your key accomplishments with WOO-EE funding and support?
- 12) What do you see as the key remaining challenges facing the field of energy efficiency as a tool for the preservation of affordable rental housing?
- 13) Are there any topics that we have not addressed that you feel are important for us to consider? Any final thoughts or concluding comments?

Data and Documentation

At the end of the interview, request any relevant documentation such as grantee reports, briefings, internal memorandum, planning documents, etc., and other relevant information that would help us to understand the context and information they have provided about EE in the WOO initiative.

D.2. Interview Protocol for WOO-EE Grantees**Part 1. Informed Consent**

[To be read verbally to interviewee prior to interview for obtaining verbal consent to participate]

I work for RAND, which is a nonpartisan, nonprofit research organization. We've been asked by the MacArthur Foundation to conduct an evaluation of the energy-efficiency program within the Window of Opportunity (WOO) initiative as an approach to preserving affordable multifamily rental housing in the United States. Today we are hoping to hear your views on this subject as *[foundation staff who administered this program; a grantee/PRI recipient; an expert in the field]*. The interview will take approximately 60 minutes *[or 90 minutes for some MacArthur staff]*.

The information you provide will be kept strictly confidential. We will not share your responses with anyone else outside of the RAND research team, and we will not identify any individuals by name in any resulting study reports or in any way to the foundation. If we use any quotations from these interviews, we will not attribute them to any individual, and we will do our best to ensure anonymity. Please feel free to tell us if you want to share something “off the record,” in which case we will not include it in any of our reports.

Your participation in this interview is voluntary. You may choose not to participate, decline to answer any question, or stop the interview at any time.

We plan to audio record our conversation, solely for our internal note-taking purposes. The audio recording will only be accessible to project staff, and we will destroy the recording when the project is completed.

If you have any questions regarding this research, please contact study Principal Investigator Aimee Curtright at (412) 683-2300 x4989 or acurtrig@rand.org.

If you have questions about your rights as a research participant or need to report a research-related injury or concern, you can contact RAND's Human Subjects Protection Committee toll-free at (866) 697-5620 or by emailing hspcinfo@rand.org. If possible, when you contact the committee, please reference Study #2017-0314.

Do I have your permission to proceed with the interview?

[IF NO:] Thank you anyway.

[IF YES:] **Do I also have your permission to audio record the interview?**

Part 2. Interview Protocol**General EE and RE Innovations and Trends in Multifamily Residential from ~2010 to Today**

- Before talking specifically about MacArthur and their role in energy-efficiency (EE) and renewable-energy (RE) investments in affordable rental housing, we want to start with the big picture of EE and RE in rental housing of any type—this includes both subsidized and “naturally affordable” housing, as well as both low-income households and more

affluent ones living in multifamily housing. *We define multifamily residential buildings as those that consist of five or more rental units.*

- We are interested in *innovations and trends over this period of time*, including but not limited to ones that might be linked to MacArthur’s WOO Initiative.
- 14) What are the most important **benefits** for multifamily residential buildings to becoming more energy efficient?
 - To whom do these benefits accrue?
 - How do these benefits differ for retrofit preservation projects versus new construction?
 - Do the benefits differ by type of owner? For example, if we compare “mom and pop” owners, local community development corporations, city-specific nonprofit developers, regional developers, national nonprofits, and for-profit developers/owners, are the nature and magnitude of benefits different for these different types of owners?
 - 15) What are the major **barriers and challenges** for *existing* multifamily residential buildings to becoming more energy efficient?
 - Who faces these challenges?
 - Do challenges differ by type of property, age of property, owner type, region, or income bracket targeted?
 - Are there regulatory or practical barriers that prevent or hinder subsidy streams from being directed to affordable rental housing?
 - 16) What **progress**, if any, was made in the 2010s in the United States to address the barriers and challenges, and leverage the opportunities, for integrating renewable energy sources into multifamily residential buildings and in making multifamily buildings more energy efficient?
 - Have there been any specific innovations with regards to financing practices; generating and/or utilizing new data; reforming policy and/or regulatory frameworks (at the local, state, or federal levels)?
 - Are you aware of any innovative models from states/localities, and/or innovations regarding collaborative partnerships between EE and/or RE stakeholder groups?
 - Which innovations/trends in EE and RE market progress are most promising or most likely to spread?
 - Where did these innovations germinate and why? For example:
 - Were these innovations more prevalent in one type of the rental housing stock compared to others (i.e., new builds versus preservation projects)?
 - Was there more sophisticated portfolio management by certain types of owners?
 - Are there better tracking systems that yield better information?
 - Did physical geography have an impact (i.e., urban vs. rural markets; coastal vs. inland markets)? Did this have effects on certain types of regulatory environments?
 - 17) Are there topics or areas in which ground was lost?

MacArthur’s Influence on EE and RE Trends in Multifamily Affordable Rental Preservation

- 18) Besides the MacArthur Foundation, who have been the primary actors involved on a national, state, or regional scale in energy-efficiency practices as a way to preserve affordable housing since 2010? For example, did these include: other foundations? State

- PUCs? Utilities? State housing finance agencies (HFAs)? Treasury? HUD? Banks? Non-profit/private-sector networks or consortia?
- 19) Do you think MacArthur's EE grantmaking and lending has influenced EE and/or RE trends in multifamily affordable rental housing? If so, how? If not, why not?
 - 20) Beyond MacArthur, what organizations and individuals have been the primary influencers in the area of energy efficiency and renewable energy in multifamily housing?
 - How have they been influential?
 - What is the relative nature and magnitude of their influence, compared to MacArthur's?
 - 21) MacArthur invested in the following types of energy-efficiency activities [*provide the foundation's table of seven activities for funding*]:
 - Do you think these were the right, emerging areas and types of interventions to invest in? Why or why not?
 - What activities are you aware of that were being engaged in by organizations working in this space, either funded by MacArthur or otherwise?
 - What was the relative importance and influence of these non-MacArthur organizations and activities? How were these other organizations influential?
 - 22) Prior to the start of MacArthur's initiatives in this area (ca. 2005–2010), how well understood was the potential for renewable energy and energy efficiency to enhance the preservation of affordable multifamily housing? How visible were activities in this space?
 - How has awareness and visibility for these issues changed in the last five to ten years?
 - What has been MacArthur's role in raising the visibility of the topic of renewable energy and energy efficiency for the preservation of affordable housing? Of raising the visibility of specific projects, activities, and tactics? Can and should MacArthur do more to raise visibility?

Interviewee's Role and Relationship with the MacArthur Foundation and the WOO Initiative

[If not on our grantee/PRI list]

- 23) Has your organization been a grantee or borrower of MacArthur funds?
 - If so, was it a PRI or grant, and in approximately what year was it issued, and for what purpose?

[If on our grantee/PRI list:]

- 24) We see that your organization got a [grant/PRI] in [year] for the purpose of [XX]. Before I ask about that, I wonder if your organization has received additional funding from MacArthur outside this [grant/PRI]?
 - If so, was it a PRI or grant, and in approximately what year(s) was it issued, and for what purposes?

Use of WOO-EE Grants/PRI

- 25) Did I list the complete set of grants and PRIs your organization received for energy efficiency—and renewable energy—related work from MacArthur just now?
 - If not, list the other grants/PRI amounts, year awarded, term of grant, purpose of grant/PRI.

- 26) Can you tell me more about how you used those grants/loans and for which types of activities? For example, can you tell me what types of energy-efficiency and/or renewable-energy investments your organization engaged in with those funds? [*If relevant: Let's go one by one through each grant/PRI.*]
- 27) Were there alternative funding sources besides MacArthur for the activities that MacArthur's loans/grants funded? [*If other sources:*] What were they?
- 28) What were the benefits or detractions of seeking funds from MacArthur rather than from other outlets?
- 29) Did the grants/loans you received from MacArthur allow your organization to do something you otherwise would not have been able to do? If so, can you please describe that for us?
- 30) Did you interact with or follow the activities of other grantees? Did MacArthur facilitate or encourage interactions?
 - [*If interacted:*] What other grantees did you interact with, and in what ways?
 - What related nongrant organizations did you interact or collaborate with?
 - [*If PRI recipient:*] How would you suggest MacArthur track the impact of its PRI on preservation of affordable rental housing over time?

Lessons Learned and Wrap-Up

- 31) Do you think that your activities, or those of other awardees in the WOO program, enhanced the preservation of affordable housing, and how?
 - What worked, what did not work, and why?
 - What successful approaches might be broadly applicable and worth sharing?
 - What activities or approaches do you wish you had been able to do that you couldn't or didn't, and why were you not able?
 - Were there any unintended consequences or unexpected events? If so, what were they?
- 32) Overall, what do you see as your key accomplishments with WOO funding and support?
- 33) What do you see as the key remaining challenges facing the field of energy efficiency as a tool for the preservation of affordable rental housing?
- 34) Are there any topics that we have not addressed that you feel are important for us to consider? Any final thoughts or concluding comments?

Data and Documentation

At the end of the interview, request any relevant documentation such as grantee reports, briefings, internal memorandum, planning documents, etc., and other relevant information that would help us to understand the context and information they have provided about EE in the WOO initiative.

Abbreviations

ACE	Affordable Community Energy Services Company
ACEEE	American Council for an Energy Efficient Economy
ARRA	American Recovery and Reinvestment Act
CDFI	community development financial institution
CIC	Community Investment Corporation
CNT	Center for Neighborhood Technology
DOE	Department of Energy
EDF	Environmental Defense Fund
EE	energy efficiency
EEFA	Energy Efficiency for All
EERS	energy-efficiency resource standard
EIA	Energy Information Administration
EPS	efficiency portfolio standard
ESCO	energy-service company
ESPC	Energy Savings Performance Contract
FHA	Federal Housing Administration
GSE	government-sponsored enterprise
HFA	(state) housing-finance agency
HUD	Department of Housing and Urban Development
HVAC	heating, ventilation, and air conditioning
IMT	Institute for Market Transformation
LEED	Leadership in Energy and Environmental Design
LIHTC	Low-Income Housing Tax Credit
MSA	metropolitan statistical area
MUSH	municipal/university/school/hospital

NEMO	New Energy Model Organization
NHT	National Housing Trust
NOAH	Network for Oregon Affordable Housing
NYCEEC	New York City Energy Efficiency Corporation
PACE	Property Tax Financing/Property Assessed Clean Energy
PHA	public-housing authority
PPESCO	public-purpose energy-services company
PRI	program-related investment
QAP	Qualified Allocation Plan
R-PACE	Residential Property Tax Financing/Property Assessed Clean Energy
RE	renewable energy
SAHF	Stewards of Affordable Housing for the Future
TPC	The Preservation Compact
VEIC	Vermont Energy Investment Corporation
WOO	Window of Opportunity initiative
WOO-EE	Window of Opportunity: Energy Efficiency (a focus of the WOO initiative from 2012 to 2015)

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