Ready to Go: State and Local Efforts Advancing Energy Efficiency

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Contents

About ACEEE

The American Council for an Energy-Efficient Economy (ACEEE), a nonprofit research organization, develops policies to reduce energy waste and combat climate change. Its independent analysis advances investments, programs, and behaviors that use energy more effectively and help build an equitable clean energy future.

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Executive Summary

This toolkit provides a resource for local and state governments and their partner organizations as they prepare to deploy current and future federal funding opportunities. It presents noteworthy energy efficiency programs from various cities and states that might serve as models, alongside guiding principles for effective and equitable program development.

We compiled our sample of noteworthy energy programs by seeking input from external organizations with knowledge of state and local policies, synthesizing internal subject matter expertise, and gathering publicly reported program data. We examined existing state and local energy efficiency programs and identified programs that have proven effective across a range of sectors and geographies. Here, we first discuss six guiding principles for governments developing energy efficiency programs, synthesizing lessons learned from examples. These principles include undertaking rigorous public engagement processes, defining multiple benefits, using a data-driven approach, setting goals and maintaining accountability, enhancing program flexibility, and maximizing comprehensiveness.

Equitable programs incorporate community input as part of policy design and produce outcomes that benefit all residents. Governments are increasingly attempting to address inequities, and federal funding opportunities call for a focus on social equity in program development. In this toolkit, we center equity considerations in our guiding principles for program development.

Following this discussion of guiding principles, we provide descriptions of 17 example programs across the United States. These programs address housing, transportation, workforce development, and other topics. They have also made intentional efforts to advance equity and have produced benefits for communities traditionally underserved by energy efficiency programs. Each project description summarizes the program, identifies successes and challenges, and highlights key ways that the program can be applied to other governments' work.

Table 1. Featured program profiles

Featured program	Highlights
VEIC Zero Energy Modular Program	Constructs modular homes with triple-glazed windows, heat pumps, Tier 3 ENERGY STAR appliances, LED lighting, and other features
SystemVision North Carolina	Builds a clean energy workforce as contractors receive training in energy-efficient construction
California Low-Income Weatherization Program for multifamily buildings	Supports both energy efficiency retrofits and renewable energy installations in buildings
Emerald Cities Collaborative RENEW	Provides energy efficiency services to multifamily buildings that house low- and moderate-income residents
Washington, DC Building Energy Performance Standards	Combines supporting programs and incentives with minimum energy efficiency standards for buildings
Minneapolis Green Zones Initiative	Designates environmental justice priority zones as a mechanism for targeting sustainability efforts to marginalized communities
EnergyFIT Philly	Conducted retrofits in entire neighborhood blocks in low-income neighborhoods
Connecticut Green Bank	Uses public funding to spur private investment in clean energy
Massachusetts Green Communities	Provides personalized assistance for municipalities in energy projects for public buildings such as schools, wastewater facilities, and municipal buildings
HeatSmart/CoolSmart Somerville	Offered 9% interest and deferred payment loans to Somerville property owners earning less than 80% of the area median income, which covered a range of repairs, including air source heat pumps
Cleveland Climate Action Plan	Identifies distinct program actions for governments, community organizations, universities, and private sector actors
Commons Energy	Provides comprehensive services using upfront financing provided by investors
Portland (Oregon) Home Energy Score	Requires most owners of single-family homes to obtain a Home Energy Score before sale

Featured program	Highlights
Minnesota's Diesel Replacement Grant	Provides grants to replace old diesel equipment with electric vehicles (EVs)
Move Louisville	Undertakes comprehensive transportation planning that includes programs that improve existing infrastructure and reduce vehicle miles driven
Our Community CarShare Sacramento	Provides car sharing for residents who struggle to afford a car or have poor public transit access
E-Contractor Academy	Trains participants in business development and marketing, as well as technical trades like solar installation and LED lighting retrofits

New Opportunities for Governments to Support Communities

Given that recent and proposed federal funding includes pandemic relief and climate and infrastructure initiatives, state and local governments have historic opportunities to invest in sustainable economic development, improve quality of life, and address climate change. As the United States continues to grapple with COVID-19 and other challenges such as air pollution and income inequality, energy efficiency is a vital resource for addressing these problems and supporting greenhouse gas (GHG) emission reductions goals (IPCC 2019; IEA 2021; IPCC 2021).

Energy efficiency is a tool for governments to meet their goals for pandemic recovery, economic prosperity, climate change, and public health.

This toolkit provides a resource for local and state governments and their partner organizations as they prepare to deploy current and future federal funding opportunities. Designing and implementing programs can pose challenges for governments, especially if they are receiving funding support that was previously inaccessible. However, effective and equitable energy efficiency programs can produce multiple benefits in addition to decreased energy consumption. Such programs can create jobs, reduce operating costs and energy bills, decrease carbon emissions, and improve the health of communities (IEA 2021; Drehobl, Ross, and Ayala 2020; Hayes 2020). Considering these opportunities, governments should be well prepared to launch effective and equitable energy efficiency programs or to ensure that existing programs poised to receive an influx of funding are inclusive and equitable.

Funding from the American Rescue Plan Act (ARPA) has specified allowed uses targeted at COVID-19 relief and a strong and equitable economic recovery, but future federal initiatives may present opportunities in different or broader areas. For example, the recently passed Infrastructure Investment and Jobs Act (commonly known as the *bipartisan infrastructure bill*) includes opportunities to fund training for clean energy jobs, transition to zero-emissions school and transit buses, and undertake commercial and residential audits and retrofits through loan programs, alongside other mechanisms to reach a clean energy future. The legislation also includes $500 million for the State Energy Program, which funds state energy initiatives under the leadership of the governor-designated State and Territory Energy Offices, and $550 million for the Energy Efficiency and Conservation Block Grant Program, which provides grants to communities and governments for energy efficiency and conservation programs (117th Congress 2021).[1]

While some state and local governments have strong energy efficiency programs, those that do not will need to invest time in developing effective programs to support new opportunities. While multiple entities can improve or develop clean energy programs, including investor-owned, municipal, and co-operative utilities, our toolkit is specifically focused on providing guidance to state and local governments facing expanded opportunities to advance an equitable clean energy future. Governments of all sizes can use existing initiatives to inform the development, expansion, or improvement of energy efficiency programs. This toolkit presents 17 noteworthy energy efficiency programs from various states and cities that might serve as models for other cities and states. These programs address topics such as housing, transportation, and workforce development. They also have undertaken intentional efforts to advance equity that have produced benefits for communities traditionally underserved by energy efficiency programs. The Appendix includes additional resources.

With federal funding, governments can develop or upgrade energy programs that incorporate the practices of these examples and go even further to support their communities. The featured programs in this toolkit are not meant to be replicated completely. Rather, governments can use these examples as starting points as they adapt effective program structures to meet the unique needs of their residents.

Federal Opportunities for Cities and States

Current and future federal investment provides cities and states an opportunity to serve their communities and address climate and environmental problems in an equitable way.

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[1] ACEEE will provide details and updates on these sources of clean energy funding as they become available.

For example, ARPA state and local assistance funds can be used to "address negative economic impacts caused by the public health emergency, including economic harms to workers, households, small businesses, impacted industries, and the public sector" (Department of the Treasury 2021a). In addition to much-needed direct relief payments to residents and businesses, along with utility assistance and similar approaches, this funding also provides opportunities to pursue energy programming with long-term benefits. Specifically, the ARPA interim guidance highlights weatherization and responding to impacts of climate change as eligible uses of funding (Department of the Treasury 2021b). In service of these goals, energy efficiency initiatives such as residential retrofits can improve health and safety while reducing utility bills for low-income households and communities of color, which have been most affected by the pandemic. Similarly, ARPA funds can be used to invest in workforce development programs. Clean energy jobs training can grow the workforce in this sector while helping restore employment negatively impacted by the pandemic (E4The Future 2020). To address health and safety issues, improvements in homes that increase energy efficiency can also reduce mold and pollution exposure and generally improve health.

Governments can also take advantage of other funding opportunities provided by federal legislation to improve the quality of low-income housing, such as through the Community Development Block Grant Program, the Energy Efficiency and Conservation Block Grant Program, the Low-Income Home Energy Assistance Program, the Weatherization Assistance Program, and the State Energy Program. The increase in funding for these programs through recent legislation is evidence of energy efficiency's value for improving lives and reducing emissions in communities. In addition, the Biden administration's Justice40 Initiative and interim guidance establish a goal of having 40% of the benefits of federal environmental investments go to disadvantaged communities to support environmental justice (Young, Mallory, and McCarthy 2021). This initiative emphasizes the importance of centering the voices and needs of marginalized communities when deploying federal funds for climate and energy. Table 2 shows a summary of some federal funding opportunities for governments, including the host agency and a link to the program site for current, detailed information.

Table 2. Highlighted federal funding sources for clean energy

Funding source	Area(s) of focus	Agency or statute
American Rescue Plan Act	COVID-19 pandemic relief including for supporting health and economic well-being, addressing social inequities, and responding to climate change	U.S. Department of the Treasury, Public Law Number 117-2
Community Development Block Grant Program	Annual grants for governments focused on improving housing and living environments, particularly for low- and moderate-income households	U.S. Department of Housing and Urban Development

Funding source	Area(s) of focus	Agency or statute
Energy Efficiency and Conservation Block Grant Program	Community-level grants for energy efficiency and renewable energy	U.S. Department of Energy
Infrastructure Investment and Jobs Act	Advancing equity, economic growth, and climate response, including investments in EV infrastructure, clean energy jobs, and efficient transit	Public Law Number 117-53
Low-Income Home Energy Assistance Program	Provides federally funded assistance with energy costs through states, territories, and local governments, including weatherization, home repairs, and energy bills	U.S. Department of Health and Human Services
State Energy Program	Technical assistance and funding for states and territories on energy initiatives	U.S. Department of Energy
Weatherization Assistance Program	Weatherization of low-income households	U.S. Department of Energy

Sources: Department of the Treasury 2021b; HUD 2021; DOE 2021b; White House 2021; California Department of Community Services & Development 2021a; DOE 2021c; DOE 2021d.

This toolkit provides key lessons and example energy efficiency programs that can support governments in more successfully deploying federal funding opportunities to meet their goals. We compile previous research and strong example programs across sectors and across the United States to inspire and inform governments in their own program development. Many of these programs display wide-reaching energy efficiency, clean energy, and climate impacts; clearly defined goals and evaluation criteria; and deliberate efforts to incorporate equity. All provide valuable lessons for governments deploying new funding, even across sectors and levels of government. Some example programs are small in scale but could be deployed on a larger scale with increased funding support. Others include complementary policies that governments can enact and support with their funds. In addition to highlighting these programs' strengths, we also describe opportunities for growth and lessons learned. Governments can learn from both the successes and the challenges of previous programs. We encourage readers to consider how elements of these programs could be applied to their own communities and which strategies best meet the needs of their residents.

CENTERING EQUITY

Equitable programs incorporate community input as part of policy design and produce outcomes that benefit all residents. Communities of color and low-income communities not only face the most severe effects of climate change but also receive few benefits from conventional energy efficiency programs (Dodman and Satterthwaite 2009; Lyubich 2020;

Hoerner and Robinson 2008). Without targeted efforts to achieve equity, energy efficiency initiatives typically see higher participation rates from more-affluent communities. Although underserved groups tend to experience higher energy costs and greater exposure to pollution, they are often left out of clean energy opportunities and workforce transitions and face higher barriers to participation (Drehobl, Ross, and Ayala 2020; Jesdale, Morello-Frosch, and Cushing 2013). Many of these community members historically have had little influence in the policy design process. The Urban Sustainability Directors Network identified four components of equity that guide the implementation and creation of the equitable clean energy approaches listed in figure 1 (Park 2014; ACEEE 2021). We aim to identify programs that reflect these dimensions and to encourage governments to focus on these tenets of equity in their sustainability efforts.
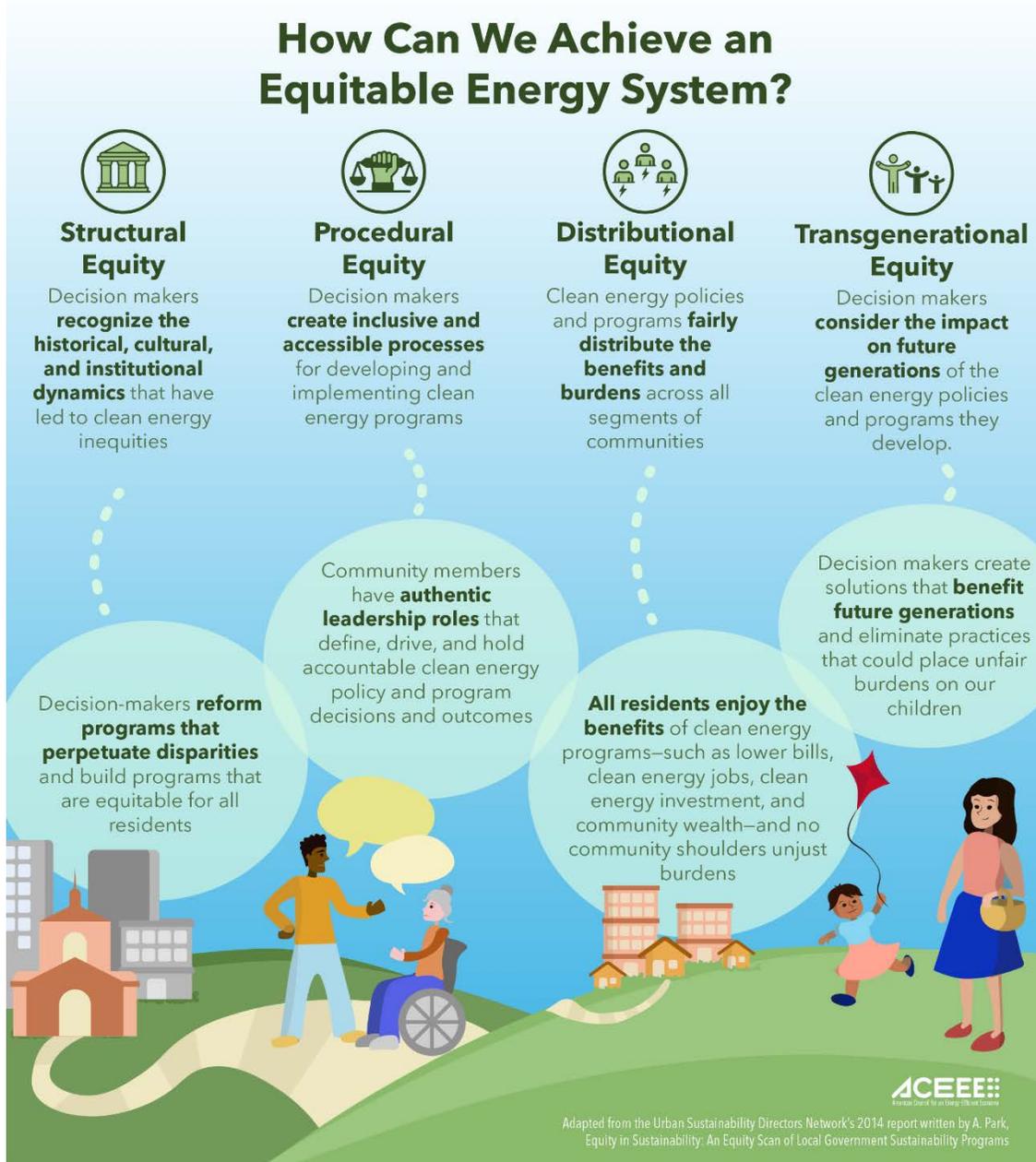
Figure 1. Dimensions of energy equity. Source: Park 2014.

Governments are increasingly attempting to address inequities, and federal funding opportunities call for a focus on social equity in program development. In this toolkit, we center equity considerations in our guiding principles for program development. While all governments have room to grow in their achievement of equitable outcomes in clean energy efforts, they can learn from existing programs. Advancing energy equity requires strategic and targeted efforts.

Program Selection

We compiled our sample of noteworthy energy programs by seeking input from external organizations with knowledge of state and local policies, synthesizing internal subject matter expertise, and gathering publicly reported program data. We examined existing state and local energy efficiency programs and identified those with strong effectiveness across a range of sectors and geographies. To determine which programs to highlight in our toolkit, we identified those that provided valuable lessons and strong outcomes for several of the following criteria:

- Clearly defined goals and metrics for meeting program objectives
- High energy and emissions savings or potential
- Prioritization of equity (e.g., defined equity metrics, goals, accountability processes)
- Replicability for other governments and stakeholders
- Scale of impact
- Strong alignment with climate goals
- Workforce development outcomes

We also aimed to show geographic diversity and different forms of partnerships with communities and community-based organizations. The following program profiles are not a comprehensive ranking of initiatives; they are instead a diverse list of strong programs that can serve as inspiration and guiding examples for governments.

We first discuss six guiding principles for governments developing energy efficiency programs, synthesizing lessons learned from example programs from across the United States. We then provide descriptions of the 17 programs, summarizing the program, identifying successes and challenges, and highlighting key ways that the program can be applied to other governments' work.

Guiding Principles for Program Deployment: Lessons Learned from Effective Programs

In evaluating the clean energy programs gathered from partners and existing ACEEE research, we noted consistent themes related to how programs can be best positioned for success. Figure 2 summarizes these themes, which we now describe in more detail.

Guiding Principles for Program Deployment: Lessons Learned from Effective Programs

- Undertake rigorous public engagement processes
- Define multiple benefits
- Use a data-driven approach
- Set goals and maintain accountability
- Enhance program flexibility
- Maximize comprehensiveness

Figure 2. Guiding principles for program development

UNDERTAKE RIGOROUS PUBLIC ENGAGEMENT PROCESSES

Undertake a robust engagement process during program development and throughout the program's duration. Public stakeholder and community engagement ahead of program development is an important step in designing programs that are effective and equitable. It can also build public support and interest in program participation. Engagement is more successful and more equitable when it is conducted in multiple formats, including through in-person, virtual, and paper feedback options, with sufficient resources and time allotted. Providing sufficient resources could involve paying outreach leads, offering food at public gatherings, and providing childcare services. Organizations that conduct significant outreach on the program's behalf should also receive appropriate financial compensation. Crucially, program staff should be prepared to respond to the feedback and input that they receive.

Public engagement processes that are, or are perceived as, one-way exchanges aimed only at giving information to a community will erode trust with its members and reduce the opportunity to use the engagement to improve programs.

As figure 3 shows, Facilitating Power's model provides a spectrum of engagement organized around the extent to which engagement processes center and include marginalized groups (Gonzalez 2020).

Figure 3. The spectrum of community engagement to ownership. Source: Gonzalez 2020.

The spectrum of approaches ranges from ignoring community voices to acknowledging community members in leadership roles.

An equitable public engagement process intentionally meets the community's needs and preferences regarding geography, resources, and other forms of access. This includes focusing extra attention on the most-marginalized community members. In practice, governments can partner with community organizations and community leaders to host events and solicit feedback. Engagement events can be hosted at existing community meeting spots, such as houses of worship, or in partnership with (compensated) community-based organizations that can help to organize and encourage attendance. Giving multiple time options can accommodate work schedules of community members, while providing materials in the languages spoken in the community can ensure that residents can access the information. Staff members should be prepared to use and respond meaningfully to feedback they receive. Providence's Racial and Environmental Justice Committee (REJC) engagement process provides an example of an approach to public engagement that focused power in the hands of marginalized communities. The REJC created the Just Providence Framework, through which community members directly created the recommendations and priorities for the city, as opposed to providing input on a plan that the city government developed (REJC 2021).

One way that decision makers can avoid pitfalls is by meaningfully hearing from all segments of the community, including marginalized voices, prior to program design and launch. Using this feedback can help governments avoid developing a program that is not effective or does not meet the community's needs. The profiles of Minneapolis Green

Zones and EnergyFIT Philly below offer examples of rigorous and innovative public engagement approaches.

DEFINE MULTIPLE BENEFITS

Carefully consider the desired benefits of a program. Saving energy and money are not the only reasons that governments pursue energy efficiency. Whether a state wants to meet its emissions reduction targets or a city wants to reduce air pollution in vulnerable neighborhoods, energy efficiency programs are viable strategies that have multiple benefits. When designing efficiency programs, governments can engage with community members and other stakeholders to determine how energy efficiency can meet a variety of community needs. This can help flesh out program goals and metrics for success. While governments may have a primary goal in mind that leads to program development, considering and recognizing the related benefits of energy efficiency during program development can help them make the most of the benefits available to them.

While kilowatt-hour savings and bill savings can indicate a program's success, focusing only on these two metrics does not necessarily paint a broad picture of a program's impacts. Energy efficiency programs are beneficial for all households, but if properly designed, they can particularly benefit households that face high energy burdens—that is, households that spend more than 6% of their income on energy bills (Drehobl, Ross, and Ayala 2020). Low-income individuals tend to live in older, inefficient buildings, where they can be exposed to a variety of health hazards such as thermal discomfort and indoor air pollution. Individuals who live near freeways or industrial plants are also exposed to outdoor pollutants that affect air quality in their homes (Cox et al. 2018). Communities located in wildfire-prone areas may share a similar concern about avoiding the respiratory health dangers of wildfire smoke. While these residents could certainly benefit from reduced energy bills, they could also benefit from reduced health risks.

Considering nonenergy benefits such as reductions in air pollution and improved respiratory health among residents can help governments understand how their programs improve different aspects of their constituents' lives, and governments can use this information to prioritize investment decisions. Smart technologies can be paired with broadband-access support, coupling energy benefits for social and economic access for residents. Being clear and open-minded in their objectives and desired benefits to their communities—in both program design and communication—can help governments deploy more-beneficial programs. The profiles of VEIC's Zero Energy Modular Program and Our Community CarShare Sacramento below offer examples of programs embracing and identifying parallel program benefits.

USE A DATA-DRIVEN APPROACH

Use accurate data to inform program development and measure success. Accurate data are essential to setting and tracking program goals. This requires staff to carefully consider the best ways to measure their efforts to the extent possible. For governments that have limited capacity to collect data, partner organizations and other government agencies may

be able to support access to data to inform program development or assist with data-collection efforts. As in all partnerships, community-based organizations should be compensated for their work and efforts to support government projects. Data collection does not need to be purely quantitative; it can include, for example, targeted community outreach efforts. Even relatively simple data collection that is limited in scope, such as a focus group of residents or a set of structured interviews with a spectrum of stakeholders, can strengthen a program more than simply developing a program based primarily on anecdotal evidence or assumptions. All efforts to collect and use data are supported by proactive planning and prioritization of a data-driven approach.

Given their limited time and resources, governments want to approach problems as efficiently as possible. Without evidence related to the problem a program is trying to address, a government may not be using its resources in the most effective way. **Data-driven programs also support accountability and the ability to communicate program outcomes to the public.** As such, transparency when using, collecting, and analyzing data supports governments in reaching their goals and centering equity (Hays et al. 2021).

Achieving energy equity is most feasible when it is informed by data tracking and rigorous community engagement. For example, if a government is interested in providing workforce opportunities for underrepresented communities, it could gather baseline data about the current clean energy workforce makeup and track demographic data of its program participants to measure success. Similarly, when identifying program objectives, governments are best served by ensuring that their assumptions are backed by data whenever possible and in a way that is feasible and appropriate for their community. The profile of Washington DC's approach to Building Energy Performance Standards below offers an example of a data-informed initiative.

SET GOALS AND MAINTAIN ACCOUNTABILITY

Set clear goals and metrics for success. Successful programs are developed with clear goals for project outcomes. Once a program is launched, these objectives provide guideposts to indicate successes, failures, and needed changes. **The process of developing goals includes identifying both clear objectives (such as reducing energy bills, reducing GHG emissions, developing the workforce, and supporting public health) and measurable metrics associated with those goals that are appropriate for the community based on data availability and community feedback.** Program leaders are best able to make needed changes when they develop a process by which they can regularly track their progress against the metrics throughout the program's duration.

All approaches to clean energy and energy efficiency should intentionally target equitable outcomes. Without such an intentional approach, marginalized communities will continue to reap fewer benefits associated with clean energy and bear a disproportionate share of the costs. Tackling this pattern requires setting equity-related goals and metrics for success and allocating appropriate funding. Governments can identify the issues facing the most-marginalized members of their communities by listening to affected community members

and directing funds to meet appropriate objectives. For example, governments may want to target disproportionate energy burdens that people of color face in their communities and would therefore be well served by identifying the best methods to track these burdens, such as with information on energy spending and income.

If programs are developed without a clear objective, it will be more difficult to identify the ideal program structure, ensure equitable distribution of funds, and determine whether they succeed. A lack of consistent progress-tracking will prevent governments from evaluating their approaches. Important dimensions include the degree of progress made, whether a program has met expectations, and whether changes are needed to support program success. Data collection and analysis can be challenging, especially for smaller governments. Therefore, governments should consider their resources, potential partnerships, and the ways in which even simple, limited data collection (as discussed above) can support their accountability. Recording and publishing program results allows governments to make informed decisions about their approaches and use their resources efficiently. The profiles of the Cleveland Climate Action Plan programs and Portland Home Energy Scores below offer examples of governments that include accountability measures in their approaches.

ENHANCE PROGRAM FLEXIBILITY

Maximize a program's ability to identify and implement the best solutions. If programs are narrowly constructed and offer only a few options or solutions, they may be less able to respond to new information or changing contexts. For example, if a program offers only one structure or type of energy efficiency upgrade, it might not be able to reach and respond to the needs of many customers. In contrast, a program that addresses a variety of energy needs can be more widely beneficial. While a narrow or targeted approach focusing on a specific energy efficiency measure may be appropriate when there is clear reason to do so (such as to meet a specific community need or a regulatory requirement), other programs may be able to be technology agnostic and provide a range of equipment and service options that can be selected to best address a specific building. Programs can also be designed to adjust in the face of preliminary results or changing community needs and feedback. While some programs offer targeted, specific solutions because their customers face gaps in existing services, they should still be flexible enough to respond to community feedback and changes in context.

Solutions, technologies, or structures that work best for one segment of a population may not do the same for others. For example, some communities may not be able to afford a project's upfront cost, making tax credits ineffective. Similarly, different households and types of buildings may not be interested in or able to install the same energy efficiency measures. **Flexibility to meet community needs and respond effectively to each case, as well as to make changes in response to community feedback, can help governments to reach a broader segment of the community with their programs.** The profiles of Connecticut Green Bank and Massachusetts Green Communities below provide examples of programs offering flexibility in tackling energy challenges.

MAXIMIZE COMPREHENSIVENESS

Combine or coordinate with similar programs to streamline efforts. Before creating a new program from scratch, it is helpful for governments to identify any existing programs that can help accomplish their efficiency goals. Coordinating programs can consolidate resources, avoid unnecessary duplication, and expand benefits. This might involve coordinating between government departments or between governments and utilities. Ideally, energy efficiency would complement efforts to ease financial burdens for low- and middle-income households. Governments can also expand current programs to meet greater needs. For example, a program targeting one type of building can be extended to apply to other building types.

Governments can then be thoughtful about creating standalone programs. **An integrated program that bundles multiple services can clarify benefits to customers.** This may take the form of a single comprehensive program or of partnerships and well-coordinated connections among multiple programs. Consolidating program resources can help customers know which service best meets their needs. To simplify the application process, governments can create a single application that pertains to all energy efficiency services. Unless required, the application must not collect sensitive demographic information, and applicants should be assured that the new program will not threaten their qualification for other government assistance programs. Governments that do this can build trust with their constituents, serve more people, and encourage greater program uptake. The profiles of California's Low-Income Weatherization Program (LIWP) and Commons Energy below offer examples of comprehensive approaches.

Figure 4 synthesizes these guiding principles in a set of guiding questions that can help governments—in partnership with communities—apply and use the principles in the process of designing and deploying effective programs.

Guiding questions to design and deploy effective local efficiency programs

- How can we structure our engagement process to make sure feedback is incorporated?
- How will we market our program?
- What goals do we have for our energy program?
- How will we regularly evaluate program outcomes?
- What data can we collect or use to inform our program design?
- How will we engage with community members to inform program design?
- In what ways can we build our program to allow flexible or customized approaches?
- Can our program be combined or coordinated with other government utility programs?
- What metrics will we use to define success?
- What data can we collect to help us evaluate program effectiveness?

Figure 4. Guiding questions for program development

During program deployment, governments should pay careful attention to community groups and other potential partners that they may engage, state-level regulations and context that can impact their design, available funding streams, and ways of being continuously accountable to achieving equitable outcomes.

Featured Program Profiles

The programs listed below provide lessons related to energy and cost savings, emissions reductions, and equity advancement. We feature diverse program approaches and discuss each program's structure and successes. Rather than designing initiatives entirely from scratch, jurisdictions can streamline their design processes by building on existing approaches such as these, tailoring them to meet their own community's needs.

Table 3. Featured program profiles

Program	Highlights	Page
VEIC Zero Energy Modular Program	Constructs modular homes with triple-glazed windows, heat pumps, Tier 3 ENERGY STAR appliances, LED lighting, and other features	18

Program	Highlights	Page
SystemVision North Carolina	Builds a clean energy workforce as contractors receive training in energy-efficient construction	19
California Low-Income Weatherization Program (for multifamily buildings	Supports both energy efficiency retrofits and renewable energy installations in buildings	20
Emerald Cities Collaborative RENEW	Provides energy efficiency services to multifamily buildings that house low- and moderate-income residents	21
Washington, DC Building Energy Performance Standards	Combines supporting programs and incentives with minimum energy efficiency standards for buildings	23
Minneapolis Green Zones Initiative	Designates environmental justice priority zones as a mechanism for targeting sustainability efforts to marginalized communities	24
EnergyFIT Philly	Conducted retrofits in entire neighborhood blocks in low-income neighborhoods	26
Connecticut Green Bank	Uses public funding to spur private investment in clean energy	28
Massachusetts Green Communities	Provides personalized assistance for municipalities in energy projects for public buildings such as schools, wastewater facilities, and municipal buildings	29
HeatSmart/CoolSmart Somerville	Offered 0% interest, deferred payment loans to Somerville property owners earning less than 80% of the area median income and covered a range of repairs, including air source heat pumps	31
Cleveland Climate Action Plan	Identifies distinct program actions for governments, community organizations, universities, and private sector actors	32
Commons Energy	Provides comprehensive services using upfront financing provided by investors	33
Portland (Oregon) Home Energy Score	Requires most owners of single-family homes to obtain a Home Energy Score before sale	34
Minnesota's Diesel Replacement Grant	Provides grants to replace old diesel equipment with EVs	35
Move Louisville	Undertakes comprehensive transportation planning that includes programs that improve existing infrastructure and reduce vehicle miles driven	36
Our Community CarShare Sacramento	Provides car sharing for residents who struggle to afford a car or have poor public transit access	37

Program	Highlights	Page
E-Contractor Academy	Trains participants in business development and marketing as well as technical trades such as solar installation and LED lighting retrofits	38

VEIC'S [ZERO ENERGY MODULAR PROGRAM](#) PROVIDES ENERGY-EFFICIENT, FACTORY-BUILT, AFFORDABLE HOUSING TARGETED TO RURAL HOUSEHOLDS

Location	Headquartered in Vermont but partnering in multiple states
Sector	New affordable construction
Highlights	Constructs modular homes with features such as triple-glazed windows, heat pumps, Tier 3 ENERGY STAR appliances, LED lighting, solar photovoltaic (PV), and battery storage 8,683 kWh and 697 gallons of propane saved per home per year Homes include accessible features that align with the Americans with Disabilities Act More than 150 households served between 2013 and 2021

PROGRAM SUMMARY

Overseen by the Vermont Housing and Conservation Board Efficiency Vermont, [Vermont's Zero Energy Modular (ZEM)](#) program constructs zero-energy modular homes[2] in a factory setting to increase the availability of high-quality affordable housing (VHCB 2021). **Taking an innovative approach to providing safe, healthy, efficient housing, the homes are built in New England and designed to eliminate energy bills for residents through a combination of energy efficiency measures and solar PV cells.** New ZEM homes require a small down payment (approximately $2,500), and new residents pay an average monthly mortgage of $500. The ZEM program provides financing support and income-based incentives such as a deferred loan from Vermont nonprofit Champlain Housing Trust and a low-income incentive of $87,000 (Denson and Hayes 2018; Champlain Housing Trust 2021).

The program reaches rural households living in cold weather conditions and incorporates features aligning with the Americans with Disabilities Act. The ZEM program served 75 households in 5 years and resulted in significant energy savings (Denson and Hayes 2018). In

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[2] A modular home is a building that is constructed from several different parts or "modules." The modules are constructed in a factory and brought to a construction site. Modular homes are permanent fixtures, distinguishing them from mobile homes (Ericson 2019).

addition to providing energy benefits that were designed to reach homeowners that often face high energy burdens, the program was also designed to improve air quality and other health-related factors.

New ZEM homes are built with energy-efficient features including triple-glazed windows, heat pumps, ENERGY STAR®-certified appliances, and efficient lighting. The program combines energy savings with social benefits such as health and increased well-being compared to poor-quality housing. It prioritizes low-income households, targeting energy benefits to residents who most often experience high energy burdens. The ZEM program has resulted in approximate annual savings of 8,683 kWh of electricity and 697 gallons of propane per home (Denson and Hayes 2018). VEIC has also used the ZEM approach to replace mobile homes and to create employment and training opportunities through ZEM factories (Juillerat et al. 2019; VHCB 2021).

SUGGESTIONS FOR OTHER GOVERNMENTS

Governments looking to deploy a similar approach and use a modular construction program could develop pilot programs integrating housing, energy efficiency, and economic and workforce development to increase the adoption of all-electric, healthy zero-energy homes for the affordable housing sector while increasing factory capacity in their jurisdictions. Governments implementing similar programs can track and publish additional outcome data, including job creation, workforce training, increases in affordable housing availability, and reductions in energy burden, as well as health-related outcomes such as pollution levels and rates of respiratory illness. They could also partner with community organizations to provide financial support for prospective homeowners. A program that specifically focuses on modular construction could even be a starting point for a supplemental workforce training program, given the specialized nature of the trade.

SYSTEMVISION SUPPORTS AND CERTIFIES ENERGY-EFFICIENT AFFORDABLE HOMES IN NORTH CAROLINA

Location	North Carolina
Sector	New affordable construction
Highlights	Builds a clean energy workforce as contractors receive training in energy-efficient construction
	Available at no cost for individuals who make less than 80% of the area median income
	More than 5,000 homes certified between 2001 and 2018

PROGRAM SUMMARY

As a partnership between the North Carolina Housing Finance Agency and Advanced Energy, SystemVision supports energy efficiency in affordable housing (SystemVision 2021a). **The program supports and trains developers of affordable housing in order to decrease energy bills and improve comfort and safety for residents by building efficient,**

affordable homes (SystemVision 2021b). For potential homeowners, the program guarantees thermal comfort and low-cost heating and cooling bills.

In addition to training builders, SystemVision certifies homes that are completed through the program. Once homes are completed and certified, SystemVision guarantees residents that the center of each room will stay within three degrees of the thermostat setting, while the average monthly heating and cooling bill will be approximately $33. SystemVision covers any difference between actual bills and the guaranteed amount (SystemVision 2021c). Services for builders and developers include plan reviews, building monitoring and diagnostics, performance testing, onsite quality assurance, specifications writing, and training (Denson and Hayes 2018).

The program states that more than 80% of affordable homes in the state are now certified by SystemVision, totaling more than 5,400 homes as of summer 2021 (SystemVision 2021d). With increased energy efficiency, owners of affordable homes in North Carolina experience healthier air and reduced energy burdens. By working with developers and contractors and providing training and support for energy-efficient construction, the program also works to grow a clean energy workforce (Denson and Hayes 2018).

SUGGESTIONS FOR OTHER GOVERNMENTS

Governments deploying federal funds could use similar existing training and certification programs for affordable housing that develop and grow the energy efficiency workforce and bring the benefits of energy efficiency to marginalized communities. Governments implementing similar programs could also take the opportunity to track feasible outcome data on their program goals, including health improvements and other variables, to increase accountability.

CALIFORNIA'S [LOW-INCOME WEATHERIZATION PROGRAM](#) ADVANCES ENERGY EFFICIENCY RETROFITS AND RENEWABLE ENERGY IN MULTIFAMILY BUILDINGS

Location	California
Sector	Multifamily retrofits
Highlights	Single program for energy efficiency retrofits and renewable energy installations in buildings
	Inclusive definition of "multifamily unit" makes more buildings eligible for this program

PROGRAM SUMMARY

The LIWP offers free energy efficiency retrofits and solar PV systems to low-income households. The program receives funding from California Climate Investments, which leverages funds from the state's cap-and-trade program to advance GHG reduction (Hill, Dirr, and Harrison 2020). The LIWP consists of three target audiences: farmworker housing,

community solar, and multifamily (California Department of Community Services & Development 2021b). The multifamily program serves buildings in which two-thirds of residents make 80% or less of the area median income. As of 2020, all properties have been in disadvantaged communities, as defined by the California Communities Environmental Health Screening Tool (CalEnviroScreen), the state's online tool for identifying environmental justice communities (Hill et al. 2020).

The LIWP served 8,404 households between 2016 and August 2020 (California Department of Community Services & Development 2021a). The success of the LIWP is supported by its program design. Originally, a building needed at least 20 residential units to be eligible, but the program later accommodated buildings with five or more residential units (Hill, Dirr, and Harrison 2020). This allowed the LIWP to reach many more households, especially in California, where low-rise apartments are common. The LIWP's bundling of efficiency retrofits and solar installation significantly reduced emissions and energy usage. By November 2020, the multifamily LIWP produced emissions savings of 167,460 metric tons of carbon dioxide equivalent, which is comparable to taking 36,400 cars off the road. On average, the energy usage of participating residents decreased by 40%, leading to energy bill savings of 30% (California Department of Community Services & Development 2020). Such bill savings are especially important for low-income residents, who have traditionally struggled with high energy burdens.

SUGGESTIONS FOR OTHER GOVERNMENTS

The LIWP lacks stable, long-term funding. As a result, many properties are on a waitlist (Hill, Dirr, and Harrison 2020) and current funding levels are expected to run out by June 2022 (California Department of Community Services & Development 2020). However, **other governments can learn from the LIWP's bundling of services and its broad definition of "multifamily unit" as they work to reduce energy burdens for low-income residents.** Also, federal funding opportunities can support this and similar efforts.

THE EMERALD CITIES COLLABORATIVE'S [RENEW PROGRAM](#) PROVIDES COMPREHENSIVE ENERGY EFFICIENCY SERVICES FOR MULTIFAMILY HOUSING

Location	Seattle and San Francisco
Sector	Multifamily retrofits
Highlights	Provides energy efficiency services to multifamily buildings that house low-income residents
	Takes a flexible, tech-agnostic approach that finds the best solution for each property
	Results include 624 units saving energy, $146K in annual bill savings, and 14.7 million pounds of CO_2 saved

PROGRAM SUMMARY

The [RENEW program](#), implemented by the Emerald Cities Collaborative, takes a comprehensive approach to energy and water efficiency in multifamily rental buildings (Emerald Cities Collaborative 2021c). The program, currently operating in Seattle and San Francisco, focuses primarily on buildings that house low-income residents. RENEW's primary aim is to ensure that clean energy benefits are distributed equitably to low-income communities. The program lists environmental and equity metrics for reaching this mission (Emerald Cities Collaborative 2019). The collaborative's website also provides resources for customers on equitable buildings, electrification, and inclusive procurement and contracting (Emerald Cities Collaborative 2021b).

Figure 5. The Saint Charles building in Seattle. Source: The Emerald Cities Collaborative.

Using funds from the Weatherization Assistance Program, RENEW provides technical assistance, facilitates financing opportunities, and combines utility incentives, thereby supporting building owners who often do not have the time, resources, and expertise to complete energy and water efficiency projects (Emerald Cities Collaborative 2019). Services provided by RENEW include building benchmarking, water and energy audits, facilitation of financing, and hiring and overseeing project contractors. As of October 2021, RENEW had audited 31 properties, retrofitted 18 multifamily buildings, and led to energy savings in 624 apartment units. This is estimated to have reduced energy usage by a total of 10,745,956 KBtus ($146,016) per year and saved 476.3 metric tons of CO_2 annually (Emerald Cities Collaborative 2019).

An innovative, comprehensive approach makes this program a strong example to inspire government efforts. By targeting affordable housing developers, it reaches a segment of buildings that face increased challenges. RENEW focuses directly on equity, while prioritizing health and safety as well as energy savings. It also sets clear and defined goals, which supports program effectiveness, including several environmental goals (e.g., energy savings, water savings, GHG reduction) and equity goals (e.g., diverse hiring, disadvantaged business utilization) (Emerald Cities Collaborative 2019).

SUGGESTIONS FOR OTHER GOVERNMENTS

Other governments could use federal funding to set up similar comprehensive programs that provide a one-stop shop for customers. In addition to coordination assistance and financial support, this service could help building owners comply with new city regulations. Programs similarly focused on affordable housing and multifamily housing could provide energy benefits for marginalized community members.

WASHINGTON, DC SUPPORTS ENERGY EFFICIENCY IN EXISTING BUILDINGS BY PROVIDING SUPPORT FOR BUILDING OWNERS TO MEET ITS BUILDING PERFORMANCE STANDARDS

Location	Washington, DC
Sector	Cross-sector
Highlights	Combines supporting programs and incentives with minimum energy efficiency standards for buildings
	Provides multiple compliance options for properties

PROGRAM SUMMARY

Through the Clean Energy DC Omnibus Amendment Act of 2018, Washington, DC, established minimum energy efficiency standards for buildings, known as *Building Energy Performance Standards* (BEPS) (Council of the District of Columbia 2019a). The creation of BEPS was identified as an action in the district's Climate and Energy Action Plan (District of Columbia Department of Energy & Environment 2018). The program is being phased in gradually but eventually will apply to all buildings with a floor area of 10,000 square feet or more. **Because BEPS requires building owners to meet minimum energy performance standards, the district also provides support for meeting the standards.**

The district offers a suite of technical assistance and incentives, including from organizations such as the DC Sustainable Energy Utility and the Building Innovation Hub, that can help property owners understand the requirements and develop the most effective path forward (DCSEU 2021; Building Innovation Hub 2021). The legislation that created BEPS also includes funding for the district's Green Bank, which "provides access to capital, growing the clean economy to develop a more equitable, resilient, and sustainable DC," and the Sustainable Energy Trust Fund, which provides funding for many of the local energy efficiency programs

(DC Green Bank 2021; Council of the District of Columbia 2019c). The Green Bank provides financing support for the type of projects required to comply with BEPS. DC PACE is another financing solution to support efficiency and other clean energy projects in the district, and it totaled $6.7 million in loan volume in 2019 (District of Columbia DOEE 2021).[3] The policy also authorizes exemptions that give owners of affordable housing more time to comply with the standards, showing an intentional focus on achieving policy goals while equitably meeting the needs of different building owners (Council of the District of Columbia 2019b). Without flexibility or support for affordable housing buildings, which often face resource limitations, such buildings could have difficulty meeting the standards and thus experience negative outcomes.

SUGGESTIONS FOR OTHER GOVERNMENTS

This program combines a rigorous energy efficiency policy with the necessary support to achieve compliance and meet energy reduction goals**.** Technical assistance, financing, and rebates all support program effectiveness. **Governments interested in achieving energy reductions in existing buildings can learn from the district's incentive programs and consider how complementary policies, such as BEPS, can support outcomes.** Program coordination across agencies and organizations supports effectiveness, as staff members work to ensure that energy opportunities available to residents are aligned with BEPS requirements.

Governments interested in pursuing similar policies should incorporate an effective public outreach process. While the district's program is still being rolled out, responding to concerns and questions and engaging with residents on responsibilities, options, and available support will be essential to meeting the program goals.

A GREEN ZONES INITIATIVE SERVES ENVIRONMENTAL JUSTICE COMMUNITIES IN MINNEAPOLIS

Location	Minneapolis
Sector	Cross-sector
Highlights	Designates environmental justice priority zones as a mechanism for targeting sustainability efforts to marginalized communities

PROGRAM SUMMARY

Through the Green Zones initiative, Minneapolis has formally identified two areas of the city that have been disproportionately affected by environmental pollution. This approach was identified by the Minneapolis Climate Action Plan's Environmental Justice Working Group

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[3] PACE information comes from data aggregated and shared with ACEEE by PACENation.

(City of Minneapolis 2021b). Each green zone has a task force that meets monthly and is open to the public (City of Minneaplis 2021b). Task forces for each zone identified the problems and solutions that were priorities for their communities. To inform their work, the Green Zones Workgroup also used a mapping tool that displays data by census tract for the group's priority issue areas, including equity, air quality, housing, and green jobs (City of Minneapolis 2021b).

The task forces have created five-year plans for sustainably supporting their green zone communities. The Northside Green Zone focuses on equity, air quality, affordable housing, greening, contamination cleanup, healthy food access, and green jobs. The group's recommended actions include ensuring that residents of the zone benefit from jobs created, establishing a sustainable building policy for housing development and improving public transportation routes (City of Minneapolis 2020). The Southside Green Zone addresses community decision making, land use, healthy food access, health, and green economy through recommended actions like adopting rental energy disclosure requirements, using utility franchise fees to reduce energy burden, and establishing environmental health requirements for rental licensing (Southside Green Zones Council 2019).

Figure 6. A Southside Green Zone meeting in December 2019. Source: Anna Botz/City of Minneapolis.

SUGGESTIONS FOR OTHER GOVERNMENTS

Other governments can replicate the Green Zones initiative as a framework to steer other programs. Designating a green zone can direct attention and resources to communities that need them the most. Gathering a task force of residents who are familiar with a particular neighborhood's challenges is an effective way to accomplish procedural equity. It is

important to note that the Minneapolis Green Zones initiative is a resolution, not a law that mandates specific action. To ensure concrete actions in such cases, governments can implement accountability measures.

Governments can further emulate the Green Zones initiative by identifying the geographic areas most in need of support and using the voices of community members to steer efforts to their clean energy programs. The Green Zones initiative received $115,000 in program funding from the Minneapolis City Council and a $75,000 grant from the McKnight Foundation in 2018, but the city does not designate consistent funding to implement recommendations for the zones or facilitate continued engagement (City of Minneapolis 2021a; Funders Network 2020). Program funds are allocated during the annual budget cycle and not guaranteed, meaning that residents must advocate for continued support and that program implementation varies based on political will. A structure containing a guaranteed, ongoing number of staff members and financial support could further strengthen a similar initiative.

ENERGYFIT PHILLY RETROFITS ENTIRE BLOCKS OF LOW-INCOME HOUSING

Location	Philadelphia
Sector	Single-family retrofits
Highlights	Conducted retrofits in entire blocks in low-income neighborhoods
	Taking a neighborhood rather than individual home approach increased cost effectiveness and benefits, and made it easier for low-income residents in single-family homes to apply
	Savings in electric and natural gas bills
	70 households received upgrades over 3 years
	Noticeable improvements in indoor air quality, relative humidity, and reductions in chronic disease
	Preservation and improvement of existing low-income housing

PROGRAM SUMMARY

The EnergyFIT Philly program served more than 70 low-income homes during its three years of operation (Denson and Hayes 2018). Most of these homes were in such poor physical condition that they had been rejected for the standard weatherization program due to leaking roofs or other structural problems. **The program used a unique approach, working with entire neighborhood blocks as opposed to individual households**. To target specific neighborhoods for participation in a contest to select blocks for retrofits, the Energy Coordinating Agency (ECA) partnered with several community-based organizations, including Strawberry Mansion, We Never Say Never, HACE, and the Hunting Park Neighborhood Advisory Committee (Lanier 2017). Winning neighborhood blocks were selected by an independent advisory committee that considered the physical condition of

homes, percentage of low-income home ownership, representation of low-income households, and rate of participation on the block.

Figure 7. Darlene Pope, EnergyFIT Philly Block Captain. Source: EnergyFIT Philly.

ECA began the repair and home improvements with a whole-house inspection in combination with BPI energy audits and a Healthy Homes Assessment; it then developed a detailed scope of work. The advanced deterioration meant that many of these homes had health and safety hazards, so devices to measure indoor humidity and temperature were installed in 44 audited homes. The program administrators connected accepted cohorts with analysts or inspectors to initiate repair projects. All homes received home repairs and extensive energy efficiency improvements, including air sealing, insulation, heating system repair or replacement, conversion from heating oil to high-efficiency gas, duct sealing, white roof coating, programmable thermostats, self-help education, and other treatments. Participating households saved an average of 35.5% on electricity bills and 22% on natural gas bills; they also experienced improved air quality (Denson and Hayes 2018). This translates into savings of between $500 and $3,500 annually for each household.

SUGGESTIONS FOR OTHER GOVERNMENTS

Despite initial success, EnergyFIT Philly ended after three years. Program challenges included clarifying home ownership in situations with tangled title holders (addressed by providing legal services) and developing trust with residents (Lanier 2017). EnergyFIT Philly had a significant impact, especially through its whole-block approach. **By targeting blocks, the program was able to preserve and upgrade entire sections of low-income homes** (Denson and Hayes 2018). Philadelphia's high concentration of row houses also made it easier to retrofit multiple buildings simultaneously (Robinson 2017). Other residential retrofit programs can learn from EnergyFIT Philly's approach to serve more high-use households. If a program is focusing on or including rental housing, it can consider additional practices to overcome trust and ownership issues, such as providing incentives for rental building owners (including escalating incentives for whole-building work), granting renters the right to make efficiency improvements, and adopting rental energy disclosure policies (Samarripas and Jarrah 2021).

THE CONNECTICUT GREEN BANK LEVERAGES PUBLIC DOLLARS TO PROVIDE ACCESSIBLE FINANCING FOR CLEAN ENERGY PROJECTS

Location	Connecticut
Sector	Cross-sector
Highlights	Uses public funding to spur private investment in clean energy
	Works in all types of buildings and finances a range of energy projects
	Reduced energy burden for more than 55,000 families over 10 years
	Reduced carbon pollution by 8.9 million tons

PROGRAM SUMMARY

The Connecticut Green Bank is the nation's first green bank, a structure that uses public dollars to attract private investment for energy projects (Connecticut Green Bank 2021a). The Connecticut Green Bank was created through legislation in 2011. Its mission is to increase access to clean and renewable energy as well as to support economic development and local job creation (Connecticut Green Bank 2021a; 2020a). The bank supports all forms of energy projects, including installation of renewable energy, building retrofits, electric vehicle (EV) chargers, and battery storage (DOE 2021a).

The organization works in residential, commercial, nonprofit, industrial, and institutional buildings, and it supports owners, contractors, and developers with financing programs such as loans, C-PACE financing, leases, and predevelopment financing (DOE 2021a). The program considers energy burden, job creation, and public health in its accountability evaluations; this can help to advance equity, as these metrics relate to social problems that disproportionately affect marginalized community members. The Connecticut Green Bank frequently monitors societal impacts from its projects, particularly in economic development, environmental protection, public health, and energy burden. The program has used funds from the 2009 American Recovery and Reinvestment Act to advance equitable outcomes in these areas. Notable accomplishments include reducing energy burdens for 8,709 families and directing 21% of total investment to communities that made below 80% of the area median income (Connecticut Green Bank 2020b). The Connecticut Green Bank website provides additional fact sheets and reports describing positive societal impacts (Connecticut Green Bank 2021b).

The Connecticut Green Bank has deployed $1.94 billion in investment, with $294.2 million coming from public dollars and the rest from private investment (Connecticut Green Bank 2020a). The organization estimates that it has supported the creation of more than 23,000 job years, reduced energy burdens for more than 55,000 families, supported public health,

and reduced carbon pollution by 8.9 million tons (Connecticut Green Bank 2020a).[4] The program takes a broad and flexible approach, supporting multiple forms of clean energy and allowing for the most effective solution for a given property.

SUGGESTIONS FOR OTHER GOVERNMENTS

Governments can consider how they can use public funds received through federal investment to attract private clean energy financing through a green bank structure. Such efforts can also include strong consumer protections and education initiatives. Intentionally considering equity in program deployment and tracking results are also strengths of the Connecticut Green Bank program.

THE MASSACHUSETTS GREEN COMMUNITIES DIVISION HELPS MUNICIPALITIES TO REDUCE ENERGY USE IN SCHOOLS AND OTHER PUBLIC BUILDINGS

Location	Massachusetts
Sector	Cross-sector
Highlights	Provides personalized assistance for municipal energy projects for public buildings such as schools, wastewater facilities, and municipal buildings
	Requires certification and accountability
	Reduced GHG emissions by 87,500 tons in 2017

PROGRAM SUMMARY

Massachusetts's Green Communities Division "provides grants, technical assistance, and local support from Regional Coordinators to help municipalities reduce energy use and costs by implementing clean energy projects in municipal buildings, facilities, and schools" (Massachusetts DOER 2021b). The division is available to provide support for all municipalities in Massachusetts for a variety of public buildings including schools and municipal facilities. To be eligible for grants, municipalities become certified Green Communities by taking actions such as monitoring energy use, prioritizing fuel efficiency in vehicle acquisition, and following a Stretch Energy Code for new construction (Massachusetts DOER 2021a). Nearly two-thirds of Massachusetts municipalities were certified Green Communities as of 2017 (Synapse Energy Economics 2019).

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[4] A *job year* is one job for one year, calculated by multiplying the number of jobs created by the number of years the position is expected to exist.

Figure 8. Inspection of the Timony School's rooftop heating and ventilation unit. Source: Massachusetts Green Communities.

The Green Communities Division and complementary grant and certification programs were established by state legislation (Massachusetts DOER 2021a). Regional coordinators help to support municipalities in identifying and implementing energy efficiency measures (Massachusetts DOER 2021a). This structure helps municipalities reduce emissions, engage their communities, and lead the way in lowering energy consumption.

Particularly notable is the focus on school projects, as energy conservation projects in schools can save energy and provide a healthier learning environment for students. In the 2020 grant cycle, more than 60 municipal grants included energy conservation projects in schools (Massachusetts DOER 2020). In its 2017 *Progress Report*, the division reported that municipalities reduced energy costs by $13.7 million, energy consumption by 11%, and GHG emissions by 87,500 tons in 2017 (Synapse Energy Economics 2019).

Suggestions for other governments

While energy reduction in government buildings can be a positive step for community leadership on clean energy, such buildings represent a relatively small proportion of overall energy use. Therefore, **other governments can use a structure like that of the Massachusetts Green Communities program to target energy reductions more broadly by focusing on schools and a wider set of public buildings.** Governments can also use a similar structure for certification, grants, and technical assistance to support energy efficiency and clean energy in businesses and residential buildings.

HEATSMART/COOLSMART SOMERVILLE INSTALLED EFFICIENT HEAT PUMPS IN SINGLE-FAMILY HOMES

Location	Somerville, Massachusetts
Sector	Single-family retrofits
Highlights	The City of Somerville offered 0% interest-deferred payment loans to Somerville property owners earning less than 80% of the area median income, which covered a range of repairs, including air source heat pumps.
	Reduced heating and cooling bills
	Completed 250 site visits and 60 installations

PROGRAM SUMMARY

Somerville's Office of Strategic Planning and Community Development Housing Division ran the HeatSmart/CoolSmart (HSCS) program from July 2017 to February 2018. **HSCS was part of a broader project to pilot renewable heating and cooling technologies in five New England cities.** The Carbon Neutral Cities Alliance provided funding until the first quarter of 2018 (Koo 2018). City officials partnered with local volunteers to conduct community outreach. HSCS was open to all Somerville residents, partnering with the city's Building Rehabilitation Program to offer special deferred-interest loans for low-income residents. Residents who received these loans worked with city officials to scope out properties and put out bids for repairs and heat pumps. In addition to loans, residents could access rebates from the Massachusetts-wide energy efficiency program Mass Save and the economic development agency Massachusetts Clean Energy Center (USDN 2018).

Somerville tied its support for heat pumps to the city's GHG emissions reduction goals. In 2017, buildings were responsible for 23% of the city's GHG emissions (USDN 2018). To maximize emissions reductions, Somerville focused on air-source heat pump installation due to the likelihood of adoption and potential for energy savings. The city hosted multiple community workshops and provided free home visits and supportive incentives for residents to install the heat pumps. In just seven months, the program completed 250 site visits and installed 60 heat pumps (USDN n.d.).

SUGGESTIONS FOR OTHER GOVERNMENTS

This project showed strengths in connecting the program to its climate goals and provides a model that is readily generalizable for other governments. **It is an example of how to provide engagement and community dialogue, disseminating program information while also listening to residents; it also demonstrates effective program implementation.** The program had a relatively narrow scope and a short time span. Governments deploying federal funding can be even more successful with additional resources. They could offer similar incentives for a wider range of technologies, host more outreach opportunities, reach more households, and run the program for a longer time period. Governments could also fund a larger portion of installation of energy-efficient technology.

PROGRAMS SUPPORTING [CLEVELAND'S CLIMATE ACTION PLAN](#) TAKE A COORDINATED APPROACH TO ENERGY EFICIENCY

Location	Cleveland
Sector	Commercial buildings
Highlights	Climate Action Plan identifies distinct program actions for governments, community organizations, universities, and private sector actors

PROGRAM SUMMARY

Cleveland's Climate Action Plan (CAP) provides a framework for the city to reduce GHG emissions by 80% below 2010 levels by 2050 (City of Cleveland 2018a). The framework covers a variety of sectors. **Each sector has a series of targets, specific actions to meet the targets, and indicators to measure progress.** Appendix E of Cleveland's CAP outlines the distinct roles that different stakeholders have in implementing the programs required to meet the CAP goals (City of Cleveland 2018c).

The plan's Energy Efficiency & Green Building category focuses on improving energy efficiency in commercial and industrial buildings. The plan outlines and connects several example energy efficiency programs, such as the relaunch of Cleveland's EnergySaver energy efficiency program. It also includes workforce development workshops and marketing for home weatherization efforts, and it coordinates multiple programs for low-income housing. In addition, Cleveland joined the [2030 District Network](#), a coalition of cities that have designated districts for highly efficient commercial buildings (2030 Districts Project Portal 2021). Between 2013 and 2017, the district added 50 new building owners, whose buildings collectively occupied 57 million square feet. Through efficiency improvements, these buildings reduced energy consumption per square foot by 20% over four years (City of Cleveland 2018a). Although Cleveland's 2030 District is primarily concentrated in the downtown area, the city government and major property owners have been working to expand green building projects in other neighborhoods.

The Cleveland CAP is notable for its defined goals, including in its commitment to equity. The CAP includes a racial equity tool for evaluating how different climate objectives influence racial equity in the city. The tool encourages policies that involve robust engagement with the community, use reliable data sources, mitigate disproportionate impacts, improve economic activities for disadvantaged communities, and communicate objectives clearly (City of Cleveland 2018b). If a policy does not meet all the criteria, it is required to be edited accordingly. This process advances accountability. The CAP also provides an example of looking across and coordinating among multiple city departments and services to meet goals (Tatum et al. 2020).

SUGGESTIONS FOR OTHER GOVERNMENTS

The Cleveland CAP provides several examples of how cities can deploy programs with federal funding to meet energy goals, such as supporting a commercial energy efficiency effort, workforce development, and training programs, and funding or building out existing municipal energy efficiency programs. **Cities considering a similar process could follow the Cleveland CAP in its clear outline of goals, targets, and relevant actions for different stakeholders.**

COMMONS ENERGY RETROFITS PUBLIC BUILDINGS IN MULTIPLE STATES

Location	Vermont, Ohio, and Washington, DC
Sector	Public-purpose buildings, including publicly owned affordable housing
Highlights	Provides comprehensive services using upfront financing provided by investors
	Has served more than 300 units in public-housing buildings
	Achieves energy savings and reduces fossil fuel reliance for clients

PROGRAM SUMMARY

Commons Energy is a for-profit subsidiary of the nonprofit Vermont Energy Investment Corporation that provides comprehensive services to save energy and uses energy savings to repay investors. **Commons Energy works with owners of buildings that serve the public—such as through affordable multifamily housing, healthcare facilities, educational settings, and municipal buildings—to create comprehensive energy solutions** (Commons Energy 2021a). In addition to Vermont, Commons Energy works in Ohio and Washington, DC. Interested participants follow a four-step process in which they meet with program representatives to identify goals, undergo an energy audit, develop financing plans for installations, and implement upgrades (Commons Energy 2021b).

As of 2018, the program had served more than 300 units in multifamily and multipurpose buildings.[5] It offers a flexible approach to implementing energy solutions in many types of public buildings and is particularly notable for its focus on publicly owned affordable housing. The financing model supports access for public-purpose buildings by fully funding upfront costs with investors and using energy savings to repay the investment. An Energy Performance Contract established by Commons Energy guarantees that the project will

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[5] This information was shared with ACEEE by the Urban Sustainability Directors Network.

reach a given amount of energy savings, and building owners are reimbursed for any energy costs above the guaranteed amount (Commons Energy 2021b).

SUGGESTIONS FOR OTHER GOVERNMENTS

Governments can take a similar approach that provides guaranteed energy savings that are used to repay a fully funded initial investment. This opens access to energy efficiency upgrades to entities that may not be able to finance them up front. A similar program could be applied to additional sectors such as privately owned affordable and multifamily housing.

PORTLAND'S HOME ENERGY SCORES PROVIDES TRANSPARENCY IN ENERGY USE IN RESIDENTIAL BUILDINGS

Location	Portland, Oregon
Sector	Single-family residential
Highlights	Policy requires most owners of single-family homes to obtain a home energy score before sale
	20,000 scores obtained
	Free scores available for low-income residents
	Certifies and provides a database of contractors authorized to provide the scores

PROGRAM SUMMARY

Portland adopted a Home Energy Score Ordinance in 2016 (City of Portland 2021a). **This policy requires most owners of single-family homes to get an energy score and disclose it when they sell a home.** Such disclosure allows prospective purchasers to evaluate a home's energy efficiency before they buy it and gives them information on efficiency improvements to consider as part of post-purchase home improvements. This ordinance was developed as a step toward achieving Portland's climate goals by improving energy efficiency in residential buildings (City of Portland 2020). The home energy requirement built on a series of residential benchmarking efforts in the state, including a voluntary scoring program and training for professionals to calculate the scores. Because this policy requires most homeowners to produce a score, the city also provides support for individuals in complying with it (City of Portland 2021b).

An important aspect of this support is eligibility for free home energy scores for residents earning at or below 80% of the city's annual median income (City of Portland 2021b). This supports low-income residents, as does the Community Energy Project, a local nonprofit that provides free assessments, as well as other free energy, health, and safety services. The city, in partnership with Earth Advantage, authorizes professionals who are qualified to provide a home energy score and maintains a database for residents to access them (Earth Advantage 2021). The Home Energy Scores website directs residents to a variety of information and

links to energy efficiency incentives and programs offered by partners and other agencies (City of Portland 2021c).

This program combines a rigorous energy efficiency policy with support for residents to comply. Without an option for low-income residents to get a required score at no cost, this program could lead to inequitable outcomes. Providing the necessary information, context, and resources for residents supports policy success. In the first 30 months after program launch, 20,000 home energy scores were provided (City of Portland 2020). In a public evaluation, results from internal program analysis of consumer opinions and energy assessment cost and timing indicated that the program was meeting objectives and providing value for consumers and policymakers (City of Portland 2020).

SUGGESTIONS FOR OTHER GOVERNMENTS

Governments interested in pursuing similar policies should incorporate an effective public outreach process to ensure that they account for the barriers to and needs for resident education. **Further, federal funding can be used to deploy supporting programs such as free scores for low-income residents or score subsidies for a wider subset of residents.** If an energy disclosure policy is not feasible, governments could target a similar structure by incentivizing, rather than requiring, home energy scores. They could also create complementary incentives or training programs for home energy assessors.

MINNESOTA'S DIESEL ON-ROAD AND HEAVY-DUTY ELECTRIC VEHICLE REPLACEMENT GRANT SWAPS NEW ELECTRIC VEHICLES FOR OLD DIESEL EQUIPMENT

Location	Minnesota
Sector	Transportation
Highlights	Provides grants to replace old diesel equipment with electric vehicles
	Clearly defines environmental justice communities and vulnerable populations
	Highlights health benefits of emissions reduction

PROGRAM SUMMARY

Through a recent grant process, Minnesota's Pollution Control Agency (MPCA) is allowing owners of diesel vehicles to trade in their old equipment for new EVs. The program began after the 2016 Volkswagen emissions scandal, when Minnesota received $47 million in settlement money (MPCA 2021a). The state is using that money to help organizations acquire EVs to replace old diesel equipment. When applying, an organization must disclose whether it plans to operate the new vehicle near environmental justice communities or communities of color.

Applicants are judged by six main criteria: emissions reductions, cost effectiveness, air pollution benefits, environmental justice benefits, health benefits, and vulnerable population

benefits. Of these criteria, environmental justice benefits hold the most weight. Environmental justice communities are typically identified by the percentage of people of color and low-income individuals living in a specific census tract. MPCA uses ZIP codes to classify environmental justice communities (MPCA 2021b). This allows the program to address air pollution on a wider scale, and it defines public health as a program goal.

SUGGESTIONS FOR OTHER GOVERNMENTS

This is a new grant program, so the state does not yet have specific results on emissions reductions. However, the awards will include approximately $3.5 million for electric buses, heavy- and medium-duty trucks, forklifts, airport equipment, and port equipment to replace old diesel vehicles (MPCA 2021b). **Governments can replicate this program by using their funds to support organizations in replacing inefficient, polluting diesel equipment and vehicles.** Incorporating a mechanism to prioritize this transition in low-income communities and communities of color can help to address the disproportionate exposure to pollution that these groups experience.

MOVE LOUISVILLE IS IMPROVING PUBLIC TRANSIT AND ACTIVE TRANSPORTATION IN LOUISVILLE

Location	Louisville, Kentucky
Sector	Transportation
Highlights	Comprehensive transportation plan includes programs that improve existing infrastructure and reduce vehicle miles driven

PROGRAM SUMMARY

Move Louisville is the city's 20-year plan for updating and improving transportation infrastructure (Louisville Metro Government 2016). Through transit improvements, complete streets policies (which aim to make streets safe and accessible for pedestrians,

Figure 9. Community engagement on Broadway Master Plan. Source: City of Louisville.

cyclists, public transit, and drivers), and better bicycle/pedestrian networks, Louisville seeks to improve alternative travel modes and reduce vehicle miles traveled (VMTs).

As it tracks project progress, the city also increases accountability to the public and clearly identifies benefits and goals associated with its approaches (Louisville Metro Government 2021). It incorporates complete streets planning, pedestrian safety, and connectivity. It is also a comprehensive and holistic approach to addressing transit goals and problems in the city.

As of June 2021, progress has been made on 16 major infrastructure projects, including redesigning streets to allow for multimodal transportation, installing bike facilities, increasing sidewalk connectivity, and constructing a new Bus Rapid Transit line (Louisville Metro Goverment 2021). By taking a comprehensive approach to envisioning and addressing transit challenges, prioritizing projects, and incorporating social and quality-of-life benefits into its planning, Move Louisville supports the government in reaching its goals.

SUGGESTIONS FOR OTHER GOVERNMENTS

Move Louisville's ambitious scope can inspire other governments that want to dramatically remodel their transport systems. Reducing VMTs through multimodal transportation is an effective strategy for reducing local air pollution and GHG emissions. Although the original Move Louisville plan focuses more on reducing nitrogen oxide (NO_x) and volatile organic compound (VOC) emissions, **governments seeking to implement similar plans would benefit from a direct tie to climate and GHG reduction goals.** This approach could be strategic for governments seeking to deploy federal funds to support connectivity and reduce VMT and transportation-related GHG emissions.

OUR COMMUNITY CARSHARE SACRAMENTO PROVIDES SHARED CARS FOR AFFORDABLE HOUSING COMMUNITIES

Location	Sacramento, California
Sector	Transportation
Highlights	Car-sharing program targeting residents who struggle to afford a car or have poor public transit access

	Acknowledges the importance of mobility for community development
	Facilitates uptake of clean energy in communities that previously didn't have access to charging infrastructure
	Free membership for the first 300 participants

PROGRAM SUMMARY

Our Community CarShare (OCCS) is funded by California Climate Investments (Sacramento Metropolitan Air Quality Management District 2017). **The program provides clean vehicles for affordable housing communities where residents have poor access to reliable transportation.** Each CarShare community receives at least two zero-emission vehicles that residents can rent for up to three hours per day (Sacramento Metropolitan Air Quality Management District 2017). The program also installs EV charging infrastructure in chosen communities. OCCS recognizes that mobility is essential for community development and economic opportunity. When the program began in 2017, membership was free for the first 300 members. However, fewer than 300 participants registered in the first year.

By 2019, OCCS had registered more than 460 members, who made more than 20,000 vehicle reservations (California Climate Investments 2019). In addition to offering vehicle rentals, the program expanded to include a monthly subsidy that residents could use for public transportation or ride-hailing services. After the first two years of implementing OCCS, program administrators concluded that providing on-site staff support was instrumental in encouraging resident participation (California Climate Investments 2019). The program also benefited from resident volunteers who translated communication materials into multiple languages to better reach participants who spoke languages other than English.

SUGGESTIONS FOR OTHER GOVERNMENTS

The OCCS program model could be replicated in other urban settings. **Local governments could identify affordable housing communities that are far from transit hubs and have low levels of car ownership. They could then install EV charging stations and provide rentable cars.** Governments creating similar programs should strategically market all benefits to encourage greater clean vehicle uptake.

EMERALD CITIES' E-CONTRACTOR ACADEMY TRAINS WORKERS FROM WOMEN- AND MINORITY-OWNED BUSINESSES

Location	Los Angeles, San Francisco, Seattle, and Boston
Sector	Contractor development
Highlights	Trains participants in business development and marketing as well as technical trades such as solar installation and LED lighting retrofits
	Focuses on women- and minority-owned business enterprises (WMBEs)
	Offers online and in-person classes

PROGRAM SUMMARY

Figure 10. E-Contractor Academy. Source: The Emerald Cities Collaborative.

The Emerald Cities E-Contractor Academy trains women- and minority-owned business enterprises (WMBEs) in clean energy and housing work. Participants first take business classes on subjects such as accounting, finance, marketing, and sales. After completing classes, participants attend a full-day symposium where they receive technical clean energy and housing training. The symposium also presents networking opportunities with program managers, project owners, contractors, and agency representatives. A typical E-Contractor Academy class has 25 participants representing more than 15 WMBEs (Emerald Cities Collaborative 2020). As of October 2021, 260 WMBE representatives have completed the program (Emerald Cities Collaborative 2021a)

As energy codes become stricter and building electrification becomes more popular, the E-Contractor Academy ensures that contractors are prepared, especially those who are underrepresented in the clean energy sector. In addition to WMBE firms, the E-Contractor Academy also sponsors veteran-owned and immigrant/refugee-owned businesses. The academy also offers technical training in low-income housing construction, furthering equity in clean energy.

Figure 11. E-Contractor Academy. Source: The Emerald Cities Collaborative.

SUGGESTIONS FOR OTHER GOVERNMENTS

Publishing data could provide a fuller understanding of the E-Contractor Academy's impact and recruit more people for the program. **Governments deploying similar programs would benefit from collecting and publishing program data.**

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Appendix. Additional Resources

2030 Districts Network: District Formation Toolkit

California Department of Community Services & Development: Low-Income Weatherization Program Fact Sheet

City of Somerville: Air Source Heat Pumps 101

Connecticut Green Bank: Impact Map

DC Department of Energy & Environment: Building Energy Performance Standards Fact Sheet

Emerald Cities Collaborative: Climate Equity & Community Engagement in Building Electrification

Smart Growth America: Complete Streets Basic Resources

Urban Sustainability Directors Network: Equity and Buildings

Urban Sustainability Directors Network: Equity Foundations Training