Neighborhood-Scale Building Decarbonization

A Toolkit for Advocates and Implementers

Zoë Cina-Sklar and Sonal Jessel

Climate & Community INSTITUTE

BPRC BUILDING POWER RESOURCE CENTER

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Introduction

Today, the dominant approach to decarbonizing homes is for individual building owners to switch to electric appliances and, in some cases, install solar. In this model, wealthier homeowners will electrify their homes and pull themselves off an aging gas grid, leaving low-income families and renters behind with polluting appliances and high gas bills.

Neighborhood-scale building decarbonization presents an exciting alternative: shifting the unit of building decarbonization from the building to the block, from the individual to the community.

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By approaching decarbonization at the scale of a block or a neighborhood, all residents in the chosen geography benefit and per-home project costs can decrease through economies of scale. Importantly, it also helps ensure that lower-income households are not stuck on aging gas infrastructure and instead allows for a more managed gas transition.

In ideal application, it also approaches building decarbonization more holistically than simply installing electric appliances by addressing environmental toxins, improving energy efficiency, and adding solar and battery storage. This approach lowers utility bills and creates healthy homes for all residents, regardless of whether they are rich or own their home.

Shifting the unit of decarbonization from the individual to the neighborhood means the success of the project hinges on getting buy-in from the whole community. This transforms building decarbonization from an individual technical project into a power-building opportunity. The following document is intended to offer a primer for partners interested in organizing for a neighborhood-scale building decarbonization project in their community.

Background: precedents and origin

Neighborhood-scale building decarbonization ties to existing conversations about electrifying multiple buildings at once. It is closely linked to discussions about non-pipeline alternatives (NPAs)—actions to decrease the need to expand or replace gas infrastructure, typically in response to state-level greenhouse gas reduction goals. Along with other measures, NPAs can include utilities pursuing "targeted electrification" projects that involve electrifying multiple buildings to avoid investments in gas infrastructure. Neighborhood-scale building decarbonization can also include thermal energy network (TEN) investments, a system of pipes that transfer heat from the ground or water.

In California, Pacific Gas and Electric (PG&E) has completed 88 targeted electrification projects that electrified 105 customers and allowed the utility to decommission 22 miles of gas transmission pipelines, and utilities Con Edison and National Grid are pursuing similar projects in New York.[1] Neighborhood-scale building decarbonization is also related to district energy system decarbonization, in which entire areas—often schools, medical institutions, or downtown areas—decarbonize a centralized heating and cooling system that serves multiple buildings. Neighborhood-scale building decarbonization can be understood as an extension of NPAs and district-level decarbonization to include a larger number of building owners and/or building types, or it can represent something more transformative.

[1] Mike Henchen et al., "Non-Pipeline Alternatives: Emerging Opportunities in Planning for U.S. Gas System Decarbonization," RMI and National Grid, May 2024, 15, https://www.nationalgridus.com/media/pdfs/other/CM9904-RMI_NG-May-2024.pdf; Consolidated Edison Company of New York, "Non-Pipes Alternatives Implementation Plan," November 18, 2024, Non-Pipeline Alternatives Implementation Plan, https://documents.dps.ny.gov › public › ViewDoc.

High-road neighborhood-scale building decarbonization

Neighborhood-scale building decarbonization is at an early stage of its development in the United States. The term gained popularity after the publication of a white paper on the topic in late 2023 and only a handful of residential neighborhood-scale projects have yet been completed.[2] Since the framework is relatively new, now is an opportune moment to organize for projects that can serve as high-road models for neighborhood-scale building decarbonization.

A more holistic approach to building decarbonization can not only draw down emissions but ensure positive public health and housing justice outcomes.

Too often, success of building decarbonization is viewed simply in terms of reduced carbon dioxide or dollars saved. In contrast, a more holistic approach can not only draw down emissions but ensure positive public health and housing justice outcomes.

Neighborhood-scale building decarbonization stands out as a key strategy to integrate these simultaneous goals because of its scale. Working at the neighborhood level creates a collective process for community members and can bring households that may not otherwise have considered decarbonization—due to lack of knowledge or lack of financing access—into the process.

It also helps to ensure that, in the project to transition buildings off gas, low-income households do not stay on an increasingly aging and expensive-to-maintain gas grid. Furthermore, the scale of these projects helps to decrease costs while allowing for union contractors to participate, increasing the quality of building decarbonization jobs.

While neighborhood-scale building decarbonization has inherent traits that make it amenable to equitable decarbonization, implementation still has to be intentional in delivering those benefits. Centering public health and housing justice requires utilizing the decarbonization process as a moment to address broader community needs and concerns. In general terms, this requires ensuring that the costs of decarbonization do not fall on renters and protecting tenants from increased rent and displacement. This can also look like

[2] Kristin George Bagdanov, Claire Halbrook, and Amy Rider, "Neighborhood Scale: The Future of Building Decarbonization," Building Decarbonization Coalition and Gridworks, November 2023, https://buildingdecarb.org/wp-content/uploads/BDC_Neighborhood-Scale-Report_WEB.pdf.

covering the costs of addressing deferred maintenance for low-income homeowners and affordable housing.

Such deferred maintenance is the product of historic disinvestment that makes buildings uncomfortable and unsafe, ignoring or postponing addressing environmental contaminants like mold, asbestos, and lead. It can also mean replacing outdated electrical wiring and improving building insulation and ventilation. In many instances, these home improvements must happen before installing electric appliances—and accessing related incentives. Making these improvements is therefore necessary both for ensuring that people live in healthy homes and for reaching decarbonization goals.

To achieve high-road implementation of neighborhood-scale decarbonization, we, the authors of this report, outline four key principles.

1. **Prioritize communities being left behind in the energy transition:** There are significant inequities in rates of building electrification across lines of race and class, with white people and homeowners purchasing heat pumps at higher rates than renters and people of color.[3] Neighborhood-scale decarbonization presents the opportunity to bring together neighbors across lines of race and class.
2. **Center community needs and leadership:** Priorities and needs will differ across neighborhoods and can only be determined through direct engagement. That being said, many community members will be most concerned about the financial and housing impacts of the project. Neighborhood-scale projects should integrate strong tenant protections, avoid upfront costs for participants, and ensure that utility bills do not increase as a result of electrification.[4] Including community members in project design and implementation will ensure that these provisions, and more, are included in the program.

[3] Morgan R. Edwards et al., "Assessing Inequities in Electrification via Heat Pumps across the US," *Joule* 8, no. 12 (August 20, 2025): 3290–3302, https://doi.org/10.1016/j.joule.2024.09.012.

[4] Ruthy Gourevitch, "Tenant Protections for Climate Justice," Climate and Community Institute and Sierra Club, October 2024, https://climateandcommunity.org/wp-content/uploads/2024/10/CCISierra_TenantProtections_final.pdf

3. **Support energy democracy:** Who has control over our energy systems has significant implications for the health of the planet and communities. Neighborhood-scale projects should benefit the surrounding communities, and, where feasible, be publicly or community-owned.
4. **Create good jobs:** The scale of neighborhood-scale building decarbonization makes it particularly amenable to union contractors or project labor agreements, as compared to going building-by-building. Furthermore, hiring contractors that employ local workers and putting project resources toward supporting workforce development can support the local community.

Phases

Neighborhood-scale projects can be thought of in four phases: laying the groundwork, organizing and design, implementation, and learning and evaluation. This toolkit focuses primarily on the first phase—this is where most organizations will start and where there is the greatest amount of existing knowledge and experience.

1	2	3	4
Laying the groundwork	**Organizing and design**	**Implementation**	**Learning and evaluation**
Initial scoping and feasibility assessment	Deeper outreach to residents and decision makers	Confirm financing and fundraising stack	Training on how to use and maintain new appliances
Team and relationship building	Confirm lead implementer	Bidding and contractor selection	Monitoring impacts on utility bills and tenants
Site selection	Complete in-home energy assessments	Continued community engagement	Reflection with stakeholders on project and communication of key takeaways
Initial community engagement	Confirm project scope and budget	Phased implementation	

Scoping and feasibility assessment

Designing, funding, and implementing a neighborhood-scale building decarbonization project is a multi-year commitment. It is important to have a lead organization with strong internal buy-in and a significant baseline level of community support before beginning to design your campaign. The scalar nature also often requires significant engagement from the local government, if not outright partnership.

As you consider neighborhood-scale building decarbonization, the following questions can serve as a useful starting point.

- Does our organization have the capacity and skill set to lead this project? If not, can we add capacity to our team or identify someone else to hold this role?
- Who do we want this project to impact? Do we have existing relationships with individuals and/or institutions that this project would impact? Are they interested in this project?
- Do we know other individuals or institutions working on building decarbonization in our community? Would they be interested in joining this effort?
- Are the local political opportunities favorable for this sort of project? Do we have relationships with individuals within local government who could help make this project possible?
- Which utility/utilities provide electricity and gas in our community? How, if at all, are they engaged with building decarbonization?
- What funding opportunities, incentive programs, and other resources could we access at the local or state level to support this work?
- Do we have an existing location in mind or a process for determining a location?

Team and relationship building

Winning neighborhood-scale building decarbonization requires strong community organizing, including relationship building and collaboration between unlikely allies. Below, we outline key roles for winning a neighborhood-scale building decarbonization project. In some projects, a single individual or organization may hold multiple roles listed.

Overall project coordinator/champion
This individual is integral in putting forward a vision for the project and navigating hurdles and challenges along the way to implementation. This can be a community-based organization, an elected official, or someone from local municipal staff.

Anchor tenant and/or block champion
Most projects involve a larger anchor tenant (a public housing development, a school, or similar) or an individual resident who is a known community leader who can help to organize their neighbors.

Community engagement point person
Securing buy-in for the project is a significant organizing project and will require someone who can serve as the clearinghouse for community engagement, questions, and concerns. This could be someone from a grassroots group, nonprofit organization, or local government. What is most important is that they understand both the community and project inside and out.

Lead implementer
Finding an experienced and enthusiastic project manager who can manage various contractors and clean energy funding streams will be critical to project success.

Technical assistance provider
This is an economically and technologically complex project, meaning that successful projects will include individuals able to identify funding streams, apply for grants, and provide technical analysis such as conducting energy audits.

Legal counsel
Neighborhood-scale building decarbonization projects—especially those involving community ownership, utility involvement, and/or

thermal energy network (TENs)—will require the participation of someone who can provide legal advice.

Some of the groups capable of holding these roles may be eager to support this campaign, while others may be hesitant or opposed. Regardless, understanding the landscape in your area—and beginning to build relationships with these actors early in project design—will help your project to succeed.

Stakeholder	Core	Possible roles	Likely interests	Likely concerns
Community members	Yes	Program design, organizing, community engagement, block champion	Decreasing utility bills, improved air quality	Displacement, increased costs
Local government	Yes	Overall project coordinator, funding, community engagement, legal counsel, market transformation	Political wins, reaching climate goals	Financial and legal risks, capacity
Schools, public housing, community center	Likely	Anchor organization, community engagement	Upgrading buildings, decreasing energy costs	Limited resources and competing priorities
General contractor or construction manager	Yes	Lead implementer	Project feasibility, costs, and completion	Project complexity, requirements relating to contractors
Labor unions	Likely	Workforce development, ensuring local hiring	Utilizing union labor, including through a project labor agreement	Learning a new industry
Utilities	Yes	Technical analysis, funding, program implementation	Increasing customer base, pursuing capital projects	Decreasing customer base, publicly and community-owned and -operated energy infrastructure
Community groups	Yes	Organizing, community engagement, anchor organization	Organizational priorities	Limited capacity
Consultants	Likely	Grant writing, home assessments, program design, engineering services, other technical assistance	Contracts and funding	Project feasibility

Role of government

While neighborhood-scale projects are localized in nature, their success will likely hinge on governmental support at both the local and state level. At the local level, municipal staff are instrumental to navigating building codes, permits, and other administrative requirements, while supportive politicians can help expedite city processes and access specific funding opportunities. Depending on the place and project, these actors may also be well-positioned to anchor the project and support community outreach and public engagement. At the state level, legislatures can appropriate money to neighborhood-scale projects and pass policies that make the regulatory context more favorable for these projects. Additionally, public utility commissions—which have different names in each state and are responsible for investor-owned utility (IOU) regulation—will likely be responsible for approving your project if IOUs are involved. More broadly, they are involved in regulating utilities and can significantly impact how easy or difficult it is to advance neighborhood-scale projects in your state.

Role of utilities

Electric service providers in your area will have information about whether your proposed project will require electric grid upgrades (at significant cost and delay), while gas providers will have information about where it is feasible to prune gas lines. If all customers in your project agree to electrify and the gas line can be decommissioned, the utility may agree to provide financial support. Because of this, beginning to build a relationship with relevant utilities early in the process—including learning to navigate their often complex internal structures—will be critical to project success.

The interests and politics of utilities will vary significantly depending on project location and utility structure. In some parts of the country, gas and electricity is provided by publicly or community-owned utilities, while in others, this energy is provided by IOUs. Across the country, there are 830 cooperative electric utilities and over 2,000 publicly owned electric utilities.[5] These entities are typically much

[5] NRECA, "America's Cooperative Electric Utilities Fact Sheet," February 2025, https://www.cooperative.com/programs-services/bts/Documents/Data/Electric-Co-op-Fact-Sheet.pdf; "Where Is Public Power?," American Public Power Association, accessed August 24, 2025, https://www.publicpower.org/system/files/documents/MAP-%20Where%20is%20Public%20Power.pdf.

smaller than IOUs—serving about 13 and 16 percent of total customers, respectively—but nonetheless serve millions of customers and have many of the same capabilities as IOUs.[6] There are also about 1,000 publicly and community-owned natural gas systems across the United States.[7] However, IOUs continue to be the energy providers for the significant majority of people across the country. These utilities are profit-driven, meaning that their support or opposition to neighborhood-scale projects will be largely shaped by the impacts of these projects on their bottom line. While state politics and regulatory requirements will mediate this profit motive, their interests can be described in broad terms based on the energy service they provide in a given area:

Investor-owned utility interests

	Support	Possibly support	Oppose
ELECTRIC	New customers, increased load.	Electric networks.	Thermal energy networks, community-owned and -operated systems.
GAS	Status quo, including large capital projects.	Thermal energy networks.	Electric networks or community-owned systems, other projects that decrease the number of gas system customers, regulations that limit gas infrastructure.
GAS AND ELECTRIC	Projects that decrease overall system costs.	Electric and thermal energy networks.	Projects that require significant coordination between gas and electric sides of utility, community-owned and -operated systems.

If your project is in a location with a municipally owned or co-op utility, the dynamics will likely be significantly different—and potentially easier to navigate.

[6] "Investor-owned utilities served 72% of U.S. electricity customers in 2017," U.S. Energy Information Administration (EIA), accessed May 5, 2025, https://www.eia.gov/todayinenergy/detail.php?id=40913.

[7] "Natural Gas Facts," American Public Gas Association, accessed May 5, 2025, https://www.apga.org/aboutus/facts.

Advocacy for neighborhood-scale building decarbonization

In some cases, key stakeholders' interests will align with pursuing a neighborhood-scale building decarbonization project. In other cases, stakeholders may have significant concerns about the proposed project or simply be unfamiliar with this approach. In those cases, much of the initial work may involve educating stakeholders. When education does not prove to be sufficient to move them, it may make sense to run a public pressure campaign to win the necessary support—and funding—for the project you want to build. The specific playbook for this campaign will vary according to who is doing the campaigning and the nature of the project you want to build.

Site selection

Site selection approaches

Broadly, there are three approaches to site selection for neighborhood-scale building decarbonization: starting with a specific anchor tenant and location in mind, allowing community members or blocks to self-nominate, or choosing sites based on the feasibility of decommissioning the gas line. These approaches have different benefits and drawbacks, outlined below.

Approach	Benefits	Drawbacks
Anchor tenant	Easier to secure the needed buy-in for project success because of fewer building owners. Possible to leverage existing relationships to secure this buy-in on the front end. Staff may have technical or financial knowledge applicable to the project.	Potentially less of an opportunity for community organizing, unless it is a school or other community center. If the anchor tenant backs out, the project fizzles.
Self-nomination	Encourages resident engagement. Ensures some baseline level of community buy-in from the outset.	Sites with capacity and interest in applying may skew wealthier and whiter. Requires capacity to solicit and process nominations.
Gas line decommissioning	Potential to access utility funding through avoided gas line expenditures. Supports shrinking the gas system and decreasing customer costs.	Limits the number of possible sites. Sites may not be the places where there are high baseline levels of support. Reliant on utility support and this support will come with conditions.

First steps toward site selection

Anchor tenant approach

- If you are planning a neighborhood-scale project with an anchor tenant like a public housing facility, school, or community center, that site will be the heart of your project.
- You will want to begin by meeting with representatives from this institution, including members of its facilities department, to gauge interest and determine feasibility.
- The project will likely require significant leadership and capacity from this institution, meaning that securing their buy-in could be a lengthy and involved process.
- Once you do obtain buy-in, you can then consider the extent to which you would want the project to extend to the surrounding area and begin engaging relevant stakeholders in that area accordingly.

Self-nomination

- Establish criteria for nomination that support implementation while prioritizing justice objectives. They should ideally be built with input from the community and technical experts and will be specific to your area. Important criteria could include the number of households that have expressed interest in the project, the number of different building types, and whether the area where the project is located is an environmental justice or disadvantaged community. At this time, you could also set goals for the number of blocks that self-nominate and the characteristics of those blocks, along with a rubric by which to assess applicants.
- Once these criteria are established, there will need to be concerted community outreach that focuses on low-income households and non-English-speaking households. Outreach will be most successful if fully resourced and led by people from the communities you are trying to reach.
- Once you have reached your nomination targets, you can bring together a team that includes both community members and technical experts to select a site according to your criteria.

Gas line decommissioning

- If your project hinges on receiving funding from gas line decommissioning, your first step will be identifying where it could be possible to decommission pipelines.
- This will likely involve engaging with the gas utility representatives to obtain information about what gas pipes will need repairs or replacement and the timelines for these projects. Some utilities will already have a mapping tool with this information—and the buildings that would be impacted—readily available, while others may need to compile it. Accessing this information may require significant back-and-forth and will likely involve signing a non-disclosure agreement.
- Once you have this information, you will need to narrow in on gas line projects with a reasonable timeline (ideally 5–10 years) and, where possible, determine the financial contribution that the utility would make to the project if completed.
- From there, you should plan to engage with electric utility representatives about the grid implications of electrifying the site under consideration. Projects that require significant grid upgrades may experience long delays and/or be more expensive. As with the gas side, the extent to which this information exists and is accessible may vary.
- Once you have further narrowed possible sites, it is useful to complete some initial mapping of the possible project locations to determine building condition and age, demographics, breakdown between renters and owners, and the presence of larger buildings like apartments and commercial buildings. You can obtain this information using site visits and data (local accessor's data, American Community Survey data, etc.).

Community engagement and site selection

For all approaches, you will need to assess the neighborhood under consideration. Some sites may make political sense but may have architectural or infrastructural limitations that make them less feasible. Others may make sense from a physical perspective but may be poorly suited for community organizing and powerbuilding. It is

important to determine this before work begins. This assessment will be technical in nature—especially for TENs systems—and, as with much of the project, will involve relationship building. It will also involve trade-offs between choosing the simpler path and one that is, while more complicated, often more just. The following are trade-offs that you may encounter during this phase of your project development.

Trade-off #1: Wait to engage residents in the project area until determining project feasibility and location VS. Begin engagement while project feasibility and location is uncertain

- Developing a high level of trust takes time and is a necessary prerequisite for people to agree to allow contractors into their homes to complete home energy assessments and, ultimately, to complete the projects. Beginning community engagement very early in the process supports residents to shape the project and develop a sense of ownership of the project if it comes to fruition. This suggests that it is valuable to begin engagement early.
- However, it can be complicated to meaningfully and honestly engage residents when it is not clear if the project will occur and whether it will occur in that specific location.

Trade-off #2: Selecting a site where most residents are homeowners VS. Selecting a site where most residents are renters

- Neighborhood-scale projects offer the promise of benefiting all residents, regardless of homeowner status. Selecting a site where most residents are renters supports a population that is more likely to be low-income and Black and Brown and less likely to be able to electrify outside of the context of a neighborhood-scale building electrification project.
- However, even if all tenants are excited about the project, projects can only move forward with the consent of building owners. Landlords may be less likely to agree to neighborhood-scale projects if they require upfront expenditures and if the immediate benefits of the project (utility bill savings, improved indoor air quality) primarily flow to their tenants. This is sometimes called the split incentive

challenge.[8] Many landlords are also hard to reach to discuss the project, and others may be hesitant to participate if they have recently completed other renovations.

- In other words, choosing a site where most people are renters may be the most just and values-aligned option. However, it also creates two layers of approval processes with the added challenge of split incentives, and will likely increase costs.

Trade-off #3: Selecting a block with new or good-condition housing stock VS. Selecting a block with old or poor-condition housing stock

- Many older buildings have poor insulation, significant amounts of deferred maintenance, and outdated wiring systems. Retrofitting these buildings is more complicated and expensive but is likely to offer the largest benefits to residents in terms of cost savings, improved comfort, and better health outcomes. It is also more likely to benefit low-income and Black and Brown residents, who disproportionately live in homes with deferred maintenance.[9]

- In places with very new or recently renovated housing stock, the scope of work will be smaller and costs will be lower. However, building owners may be hesitant to replace existing appliances and systems and cost savings may be more difficult to find.

Trade-off #4: Choosing a project with a long timeline VS. Choosing a project that requires an ambitious timeline

- The climate crisis demands that we stop investing in fossil fuel infrastructure today. This means electrifying blocks instead of repairing or replacing gas lines, and replacing gas boilers with heat pump systems when they break. Choosing projects with aging fossil fuel infrastructure in need of imminent replacement makes intuitive sense for this reason and presents the greatest opportunity for cost-effective projects.

[8] The Greenlining Institute and Energy Efficiency for All, "Equitable Building Electrification: A Framework for Powering Resilient Communities," The Greelining Institute, October 1, 2019, https://greenlining.org/publications/equitable-building-electrification-a-framework-for-powering-resilient-communities/.

[9] David E. Jacobs, "Environmental Health Disparities in Housing," American Journal of Public Health 101, no. S1 (December 2011): S115–S122, https://doi.org/10.2105/AJPH.2010.300058.

- However, choosing projects with too short of a timeline can create health and safety risks if a gas pipeline begins leaking or a boiler fails before the project is complete. This also risks a scenario in which building owners or utilities are forced to pay for both a fossil fuel upgrade and an electric system.

Trade-off #5: Participating in a utility pilot project VS. Pursuing a publicly or community-owned system

- Municipal or community ownership are both possible pathways that support energy justice—particularly in cities and neighborhoods with significant institutional capacity and leadership. However, developing ownership structures and maintenance plans requires overcoming legal hurdles and building new institutional structures and skillsets within communities and local government.
- In recent years, there has been momentum toward utility-owned neighborhood-scale systems, particularly for TENs. Since 2021, nine states have passed legislation allowing utilities to provide geothermal energy and/or creating geothermal pilots.[10] In most cases, this legislation allows utilities to recover costs from—and often profit from—neighborhood-scale projects. Because of this, projects owned by IOUs will likely be the path of least resistance.

Trade-off #6: Building owners are responsible for some upfront costs VS. Installations occur at no costs for building owners

- High upfront costs represent a major barrier for low-income homeowners to electrify and landlords are unlikely to pay the costs of electrification if their tenants will primarily benefit.[11] Because of this, projects are more likely to secure buy-in if building owners do not have to contribute financially.
- However, the government may be hesitant to cover the full scope of work if buildings are privately owned. This will make it necessary to braid together different funding streams and/or turn to the utility for financial support.

[10] "Thermal Energy Networks," BDC, accessed May 13, 2025, https://buildingdecarb.org/resource-library/tens. In California, the legislation also allows for electric networks.

[11] The Greenlining Institute, "Equitable Building Electrification."

Project scope

The scope of work involved in electrifying buildings at the neighborhood scale largely mirrors the work required in individual homes. In most residential buildings in the United States, space heating and cooling and water heating represent the bulk of energy use.[12] For buildings that burn fossil fuels for these purposes—namely those using gas- or oil-fired boilers, furnaces, and water heaters—replacing these appliances is central to decarbonization.

Making these appliance switches often requires a significant amount of work inside of homes, particularly for older buildings. In order for the project to improve resident comfort and lower energy usage and utility bills, building decarbonization should also include environmental toxin remediation, addressing deferred maintenance, improving energy efficiency, and, in many cases, installing solar and storage. After the site and technology pathway has been selected, the flow of completing this work could occur roughly as follows:

1. **Complete home energy assessment:** Work can be conducted with a contractor to inspect buildings in the proposed area to understand existing energy systems, energy efficiency, building code violations, and deferred maintenance needs.
2. **Address environmental toxins and deferred maintenance:** Before projects can move forward, some buildings require investments to address existing challenges. This can include remediating mold, lead pipes, and asbestos; roof repairs; and ensuring that buildings are otherwise up to health and safety standards. In some cases, this first step is required to access other funding streams.
3. **Complete energy efficiency retrofits:** Remediate the building to ensure that the home is well-insulated and -ventilated in order to minimize electricity costs and improve comfort. Common components include replacing single-pane windows, sealing gaps in the building envelope, installing ventilation systems, and adding additional insulation.

[12] "Use of energy explained: Energy use in homes," U.S. Energy Information Administration (EIA), accessed June 6, 2025, https://www.eia.gov/energyexplained/use-of-energy/homes.php.

4. **Prepare buildings for appliance electrification:** In order to electrify appliances, many buildings—especially older ones—will require new wiring, modifications to the duct system, and/or installing a larger electric panel that can accommodate the increased load from electrification.
5. **Switch to electric appliances:** After the first four steps are complete, the project can switch out fossil fuel appliances for energy-efficient electric ones. Common switches include gas boilers or electric resistance heating to heat pumps, gas stoves to induction stoves, and gas-powered water heaters and laundry machines to electric ones.
6. **Install solar and storage:** Installing solar decreases utility bills and including battery storage improves resilience by keeping the lights on during power outages. Solar can be installed on individual homes' roofs or in a larger array that serves an entire neighborhood. Similarly, projects can include individual-level battery systems or a single larger battery. Installing solar and storage also has climate benefits because the majority of utility-scale electricity still comes from fossil fuels.[13]
7. **Quality assurance and air quality testing:** Contractors should ensure that appliances have been installed correctly and that the building envelope is well-sealed, among other measures. In addition, projects should include indoor air quality testing before and after retrofits to ensure that environmental toxins have been successfully remediated and that the building is well-ventilated.

While the scope of work mirrors that of individual homes, neighborhood-scale projects also offer opportunities for distributed energy generation and sharing. These scaled approaches are proven from a technological standpoint, and they are only now being applied in the context of neighborhood-scale decarbonization.

[13] "Frequently Asked Questions (FAQs)," U.S. Energy Information Administration (EIA), accessed June 6, 2025, https://www.eia.gov/tools/faqs/faq.php?id=427&t=3.

Thermal energy networks (TENs): Thermal heat pump systems can be linked together to create a thermal energy network. In these systems, energy is generated in a central location—a geothermal borefield, waste heat source, or similar—and then distributed throughout a neighborhood using a system of water pipes. This approach creates significant improvements in energy efficiency, especially in cases when the buildings in the network have different heating and cooling needs (e.g., a school vs. a grocery store vs. a residential building). Eversource's networked geothermal pilot in Framingham, MA and Colorado Mesa University's geo-exchange system are the best-known examples of this approach in the United States.[14] These systems run on electricity but can include solar and/or batteries to provide heating and cooling in the case of power outages.

Microgrids: Clean distributed generation sources like rooftop solar and battery storage can be linked and made into a closed-loop system that does not rely on the broader power grid and can be "islanded" in the case of a power outage. While most existing microgrid systems are currently built and maintained by a single institution like a hospital or university, neighborhood-scale building decarbonization projects are attempting to build out this approach to include multiple property owners. In addition to improving resilience, including a microgrid can decrease utility bills costs by creating a mechanism through which to share energy across a neighborhood.

Virtual power plants (VPPs): As the electric grid becomes "smarter" and battery storage and information technology improves, there is growing excitement about VPPs, which aggregate distributed energy sources like community solar and energy storage, individual electric cars, and smart water heaters to provide a source of energy to the broader grid when it is needed. These systems can provide economic benefits to communities while improving the resilience of the grid in the case of extreme weather events.[15]

[14] Eversource, "Networked Geothermal Pilot," accessed November 6, 2025, https://www.eversource.com/residential/save-money-energy/clean-energy-options/geothermal-energy; Colorado Mesa University, "Geo-Grid System," accessed November 6, 2025, https://www.coloradomesa.edu/sustainability/initiatives/geo-grid.html.

[15] National Caucus of Environmental Legislators, "Microgrids and Virtual Power Plants Issue Brief," accessed June 6, 2025, http://ncelenviro.org/resources/microgrids-and-virtual-power-plants-issue-brief/.

Electric networks vs. thermal energy networks

One early choice you will need to make in project design is whether to pursue an electric network or TENs system. Electric networks rely on the existing grid for power, often utilizing air-source heat pumps, whereas TENs generate energy utilizing the heat transfer properties of the ground, water, or other buildings and a system of pipes. TENs tend to be more efficient but have higher upfront capital costs than electric networks.

It is likely that you are coming to this work with an instinct as to what technology pathway will make sense for your project based on your political context and your possible site.

If this is not the case, the following set of questions can help you decide which technology makes most sense for your area:

Are there separate gas and electric utilities or a single dual-fuel utility?

- Separate utilities: a TENs will be more politically feasible, given likely gas utility opposition to electric networks.
- Dual-fuel utility: a TENs or electric network are both possible.

How big is your project in terms of number of buildings and energy usage?

- Smaller project and energy usage: an electric network may make more sense because of the higher upfront costs of TENs.
- Larger project and energy usage: a TENs may make more sense because these projects enjoy economies of scale, including improved efficiency for larger systems.

Are the buildings relatively close together or spread out?

- Close together: a TENs or electric network are both possible.
- Spread out: an electric network will make sense because laying large amounts of pipe in less dense areas increases costs of TENs systems.

What fuel do buildings currently use for heating and cooling?

- Gas: electricity costs are not competitive with gas in many states,[16] meaning that a more efficient TENs system will be more likely to ensure utility bill savings.
- Propane, wood, or electricity: a TENs or electric network are both likely to generate savings because these heating systems are less efficient and not cost-competitive with heat pump systems.

What are the heating and cooling needs for area buildings? Do any of the buildings release waste heat and/or have the capacity to serve as a heat sink?

- Because of their networked nature, TENs are most efficient when they serve buildings with different heating and cooling needs.
- If the project site is located near a body of water or a facility like a wastewater treatment facility or data center, a TENs project can extract or store heat in these sites. This can significantly decrease the required number of boreholes and overall project cost.

[16] Eric J.H. Wilson, Prateek Munankarmi, Brennan D. Less, Janet L. Reyna, and Stacey Rothgeb,"Heat pumps for all? Distributions of the costs and benefits of residential air-source heat pumps in the United States," *Joule* 8, no. 4 (2024): 1000–1035, https://doi.org/10.1016/j.joule.2024.01.022.

Designing in line with values

Regardless of how you navigate the choice points outlined above, we encourage all projects to include strong tenant protections, limits to utility bill impacts, and labor standards. These provisions—which are often challenging to realize in the context of individual-scale decarbonization projects—are critical for securing community buy-in and scaling this approach, as well as for ensuring equitable outcomes.

Tenant protections

Building electrification and other retrofits can be used by landlords as a tool to increase rents or evict tenants. In order to ensure that neighborhood-scale building decarbonization does not perpetuate this dynamic, project agreements should include the following provisions as a baseline:

- **Just cause eviction:** owners cannot evict tenants without a non-discriminatory reason (e.g., non-rent payment, breaches of the lease, or the property owner reoccupying the property) during the project and for a set period after its completion.
- **Right to return:** tenants have the right to return to their home if they must leave over the course of renovations, and they should receive compensation and/or alternative housing if they are temporarily displaced as a result of this project.
- **Limits to rent increases:** landlords should not increase rent as a result of renovations and, more broadly, should limit any other rent increases above the rate of inflation.
- **Requirement for tenant consent:** in addition to owner consent, tenants should also be required to consent to the project, which will help ensure that the project is in their interests.

Utility costs and solar benefits

Projects should not increase utility bills and should ideally provide a net financial benefit to participants. The specifics of how to ensure that this is the case will vary depending on the project's location and

existing heating systems. Regardless, the following are possible pathways for ensuring rate neutrality for the project:

- In many places, the utility commission has established special rates for heat pump customers. Residents should be supported to enroll in the lowest appropriate rate after electrification, including discounts for low-income households.
- In the case that an IOU contributes financially, work with your state's public utility commission to include a requirement to hold utility bill rates constant as a prerequisite for the utility to recover its costs related to the project.
- For most projects, especially those switching from a gas heating to an air-source heat pump system, include renewable energy generation in the project scope to decrease utility bills.
- Include money in the project budget to cover unexpected increases in utility bills.
- Where politically possible, collaborate with local elected officials to pass policies that require that utility bills remain flat after electrification.
- Complete educational events in project areas regarding energy efficiency and cost-saving measures.

Guardrails around utility involvement and support for public ownership

The US energy system is shaped by privately owned, profit-motivated entities. IOUs are key players in this system, with high and increasing returns on equity for investors paid for by utility customers.[17] Because of their status as incumbent energy providers and their financing capabilities, some see them as key actors in neighborhood-scale building decarbonization. We believe that it is important to proceed with caution in the following ways if collaborating with IOUs:

[17] Mark Ellis, "Rate of Return Equals Cost of Capital," American Economic Liberties Project, January 2025, https://www.economicliberties.us/wp-content/uploads/2025/01/20250102-aelp-ror-v5.pdf.

- When deciding whether to collaborate with an IOU, consider the extent to which the project will increase ratepayer costs and/or utility profits, avoiding projects in which the utility would be the primary beneficiary.
- Clearly delineate decisionmaking power and responsibilities, ensuring that non-utility actors have a decisionmaking role and that community outreach is led by trusted actors with existing ties to the neighborhood.
- Minimize utility ownership of physical assets to the extent possible and ensure that people maintain ownership of equipment inside of their homes.
- Pursue projects that are fully municipally or community-owned when there is sufficient public sector or neighborhood capacity and there are financial resources to do so.

Labor standards

While commercial and industrial building retrofits are often completed by union labor, most single-family residential decarbonization projects are completed by smaller, non-union contractors. These contractors often receive lower pay, fewer benefits, and worse working conditions than their union counterpoints. The quality of their work—and the resulting energy savings—may also be lower as well. The small scale of most single-family residential building decarbonization projects is one of the major barriers to labor unions entering the residential building decarbonization space. Neighborhood-scale building decarbonization addresses this barrier and creates economies of scale, making it possible to ensure high-road labor standards for workers completing the project. The following actions can support union participation:

- Prioritize cultivating a relationship with your local building trades council and gauge interest in participation.
- Where possible, explore signing a project labor agreement (PLA) for your project. A PLA is an agreement between organized labor and the entity responsible for project implementation that sets baseline labor standards for all contractors, as well as other provisions.

- Regardless of whether you are able to pursue a PLA, consider including provisions that guarantee a living wage for workers, prioritize hiring local contractors, and support workforce development. These provisions will help ensure that the benefits of the project stay within your community and allow more people to access clean energy jobs.

Funding projects

Neighborhood-scale building decarbonization is still considered a new approach to residential decarbonization and requires flexible funding and a committed coalition. A funding source must be able to accommodate the different physical needs of each building in the zone. Additionally, flexible funding allows projects to move more efficiently by reducing administrative burden.

Secondly, in addition to flexible funding, a publicly funded model is critical for scale. The public investment model is critical for communities to initiate pilot projects, allowing them to design, innovate, and test successful strategies at a higher risk tolerance and with less pressure to cut corners to finish a project with minimum spending.

As neighborhood-scale building decarbonization gets off the ground in the United States, project implementers must feel safe being creative and trying new strategies. Another reason that public funding is important is that it offers opportunities for scale.

Depending on the locality, funding options may already exist but have to be obtained for the project. Other localities may need a new funding stream. Many of the options on the list below have not yet been used for neighborhood-scale building decarbonization in large part because this project type is still very new.

Grants

Source	Overview	Example
Local, state, and federal grants	Grants are a favorable form of funding because they do not need to be paid back and are not a direct result of increasing debt or taxation. Grants are especially important because these projects require flexible funding. States and municipalities regularly have grants for clean energy projects, some of which are directed by law. Grants were also created through the Inflation Reduction Act (IRA), most of which are now awarded or canceled.	Minnesota's legislature passed a law in 2024 establishing the geothermal planning grant account to create a Geothermal Planning Grant Program (COMM-GT01_20241216).[18] The Commerce Department Division of Energy Resources will award municipalities up to $150,000 for geothermal feasibility studies. The vision is for these municipalities to then apply for financing to build the project.
Community Development Block Grant (CDBG) Program	This is a federal grant distributed annually from Housing and Urban Development (HUD) to localities to fund economic, community, and neighborhood development. A total of 70% of the funds must be used for low- and middle-income people. "Activities may address needs such as infrastructure, economic development projects, public facilities installation, community centers, housing rehabilitation, public services, clearance/acquisition, microenterprise assistance, code enforcement, homeowner assistance, etc."[19] Based on a federal formula, cities can receive upwards of hundreds of millions annually in CDBG funds. These funds can be allocated to government-run residential decarbonization projects.	Montgomery County, Maryland Department of Environmental Protection administered the Healthy, Efficient, Electrified, Climate-Adapted Pilot Homes Grants Program. The grant provided $1.5 million to awardees to provide gap funding for health and safety repairs and climate mitigation for low- and middle-income homes in the County.[20]

Bonds, taxes, and penalties

Source	Overview	Example
General obligation or municipal bonds	A state or city governmental bond is a low-risk debt security (can be thought of like a loan) issued by a government for spending. General or revenue-issued bonds can create a funding stream into the billions to be used for projects,	New York State voted for a $4.2 billion Environmental Bond Act in 2022. The bond includes a programmatic bucket for climate change mitigation that requires no less than

[18] Minnesota Legislature, Office of the Revisor of Statutes, 2025 Minnesota Statutes, 216C.47 Geothermal Planning Grants. https://www.revisor.mn.gov/statutes/cite/216C.47#stat.216C.47.7.

[19] "Community Development Block Grants," HUD Exchange, accessed November 16, 2025, https://www.hudexchange.info/programs/cdbg/.

[20] "Healthy, Efficient, Electrified, Climate-Adapted Pilot Homes Grants Program," Department of Environmental Protection, Montgomery County, Maryland, accessed November 16, 2025. https://www.montgomerycountymd.gov/DEP/energy/homes/heecap.html.

	often referred to as "green bonds."[21] A municipality can issue a bond to create a funding pot for a neighborhood electrification program that can scale to whole neighborhoods and generate economic activity through improving neighborhoods and creating hundreds of high-paying union jobs.	$400 million to go toward green building and electrification projects and programs.[22]
Taxes, fees, and levies	A municipality or state can levy a tax or fee and direct the funds toward a specific program. A tax is generally used to raise revenue, and a fee is generally used to recoup a cost. There are several types of taxes that can be used: real estate taxes, sales taxes, tourist taxes, fuel taxes, and more. Fees can be imposed similarly and/or be more targeted.	The State of Hawaii has passed a law to create a "green fee," which is a net 0.75% increase in the Transient Accommodation Tax (TAT), the state's lodging tax. These funds are expected to generate $100 million annually and will be used for climate change mitigation and resilience projects throughout the state.[23] Vermont was the first state to enact the "Climate Superfund Act" to recover costs from oil and gas companies for climate-related loss and damage throughout the state. Working like a fee, the payments will go into a fund that will be used to implement climate change adaptation projects, including building upgrades.[24]
Polluter penalty, cap and invest, cap and trade, or loss and damage	Programs can be a revenue-generating opportunity for a state to collect penalties from facilities and companies that pollute above pre-determined allowable levels and use those funds for clean energy and climate programs. There are several types of this funding mechanism, listed above. The best programs target the outcome of reducing point source emissions while collecting fines from lawbreakers. It should be noted that the environmental justice movement does not support cap-and-trade programs because they have not proven to sufficiently reduce point-source emissions in frontline communities.	Starting in 2023, California began its cap-and-trade program. The program sets a declining limit on the largest sources of greenhouse gas emissions in the state, with the goal of returning to below 1990 levels.[25] The allowances from the program go into the Greenhouse Gas Reduction Fund (not to be confused with the federal GGRF program), which funds programs to address climate change across the state.

[21] "How to Decide if Green Bonds are Right for Your City," Implementation Guides, C40 Knowledge, April 2022, https://www.c40knowledgehub.org/s/article/How-to-decide-if-green-bonds-are-right-for-your-city?language=en_US.

[22] "Clean Water, Clean Air and Green Jobs Environmental Bond Act," New York State, accessed November 16, 2025, https://environmentalbondact.ny.gov/.

[23] Office of the Governor, State of Hawai'i, "GOVERNOR GREEN WINS PASSAGE OF HISTORIC CLIMATE IMPACT LEGISLATION," May 2, 2025, https://governor.hawaii.gov/newsroom/office-of-the-governor-news-release-gov-green-wins-passage-of-historic-climate-impact-legislation/.

[24] "Climate Superfund Act," Vermont Agency of Natural Resources Climate Action Office, accessed November 24, 2025, https://climatechange.vermont.gov/climate-superfund.

[25] "Cap-and-Trade Program," California Air Resources Board, accessed November 24, 2025, https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program.

Inflation Reduction Act (IRA) tax credits, rebates, and programs

Source	Overview	Example
Direct pay and the Investment Tax Credit (ITC)	This is the IRA's direct pay mechanism, which allows tax-exempt and government entities to receive a tax credit in the form of a cash payment of between 30–70% of total costs for qualifying renewable energy projects (solar, battery storage, ground-source heat pumps, and EV chargers). A residential electrification project can benefit from direct pay if the government or nonprofit entity builds and owns a renewable energy system that then helps residents, so long as it owns at least a portion of the heat pumps installed.[26] While solar and EV credits are phasing out quickly, geothermal and battery storage still presents a fiscal opportunity for renewables. With changes made in the One Big Beautiful Bill Act (OBBA), projects that began construction before December 31, 2025 will have no changes to eligibility; for those beginning construction between January 1 and July 4, 2026, the tax credits are still available with new supply chain restrictions; and for those beginning construction after July 4, 2026, the project must be in service by the end of 2027 with the supply chain restrictions.	The City of Ann Arbor, Michigan is building a community-scale geothermal heating and cooling system in the Bryant neighborhood, which will reach 262 residential and four other buildings.[27] If the system is City-owned, it would qualify for direct pay.
Home Efficiency Rebates (HERs) program and Home Electrification and Appliance Rebates (HEARs) program	Administered by states, these rebates can offer up to $10,000 and $14,000, respectively, for efficiency and electrification per household (for multifamily and single-family households) and can be stacked. This is the clearest program from the IRA that helps low- and middle-income neighborhoods do scaled electrification. Funds are already running out in some states and just getting started in others. This program did survive the OBBA cuts to the IRA.	Wisconsin was the first state to launch their rebates program in August 2024 and it is anticipated to benefit between 20,000 and 40,000 homes across the state.[28]

[26] U.S. Department of the Treasury, "U.S. Department of the Treasury Releases Final Rules on Investment Tax Credit to Produce Clean Power, Strengthen Clean Energy Economy," December 4, 2024, https://home.treasury.gov/news/press-releases/jy2736.

[27] City of Ann Arbor, "Ann Arbor City Council Votes Unanimously to Accept $11 Million for District Geothermal System," November 4, 2025, https://www.a2gov.org/news/posts/ann-arbor-city-council-votes-unanimously-to-accept-11-million-for-district-geothermal-system/.

[28] "IRA Home Energy Rebates," Focus on Energy, accessed November 24, 2025, https://focusonenergy.com/home-energy-rebates.

Funds through public utility commissions and utility providers

Source	Overview	Example
Ratepayer funding	In rate cases and generic proceedings, the state public utility commissions (PUCs) can also direct utility companies under their jurisdiction to create a special surcharge on utility bills to fund a program. Similarly, a legislature can pass a law that requires a utility surcharge. Furthermore, parties to a rate case can submit proposals to create or enhance clean energy programs funded through the utilities as part of their total expenditure instead of a special surcharge. In working with utilities, it is important to avoid increasing utility costs for those who are already energy-burdened. Most ideally, some programs could be funded through shareholder profits, not through programs that are recovered in rates. This would be a new and powerful funding source.	Mass Save is a collaborative of utilities, implementors, and government that offers energy efficiency upgrades for homes, communities, and businesses. The program is primarily funded through the System Benefit Charge (SBC) and the Energy Efficiency Reconciliation Factor (EERF), which are surcharges on utility bills.[29] The Washington, D.C. Healthy Homes Act to upgrade 30,000 low- or middle-income homes is funded mostly through the Sustainable Energy Trust Fund (SETF), which is a utility bill surcharge.[30]
Utility capital or program funding	Similarly, a neighborhood-scale project that coordinates with the local gas utility to identify blocks that will need gas pipeline repair or replacement soon can result in a funding opportunity. A utility can agree that the funds saved from pipeline repair by decarbonizing that zone can be directed to the project. The potential funding can range heavily, from hundreds of thousands of dollars to above $1 million per block. Projects have already been implemented in states such as New York, California, Massachusetts, and Illinois.	California recently passed SB1221, designating priority neighborhood decarbonization zones and requiring the PUC to create 30 pilots for neighborhood-scale electrification projects across the state, paid for by the utility providers.[31]
Virtual or Distributed Power Plants (V/DPPs)	An emerging opportunity for funding and scaling residential electrification, V/DPPs can be created by a municipality, the public utility, or IOU to install battery, solar, and other smart technologies in homes. The energy from those homes are then aggregated and sold to the	In Vermont, Green Mountain Power leases battery storage to households below market rate, and then when there are peak demand needs in the community, the utility pulls power from the network of batteries. The utility has invested over $30 million in the program to

[29] "Massachusetts Energy Budgets & Investments," Department of Energy Resources, Commonwealth of Massachussetts, accessed November 24, 2025, https://www.mass.gov/info-details/massachusetts-energy-budgets-investments#:~:text=recipients%2C%20and%20staff.-,Mass%20Save%C2%AE,from%20the%20RGGI%20auction%20proceeds.

[30] Sustainable Energy Trust Fund, § 8-1774.10, Code of the District of Columbia, accessed November 24, 2025, https://code.dccouncil.gov/us/dc/council/code/sections/8-1774.10.

[31] California State Legislature, Gas corporations: ceasing service: priority neighborhood decarbonization zones., SB-1221, approved by Governor September 25, 2024,https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240SB1221.

	grid. These programs help utilities manage peak demand and grid stability, increase availability of distributed energy resources, and can bring direct financial benefits to customers.	plug in over 3,000 homes.[32] Customers that sign up receive a minimum of $850 per kW for three-hour discharge, reaching up to $10,000 depending on how much energy they discharge. These payments pay off the battery storage.[33]

Energy assistance and clean energy programs

Source	Overview	Example
State energy programs	States often have existing programs through state energy departments for clean energy upgrades in homes. Related to the utility section, many states have a System Benefits Charge (SBC), collected from ratepayers, which is the source of funding for the state energy department and energy programs. Advocacy to direct these funds to neighborhood-scale projects can be one of the most direct ways to gain flexible funding. These programs can be critical to helping low-income residents access clean energy opportunities. These programs can often be part of a funding stack to complete energy efficiency or electrification of the buildings in the project. States and municipalities often have existing programs through their housing departments to assist low-income homes with issues such as mold or lead; these programs can also potentially be stacked, as they are necessary to mitigate before efficiency and electrification upgrades.	The New York State Clean Heat Program offers rebates and financing for the installation of heat pumps, which is mostly paid for through the state's SBC.[34]
Federal assistance programs	Two programs established decades ago are meant to assist low-income residents with their utility costs. Although they have been critical to ensuring low-income households can access energy, these funding avenues are currently canceled by the federal government. This status could change.	In Lake County, Colorado, 16 mobile home park residents participated in a neighborhood-scale efficiency pilot led by the Colorado School of Mines. Most of the work was funded through the WAP via the Colorado Energy Office, which earmarked $1.3 million for the project.[35]

[32] Alejandro de la Garza,"This Vermont Utility Is Revolutionizing Its Power Grid to Fight Climate Change. Will the Rest of the Country Follow Suit?," Time, July 26, 2021, https://time.com/6082973/vermont-electric-grid/.

[33] John Engel, "How are utilities using virtual power plants? 5 case studies," August 28, 2024, *Factor This*, https://www.renewableenergyworld.com/power-grid/smart-grids/how-are-utilities-using-virtual-power-plants-5-case-studies/.

[34] "Heat Pump Program (NYS Clean Heat)," NYSERDA, accessed November 24, 2025, https://www.nyserda.ny.gov/All-Programs/Heat-Pump-Program.

[35] Mark Jaffe, "Colorado School of Mines project hopes to warm houses, lower bills in mobile home communities," Colorado Sun, March 3, 2025, https://coloradosun.com/2025/03/03/energy-efficiency-mobile-homes-colorado-school-of-mines-leadville/.

- The Weatherization Assistance Program (WAP) is a federal energy assistance program offered through states that provides upwards of $20,000 per home for weatherization and electrification measures for income-eligible homes.
- The Low-Income Home Energy Assistance Program (LIHEAP) is a federal assistance program offered through states that provides utility bill assistance to lower monthly costs for qualified low-income households. These funds can be stacked with other funding sources to mitigate the potential electric bill increases. There are also assistance programs and special electrification rates at the state level that can help with utility costs. The Trump administration has targeted the program, and with limited staff to distribute the funds, the program is in unprecedented uncertainty.

Appropriations

Source	Overview	Example
Local and state appropriations from general funds or preexisting relevant funding streams	Municipalities and states can decide to allocate any amount of funding for a specific project or a wider program. Allocations can be through general funds or through an established fund. Funding requests can come from the governor or mayor, the legislature, or an agency. Energy, housing, and community development agencies are all well-positioned to create programs and request funding for pilot projects, and therefore are strong partners for building a neighborhood-scale project from the ground up.	In New York, the Upgrade NY coalition passed a law in 2022 requiring the state PUC to establish 11 pilot projects to explore utility thermal energy networks for neighborhood-scale decarbonization.[36] Since its passage, the state has allocated $150 million for these projects on public university campuses and the coalition is advocating for $200 million in the FY2026 budget.[37] Funding is also coming from utilities, with a total estimated investment of $880 million between the state and utilities.[38]
Congressional appropriations	Federal House and Senate representatives can appropriate funds for projects, and the routes of these requests vary based on the state and	Submitted by Rep. Pete Aguilar of California's 33rd Congressional District, the Neighborhood Partnership Housing Services, Inc. was

[36] New York State Senate, Utility Thermal Energy Network and Jobs Act, Senate Bill S9422, 2021-2022 Legislative Session, signed by Governor July 5, 2022, https://www.nysenate.gov/legislation/bills/2021/S9422.

[37] Upgrade NY, "Lawmakers, Labor, Advocates Call for $200 Million Investment in Thermal Energy Networks in State Budget," March 26, 2025, https://www.upgradeny.org/upgradeny-tens-budget-press-conference.

[38] New York State Department of Public Service, "PSC Adopts Initial Utility Thermal Energy Networks Rules," July 18, 2024, https://dps.ny.gov/news/psc-adopts-initial-utility-thermal-energy-networks-rules.

project scope. For example, Community Project Funding (CPF) is for members of Congress or the Senate to request funds on behalf of their constituents, including nonprofits and local governments, for a specific purpose. Funding can range from hundreds of thousands to millions per project. awarded $1 million to preserve affordable housing in the City of San Bernardino.[39] Neighborhood-scale projects of similar cost (between $1–$5 million) can be awarded flexible funds through this program.

Potential barriers

Neighborhood-scale building decarbonization offers a number of exciting opportunities, but a number of regulatory, political, and economic barriers exist in its implementation. While not the focus of this toolkit, the following four roadblocks are worth noting.

Obligation to serve

The obligation to serve—also sometimes called the duty to serve—refers to the requirement that utilities provide a service to all customers in the region in which they have a monopoly. It typically includes a requirement both to connect new customers in their service area and to continue providing service to existing customers.[40] While regulations are state-dependent, the latter provision is often fuel-specific—or interpreted as such—meaning that all gas customers involved in a neighborhood-scale electrification project must agree to electrify before the utility is allowed to decommission gas lines.[41] This creates the following holdout challenge: if even one homeowner refuses to electrify, the gas utility must continue to maintain and provide gas service.

↳ **Solution**: Analysts have proposed that the obligation to serve be redefined to refer to the energy service provided (i.e., heating) instead of the fuel source.[42] In 2024, the Washington State Legislature passed a bill allowing gas utilities to fulfill their obligation to serve "by providing thermal energy through a thermal energy network" and the

[39] "FY24 COMMUNITY PROJECT FUNDING," U.S. House of Representatives, accessed November 24, 2025, https://appropriations.house.gov/fiscal-year-2024-community-project-funding.

[40] Heather Payne, "Unservice: Reconceptualizing the Utility Duty to Serve in Light of Climate Change," University of Richmond Law Review 56, no. 2 (2022): 603, https://scholarship.richmond.edu/lawreview/vol56/iss2/7.

[41] Kristin George Bagdanov, "Decarbonizing the Obligation to Serve," BDC, March 2024, https://buildingdecarb.org/wp-content/uploads/FINAL_Decarbonizing-the-Obligation-to-Serve_Oct2024.pdf.

[42] Bagdanov, "Decarbonizing the Obligation to Serve."

California State Legislature passed a bill creating a two-thirds resident approval threshold for zonal electrification pilots.[43]

High costs and limited access to funding

Neighborhood-scale building decarbonization is currently quite expensive because it is at an early phase of its development. It is likely that obtaining the resources to make these projects a reality will take time, and it is unlikely that you will be able to secure all of the funding you need to complete the project from a single source. This is exacerbated by recent cuts to federal climate programs and Inflation Reduction Act incentives.

↳ **Solution**: Starting by securing a smaller amount of seed funding can allow the lead organization to dedicate staff time to the project and for the completion of initial technical assessments. Possible funding sources include state and local government programs and grants from non-profit organizations. Once this initial assessment is complete, you will have a better sense of project feasibility and vision, as well as overall costs. This will give the campaign the option to pursue more funding—with a clearer vision and understanding of costs—or shift directions as needed.

Siloing of energy systems

Despite the physically interconnected nature of our gas and electric systems, the status quo of energy system planning is often disjointed across geographies and actors. At the hyperlocal level, homeowners and institutions plan upgrades and appliance replacements individually without coordination, and, at a larger level, gas and electric utilities rarely coordinate long-term planning, even when they are part of the same corporation. State and local electrification programs are also sometimes similarly disjointed. By nature of its larger scale, neighborhood-scale decarbonization requires greater coordination, which can be a barrier to project implementation.

↳ **Solution**: As discussed above, building relationships with key stakeholders can begin to break down siloes—and uncover siloes that continue to exist. Prioritizing relationships and developing

[43] Washington State Legislature, House, An Act Relating to Promoting the Establishment of Thermal Energy Networks, HB 2131, 68th Legislature, introduced in House January 26, 2024, https://lawfilesext.leg.wa.gov/biennium/2023-24/Pdf/Bills/House%20Passed%20Legislature/2131-S.PL.pdf?q=20250606142904; California State Legislature, Senate, An Act to Add and Repeal Section 451.9 of, and to Add and Repeal Article 11 (Commencing with Section 660) of Chapter 3 of Part 1 of Division 1 of, the Public Utilities Code, Relating to Gas Corporations, SB 1221, Chapter 602, introduced in Senate September 25, 2024, https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240SB1221.

coordination structures at the front end of project development is time-consuming work but will be critical to the success of your project—and projects to come.

Customer experience

Completing deep energy efficiency retrofits and electrification can be an intensive, invasive process. During parts of the project, residents will need to move their belongings or leave the premises. During others, there will be loud construction-related noises in and around their building, including drilling boreholes for TENs projects. Completing projects at the neighborhood scale will likely make this disruption extend over a longer timeframe, especially if the project utilizes multiple incentive programs and a large number of contractors.

↳ **Solution**: Program participants should, at a bare minimum, receive alternative accommodations or funding for these accommodations if they need to leave their homes during construction, along with a guarantee of returning after construction is complete. There should also be a dedicated community liaison responsible for fielding construction-related questions and concerns. This liaison should work with contractors to ensure that residents receive frequent updates about the project and possible disruptions.

Conclusion

Neighborhood-scale building decarbonization has the potential to transform how we decarbonize building stock. The scale of thinking beyond a building-by-building approach allows for a more managed transition off gas infrastructure, provides an economy of scale to both drive down costs and increase labor coordination, and facilitates opportunities for households to decarbonize which may not have been able to do so on their own. Delivering on these goals requires a high-road approach to implementation that centers community engagement, tenant protections, and good labor standards. The fact that it is a new way of managing decarbonization also means that it requires significant upfront community organizing for the maximum impact. Communities are already beginning to take up this new path toward building decarbonization, and this toolkit can hopefully help organizers and implementers navigate this new terrain.

Additional resources

Toolkit: How to Develop a Thermal Energy Network

Neighborhood Scale: The Future of Building Decarbonization

Thermal Energy Networks in the United States: Emerging Opportunities, Challenges, and Needs

Thermal Energy Networks: Considerations from Environmental Justice and Energy Democracy Perspectives

The State of State Climate Action: Updated Scorecards Tracking Progress to 2030

Building an Equitable, Diverse, & Unionized Clean Energy Economy