Governors' Roadmap for Improving the Energy Efficiency of Multifamily Buildings

Executive Summary

Improving the energy efficiency of multifamily buildings can help governors achieve their goals of reducing consumers' energy costs, strengthening electricity system reliability, and lowering emissions.[1] One-third of the U.S. population lives in multifamily buildings, most of which were built before the adoption of statewide codes that set standards for energy efficiency in residential buildings.[2] Although benefits vary by state and region, a national study estimates that cost-effective investments in energy efficiency in the multifamily housing sector could reduce consumers' annual utility bills by nearly $3 billion, based on 2010 energy prices.[3] To help achieve those savings, governors are supporting new collaborations among state agencies, their legislatures, utilities, and building owners to help deploy cost-effective investments, create financing mechanisms, and train the workforce needed to increase the energy efficiency of multifamily buildings. They have directed their efforts at both the market-rate and affordable-building subsectors.

Historically, state programs that promote efficient use of energy have not targeted the multifamily residential sector.[4] Structural, financial, and regulatory barriers, which often do not exist in the single-family market, have limited the scale of state efforts. Owners or occupants of single-family homes benefit when they spend less on energy and thus have an incentive to invest in efficiency. In contrast, owners of apartment buildings whose tenants pay their own utility bills have less incentive to invest in energy efficiency. Even in circumstances where the owners of multifamily buildings have an incentive to invest, the ability to measure energy use in individual rental units can be limited, particularly in older buildings. In addition, complex ownership and management structures in some multifamily buildings can impede investment.

Policymakers can be discouraged from directing limited public resources towards reducing energy use in multifamily buildings because they lack the information necessary to estimate the energy savings and cost reductions that could be realized by retrofitting the existing stock of multifamily buildings. Financing investments in energy efficiency is challenging because some private mechanisms are complex, and public support is limited. Finally, utilities and state housing agencies could better coordinate their efforts to increase energy efficiency in the affordable building subsector.

Recent technology and policy developments are providing opportunities to overcome those barriers

[1] This paper will use the generally accepted definition of *multifamily buildings* to mean rental residential buildings that have five or more units. The multifamily housing market includes market-rate, privately owned multifamily buildings and affordable housing partially or fully subsidized by the federal government. For more information, see the table "What Type of Structure Do Renter Households Live In?" in *National Multifamily Housing Survey, Quick Facts: Resident Demographics,* https://nmhc.org/Content.aspx?id=4708#Rent_v_Own (accessed December 23, 2014).

[2] Ibid.; data from the U.S. Census Bureau, American Housing Survey for the United States: 2013, Table C–01–RO, http://www.census.gov/programs-surveys/ahs/data/2013/national-summary-report-and-tables---ahs-2013.html (accessed December 29, 2014).

[3] Anne McKibbin, Anne Evens, Steven Nadel, and Eric Mackres, "Engaging as Partners in Energy Efficiency: Multifamily Housing and Utilities" (Washington, DC: American Council for an Energy-Efficient Economy, 2012), http://aceee.org/research-report/a122 (accessed December 23, 2014).

[4] For further information about this topic, please review the companion paper, "Multifamily Energy Efficiency Opportunities in the States" from Elevate Energy. The paper describes the opportunities for energy efficiency investments in multifamily housing, reviews recent studies of the potential for cost-effective programs, and describes potential job-creation benefits at http://www.elevateenergy.org/research/.

and reduce program costs. States might wish to explore one or more of the following opportunities:

- Using advances in building energy measurement technologies to better assess savings opportunities;

- Adopting energy-use disclosure policies and benchmarking to motivate building owners and tenants to make investments;

- Working in partnership with local governments, community development institutions, and financial lenders to deploy traditional loans, new financing models for building owners, and mechanisms to assist individual renters;

- Exploring opportunities to use a national Energy Star score for multifamily buildings. Developed through a partnership between Fannie Mae and the U.S. Environmental Protection Agency (EPA), the Energy Star score helps states and multifamily building owners understand the relative energy performance of their buildings;[5] and

- Accessing data management tools and other technical assistance available through the Better Buildings Challenge. Issued in 2013 by the U.S. Department of Energy (DOE) and the U.S. Department of Housing and Urban Development (HUD), the Better Buildings Challenge aims to reduce energy consumption 20 percent over 10 years working with state and local officials, building owners and other stakeholders.

Governors can play an important role in making multifamily housing more energy efficient. Below are five actions for governors to consider:

- **Convene stakeholders to help encourage innovative solutions in the multifamily sector.** Governors' offices can convene stakeholders and encourage greater collaboration regarding investment in energy efficiency in multifamily housing. Such efforts should include convening representatives from local public housing authorities and utilities, who do not traditionally interact;

- **Issue executive orders that create multifamily energy efficiency programs.** Governors can issue executive orders to create or strengthen programs that target energy efficiency in multifamily buildings;

- **Incorporate multifamily buildings into state energy strategies goals.** Governors can issue statewide energy plans to generate new policy and program ideas that support energy efficiency upgrades in multifamily buildings;

- **Create one-stop shops for educational resources on investment in energy efficiency in the multifamily sector.** One-stop shops have emerged as an innovative way to help educate the owners of multifamily buildings and their tenants about the cost savings and other benefits gained from energy-efficient retrofits;

- **Improve access to funding for investments in energy efficiency in multifamily housing, especially affordable housing**. To help meet states' goals of lowering the energy costs of low-income households, governors can improve access to funding for investments that increase energy efficiency in the multifamily housing sector; and

- **Align workforce-training programs to state energy policies and business attraction goals.** Governors can invest in workforce training

[5] Chrissa Pagitsas, "Transforming Multifamily Housing: Fannie Mae's Green Initiative and Energy Star for Multifamily," *Fact Sheet* (Washington, DC: Fannie Mae, September 2014), https://www.fanniemae.com/content/fact_sheet/energy-star-for-multifamily.pdf (accessed December 23, 2014).

programs to encourage the development of skills necessary to make multifamily buildings more energy efficient. Notably, auditors trained in single-family and commercial structures might need new skills to complement their existing training to audit multifamily structures accurately.[6] Workforce training is a necessary component of economic development programs intended to attract clean energy companies to a state.

Introduction

States and utilities generally have focused their residential energy efficiency efforts on single-family homes. However, new technologies and program approaches offer increased opportunities for cost-effective energy efficiency investments in multifamily housing, which is the fastest growing part of the U.S. housing sector.[7]

Currently, one-third of the U.S. population lives in multifamily buildings.[8] Stagnant household incomes, tighter credit standards, and a trend toward urban living have increased demand for multifamily units, both market-rate and affordable.[9] The demand for market rate multifamily housing doubled from 2000 to 2010, while the rate of homeownership fell to 64 percent—the lowest level since 1994.[10] The number of eligible households seeking subsidized, affordable housing units has more than doubled, from 1.9 million in 2001 to 4.9 million in 2011.[11]

A report by the University of Arizona and Fannie Mae found 34 percent fewer energy-efficient features (attributes that reduce the amount or cost of energy required for a given level of energy service) in multifamily units compared to other housing types.[12] That finding is in part because 75 percent of the nation's multifamily buildings were built before 1980, before the adoption of statewide residential building energy codes that set baseline efficiency standards.[13]

State efforts to encourage cost-effective investments in energy efficiency in the multifamily housing stock offer a number of potential benefits. Those include:

- **Providing cost savings for tenants.** Residents of both market-rate and affordable multifamily buildings can realize significant savings through greater energy efficiency. A national study found that retrofits of entire multifamily buildings (and related equipment) could achieve energy savings of 30 percent for natural gas use and 15 percent for electricity use. Those improvements would save almost $3.4 billion in utility costs nationwide at 2010 energy prices;[14]

- **Enhancing the reliability of the electricity system.** Lowering demand for energy reduces congestion on the transmission grid, helping maintain reliability and potentially reducing wholesale electricity costs. Some states, such as

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[6] Pennsylvania Housing Finance Agency Preservation Through Smart Rehab Program, http://energengineers.com/preservation.php (accessed December 29, 2014).
[7] This paper uses the generally accepted definition of *multifamily buildings* to mean rental residential buildings that have five or more units. For more information, please see *National Multifamily Housing Survey, Quick Facts*. http://www.nmhc.org/Content.aspx?id=4708 (accessed June 22, 2015).
[8] Ibid. Data from the U.S. Census Bureau, American Housing Survey for the United States: 2013, Table C–01–RO.
[9] Ibid. The multifamily housing market discussed in this paper includes market-rate, privately owned multifamily buildings and affordable housing that is partially or fully subsidized by the federal government. For more information, please see *National Multifamily Housing Survey, Quick Facts.*
[10] U.S. Census Bureau, "Residential Vacancies and Homeownership in the Third Quarter 2014," Press Release, October 28, 2014, http://www.census.gov/housing/hvs/files/currenthvspress.pdf (accessed January 2, 2015).
[11] Eligibility is based on annual income levels; Joint Center for Housing Studies of Harvard University, "America's Rental Housing: Evolving Markets and Needs," *Fact Sheet* (2013), http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/americasrentalhousing-2013-factsheet_0.pdf (accessed December 29, 2014).
[12] Gary Pivo, "Energy Efficiency and Its Relationship to Household Income in Multifamily Rental Housing," *Fact Sheet* (Washington, DC: Fannie Mae, September 2012), https://www.fanniemae.com/content/fact_sheet/energy-efficiency-rental-housing.pdf (accessed June 5, 2015).
[13] Data from the U.S. Census Bureau, American Housing Survey for the United States: 2013, Table C–01–RO.
[14] A. McKibbin, "Engaging as Partners in Energy Efficiency."

California, attribute investments in energy efficiency to the delayed need for new power plants and associated transmission costs;[15]

- **Helping utilities meet state targets for energy efficiency.** Currently, 23 states have an energy efficiency resource standard (EERS) or have set energy efficiency goals. The policies adopted for those purposes require utilities or other entities to reduce the amount of electricity produced over a specified time period.[16] Energy efficiency measures in the multifamily sector have yet to be assigned a role in reaching those goals. As EERSs become more stringent (many have escalating targets) and utilities face penalties for noncompliance, programs intended to lower energy use in multifamily units can become an attractive compliance approach. A few states, including **Massachusetts** and **Minnesota**, have begun exploring the accounting, regulatory, and technology requirements for crediting multifamily programs in their EERS goals;[17] and

- **Reducing greenhouse gas (GHG) emissions.** The U.S. Environmental Protection Agency (EPA) has proposed rules under Section 111(d) of the Clean Air Act that, when finalized, will require states to limit GHG emissions from their existing power plants. Many states are considering incorporating energy efficiency measures into their compliance strategies. Indeed, EPA assumed a 1.5 percent increase in energy efficiency per year when developing each state's target under the proposed rule. Although EPA does not require that level—and states have questions about how to measure and verify energy efficiency to satisfy EPA's requirements—states might be able to use investments in multifamily energy efficiency programs to help achieve compliance.[18] States could also consider programs that promote the efficient use of energy in multifamily buildings to help achieve state-level GHG emission goals. Some states, like **California** and **Washington**, have incorporated multifamily housing programs into their existing state programs intended to reduce GHG emissions.[19]

Challenges to Investment in Energy Efficiency in Multifamily Housing

To develop a successful energy efficiency program for multifamily buildings, states must overcome existing structural, financial, and regulatory barriers to wide-scale deployment of retrofit programs. Although some of those barriers exist in other markets, they are often more pronounced in the multifamily sector. According to the Lawrence Berkeley National Laboratory, the total savings-weighted average cost for market-rate multifamily retrofits (including the costs for both

[15] Devra Wang, "Does Energy Efficiency Avoid the Need for Power Plants in California?" Natural Resources Defense Council Switchboard Blog, entry posted January 24, 2013, http://switchboard.nrdc.org/blogs/dwang/does_energy_efficiency_avoid_t.html.

[16] "Energy Efficiency Resource Standards (EERS)" (Washington, DC: American Council for an Energy-Efficient Economy), http://aceee.org/topics/energy-efficiency-resource-standard-eers (accessed June 5, 2015); and D. Steinberg and O. Zinaman, *State Energy Efficiency Resources Standards: Design, Status and Impacts* (Golden, CO: National Renewable Energy Laboratory, 2014), http://www.nrel.gov/docs/fy14osti/61023.pdf (accessed December 29, 2014).

[17] Mass Save, "2014 Implementation Update," report presented to the Energy Efficiency Advisory Council by the Program Administrators on April 8, 2014, http://ma-eeac.org/wordpress/wp-content/uploads/PA-Year-2014-Implementation-Update-Presentation-4-8-14.pdf (accessed June 5, 2015); and Minnesota Department of Commerce, "Study Captures Energy Savings Potential of State's Multifamily Sector," Press Release, August 2013, http://www.cleanenergyresourceteams.org/blog/study-captures-energy-savings-potential-state's-multifamily-sector (accessed June 5, 2015).

[18] Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, U.S. Environmental Protection Agency, 79 *Federal Register,* 34830, 34899 (June 18, 2014), https://www.federalregister.gov/articles/2014/06/18/2014-13726/carbon-pollution-emission-guidelines-for-existing-stationary-sources-electric-utility-generating (accessed September 11, 2014). EPA has announced that it will issue a final rule in summer 2015 that will clarify pathways for states to receive credit for nonutility-delivered energy efficiency, which would include investments in more efficient multifamily housing.

[19] Washington Carbon Pollution Reduction and Clean Energy Leadership Policy Brief Washington, http://www.governor.wa.gov/sites/default/files/policy_briefs/pb_Carbon_pollution_reduction_2014.pdf (accessed June 19, 2015).

the utility operating the program and any additional costs the participants in the program pay) is 7.1 cents/kilowatt hour (kWh)[20] compared to the total weighted-average cost for energy efficiency programs in all sectors, which is 4 cents/kWh. In addition, utilities operating energy efficiency programs in the multifamily sector can expect to pay a higher portion of total costs than for most other energy efficiency programs.[21]

Split Incentives and Disincentives from Metering Configuration

Split incentives in market-rate and affordable buildings pose one of the greatest challenges to states seeking the participation of building owners in multifamily energy efficiency programs. Split incentives occur when the benefits of a transaction pass to someone other than the party paying the cost. Most multifamily buildings are direct metered (one meter attached to each unit), so when a building owner pays for a retrofit, the initial benefit goes to the tenant in the form of lower energy bills.[22] Because owners of direct-metered buildings cannot directly recoup savings from their investments, few are making capital investments in energy efficiency. In principle, market-rate building owners can benefit from such investments because the number of renters willing to pay higher rents will increase as the costs of their energy bills decrease. Yet, those benefits take time to accrue, have only been anecdotally cited, and not studied enough to verify a direct relationship.[23]

The building owners and tenants of affordable buildings often face an even larger disincentive for investment in energy-efficient measures because of how the U.S. Department of Housing and Urban Development (HUD) subsidizes tenant utility costs. Each year, the state or local public housing agency determines the tenant's *utility allowance,* the amount necessary to cover the resident's reasonable utility costs. Although the process varies depending on the meter configuration of the building, HUD typically pays those allowances directly to the public housing agency. For direct-metered affordable buildings, the tenant pays a fixed utility allowance, calculated on a yearly basis, which is deducted from 30 percent of his or her income paid in monthly rent, as required under federal law.[24] Any energy savings would thus reduce the resident's utility allowance, limiting the incentive for public housing residents to ask for efficiency measures because they receive no net savings benefit from such measures. The utility allowance structure also acts as a disincentive to affordable building owners because the reduction in the utility allowance from energy savings would not automatically allow for an increase in rents paid by tenants since rents in affordable multifamily buildings are income based. Structures need to be in place to ensure that any reduction in utility allowances allows owners to recapture some of those savings in the out-of-pocket amount tenants pay for rent; otherwise, affordable building owners are likely to remain disinterested in efficiency measures.[25]

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[20] Hoffman, Ian M., Gregory M. Rybka, Greg Leventis, Charles A. Goldman, Lisa C. Schwartz, Megan A. Billingsley, and Steven R. Schiller, The *Total Cost of Saving Electricity Through Utility Customer-Funded Energy Efficiency Programs: Estimates at the National, State, Sector and Program Level* (Lawrence Berkeley National Laboratory, April 21, 2015), http://emp.lbl.gov/publications/total-cost-saving-electri. (accessed June 1, 2015)

[21] Ibid. Program administrator contributions are typically 72 percent of the total compared with approximately 50 percent for programs in other sectors.

[22] Multifamily buildings are either *direct metered,* which means that each unit is billed for its energy use, or *master metered,* where the building receives one bill and the split-incentive issue does not occur.

[23] Michael Carliner, *Reducing Energy Costs in Rental Housing: The Need and the Potential* (Cambridge, MA: Joint Center for Housing Studies of Harvard University, 2013), http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/carliner_research_brief_0.pdf (accessed December 29, 2014).

[24] U.S. Department of Housing and Urban Development, "Utility Allowances," http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/programs/ph/phecc/allowances (accessed December 29, 2014).

[25] Charlie Harak, *Up the Chimney: How HUD's Inaction Costs Taxpayers Millions and Drives up Utility Bills for Low-Income Families* (Boston, MA: National Consumer Law Center, 2010), 27–29, https://www.nclc.org/images/pdf/pr-reports/up_the_chimney_082610.pdf (accessed December 29, 2014).

Four states, **Connecticut**, **Hawaii**, **Massachusetts**, and **New York** maintain state-supported public housing which is not subject to the same federal "utility allowance" rules. In Massachusetts, the Department of Housing and Community Development, which oversees low-income housing, is collaborating with the Department of Energy Resources (DOER) to prioritize energy reduction in multifamily public housing. Those two state agencies have leveraged federal grant funds from the Department of Energy to implement a total of $7 million of retrofits, which combine energy efficiency with renewable thermal (heating and cooling) technologies, such as geothermal, solar domestic hot water and biomass. This grant supported 14 project installations with projected energy savings of a minimum of 20 percent and, in some cases, as much as 50 percent.

Lack of Publicly Accessible Data About Energy Savings

A lack of available data about energy use in multifamily buildings has hindered building owners' ability to predict accurately their savings from energy efficiency retrofits. In addition to whole-building energy data, building owners need to know the current energy use of each unit to determine whether an efficiency retrofit is worth the upfront investment. Data about energy use in specific units are particularly important for accurately identifying opportunities for savings and targeting retrofit opportunities within each unit because of differences in the use levels and patterns that affect cost-effectiveness. For example, residents who use higher-than-average levels of electricity during the peak hours of the day might benefit the most from energy efficiency measures. Owners typically do not have access to data about tenant energy use, which they need to track energy use both before and after a retrofit. Obtaining that information requires the lengthy (and sometimes impossible) task of gaining tenant approval for their billing information or requesting such information from the utility, which might be unable or unwilling to provide it.[26] Even if an owner were eligible for a state-supported energy efficiency program, the extensive staff time needed to secure such data can limit the owner's desire to participate.

The lack of accessible data about energy use has also hindered action to improve the energy performance of multifamily buildings through benchmarking and disclosure. Benchmarking and disclosure laws increase the transparency of energy performance data and where they have been used in the commercial sector they have, according to one study, led to a three percent reduction in utility costs.[27] Thirteen jurisdictions have passed benchmarking laws that require building owners to measure annual energy use, and some have added disclosure laws to share information with policymakers or the public. Lawmakers have only recently extended seven of those laws to cover the multifamily sector, which has led to limited activity to date. Similarly, state benchmarking and disclosure efforts have been slow to add the multifamily sector because of technical barriers and tenant privacy concerns cited by utilities and others.[28]

Limited Access to Private Financing for Energy Efficiency Retrofits

Both market-rate and affordable-building owners and tenants lack access to financing for energy efficiency retrofits. Building owners often do not have the upfront capital needed for retrofits, which can range between $2,500 and $5,000 per unit and total several hundred thousand dollars for large buildings. This kind of upfront capital would typically necessitate the use of outside financing, but lenders are often unwilling to risk their capital because they lack confidence

[26] Andrea Krukowski and Andrew C. Burr, *Energy Transparency in the Multifamily Sector* (Washington, DC: Institute for Market Transformation, 2012), 13–14, http://www.imt.org/uploads/resources/files/Energy_Trans_MFSector_IMT_Final.pdf (accessed December 29, 2014).
[27] Karen Palmer and Margaret Walls, *Does Information Provision Shrink the Energy Efficiency Gap? A Cross-City Comparison of Commercial Building Benchmarking and Disclosure Laws*, May 2012, http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=22536 (accessed June 19, 2015).
[28] Ibid.

in energy-saving projections and, as a result, the borrower's ability to repay.

Those challenges are more prevalent within the affordable housing market. Longer refinance and rehabilitation cycles (which range from 20 to 30 years compared with 7 to 10 years for market-rate apartment buildings) mean fewer opportunities over time to integrate energy efficiency upgrades into a full-scale building upgrade. In addition, most refinancing arrangements typically require a lien against the property, which may limit opportunities for energy efficiency retrofits. The Federal Housing Authority, which oversees government-supported housing loans, has prohibited owners from taking on subordinate liens on their affordable housing properties. Even for affordable multifamily buildings not backed by federal institutions, owners might need approval from multiple lienholders to secure financing for energy efficiency improvements, adding time and uncertainty to the process.[29]

Lack of Dedicated Public Funding for Energy Efficiency Retrofits

At the state level, decision makers, who may include utilities or third parties, rarely use public benefit funds collected from utility customers to fund efficiency programs in proportion to the multifamily share of the housing stock.[30] According to a 2013 report by the American Council for an Energy Efficient Economy, the funding for utility energy efficiency programs for multifamily housing is generally a fraction of that for single-family housing and not proportional to the multifamily share of housing stock. The lack of communication and engagement among a variety of local, state, and federal stakeholders may help explain the relatively small number of utility programs directed at the multifamily sector.[31]

The Weatherization Assistance Program (WAP) is a federal grant program for affordable housing that provides funding for state energy efficiency as well as conservation funds for low-income residents. States do not typically use these funds to support retrofits of multifamily buildings because of the challenges—notably, complex building ownership and management structures.[32] As a result, decision makers in weatherization agencies tend to focus on single-family units and train auditors and installers for the weatherization of single-family homes even when multifamily buildings are eligible.[33]

Complex Building Ownership and Management Structures of Multifamily Buildings

It is a challenge for states to engage multifamily building owners effectively on the benefits of energy efficiency investments because of complex building ownership and management structures. Individual investors own almost 70 percent of multifamily buildings, with real estate investment groups, partnerships, or joint ventures owning the remainder.[34] Those mixed ownership structures and multiple owners make it difficult to design a specific model and implement an effective program to promote energy efficiency in multifamily buildings. Further, multifamily buildings have other decision makers apart from owners, such as property managers, building staff, and tenants, who must be educated about and engaged in the retrofit

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[29] Jack Markowski, Anne Evens, and Matt Schwartz, *Financing Energy Efficiency Retrofits of Affordable Multifamily Buildings*, 28–29, http://www.chpc.net/dnld/FedReserveFinancingMF_EE_RetrofitsMarch2014.pdf (accessed December 29, 2014).

[30] *Public benefit funds* are charges to customers on their electric bills used to support utilities' investment in renewable energy resources, energy efficiency initiatives, and low-income programs.

[31] Kate Johnson and Eric Mackres, *Scaling Up Multifamily Energy Efficiency Programs: A Metropolitan Area Assessment* (Washington, DC: American Council for an Energy-Efficient Economy, 2013), 14, http://www.aceee.org/sites/default/files/publications/researchreports/e135.pdf (accessed December 29, 2014).

[32] Stephen Glatter and Jeanne Engle, *Use of Weatherization Program Funds to Benefit Residents of Multifamily Housing* (Washington, DC: Stewards of Affordable Housing for the Future), 1–3, http://www.sahfnet.org/files/index_56_2536597366.pdf (accessed December 29, 2014).

[33] C. Harak, *Up the Chimney.*

[34] *National Multifamily Housing Council, Quick Facts.*

process.[35] The need to engage each party adds time and can hinder the implementation of retrofits.

Limited Coordination Between Utilities and Housing Agencies

The lack of communication between utilities and state housing-finance agencies has limited the amount of investment in energy efficiency in the multifamily sector.[36] Aside from a few select programs, utilities have not coordinated their multifamily programs with state housing finance agencies.[37] That can mean missed opportunities to share expertise across a continuum of activities, from low-cost energy audits to prioritization of buildings most in need of energy efficiency improvements. More communication between state and federal housing authorities can advance programs that promote energy efficiency in multifamily housing. States might consider taking advantage of federal programs, including building energy-scoring tools and state-specific technical assistance.

Factors That Promote Energy Efficiency in the Multifamily Sector

Recently, policy and technological factors have led states to take a closer look at energy efficiency investments in the multifamily building sector. New energy-management technologies, the emergence of energy disclosure policies, the expansion of financing mechanisms to support the multifamily sector, and the growing interest in reducing GHG emissions reduction efforts have created a new impetus for states to consider cost-effective investments to improve energy efficiency in the multifamily sector. New federal programs and initiatives complement such investments and provide states with the opportunity to lower their costs and increase the scale of their efforts. In addition, there is an ongoing discussion of whether and how efforts to support multifamily energy efficiency programs in the affordable housing subsector could make use of a broader set of benefits when assessing cost effectiveness performance.[38]

New Energy Measurement Technologies

Advances in energy measurement technologies—for example, processing though submetering and wireless data access—can improve the measurement and management of tenant energy use in multifamily buildings. With modern submeters, the utility sends an aggregated electric bill to the owner, who then divides charges among tenants based on the actual use of each unit.[39] Advances in submeters also allow the wireless collection of meter data, improving what once was a costly and time-consuming task that required physical access to each apartment to read the meter. Web-enabled submeters also allow third-party vendors to collect energy data, store and access data electronically, and easily create reports that help building owners and tenants understand how to use energy more efficiently.[40] Although submeters offer advantages, they can also cost up to $1,000, which has deterred building owners from investing in them. Through its "$100 Electric Submeter

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[35] *Multifamily Energy Efficiency: What We Know and What's Next* (Washington, DC: Energy Programs Consortium, 2013), 9, http://www.energyprograms.org/wp-content/uploads/2013/11/EPC_Report.pdf (accessed December 29, 2014).

[36] *Multifamily Energy Efficiency: Reported Barriers and Emerging Practices* (Washington, DC: Energy Programs Consortium, 2013), 16, http://aceee.org/files/pdf/resource/epc_%20multifamily_housing_13.pdf (accessed December 29, 2014).

[37] Lori Bamberger, *Scaling the Nationwide Energy Retrofit of Affordable Multifamily Housing: Innovations and Policy Recommendations* (Washington, DC: Urban Institute, 2010), 12, http://www.urban.org/uploadedpdf/1001482-Multifamily-Housing.pdf (accessed December 29, 2014).

[38] For further information about this topic, please review the companion paper, "Multifamily Energy Efficiency Opportunities in the States" from Elevate Energy. The paper describes the opportunities for energy efficiency investments in multifamily housing, reviews recent studies of the potential for cost-effective programs, and describes potential job-creation benefits at http://www.elevateenergy.org/research/.

[39] A system that allows a property owner, property management firm, condominium association, homeowners association, or other multitenant property to bill tenants for individual measured utility use. The approach uses individual water meters, gas meters, or electricity meters per the relevant utility. Edward W. Morrison II, "Sub-metering for Electricity" (Albany, NY: New York State Energy Research and Development Authority) http://syracusecoe.org/gpe/images/allmedia/LivableNewYork/Sub-MeteringforElectricity.pdf (accessed December 29, 2014).

[40] Samantha Dubrow, "3 Submetering Game Changers Facility Mangers Should Take Advanced Of" Aquicore Energy Beat, entry posted July 16, 2014, http://energybeat.aquicore.com/metering-game-changers-real-time-data (accessed December 29, 2014).

Challenge," the U.S. Department of Energy's (DOE) Better Buildings Technologies Program challenged companies to produce a wireless submeter that costs $100 or less. Companies engaged in that effort, such as GE and Honeywell International, have spurred the development and wider adoption of lower cost submeters.[41]

The **New York** State Energy Research and Development Authority's *Demonstration of New Submetering Technologies* found that the deployment of submeters could reduce the energy consumption of residents in multifamily buildings by 10 to 26 percent within a single year because tenants are able to directly view and pay for their energy use.[42] The increased state focus on finding solutions to improve the energy efficiency of buildings has helped grow the global market for submeters, which researchers expect to nearly double between 2012 and 2020.[43] States are also working with utilities and DOE to ensure that advanced submetering reaches the multifamily sector.

In **Massachusetts**, public funding supported the establishment of the database software firm, WegoWise. All state-supported public housing authorities were provided one year of free access to the WegoWise database, an online tool for tracking and benchmarking energy use that helps building managers prioritize opportunities for energy-saving retrofits. Energy use for electricity and gas is pulled electronically from utility account information. Delivered fuels are entered via a customized method to match the available data from oil and wood pellet deliveries. This information enables the Massachusetts Department of Housing and Community Development to identify the state-subsidized buildings with the highest energy-intensity use and better prioritize capital improvement spending. Public housing authorities that use the database are eligible for specially designated sustainability funding.

Disclosure Policies and Benchmarking

Disclosure policies require the public release of energy use data. Those data can be used to compare the energy performance among similar buildings and to establish benchmarks. Benchmarking has increased the demand for efficiency in the commercial and residential sectors and could provide a similar incentive for owners of multifamily buildings. Since 2008, 14 states (**Alabama, Alaska, California, Connecticut, Hawaii, Kansas, Maine, Michigan, Minnesota, New York, Ohio, South Dakota, Utah**, and **Washington**) and 15 cities have passed benchmarking and disclosure policies that apply to commercial, residential, or public buildings. Seven of those cities (Austin; Cambridge; Chicago; Boston; New York City; Seattle; and Washington, D.C.) have started to obtain and analyze data to support multifamily energy efficiency, using an energy performance score developed by Fannie Mae and EPA.[44] Since 2012, New York City has required collection of building benchmarking data on almost 900 million square feet of multifamily properties. Although concerns about tenant privacy remain a barrier, the implementation of local disclosure policies for the multifamily sector such as the program in New York City has shown the potential for expanding such policies statewide. That statewide expansion can further help states reach other policy initiatives, like energy saving and emission reduction goals.

Financing Mechanisms Expanded to the Multifamily Sector

States, working in partnership with local governments, community development institutions, and financial lenders, are working to encourage private-sector lenders

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[41] Katherine Tweed, "DOE Launches $100 Electric Submeter Challenge," Green Tech Media, entry posted May 3, 2013, http://www.greentechmedia.com/articles/read/doe-launches-challenge-for-100-electric-submeter (accessed December 29, 2014); and Research and Markets, "Global Electricity Submeters Market, 2014–2018," http://www.researchandmarkets.com/research/bs5kt7/global (accessed December 29, 2014).

[42] Herbert E. Hirschfeld, Joseph S. Lopes, Howard Schechter, and Ruth Lerner, *Residential Electrical Submetering Manual* (Albany, NY: New York State Energy Research and Development Authority, 2001), http://www.submeteronline.com/pdf/subman2001.pdf (accessed December 29, 2014).

[43] K. Tweed, "DOE Launches $100 Electric Submeter Challenge."

[44] Institute for Market Transformation, "Cambridge, Mass., Passes Energy Benchmarking Ordinance," Press Release, July 30, 2014, http://www.imt.org/news/the-current/cambridge-mass.-passes-energy-benchmarking-ordinance (accessed December 29, 2014).

to respond to the needs of the multifamily sector through traditional loans, new financing models for building owners, and mechanisms to assist individual renters. Governors can support new financing programs that offer tenants and property owners more options to invest in energy efficiency. States, including **California, Connecticut, Florida**, and **New York**, have recently expanded their residential Property Assessed Clean Energy (PACE) loans to cover multifamily buildings.[45] In addition, to address concerns with the default risk, **California** has created a $10 million loan loss reserve that will reimburse mortgage lenders for any losses attributable to PACE loans.[46] The governors of **California, Connecticut, Kentucky, Illinois, New York**, and **Oregon** have approved legislation in those states to allow multifamily residential tenants to be eligible for on-bill financing (OBR) mechanisms.[47] **California** has created a two-year Energy Efficiency Financing Pilot for multifamily properties planned for launch in late 2015.[48]

Federal and State Measures to Reduce Greenhouse Gas Emissions

EPA has proposed rules under Section 111(d) of the Clean Air Act that, when finalized, will require states to reduce GHG emissions from their existing power plants. Many states are considering a role for energy efficiency in their compliance strategies. EPA assumed a 1.5 percent increase in energy efficiency per year when developing each state's target. Although that level is not required and it is not currently certain what the rule will recommend or require to measure and verify energy efficiency, states might be able to use investments in multifamily energy efficiency programs to comply.[49] Multifamily energy efficiency measures can also contribute to meeting state-level GHG emissions reduction goals. **California** and **Washington** have incorporated multifamily housing programs into their existing GHG reduction programs. In 2011, the California Public Utilities Commission (CPUC) released a report on its long-term strategy to reach the state's goals to use energy more efficiently and reduce GHG emissions. The CPUC plan includes a strategic approach to invest in advancing net-zero-energy homes, including in the multifamily affordable housing sector, and innovative financing mechanisms that address the split-incentive issue.[50]

Federal Efforts to Support Energy Efficiency in the Multifamily Sector

The federal government has established cross-agency

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[45] PACE programs provide property owners—single-family or multifamily owners—with state- or local government–backed loans, often secured through bonds, to fund residential energy efficiency upgrades. Borrowers repay PACE loans through a special tax assessment on the customer's property. The tax assessment is treated like all other property tax assessments, which means that PACE loans are repaid first in the event of a foreclosure. In addition, PACE loans stay with the property in the event of sale, allowing the benefits and costs to pass on to the new owner. As with other arrangements of that kind (known as a *primary lien*), beneficiaries receive a lower loan rate, but nonpreferred borrowers pay a slightly higher rate than they would otherwise. Of course, even with its lien protection, the state has a contingent liability for the loan.

[46] Governor Jerry Brown authorized the California Alternative Energy and Advanced Transportation Financing Authority to support new financing for energy efficiency that will pay back lenders in the event of a loan default. Multifamily units are eligible but must have submeters to ensure that utilities have access to electricity or gas data from individual units. Office of California Governor Edmund Brown, "Governor Brown, Treasurer Lockyer Kick-Start California PACE Program," Press Release, March 11, 2014, http://gov.ca.gov/news.php?id=18445 (accessed December 29, 2014).

[47] *On-bill financing* (OBF) is a loan made to a utility customer to pay for energy efficiency improvements. OBF can facilitate the use of utility funds to pay for energy efficiency retrofits through a customer's utility bill, which can address the split-incentive problem because all retrofit costs are included in tenants' energy bills. National Conference of State Legislatures, "On-Bill Financing: Cost-Free Energy Efficiency Improvements," http://www.ncsl.org/research/energy/on-bill-financing-cost-free-energy-efficiency-improvements.aspx (accessed December 30, 2014).

[48] The pilot will offer up to a 10 percent ratepayer credit enhancement, subsidies for audits, and an automated billing system to track and collect OBR payments. California State Treasurer, California Alternative Energy and Advanced Transportation Financing Authority, "Statewide Energy Efficiency Financing Pilot Programs," http://www.treasurer.ca.gov/caeatfa/cheef (accessed December 30, 2014).

[49] Carbon Pollution Emission Guidelines for Existing Stationary Sources. EPA has announced that it will issue a final rule in summer 2015 that will clarify pathways for states to receive credit for nonutility-delivered energy efficiency, which would include investments in more efficient multifamily housing.

[50] *Zero net energy* is defined as buildings that use no more energy over the course of a year than they produce from on-site renewable sources. *California Energy Efficiency Strategic Plan—2011 Update* (San Francisco, CA: California Public Utilities Commission, September 2008), 16, http://www.cpuc.ca.gov/NR/rdonlyres/A54B59C2-D571-440D-9477-3363726F573A/0/CAEnergyEfficiencyStrategicPlan_Jan2011.pdf (accessed April 10, 2015).

efforts to advance energy efficiency in multifamily buildings that complement state efforts. Two examples that can help other state efforts are:

- **Energy Performance Scores.** Fannie Mae recognized that a single national metric could help multifamily building owners better understand the energy performance of their buildings and partnered with EPA to develop the 1 to 100 Energy Star score for multifamily properties. Released in September 2014, the 1 to 100 Energy Star score allows building owners to better assess their property's energy performance by accounting for energy use across fuel types and normalizing for weather, building characteristics, and business activity. Multifamily building owners receive a score of 1 to 100 that represents the property's percentile ranking compared with similar properties;[51] and

- **Better Buildings Challenge.** In 2013, DOE and HUD issued the Better Buildings Challenge to support energy efficiency in the building sector. States, building owners or other interested stakeholders can sign a pledge to commit to reduce energy consumption by 20 percent over 10 years in their respective building portfolio.[52] Participating stakeholders receive technical assistance from the federal agencies. DOE provides building owners with energy data-collection and management tools and HUD helps train owners in energy-management techniques.[53] Eight states are members of Better Buildings. Since the program added multifamily housing, more than 55 market-rate and affordable multifamily housing developers have become Better Buildings Challenge partners.[54]

Actions for Governors

Governors can play a critical role in enhancing energy efficiency in the multifamily housing sector by taking the following actions:

- Convene stakeholders to help encourage innovative solutions in the multifamily housing sector;
- Issue executive orders that create multifamily energy efficiency programs;
- Incorporate multifamily buildings into state energy strategies;
- Create one-stop shops for educational resources on investment in energy efficiency in the multifamily housing sector;
- Improve access to funding for investments in energy efficiency in multifamily housing, especially affordable housing; and
- Align workforce-training programs to state energy efficiency policies and business attraction goals.

Convene Stakeholders to Help Encourage Innovative Solutions in the Multifamily Housing Sector

Governors' offices can convene stakeholders to discuss barriers to the adoption of energy efficiency efforts in multifamily buildings and develop innovative solutions to facilitate investments in energy efficiency in multifamily housing. Stakeholders, some of whom might not otherwise regularly interact, include representatives from state agencies, local public housing authorities, and utilities. In 2010, **New Jersey** Governor Chris Christie brought together the New Jersey Public Service Electric and Gas Company (PSE&G) and the New Jersey Housing Mortgage and Finance Agency (NJHMFA) to address the needs of multifamily affordable housing in the state during the 2008 economic recession. From that convening,

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[51] C. Pagitsas, "Transforming Multifamily Housing."
[52] U.S. Department of Energy, "Better Buildings Challenge," http://betterbuildingssolutioncenter.energy.gov/partnerships (accessed December 29, 2014).
[53] In May 2015, DOE launched the Better Buildings Solution Center to help stakeholders find building energy-efficiency solutions by topic, building type, and location.
[54] U.S. Department of Energy, "Better Buildings Challenge," http://www4.eere.energy.gov/challenge/partners/multifamily (accessed December 29, 2014).

PSE&G created the Residential Multifamily Housing Program, with priority given to affordable housing projects financed through the NJHMFA. The program offers a free on-site, investment-grade audit of multifamily facilities and financial incentives for the installation of cost-effective measures that increase energy efficiency.[55] To date, $39 million has been invested in the program, with a little less than 12 percent of that being administrative costs.[56] About 10,000 units have been served in the program, with 8,595 megawatt-hours (MWh) of energy saved and the total cost of saved energy amounting to 4 cents per kWh.[57]

Governors can support state participation in ongoing stakeholder engagement initiatives aimed at advancing investments in energy efficiency in the multifamily sector. An example is *Efficiency for All,* a multiyear initiative that seeks to ensure that different programs work effectively within statewide collaborative efforts and to increase funding from utilities for energy-efficient retrofits in multifamily affordable buildings.[58] Four nonprofit partners are working together in nine states (**California, Illinois, Maryland, Michigan, Minnesota, Missouri, New York, Pennsylvania**, and **Rhode Island**) to convene stakeholders, including state energy offices, state housing-finance agencies, and utilities, to open the lines of communication, identify, and overcome barriers that impede investments in energy efficiency in the multifamily sector. The partners have developed a program design guide to highlight regulations and financing strategies to further energy efficiency in the multifamily sector.[59]

Statewide housing conferences can be opportunities to incorporate energy efficiency in the multifamily housing sector. **Tennessee** Governor Bill Haslam's 2014 Governor's Housing Summit featured diverse stakeholders, including economists and housing industry professionals, to discuss a strategy to improve the state's housing market. One panel looked at how private developers can spur investment in energy efficiency to reduce long-term energy costs and the rehabilitation cycle of buildings. The panel covered the state's certification process for green affordable housing developments and featured multifamily developers that have gone through the process and encouraged participation by other developers.[60]

Issue Executive Orders That Create Multifamily Energy Efficiency Programs

Governors can issue executive orders that promote energy efficiency in multifamily buildings.[61] In 2014, **Connecticut** Governor Dan Malloy issued an executive order creating a new energy efficiency program to reduce energy consumption in multifamily housing units. The Connecticut Housing Finance Authority (CHFA) will administer the Affordable Housing Energy Efficiency Program using $10.8 million from

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[55] Elaine Bryant and Susan Lacey Ringhof, "The Collaborative Program Design and Delivery Strategies Behind the Development, Regulatory Approval, and Successful Implementation of PSE&G's Residential Multifamily Housing Program," http://www.puc.state.pa.us/Electric/pdf/Act129/OBF-PSEG_Paper.pdf (accessed December 29, 2014).

[56] Some states cap administrative costs at 10 percent; at 12 percent, the costs are above that level but could potentially be lower with more experience or greater scope.

[57] The New Jersey PSE&G uses the metric ekWh, where the *e* signifies the conversion of other sources of energy into kWh. Rachael Federicks, Program Manager, Energy Efficiency Programs, PSE&G Energy Services, personal communication, April 8, 2015. For consistency, this issue brief uses the kWh metric (without the *e*).

[58] Four partners are leading the effort for Efficiency for All: The Energy Foundation, Elevate Energy, the National Housing Trust, and the Natural Resources Defense Council.

[59] Natural Resources Defense Council, "Energy Efficiency for All," *Fact Sheet* (New York, NY: NRDC, 2014), http://www.nrdc.org/energy/files/energy-efficiency-for-all-FS.pdf (accessed December 30, 2014).

[60] Tennessee Housing Development Agency, "2014 Governor's Housing Summit Agenda," http://issuu.com/thda/docs/summit_program_2014/4 (accessed December 30, 2014).

[61] Although many multifamily programs have historically been created by state energy offices and nonprofit organizations, an executive order can provide exposure and boost participation in a program.

the state's remaining Qualified Energy Conservation Bonds (QECBs) allocation.[62] The program supports energy efficiency or renewable energy projects that save at least 20 percent of energy costs in multifamily buildings either owned by a public housing authority or mortgaged with the CHFA.[63] The CHFA released a request for proposal in January 2015 and plans to notify applicants of selection in summer 2015.[64]

In 2014, **Washington** Governor Jay Inslee issued an executive order outlining six key areas in which to promote clean energy throughout the state. The executive order directed the creation of a statewide program to accelerate cost-effective energy efficiency retrofits to existing buildings along with technical assistance for building owners. The program must improve residents' access to financing for energy efficiency upgrades, support vulnerable and low-income populations through weatherization assistance, and set minimum standards for energy efficiency in rental housing. It also includes a public campaign to inform citizens of the new program and encourage its use. The order requires that the program enhance or be compatible with similar programs that utilities offer.[65]

Incorporate Multifamily Buildings into State Energy Efficiency Strategies

Through the Clean Energy Jobs Plan, **California** Governor Edmund Brown supported the CPUC's zero-net-energy goals for new buildings in the residential sector by 2020 and the commercial sector by 2030. Zero-net-energy buildings use no more energy over the course of the year than they produce from on-site renewable sources. The governor's plan required the CPUC to establish a plan and a timeline to make all new homes and commercial buildings in the state zero-net-energy.[66] To identify sustainable business models in the state, the CPUC initiated two zero-net-energy pilot projects for multifamily affordable housing buildings in San Diego, California. The pilot projects informed the goals of the statewide effort to encourage changes in tenant behavior to increase energy savings and meet the program's goals.[67] That effort was a part of the state's strategic long-term plan to reach its ambitious goals to improve energy efficiency and reduce GHG emissions.[68]

Statewide energy plans that governors establish can initiate new ideas to promote energy efficiency upgrades in multifamily buildings. In October 2014, **Virginia** Governor Terry McAuliffe unveiled the 2014 Virginia Energy Plan, which described his strategic vision for energy policy in the state. The plan identifies goals and recommendations to diversify the state's economy by, among other things, accessing the "untapped potential" in the energy sector, in part through reducing energy costs, investing in reliable energy infrastructure, and providing workforce training. The plan calls for engaging with

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[62] QECBs are federally subsidized tax credit bonds available to states to support renewable energy and energy efficiency projects. Although in existence for the past five years, states have only rarely used them for multifamily energy efficiency programs. As of December 2014, approximately 34 percent of the $3.2 billion in available funds have been issued. Tennessee Department of Environment and Conservation, "Qualified Energy Conservation Bonds," h http://www.tn.gov/environment/article/qualified-energy-conservation-bonds (accessed April 6, 2015).

[63] Executive Order 40, "Re: Affordable Housing Energy Efficiency Program," http://www.ct.gov/malloy/lib/malloy/EO_40_Affordable_Housing_Energy_Efficiency_Program.pdf (accessed December 29, 2014).

[64] Connecticut Housing Finance Authority, *Request for Proposals Housing Energy Efficiency Program,* http://www.chfa.org/content/Lists/Request%20for%20Proposals/Attachments/189/Housing%20Energy%20Efficiency%20Program%20RFP%20-%202015.pdf (accessed March 16, 2015).

[65] Executive Order 14–04, "Re: Washington Carbon Pollution Reduction and Clean Energy Action," http://www.governor.wa.gov/sites/default/files/exe_order/eo_14-04.pdf (accessed December 29, 2014).

[66] Office of California Governor Edmund Brown, "Clean Energy Jobs Plan," http://gov.ca.gov/docs/Clean_Energy_Plan.pdf (accessed December 30, 2014).

[67] Ted Bardacke and Walter Wells, *Affordable Multifamily Zero Energy New Homes* (Santa Monica, CA: Global Green USA, 2012), Publication number CEC-500-2012-052, http://www.energy.ca.gov/2012publications/CEC-500-2012-052/CEC-500-2012-052.pdf (accessed December 30, 2014).

[68] *California Energy Efficiency Strategic Plan—2011 Update.*

social entrepreneurs to develop innovative models, such as pay for performance, that help finance energy efficiency upgrades in existing multifamily buildings.[69]

Create One-Stop Shops for Educational Resources on Investment in Energy Efficiency in the Multifamily Housing Sector

Governors' offices can direct educational resources on the benefits of investment in energy efficiency to both the owners of multifamily buildings and their tenants. A common stereotype among multifamily building owners and tenants is that energy efficiency programs are strictly for single-family homeowners. This is often reinforced by promotional materials for investments in energy efficiency that primarily feature anecdotes from single-family homeowners.[70] To help educate multifamily building owners about the cost savings from and other benefits of energy-efficient retrofits and the increasing opportunities to assist in implementing such retrofits, one-stop shops have emerged as an innovative program. One-stop shops provide building owners with a single point of contact throughout the entire retrofit process to reduce time and the efforts spent seeking out different agencies to obtain necessary information before embarking on a retrofit. In **Michigan**, a pilot between Consumers Energy (a utility), the Michigan State Housing Development Authority, Michigan Energy Options, Michigan Saves, and others is based on a one-stop-shop model tailored to the state's specific housing needs. Between 2014 and 2016, the program expects to retrofit 1,224 units in 79 buildings, with estimated energy cost savings of $2.2 million in five years.[71]

Improve Access to Funding for Investments in Energy Efficiency in Multifamily Housing, Especially Affordable Housing

To help meet state goals of providing affordable housing and lowering energy costs for low-income households, governors can direct and improve access to funding for investments in energy efficiency in the multifamily housing sector. In January 2015, **California** Governor Jerry Brown announced the establishment of the California Multifamily PACE pilot, in partnership with the MacArthur Foundation, to remove barriers to and make available financing for investments in energy efficiency and solar energy in multifamily housing. The pilot will enable PACE financing for certain multifamily properties, including specific properties with HUD, the California Department of Housing and Community Development, and the CHFA.[72] The initiative builds on prior efforts from the CPUC to remove barriers—for example, split incentives that impede investment in energy efficiency in the affordable housing sector. The CPUC launched a statewide program for multifamily affordable housing that allows the owner or public housing authority and tenant to share energy savings from efficiency improvements, thus addressing the split-incentive barrier common in the sector. The CPUC's Energy Efficient Utility Allowance program reduces tenant utility allowances but allows the owner to increase rents to make up a portion of the difference. Although net costs for tenants still decrease, the design is for the reduction in the utility allowance so that it is smaller than the projected energy savings. A successful example was a 53-unit building in Riverside, California, that generated more than $11,000 annually in profit to the building owner without increasing rent payments and

[69] Commonwealth of Virginia, Department of Mines, Minerals and Energy, *Virginia Energy Plan: October 1, 2014,* 229–230, http://www.dmme.virginia.gov/DE/LinkDocuments/2014_VirginiaEnergyPlan/VEP2014.pdf (accessed December 29, 2014).
[70] Michael Bodaken, President, National Housing Trust, personal communication, October 15, 2014.
[71] Ariana Gonzalez, "Multifamily Affordable Housing in Michigan: Energy Efficiency for All," Natural Resources Defense Council Switchboard Blog, posted May 12, 2014, http://switchboard.nrdc.org/blogs/agonzalez/multifamily_affordable_housing.html (accessed December 30, 2014).
[72] The White House, Office of the Press Secretary, "Administration and California Partner to Drive Renewable Energy and Energy Efficiency in Multifamily Housing," Press Release, January 29, 2015, https://www.whitehouse.gov/the-press-office/2015/01/29/fact-sheet-administration-and-california-partner-drive-renewable-energy- (accessed April 6, 2015).

allowed for a reduction in tenants' utility allowance by $20 per month on average.

Maine Governor Paul LePage's Office of Energy Independence and Security, through Efficiency Maine Trust, received $4.5 million in seed funding through DOE's State Energy Program for its Multifamily Efficiency Program (MEP) pilot.[73] The program provides building owners with a benchmarking report, helps with development of an energy-reduction plan, and offers access to a network of approved partners trained in energy assessments for multifamily units. MEP also supports uptake in the energy efficiency market by offering incentives for building owners at the completion of the program.[74] Less than two years after the program was launched, 35 building owners completed 66 building retrofit projects, with annual electricity savings of 238 MWh.[75]

Align Workforce Training Programs to State Energy Policies and Business Attraction Goals

As an increasing number of states and municipalities adopt building standards that require more energy-efficient multifamily housing, states can support local contractors and building management professionals in obtaining the skills necessary to meet those standards. For example, auditors trained in single-family and commercial structures might need new skills to evaluate equipment and construction improvements to multifamily buildings.[76] Governors can support investments in workforce training programs to encourage the development of those skills, particularly for the multifamily sector.

State training programs that provide workers with the skills necessary to improve energy efficiency in multifamily buildings can complement state economic development programs to attract companies.[77] **Massachusetts** and **North Carolina** are both investing resources in job training as part of efforts to attract clean energy industries to the state. Both states are tracking energy efficiency–related job growth on an annual basis.[78] **New York** Governor Andrew Cuomo announced the selection of 14 regional workforce-development organizations to train workers to meet the demand of the state's growing clean energy industry and to help the state remain attractive for clean energy businesses looking for a location that has a skilled workforce. The training courses focus on upgrading the skills of current workers, including plumbers, electricians, and weatherization crew members who work on clean energy projects in the residential, multifamily, and commercial sectors. Within the next two years, the state expects to train more than 14,000 people across the state through this program.[79] Although the long-term demand for a clean energy workforce is uncertain, greater attention to workforce training by governors can support clean energy policy goals and help to maintain a competitive workforce.

The success of the **Pennsylvania** Housing Finance Authority (PHFA) Smart Rehab Program created additional demand for energy auditors for the multifamily

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[73] Efficiency Maine Trust is the independent administrator of energy efficiency programs in Maine. It is governed by a stakeholder board of trustees, with oversight from the Maine Public Utilities Commission. EfficiencyMaine.gov, "About," http://www.efficiencymaine.com/about (accessed December 30, 2014).

[74] U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy, "Maine Multifamily Building Owners Trust in Efficiency," http://energy.gov/eere/better-buildings-neighborhood-program/maine-sep#workforce (accessed December 30, 2014).

[75] Antje Flanders, *Efficiency Maine: Multifamily Efficiency Program Evaluation* (Waltham, MA: Opinion Dynamics, 2014), 24, http://www.efficiencymaine.com/docs/Multifamily-Efficiency-Program-Evaluation-Report.pdf (accessed June 5, 2015).

[76] Pennsylvania Housing Finance Agency Preservation Through Smart Rehab Program.

[77] Douglas Belkin and Mark Peters, "States Boost Workforce Development to Attract Employers," *The Wall Street Journal,* March 21, 2014, http://www.wsj.com/articles/SB10001424052702303287804579447320943274410 (accessed April 7, 2015).

[78] For more information, see the *Massachusetts Clean Energy Industry Report.* (Massachusetts Clean Energy Center, 2014) http://www.masscec.com/content/2014-clean-energy-industry-report and the *North Carolina Clean Energy Industry Census.* (N.C. Sustainable Energy Association, 2015) (accessed March 2, 2015)

[79] Office of New York Governor Andrew Cuomo, "Governor Cuomo Announces Expanded Training for Clean-Energy Workforce Across the State," Press Release, June 30, 2014, http://www.governor.ny.gov/press/06302014-clean-energy-workforce (accessed December 29, 2014).

sector, which prompted the PHFA to invest $2 million to ensure that Pennsylvania auditors were qualified to assess multifamily buildings. The PHFA worked with the Pennsylvania Public Utilities Commission and the state's five major electric utility companies to provide funding for the training and energy audits.[80]

The **Tennessee** Department of Environment and Conservation's Office of Energy Programs launched the Tennessee Energy Education Initiative (TEEI) in conjunction with Pathway Lending, a community development financial institution, and other statewide energy resource providers. TEEI launched an online resource center, which has a section specifically devoted to energy efficiency in multifamily buildings that includes presentations from TEEI events and information about federal and local utility incentive programs.[81] In 2013, TEEI held the Untapped Opportunities for Energy Efficiency in Multifamily Housing Workshop in Nashville, which included convening technical experts to address solutions specifically for multifamily builders, developers, property owners, and facility managers, for issues they face when working on energy efficiency retrofits in multifamily buildings.[82]

At the federal level, DOE has made specific tools available to help states develop worker-training programs. DOE's Multifamily Standard Work Specifications and the Multifamily Job Task Analyses catalogues the knowledge, skills, and abilities that those working on multifamily buildings need to ensure that an energy-efficient retrofit is effective and safe.[83]

Conclusion

Demographic and market trends are expected to continue the shift toward greater demand for multifamily buildings. New technologies, financing mechanisms, and innovative programs emerging at the state level have the potential to spur investment in energy efficiency in this sector. Governors who unlock that potential can provide cost savings for consumers, meet energy efficiency and reliability goals, and further reduce GHG emissions.

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[80] Pennsylvania Housing Finance Agency Preservation Through Smart Rehab Program.
[81] Tennessee Energy Education Initiative, "Multifamily Resource List," http://tnenergy.org/resourcecategories/multi-family (accessed December 30, 2014).
[82] Tennessee Energy Education Initiative, "Untapped Opportunities for Energy Efficiency in Multi-family Housing, Nashville," http://tnenergy.org/event/untapped-opportunities-for-energy-efficiency-in-multi-family-housing-nashville (accessed April 6, 2015).
[83] U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, "Multifamily Retrofit Tools and Workforce Resources," http://energy.gov/eere/wipo/multifamily-retrofit-tools-and-workforce-resources (accessed April 20, 2015).