



Developing the Market Infrastructure for Multistage Home Retrofits: The Role for Programs

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Research Report



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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Contents

Executive summary	iv
Introduction	1
Why multistage retrofits?	1
Elements of a multistage retrofit approach.....	3
Opportunities for expanding multistage retrofits	9
Summary of recommendations	19
Next steps	20
References	21

Executive summary

Key findings

- Home retrofits conducted in sequenced stages can appeal to homeowners concerned about the financial burden and disruption associated with one-time whole-home energy efficiency and electrification projects. Multistage retrofits allow customers and contractors to develop a sequenced retrofit plan, align energy upgrades with other home maintenance and improvement projects, and track progress toward their overall objectives.
- Multistage retrofits hold great promise for increasing the number of households that complete multiple energy efficiency and electrification upgrades toward a more comprehensive retrofit over time.
- Energy efficiency program incentives to offset the costs of developing a customer’s multistage retrofit plan (or roadmap) would encourage more contractors to offer this service. Incentives and other support would be particularly helpful for new contractors and those expanding the range of services they offer.
- Maintaining long-term relationships with homeowners is essential for multistage retrofits and deeper savings. A trusted advisor (i.e., an energy concierge or coach) who supports participants throughout the retrofit process is an emerging role in home retrofit programs.
- Contractors are interested in efficiency program efforts to build robust contractor networks and partnerships, but existing models have found limited success. New approaches are needed to support partnering and address performance issues associated with subcontracting.
- Energy efficiency program administrators can work with regulators to remove barriers to multistage retrofits. Mechanisms to provide consistency in program design and incentives over several years, and that consider the savings of measures, measure packages, and the full retrofit project are needed.

Comprehensive (i.e., whole-home) energy retrofit projects are complex, expensive, and often disruptive to homeowners and occupants. Retrofits conducted in sequenced stages can appeal to homeowners concerned about the financial burden and inconvenience associated with one-time whole-home energy efficiency and electrification projects. Multistage retrofits allow customers and contractors to develop a sequenced retrofit plan; align projects with equipment and appliance replacement cycles or with the homeowner’s timetable for other home maintenance, upgrades, or remodeling work; and track progress toward their overall objectives.

ACEEE is working with a group of interested market actors including manufacturers, software providers, contractors, and program administrators to explore the feasibility of a market development initiative to support multistage retrofit offerings and build consumer awareness and demand for these offerings. This report summarizes findings from interviews and discussions with each of these stakeholders.

Whole-home retrofit projects deliver a set of measures designed to meet the specific needs of a home using data on baseline energy use, customer input on comfort and other performance issues, and the results of diagnostic testing of air leakage, duct leakage, thermal performance, and potentially other performance issues such as air quality or presence of hazardous materials. Many homeowners will not invest in a full comprehensive home retrofit as one project because of cost, difficulty in finding a contractor who can do all the work, disruption to daily life, confusion about the best course of action, or skepticism about the overall benefits.

A multistage retrofit approach breaks a whole-home retrofit into a series of smaller sequenced projects—the number of stages will vary depending on the number/type of upgrades needed in the home and the interests of the customer. This approach presents the opportunity to respond to customers' immediate concerns and offer them a stepwise roadmap to complete the retrofit over time. Ideally, the multistage retrofit roadmap is developed shortly after a home energy and performance assessment (i.e., an expanded energy audit) based on discussions with the homeowner about their interests, budget, and other considerations. The roadmap provides the homeowner with a clear vision and a sense of control over the process to achieve their goals.

Efficiency program administrators see multistage retrofits as an opportunity to scale up the number of customers participating in their programs and to achieve deeper savings from each customer by addressing many of the challenges to all-at-once comprehensive home retrofits. To make the most of this opportunity, program administrators, contractors, and stakeholders should collaborate on more formalized and standardized market offerings for multistage retrofits. Key elements of the offering include

- A tailored roadmap developed in collaboration with the homeowner
- Easy-to-use tools that allow homeowners, contractors, and programs to track progress
- Trusted advisors to simplify the process and keep homeowners engaged and motivated
- Robust contractor networks to promote and support cross-trade collaboration
- Flexible measure packages designed to reduce lost energy savings opportunities and avoid lock-in effects
- Appropriate documentation of measures taken and progress toward achieving the roadmap objectives
- Accessible, affordable financing that supports completion of the multistage retrofit

Developing scalable market offerings for multistage retrofits will be complex and challenging. Efficiency programs can help address the challenges by

- Aligning multistage retrofits with program models and goals (e.g., demand reduction, electrification)
- Packaging envelope upgrades with other measures to increase the likelihood envelope improvements are completed
- Increasing program flexibility to support customers over the course of their multistage retrofit project
- Leveraging existing resources and tools (e.g., labeling and certifications, software platforms) to reduce costs, increase consistency

- Supporting contractors with education and training, business development services, incentives, and networking opportunities
- Providing documentation of improved features and energy efficiency (e.g., through certification) to increase their visibility to prospective buyers and lenders at time of home sale or refinance

Policymakers can also play a role in encouraging broader adoption of multistage retrofits. Home energy disclosure policies, including time of sale/listing requirements and building energy passports, have been shown to influence both buyers and sellers to invest in home energy upgrades. Tax credits and other financial incentives can be structured to align with multistage retrofits. Incentives for efficiency and renewable energy systems can be deliberately harmonized. For efficiency programs, regulatory barriers to multistage retrofit programs can be addressed by allowing longer program and budgeting cycles and reconsidering cost-effectiveness approaches to account for multiyear projects. Resale considerations can be systematically integrated into program decisions.

Initial research with contractors and program administrators suggests that multistage retrofits are a promising mechanism for achieving more comprehensive retrofits in homes. Retrofit roadmaps can help homeowners make more informed decisions about the sequence and timing of home retrofit projects to improve outcomes and potentially reduce overall costs. For contractors and program administrators, multistage retrofits provide a platform for increasing the number and depth of projects completed, resulting in expanded business opportunities, program participation, and savings.

Further research and development of the multistage retrofit concept is needed. Important next steps include

- Further engagement with contractors, particularly heating, ventilation, and air conditioning (HVAC) and solar contractors, to inform the development and implementation of more effective ways to expand partnerships across different trades and increase the number of contractors offering critical services including insulation and electrical upgrades
- Consumer research to understand consumer interest in multistage retrofits and the tools, services, and messaging that will resonate with homeowners and encourage them to develop and stick with a multistage retrofit roadmap
- Research on funding mechanisms to support the multistage retrofit process, including guaranteed or reserved incentives, flexible financing tools, innovative mortgage products that support renovations following purchase or that provide home equity lines of credit, and other innovative financing models to reduce risks for consumers and contractors pursuing multistage retrofits
- Further research on the most effective standardized measure packages for different climates and housing types; findings can be used to develop pilot program designs for implementation and evaluation
- Research on the most effective ways to make the enhanced value of improved homes visible throughout the homeownership lifecycle, particularly the home sale and refinance transactions, and the impacts of this enhanced visibility on buyer responses, appraisals, and sale prices
- Research on opportunities and challenges for multistage retrofits in larger multifamily buildings
- Convenings of interested contractors, manufacturers, trade partners, and program administrators to share our findings, gather additional feedback, and engage them in development and implementation of pilot programs

Introduction

Comprehensive home energy retrofit projects are complex, expensive, and often disruptive to homeowners and occupants. Retrofits conducted in sequenced stages can appeal to homeowners concerned about the financial burden and inconvenience associated with one-time whole-home energy efficiency and electrification projects. Multistage retrofits allow customers and contractors to develop a sequenced retrofit plan, align projects with equipment and appliance replacement cycles and other home maintenance or remodeling work, and track progress toward their overall objectives. ACEEE is working with a group of interested market actors including manufacturers, software providers, contractors, and program administrators to explore the feasibility of a market development initiative to support multistage retrofit offerings and build consumer awareness and demand for these offerings.

A growing number of contractors offer or are interested in working with their customers on multistage retrofits. Earlier ACEEE research found that multistage retrofit options can meet consumer needs and interests without sacrificing energy savings (Amann, Srivastava, and Henner 2021). This approach—coupled with strong federal, state, and utility efficiency program incentives—can also make the cost of decarbonization manageable by spreading the expense over multiple projects. A few promising program designs and tools with the potential to encourage and support multistage retrofits are emerging; however, broader program support and market infrastructure are lagging.

This report covers findings from the initial phase of this work focused on stakeholder engagement. ACEEE conducted virtual interviews and in-person discussions at industry conferences with six efficiency program administrators, eight home retrofit contractors, three manufacturers, and three vendors offering software and other services to the home retrofit industry.¹ These conversations explored each participant’s experience with multistage retrofit projects and programs and their thoughts and recommendations on sequencing and scheduling stages, putting together measure packages, engaging and marketing to homeowners, and the types of program and product supports that are needed for multistage retrofits.

The following sections define multistage retrofits and the problems they can solve, review challenges to the adoption of multistage retrofits, and showcase opportunities to expand them. Findings from the stakeholder engagement effort inform an initial set of recommendations primarily targeted to efficiency program administrators who want to advance (1) market offerings and (2) programs for staged home energy retrofits that are easy for consumers and contractors to access and navigate.

Why multistage retrofits?

Whole-home retrofit projects deliver a set of measures designed to meet the specific needs of a home using data on baseline energy use, customer input on comfort and other performance issues, and the results of diagnostic testing of air leakage, duct leakage, thermal performance, and other performance issues such as air quality. Many homeowners will not invest in the full comprehensive home retrofit as one project because of cost, difficulties in finding a contractor who can do or coordinate all the work, disruption to daily life, confusion about the best course of action, or skepticism about the overall

¹ In-person discussions were held at the ACEEE Hot Water Forum March 4–6, 2025, and the National Home Performance Conference April 7–10, 2025.

benefits. Table 1 outlines some of the common customer interests and concerns that prevent them from investing in home retrofits, along with potential solutions provided by multistage retrofits.

Table 1. Customer interests and potential solutions

Consumer interest/concern	Solutions for program administrators and contractors
Customer needs equipment replacement but does not see the value and benefit of addressing envelope issues at the same time	Recognize the customer's view and propose an approach that incorporates only the highest priority envelope measures along with a roadmap for further envelope and equipment upgrades. Present data on the energy savings and comfort benefits of envelope upgrades in their climate.
Customer has a list of priority projects or repairs to complete before considering an efficiency retrofit	Take advantage of every home improvement project to incorporate related efficiency measures when added costs and inconvenience are lowest.
Consumer is willing to undertake some added upgrades but is reluctant to adopt new technologies that are still evolving	Focus on other measures to generate near-term savings and pave the way for more savings in the future by incorporating new tech later. For example, a customer unsure about cold climate heat pump performance would benefit from envelope measures that provide energy savings and comfort improvements. When the time comes for an HVAC replacement, the reduced building energy load will allow for a less costly heat pump upgrade and even greater energy savings.
Customer balks at the price, inconvenience, or uncertainties but is open to measures with lower cost, less disruption, and/or non-energy benefits of particular value to the household	Incorporate a broader range of program measures that include options to address customer interests in energy and non-energy benefits. Educate customer about non-energy benefits as way to engage them in a roadmap that minimizes cost and disruption by coupling additional measures with necessary equipment replacement.
Customer cannot find contractor that is either capable of doing all the necessary upgrades or willing to coordinate trades	Provide concierge services, support contractor partnerships, and/or develop lists of contractors willing and capable of contributing to a staged upgrade.

Source: Adapted from Amann, Srivastava, and Henner 2021 with feedback from stakeholder interviews

A multistage retrofit approach breaks a whole-home retrofit into a series of smaller sequenced projects—the number of stages will vary depending on the number/type of upgrades needed in the home and the interests of the customer. This approach presents the opportunity to respond to customers' immediate concerns and offer them a stepwise roadmap to complete the retrofit over time. Ideally, a plan for the multistage retrofits process is developed shortly after a home energy and performance assessment (i.e., an expanded energy audit) and discussions with the homeowner about their interests, budget, home performance issues, and other considerations. This plan (which we refer to as the project roadmap) can provide the homeowner with a clear vision and a sense of control over the

process to achieve their goals. The time horizon for the roadmap should correspond to the customer's plans regarding how long they will stay in the home and any expected changes in occupancy along with equipment replacement schedules.

According to our interviews, efficiency program administrators see multistage retrofits as an opportunity to scale up the number of customers participating in their programs and to achieve deeper savings from each customer. Program administrators pointed to the important role that envelope and equipment retrofits play when the savings opportunities from other residential efficiency measures are diminished, as codes and standards increase baselines. Because much of the low-hanging fruit has been picked (e.g., in lighting and appliances), programs need to capture more of the savings available in envelope and equipment (e.g., HVAC and water heating systems). Recognizing the challenges to scaling up all-at-once comprehensive home retrofits, staging projects has emerged as a way to support energy programs' objectives.

In our interviews, there was broad agreement that multistage retrofits hold great promise and align well with existing customer behaviors and that, conversely, one-off, transactional upgrades are inefficient and result in suboptimal outcomes, such as inappropriately sized HVAC equipment or missed electrification opportunities. Based on the experience of contractors, program administrators, and implementers, many respondents believe that it makes sense to move toward formalizing and standardizing multistage retrofit approaches where multiple upgrades are planned and sequenced over time for each home. Personalized roadmaps, dynamic tracking and engagement of consumers in roadmap development, and ongoing engagement to update the roadmap as upgrades are completed are strategies that can be combined for maximizing energy and performance benefits.

Elements of a multistage retrofit approach

Roadmaps provide the plan for achieving customer goals

Development of a customer roadmap is at the heart of a multistage retrofit. Our interviews found several roadmap models, ranging from a document developed by the home energy auditor or contractor that accompanies the energy assessment report, to app-based tools that contractors and customers can access and update over time. At a minimum, the roadmap lays out a sequenced retrofit plan that includes envelope upgrades, equipment replacement, duct sealing, and any necessary ventilation system improvements. The roadmap allows the homeowner and contractor to

- Align envelope upgrade projects with equipment and appliance replacement cycles to optimize energy performance
- Plan for HVAC and water heater replacements to avoid emergency purchases; including specifications for the replacements can save time and improve decision-making if an emergency does arise
- Incorporate energy efficiency, renewables, electrification, and/or other performance upgrades as part of other planned home improvement projects (e.g., roof or siding replacement, kitchen remodel)
- Reduce (and spread out) the overall cost of home efficiency and electrification retrofits
- Track progress toward homeowners' desired outcomes including lower energy bills, electrification, reduced environmental footprint, improved indoor air quality, and resilience

While a homeowner may be able to accomplish this without a roadmap, it is unlikely, given the technical considerations regarding measure interactions that should be taken into account in a whole-home approach, and there is little evidence that this happens in practice. A roadmap makes it easier to plan and prepare for replacements, make the most of opportunities to improve efficiency, and ensure that important measures (e.g., adding ventilation to ensure positive health and safety outcomes when tightening up the envelope) are not overlooked, and that measure interactions and necessary sequencing are addressed.

Home performance contractors expressed interest in the roadmap concept; some had worked with customers to develop robust roadmaps, others had developed more targeted plans for a few upgrade measures, and still others saw the value but had not developed roadmaps themselves. Roadmaps were most attractive as a customer-retention tool. Contractors were also interested in learning about other home improvement projects their customers were planning to pursue (e.g., kitchen remodel, siding replacement) that they otherwise would not know about. These projects present opportunities to slot in energy efficiency or electrification measures more seamlessly and cost effectively and, in some cases, may even fall within the services the contractor offers. Examples include installation of an induction range or cooktop as part of a kitchen remodel or adding insulation and air sealing when finishing or upgrading a basement.

Program administrators and contractors agreed that efficiency programs can support the roadmapping process. One common thread was that contractors are well positioned in theory, but the market lacks sufficient depth and capability among contractors to take on this role at scale. While contractors that provide energy audits see the value in working with customers to develop a roadmap in conjunction with the initial home energy assessment, the process can be time consuming and the return on their investment may take years to realize. Program incentives to cover some or all of the cost of developing the customer roadmap may encourage more contractors to offer this service and would be particularly helpful for those just getting started or expanding to offer more services to their customers.

Other roadmapping assistance for contractors can complement incentives. Programs can provide roadmap templates; identify general contractors, energy auditors, or others interested in partnering with contractors to develop roadmaps; and offer training and assistance to contractors on developing and marketing roadmapping services aligned with program offerings.

Trusted advisors simplify the process and keep customers engaged and motivated

Getting consumers' interest and follow-through with all stages of a project can be a challenge. Homeowners have many competing needs and interests, so it is crucial to incorporate tools and incentives to keep them on track with their retrofit roadmap. This is another area where efficiency programs can support contractor efforts. Programs can serve as another point of contact for customers as they follow their roadmap. Valuable communications include roadmap check-ins and reminders, announcements of new incentives or promotions, and ongoing education about the benefits of efficiency and electrification. Bonus incentives for completion of each stage of the roadmap could also keep customers engaged and encourage them to complete their plan.

Industry and program experience with whole-home retrofits show how complexity and consumer burden deter participation from customers and contractors alike. Interviewees pointed to program requirements such as multiple audits, excessive paperwork, and unclear timelines and processes that

create barriers to participation for all but the most determined and committed homeowners. Multistage retrofit programs can minimize these issues by providing customers with a trusted advisor to support them throughout the process. Trusted advisors provide the long-term engagement and follow-through that is lacking in many programs and that few contracting firms are positioned to offer to their customers. Incorporating mechanisms for sustained customer engagement can create more opportunities to achieve deeper retrofits.

The trusted advisor (sometimes referred to as a concierge or energy coach) is an emerging role in home retrofit programs.² The role can be played by program staff (or their implementation contractor), by an independent energy auditor or a member of the contractor team, or by a nonprofit or other third party. The advisor's responsibilities include regular communications with the customer—ideally starting with the initial home energy audit—to ensure their needs and interests are addressed at each stage of the project. Like a general contractor, they may track project activity and data collection, handle or help with program paperwork for incentives/financing, and serve as the primary point of contact between the homeowner and the contractor(s) performing the energy upgrades and any other associated work. In some cases, the trusted advisor may provide other services such as education, utility bill review, roadmapping tool support, or maintenance contract enrollment. Guidehouse (Buccitelli,

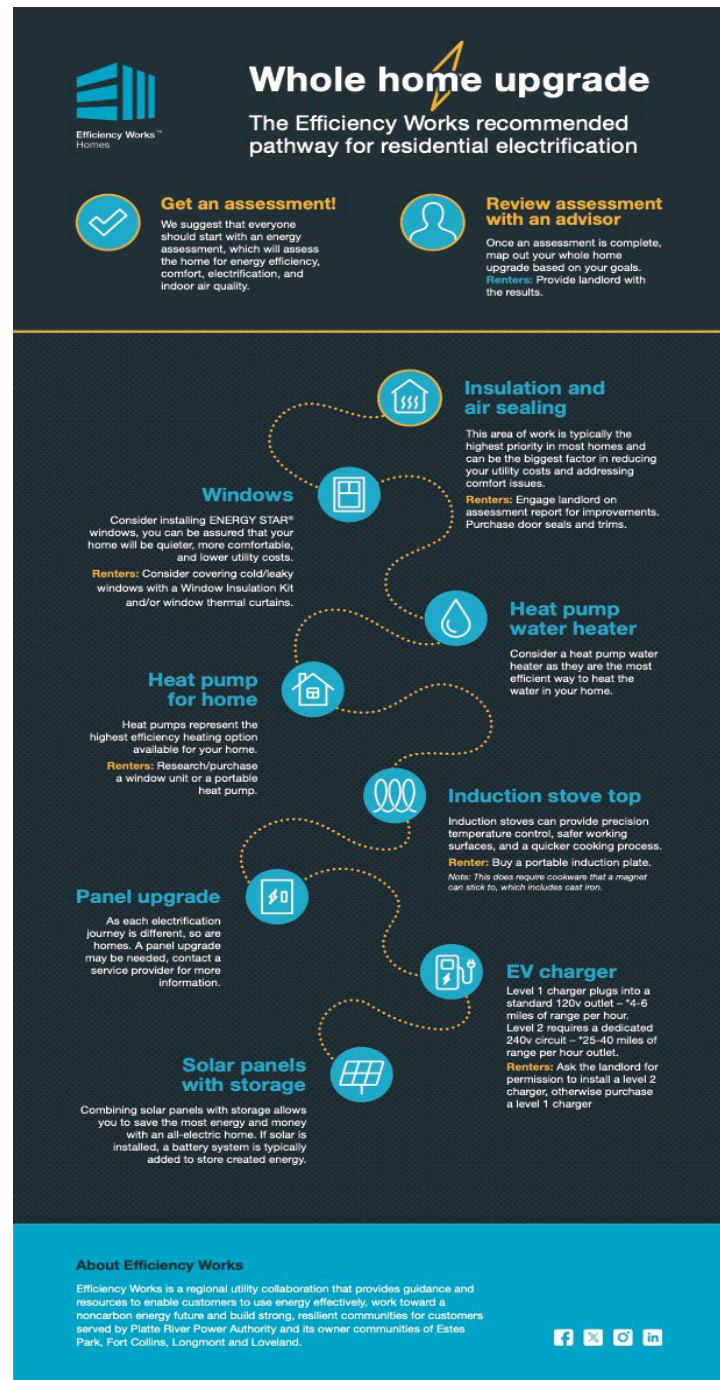


Figure 1. Efficiency Works Homes whole-home upgrade approach. Source: Platte River Valley Authority.

² There is some history in the home performance industry of energy auditors that provide detailed home energy assessments and work with the customer, much like a general contractor, to facilitate project completion (e.g., develop the project scope based on recommended upgrades, prepare paperwork for program incentives and financing, and coordinate with the contractor(s) required to complete the project), but do not perform any of the actual upgrades themselves. However, this business model has found limited uptake.

Gearan, and Schwartz 2024) reports on early best practices and recommendations for concierge programs.

In a multistage retrofit, the trusted advisor can provide customers with visibility and control over their roadmap, answer questions, and serve as a mechanism for regular feedback on progress and next steps. By initiating regular contact, the trusted advisor can help keep the customer engaged and motivated to continue with their planned upgrades. Program-affiliated or third-party advisors provide a service that most small contractors lack the resources to offer and can encourage greater contractor participation in programs by streamlining their engagement. Contractors are well positioned in theory, but the market lacks sufficient depth and capability among contractors to take on this role at scale.

A number of home decarbonization and targeted heat pump installation initiatives have adopted the coach/concierge approach to engage and support customers. Examples include utility and state programs such as Mass Save's Decarbonization Consultations, the Arizona Home Electrification and Appliance Rebate Program, and Platte River Power Authority's Efficiency Works Homes; local nonprofit and volunteer efforts like Neighborhood Housing Services of New Haven's Home ConneCT program and the Massachusetts HeatSmart Alliance; and private business offerings like Sealed.

For program administrators, the administrative costs of this model can be a challenge. To address cost issues as programs scale, program administrators can explore innovative approaches including partnering with local nonprofits to support community and volunteer-based coaching models and technology-enabled solutions that incorporate virtual home assessments or personalized, AI-assisted energy coaches. When pursuing these approaches, programs must consider how to address and align recommendations from the trusted advisor with those of the energy auditor and/or contractors.

Platte River Power Authority Efficiency Works Homes

Colorado's Platte River Power Authority and its four municipal utility members collaborate to offer the Efficiency Works Homes program.³ For a \$60 fee (free to rental customers), customers receive an efficiency assessment including inspection, measurements, and diagnostic testing. Energy advisors recommend efficiency upgrades, help review project bids, and plan future projects. Based on the assessment, the energy advisor will recommend good, better, and best project options for the home. Each package can be customized to address the customer's needs and budget; remaining upgrades can be included in the customer roadmap for the future. Customers are eligible for Efficiency Works rebates covering measures installed in their specific package, including a \$500 bonus incentive for completing an envelope measure and heat pump installation within six months. Figure 1 shows Efficiency Works Homes recommended whole-home upgrade approach including energy efficiency and electrification projects.

Robust contractor networks promote and support cross-trade collaboration

Most respondents stressed that contractors are the primary touchpoint for homeowners, so including them in program design and implementation is critical to program success. Home retrofit programs that make it easy for contractors to access financing, incentives, and support are more likely to succeed.

³ The four municipal utility partners of the Platte River Power Authority are Estes Park Power & Communications, Fort Collins Utilities, Longmont Power & Communications, and Loveland Water and Power.

Attracting contractors that offer a broad set of services (e.g., HVAC and air sealing/insulation, HVAC and electrical, full home performance contracting) or finding and facilitating contractor partnerships that bring multiple trades to projects is a major hurdle for programs. This has proven difficult even in markets where there have been large-scale, long-term investments in the home performance model (e.g., New York). Interview respondents noted that most contractor businesses are specialized and focused on single trades, making holistic upgrades and collaboration difficult. Furthermore, few contractors are equipped or incentivized to act as project managers or “general contractors” for multistage retrofits.

The contractors we spoke with that offer a more comprehensive set of services noted that the main impetus for expanding their businesses to bring more trades in house was the difficulty of working with subcontractors on their projects. Using subcontractors often led to scheduling problems and delays in project completion and gave them less control over the quality of the work. When installation issues led to callbacks, subcontractors were less responsive when they were not the lead on the project, which created delays and unhappy customers.

Contractor networks—whether formal or informal—are essential for cross-trade collaboration and delivering holistic projects. Informal networks exist, but formal, trusted partnerships are tricky to develop in an organic way. Contractors did report successful partnerships and noted that a partnership model can be very helpful for smaller contracting companies and those in the early stages of offering energy assessments and facilitating more comprehensive projects for their customers. Contractors see this as an area where efficiency programs can help by offering matchmaking services for vetted contractors from a variety of trades and facilitating peer networks for contractors to learn from each other. Interviewees suggested that programs could do more to support collaboration by bringing contractors from different trades together for education and networking, offering incentives for cross-trade collaboration, and exploring ways to help contractors develop revenue-sharing arrangements to support partnering and address some of the performance issues associated with subcontracting.

Measure packages reduce lost opportunities and avoid lock-in effects

From a building science perspective, the ideal home retrofit starts with the building envelope. Reducing air leakage, adding/upgrading insulation, and eliminating moisture intrusion before replacing mechanical systems provides immediate energy savings and comfort improvement and allows for right-sizing of the new HVAC system when the time comes for replacement. Incorporating standardized measure packages into the customer roadmap can simplify the process for contractors, customers, and program administrators while ensuring that each stage yields comfort improvements and energy savings in alignment with building science principles. Several efficiency programs offer incentives for measure packages designed to address the most common envelope deficiencies in their local housing stock.

New York Comfort Home and Clean Heat Programs

The New York State Energy Research and Development Authority (NYSERDA) developed the Comfort Home Program to provide permanent energy load reduction and prepare the housing stock for the transition to heat pumps, while capturing energy savings as a near-term benefit. The program offers customer incentives for three tiers of envelope upgrades. Customers who opt to complete the envelope upgrades in stages are eligible to participate in the program multiple times with no time restrictions or limitations (NYSERDA 2025).

To encourage completion of a full energy efficiency and electrification upgrade, contractors who refer their Comfort Home customers to install a qualified heat pump within 24 months of their Comfort Home

project were eligible for a referral incentive that could be kept by the contractor or passed through to the customer. Customers can take advantage of heat pump incentives offered through the New York State Clean Heat program run by the state's investor-owned utilities. Clean Heat program incentives vary depending on the utility. Details of the Comfort Home measure packages and incentives are provided in table 2. The heat pump referral incentive offered by Comfort Home was discontinued in 2025 due to limited uptake primarily by companies that offer both load reduction and heat pump installation services. The incentives were deemed ineffective at nurturing cross-trade referrals from one company to another.

By allowing customers to complete their envelope upgrade in stages and to retain their existing fossil heating system as a backup while they complete all of the necessary envelope upgrades, the Comfort Home and Clean Heat programs address customer concerns about heat pump performance and higher energy bills during very cold weather. This flexibility supports customers and discourages installation of new fossil fuel systems that would lock customers into using gas or delivered fuels for another 15–20 years.^{4, 5}

Table 2. New York Comfort Home and Clean Heat Program incentives

NY Comfort Home			NY Clean Heat		
Package	Measures	Customer incentive*	Contractor incentive	Contractor reward	Customer incentive**
Good	Seal and insulate attic + seal and insulate rim joists	\$2,500	Site visit and home assessment report (free to customer): ○ \$300 with blower door test ○ \$200 without blower door test	Space conditioning HP: \$300–1,000	Varies by system type. For cold climate air-source heat pump (ASHP): \$500–1,600 per 10,000 Btu/hour max heating capacity
Better	Good package + insulate walls and floors	\$3,000		Heat Pump Water Heater (HPWH): \$50 to contractor; \$50 to distributor	
Windows Add-On	Better package + install ENERGY STAR windows or storm windows/insulated panels	\$2,000*			

* Incentive paid to contractor and must be passed on to the customer. Bonus incentives are offered for multiple packages: Good package customers who install the Better package or Windows Add-on and Better package customers who install the Windows Add-on are eligible for \$1,000 toward the additional package if installed within one year of original package or \$2,000 if more than one year after original package.

**Contractor reward and customer incentive varies depending on (1) electric utility, (2) type of heat pump, (3) housing type, (4) household income, and (5) retention or removal of existing fossil fuel heating system.

Source: NYSERDA 2025

⁴ For the 2026 to 2030 program cycle, the New York State Clean Heat program will focus only on installation of heat pumps designed to meet the home's full heat load. While the program will continue to allow customers to retain their existing fossil system, the highest incentives are reserved for customers that decommission their existing system.

Opportunities for expanding multistage retrofits

Broad agreement among the stakeholders interviewed on the promise of multistage retrofits was coupled with widespread recognition of the complexity and challenges involved in developing scalable market and program offerings centered around the multistage retrofit approach. Stakeholders identified several recommendations to address these challenges for efficiency program administrators interested in supporting multistage retrofits. A number of these recommendations can be incorporated into existing home retrofit, electrification, and equipment replacement programs, while others are more foundational to designing and deploying multistage retrofit program offerings.

Align multistage retrofits with efficiency program models and goals

Multistage retrofits present challenges for utility energy efficiency program administrators. Once the initial stages of the project are done, the savings opportunity from later stages are lower. This may make it hard to justify later stage program costs to regulators. For example, a thorough envelope retrofit may reduce heating and cooling energy use by 15% or more. Working from the new baseline, the savings from a heat pump installation are lower and may not pencil out as cost effective. If the program has electrification goals, this may not be as much of an issue, but for those focused solely on energy savings it can be a major hurdle. Program administrators can work with regulators to implement mechanisms for considering the savings of measures, measure packages, and the full retrofit project. When considering costs and benefits, the impacts of measures that enable customers to take advantage of demand response and time-of-use or other beneficial rates should also be taken into account.

Staged approaches can support states in meeting their energy and environmental policy goals. In New York, the Comfort Home program (discussed above) focuses specifically on getting homes ready for heat pumps by offering incentives and support for envelope upgrades. Envelope upgrades provide permanent load reduction in the near term and increase the likelihood that homeowners installing heat pumps down the road will be satisfied with their experience. The program is also an important bridge while the price signals for electrification in New York remain out of line with the state's decarbonization goals as low natural gas rates and high electricity rates increase the costs associated with home electrification.

Package envelope upgrades with other measures

Program administrators point out that standalone envelope upgrades can be a hard sell in some markets. The opportunity to package the most critical envelope measures with each equipment upgrade or with other measures as part of a customer roadmap can build support and interest in incorporating these important measures. The approach also appeals to contractors as a way to engage customers on important envelope upgrades.

For many contractors, the majority of customers reach out to them when it is time for an HVAC replacement, while others want help with comfort issues that they think can only be solved through an HVAC upgrade. Coupling attic insulation and air sealing or duct sealing as a minimum with an HVAC project—whether a full system replacement or a tune-up to address a specific issue or deficiency—ensures the customer gets the right solution and is happier with the outcome. This can be an ideal time to develop a customer roadmap to plan additional envelope measures and other efficiency and electrification upgrades. Contractors may have concerns that a large project proposal or roadmap may overwhelm customers and discourage them from starting the work. Engaging an independent third party to perform the evaluation and manage the roadmap process may help alleviate this concern.

Envelope upgrades can also benefit customers pursuing on-site solar installations. Improving the envelope can address comfort and performance issues unchanged by the addition of solar. Energy savings from these measures can reduce the size of the solar system or allow the system to meet more of the home's energy demand. By adding these measures to their business offerings, solar installers can expand the size of their jobs and create an avenue for repeat business with the same customer, potentially reducing customer acquisition costs.

A growing number of programs and policies are requiring air sealing and attic insulation as part of any incentivized heat pump project that replaces a fossil fuel system to protect the homeowner from unexpected utility bill increases.⁶ These programs and policies are designed to ensure the most critical weatherization measures are completed. Programs can develop a stepping stone approach by offering higher heat pump incentives for homes that have been weatherized or undergo envelope improvements in conjunction with the heat pump installation. Additional insulation measures that can further reduce energy use and improve home performance can be incorporated into the customer roadmap.

Use roadmaps to increase flexibility and manage project costs

The high cost of whole-building efficiency and electrification projects creates an opening for a staged approach. Contractors noted that only a small number of customers they work with take on a comprehensive retrofit or electrification project at once. A staged approach can increase the chances that a comprehensive project will be completed and that the sequence will optimize outcomes while minimizing the chance for lock-in of less optimal decisions such as a new HVAC system that is oversized as soon as envelope upgrades are completed. The time horizon for the roadmap can be tailored to the customer. Some customers may prefer a longer time horizon (e.g., five years or more) that aligns with other home improvement projects or major equipment replacements. This may also allow the customer to fully pay off financing for one stage before moving onto another major expenditure. Other customers may prefer a shorter time horizon that ensures upgrades are completed before they list the home for sale or to maximize the time they have to benefit from the upgrade.

Expanding the types of projects and measures included in the roadmap can increase flexibility and reduce cost burden. Programs can expand the range of measures they incentivize and educate contractors on how to incorporate them into roadmaps to give customers more options. For example, the New York Comfort Home program includes storm windows and interior insulated panels as alternatives to new window replacements in their Windows Add-On package. This offers customers a lower-cost way to meet the requirements for this project incentive. Xcel Energy offers rebates for high-performance cellular window shades. Incorporating cellular shades, storm windows, or other window attachments at the outset of a multistage retrofit provides energy and comfort benefits at a lower cost and allows customers to delay or even avoid costly window replacements. A highly visible and desirable decorative option like cellular shades has added customer appeal and serves as an ongoing reminder of their commitment to the retrofit project in ways that other, largely invisible envelope upgrades do not.

Bathroom and kitchen remodels also offer opportunities to incorporate efficiency improvements and electrification measures (e.g., high-efficiency appliances and ventilation fans) but are not typically considered as retrofit opportunities. If a customer plans to take on a remodeling project, it should be

⁶ For example, Energize CT requires participants to complete air sealing and recommended insulation measure to receive heat pump incentives <https://energizect.com/explore-solutions/heat-pumps-and-weatherization>. In May 2025, the New York Department of Public Service ruled that programs must require envelope upgrades before or concurrent with heating electrification projects <https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={F05AD596-0000-CB2A-93BA-002A02C52FA4}>.

included in the roadmap so that the efficiency and electrification measures are incorporated and so that their impact on the timing and funding for the full retrofit is considered.

Incorporate existing resources and tools to support contractors, customers, and programs

A number of existing resources and tools can be leveraged to support contractors and programs to successfully market and develop retrofit and electrification roadmaps. These resources can simplify the roadmapping process and avoid the time and investment required to develop new templates and tools. Interview respondents noted that software platforms can facilitate roadmap creation, dynamic tracking, incentive stacking, and contractor collaboration. They also pointed out that the wide range of software packages that contractors use (e.g., energy modeling, scheduling, business management) often have limitations in how they communicate and work together. There is a need for interoperable, user-friendly tools that serve contractors, homeowners, and programs, allowing for visibility, updates, and long-term engagement.

Existing platforms include federal programs such as the US Department of Energy's (DOE) Home Energy Score and Zero Energy Ready Homes and the US Environmental Protection Agency's (EPA) ENERGY STAR Next Gen, and private nonprofit and for-profit programs such as the GreenHome Institute's GreenStar Certification, National Green Building Standards, PHIUS (Passive House) and Pearl Certification. These platforms can help contractors develop roadmaps and support homeowners and their trusted advisors to gauge where they are and what the next steps are, and set goals for what they want to achieve.⁷ These tools also provide a platform for marketing the multiple and cumulative benefits of combining upgrades in the right sequence to keep customers engaged and increase the likelihood that projects deliver the best performance possible.

Home Energy Score

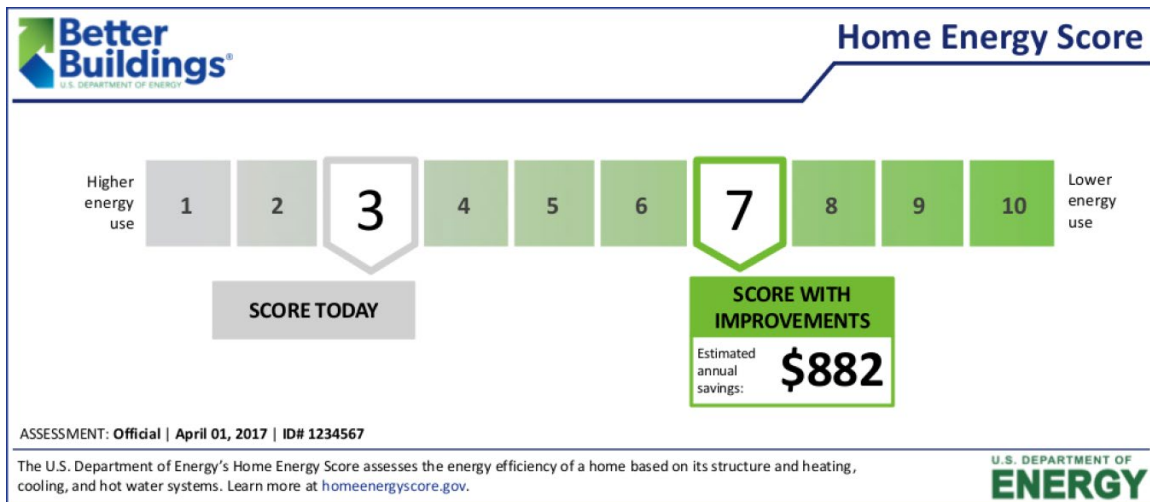
DOE's Home Energy Score (HES) tool provides recommendations for upgrades that can form the basis for a roadmap. The HES assigns a home a score from 1 to 10 (with 10 being the most efficient) and includes a tailored and prioritized list of recommended upgrades to improve a home's energy performance, such as air and duct sealing; upgrading to an ENERGY STAR or heat pump water heater; adding insulation to attics, walls, and crawlspaces; and replacing inefficient heating systems with heat pumps. These recommendations are tailored to the specific characteristics of each home, allowing homeowners to plan retrofits in stages that align with their budget, priorities, and available incentives.

As of January 2025, over 261,000 Home Energy Scores have been completed nationwide, with more rapid growth expected as HES is incorporated into more time-of-listing requirements (see Policy section below). In a staged approach, the customer and contractor can work to incorporate the recommendations from the HES into the right sequence for the home and even target a specific Home Energy Score as the goal of their multistage retrofit project (e.g., improving the home from a score of 4 to an 8). Figure 2 shows an example Home Energy Score and associated set of recommendations.

There has been significant action at the local policy level to integrate the HES into requirements for real estate transactions, stretch codes, and other mechanisms to support energy performance disclosure and retrofits. Today, HES is used in real estate and rental disclosure ordinances in eight cities, statewide

⁷ Zero Energy Ready Homes, ENERGY STAR NextGen, and PHIUS offer certification options for homes undergoing major renovations. The other programs are available for rating any existing home

labeling frameworks or programs in five states, and as a requirement in reach codes for major renovations in three cities. Additionally, nine utility programs utilize HES to promote energy efficiency improvements and document the value of upgrades. HES is also referenced in mortgage products by Fannie Mae, Freddie Mac, and the Federal Housing Administration, including in some Multiple Listing Service (MLS) listings, and is used in appraisal forms, further integrating energy performance into the housing and finance markets (2024).



Recommendations

The Home Energy Score's Recommendations show how to improve the energy efficiency of the home to achieve a higher score and save money. All together, these improvements are estimated to pay back in about ten years based on national average installation costs; items marked with a ★ are modeled to pay back in ten years or less on their own. When making energy related upgrades, homeowners should consult with a certified energy professional or other technically qualified contractor to ensure proper sizing, installation, safety, and adherence to code. Learn more at HomeEnergyScore.gov.

Recommended Improvements

REPAIR NOW. These improvements will save you money, conserve energy, and improve your comfort.

- ▶ Windows (where possible): Add low-e storms to save **\$71.67 / year** ★
- ▶ Exterior walls (where possible): Insulate to at least R-13 to save **\$159.58 / year**
- ▶ Air tightness: Have a professional seal the gaps and cracks that leak air into your home to save **\$43.59 / year**

REPLACE LATER. These improvements will help you save energy when it's time to replace or upgrade.

- ▶ Room air conditioner (Hvac 1): Pick one with an ENERGY STAR® label to save **\$69.15 / year** ★
- ▶ Central furnace (Hvac 1): Pick one with an ENERGY STAR® label to save **\$43.17 / year** ★
- ▶ Water heater: Pick one with an ENERGY STAR® label to save **\$39.51 / year** ★
- ▶ Roof 2: Add rigid insulation sheathing to save **\$22.3 / year** ★

Figure 2. Home Energy Score and recommendations report. Source: DOE 2025.

The HES is a promising tool to support multistage retrofits because it provides an accessible entry point for engaging homeowners in improving their home's energy performance and planning upgrades centered around a clear scoring framework. By outlining specific, prioritized recommendations, the HES can help homeowners map out a pathway to high efficiency, track progress over time, and ultimately realize the added value and comfort that come with energy efficiency improvements. Experience from the utilities using HES in their programs can support those seeking to adopt HES and provide guidance for DOE and program administrators on how to improve the program by streamlining requirements and reducing the burden of program implementation.

Pearl Certification

Pearl offers a platform designed to educate homeowners and homebuyers about energy efficiency and home performance, and to support them in making home improvements throughout the home ownership life cycle. The Pearl Certification Report provides detailed information and technical specifications for the home's clean energy features.

Pearl has generated a home performance SCORE to make energy efficiency and home performance visible and engaging. The SCORE provides an indication of a home's overall performance on a scale of 1 to 1,000. Homes that SCORE above 500 points are eligible for Silver, Gold, and Platinum medallions.

The SCORE is built on five pillars:

- Safety: safety and health
- Comfort: thermal, auditory, and visual comfort
- Operations: energy and water efficiency
- Resilience: resilience to natural disasters, including flooding, storms, wildfires, earthquakes, and extreme heat and cold
- Energy: energy generation, storage, and management

Pearl has generated a SCORE for every home in the United States, using public and proprietary data. The SCORES are currently accessible through Pearl's national online registry. Pearl also provides both an estimate of the energy costs of all homes in the United States, and an unofficial or official Home Energy Score. The SCORE and energy cost estimates are updated continuously as new data become available.

Pearl provides comprehensive reports about the home that can be used to showcase the home at time of sale. Research shows that energy-efficient homes have higher appraisal values and command higher sales prices than otherwise comparable, but less efficient, homes (Fincham 2022; Adomatis 2017, 2018; Hallman 2018). Pearl's business model is to provide homeowners with reports that enable them to capture that added value by identifying and verifying efficiency features and making them visible to homebuyers, sellers, and appraisers.

To help homeowners capture the value of their upgrades when they sell the home, Pearl includes a completed Appraisal Institute Addendum providing the details needed by appraisers to accurately value the home's clean energy features in appraisals. Real estate agents can use customized marketing materials, including flyers and tour cards that can be used in online home listings and onsite during tours and open houses, to highlight home features. Agents are also given guidance on completing the MLS green data fields for the home. The Pearl app allows customers and contractors to collaborate on the development of a retrofit roadmap (the Home Investment Plan, figure 3). With Pearl's app, the homeowner can capture details of past efficiency and electrification projects, identify recommended upgrades, and track their progress, including any do-it-yourself (DIY) projects, appliance replacements,

and other projects that may not require a contractor. Pearl is now rolling out a feature that enables detailed estimates of energy savings from each planned upgrade in the user's Home Investment Plan roadmap.

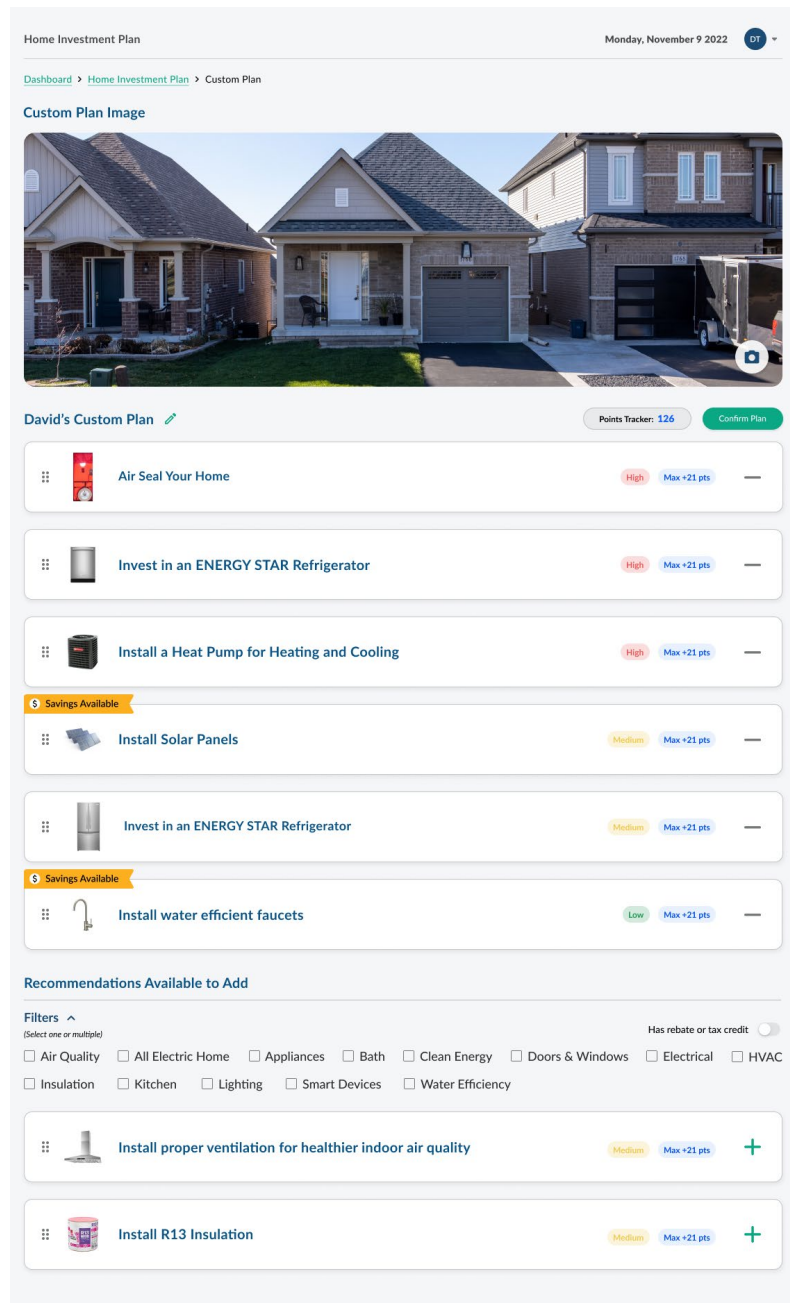


Figure 3. Home Investment Plan

Support contractors working to develop and expand multistage retrofit offerings for their customers

Stakeholders brought up many suggestions for programs to better support contractors to deliver multistage retrofit services. Key considerations include addressing workforce and contractor capacity

gaps, supporting ongoing customer engagement and retention, and providing incentives for the added contractor time and work required for multistage retrofit projects.

Interviewees pointed to the shortage of skilled professionals offering holistic, whole-home retrofits, especially outside urban centers. While many initiatives for upskilling and workforce development are underway, they need to be scaled to meet the need. In addition to technical skills, training in soft skills including project management, sales and customer engagement, and cross-trade coordination are often lacking. Training can help contractors develop these skills and expand their firm's capacity by creating roles within their firm for those who excel in these roles.

Maintaining long-term relationships with homeowners is essential for multistage retrofits and deeper savings; it is also a benefit for contractors and an effective way to gain their buy-in. Programs can incorporate trusted advisors through energy coaching, concierge services, and dynamic roadmaps to foster ongoing engagement. As discussed above, the trusted advisor role can be offered directly by the program or through community-based organizations (CBOs) or other third parties.

Program incentives to cover some or all of the cost of developing the customer roadmap would encourage more contractors to offer this service and would be particularly helpful for those just getting started or expanding to offer more services to their customers.

Adopt policies to encourage broader adoption of multistage retrofits

State and local policies can support broader adoption of multistage retrofits. Efficiency programs can offer further support to increase the effectiveness of these policies.

Home energy information disclosure

Several U.S. cities and states, along with a number of other countries, have adopted time of sale or time of listing requirements mandating the disclosure of information on a home's energy efficiency to potential buyers. The requirements range from a simple checklist of energy efficiency features of the home to disclosure of utility bills to disclosure of a Home Energy Score or other home energy assessment report or audit findings. While data on compliance or effectiveness for feature checklists or energy bill disclosures are lacking, more detailed evaluations have been conducted for policies requiring home energy assessment or audit reports.

Evaluations from the United States and abroad have found that these policies influence 12–37% of homebuyers to invest in recommended energy efficiency upgrades (Nadel 2025). More efficient homes typically sell at a price premium relative to less efficient homes, allowing homeowners to recoup some of the costs of efficiency upgrades when they sell the home. For example, one national study and a study of Portland, Oregon, found that sales price increased 0.5% for each point increase in Home Energy Score. Higher scores were also associated with a lower rate of delinquent mortgage payments and loan defaults (Nadel 2025). Home disclosure reports also provide policymakers with valuable data on the number of homes with deficient envelopes and inefficient heating and cooling systems, presenting an opportunity to target those homes with information on local energy efficiency programs and incentives. It also provides a mechanism to track home energy improvements installed as a result of required energy assessments. Experience from these jurisdictions demonstrates the role that energy efficiency programs can play in supporting the development and implementation of these policies, including coordinating incentive programs to encourage upgrades based on the home assessment findings.⁸

⁸ Nadel (2025) provides more information on the current state of home energy ratings and disclosure policies.

Case study: Using Home Energy Score to support customer road mapping and multistage retrofits in Portland, Oregon

Portland, Oregon, stands out as a leader in integrating HES into municipal policy. In December 2016, the Portland City Council unanimously adopted a requirement that all sellers of single-family homes must obtain and disclose a Home Energy Score, along with its accompanying report, when listing their property for sale (Better Buildings Solution Center n.d.). This policy, which took effect in 2018, was designed not only to increase transparency in the real estate market but also to encourage energy efficiency upgrades, particularly in the city's older housing stock, and to support Portland's ambitious goal of reducing carbon emissions by 80% by 2050 (City of Portland n.d.).

The impact of Portland's HES program has been significant and well documented. By 2024 more than 55,000 Home Energy Scores had been issued by the city (M. Salzman, pers. comm., June 2025). Analysis of program data reveals that the HES report is an effective motivator for action. Between July and December 2023, 464 households that received a Home Energy Score undertook upgrades, collectively saving 840,974 kWh per year, or an average of 1,812 kWh per home (Tools of Change 2024). Furthermore, households that received a HES were found to be 11 times more likely to undertake energy efficiency upgrades compared to those who did not, based on data from the Energy Trust of Oregon. After reviewing their reports, these households were also 12 times more likely to claim an incentive for at least one upgrade provided by Energy Trust of Oregon, demonstrating the report's role in accelerating retrofit activity (Tools of Change 2024).

Feedback from both buyers and sellers underscores the value of the HES report's recommendations. Buyers have used the score to budget for future energy costs, negotiate presale improvements, and actively seek out homes with higher energy efficiency ratings. Sellers, meanwhile, have found that completing recommended upgrades can make their homes more attractive in the marketplace (City of Portland 2021). The program has also provided policymakers and the energy efficiency sector with valuable data, helping to identify retrofit opportunities and track progress toward climate goals (City of Portland 2020). The success of Portland's approach has inspired similar requirements in other Oregon cities, including Bend and Hillsboro, which have adopted city policies that similarly require HES to list a property for sale (Oregon Department of Energy 2025).

Case study: European Union building passports

Similar to the United States, the European building stock requires aggressive action: over 75% of existing buildings are energy inefficient, and most will still be in use by 2050 (Building Performance Institute Europe 2017). Recognizing this, the European Union (EU) introduced the first Energy Performance of Buildings Directive (EPBD) in 2002, mandating that member countries establish specific requirements for Energy Performance Certificates (EPCs) that provide homebuyers and tenants with a clear, standardized rating of a building's energy efficiency performance (International Energy Agency 2019).

Building on this foundation, countries like Germany and France developed tools in the 2010s to encourage energy upgrades through a combination of building assessment and personalized renovation planning, similar to the U.S. Department of Energy's Home Energy Score. Germany's Individueller Sanierungsfahrplan (iSFP) is a voluntary renovation roadmap that helps property owners plan staged improvements and offers bonus subsidies for following recommended measures (Germany Energy Agency n.d.).

In the 2024 update to the EPBD, the EU strengthened the EPC requirement by introducing a voluntary building renovation passport, designed to complement EPCs by providing a personalized, step-by-step

renovation roadmap (European Commission n.d.a). This helps owners transition from merely knowing their building's energy performance to actively planning and carrying out deep energy retrofits in line with EU climate goals. The Building Performance Institute of Europe defines a renovation passport as a "document—electronic or paper—outlining a long-term (15–20 year) step-by-step renovation roadmap for a specific building, designed to reflect the changing situation of the owner or occupier," a definition that is closely aligned with the multistage retrofits concept outlined in this paper (Building Performance Institute Europe 2021). The 2024 EPBD outlined a clear structure for renovation passports, requiring them to include

- Current building energy performance data acquired through an energy audit
- A graphical roadmap showing staged improvement steps
- Sequencing guidance for those steps
- Details on each recommended measure, including technology options, projected cost energy savings, and emissions reductions
- Information on relevant national policies (e.g., performance standards, fossil fuel phaseout dates) and how the suggested upgrades align
- Funding and technical support opportunities for each recommended upgrade
- Contact information for service providers

Passports are expected to be delivered digitally, in a user-friendly format with visual timelines, charts, and checklists. The directive also required that beginning in 2030, all residential buildings must achieve at least an E rating (on an A-to-G scale) to be legally sold or rented. These minimum energy performance standards (MEPS) will reinforce the voluntary use of renovation passports by creating a strong market signal: Homes that do not meet minimum energy performance standards cannot be placed on the market, encouraging proactive energy upgrades (EU Directive 2024/1275 2024).

Evidence from pilots across Europe supports the potential of implementing the passports. A 2017 Irish study found that 89% of participating homeowners felt that renovation passports motivated them to act, lowered decision-making barriers, and provided the technical guidance needed to make informed renovation choices (Irish Green Building Council 2020). To boost participation in building passport schemes, several EU countries have launched robust public engagement efforts paired with technical support. In Romania and Bulgaria, for example, the Renocally project took a proactive approach ahead of the 2024 EPBD update—hosting technical and financial master classes, town hall meetings, and webinars to educate both local authorities and homeowners on renovation passports, available funding, and multistage retrofit strategies (European Climate Initiative 2025).

By December 31, 2025, all EU member states must submit draft National Building Renovation Plans. These must include an overview of the national building stock; roadmaps with national targets for 2030, 2040, and 2050; descriptions of planned policies and measures; and investment needs and financing strategies. Following review by the European Commission, the final versions of these plans are due and must be implemented by December 31, 2026.

For U.S. program administrators exploring multistage retrofit initiatives, the EU's experience offers several key lessons:

- Clear, personalized roadmaps help homeowners navigate complex renovations in manageable steps.

- Integration with available incentives streamlines access to funding and ties public investments to measurable outcomes.
- Public engagement and technical support, including homeowner education and connection to service providers, are crucial to program success, particularly for voluntary programs, such as building passports.
- Digital tools and on-site assessments enhance data quality and improve access for homeowners.
- Cross-sector coordination among policymakers, utilities, financiers, and local governments can scale and sustain retrofit momentum.

Energy efficiency and electrification incentives

Government incentive programs can also be structured to support multistage retrofits. Changes to the federal Energy Efficient Home Improvement Credit (25C tax credit) implemented with the 2023 tax year illustrate one approach. When the 25C tax credit was first established in 2005, it was capped at a lifetime maximum of \$500. Revisions effective as of 2023 included expanding the credit to allow taxpayers to claim the credit annually up to an annual maximum of \$1,200 (through 2032). Priority energy efficiency measures (e.g., heat pumps, heat pump water heaters, and biomass stoves and boilers) qualify for a credit of up to \$2,000 above and beyond the \$1,200 annual cap. By allowing households to claim a tax credit toward energy efficiency upgrades each year and increasing the amount of the credits, the revised tax credit can encourage households to pursue multiple energy upgrades and incorporate the incentives into their home retrofit roadmap.

In July 2025, Congress passed legislation that the Internal Revenue Service says phases out the 25C tax credit at the end of the 2025 calendar year, though this is disputed.⁹ Regardless of the fate of the federal tax credit, its design provides a model for state and local governments looking to offer similar incentive programs or considering expansion of existing tax credits or other energy efficiency incentive programs. Utilities and other efficiency program administrators can also explore the potential to incorporate similar incentive designs for their retrofit programs.

Whatever form the incentives take, retrofit programs can encourage participation by helping their customers stack all available federal, state, local, and program incentives to reduce the cost of each upgrade project. Trusted advisors can guide customers and contractors on how to maximize incentives and align incentive options with customer roadmaps.

Regulatory barriers

Just as policies can support multistage retrofits, they can also create barriers. Programs are experimenting with new models, but regulatory and funding constraints can limit innovation. Regulatory constraints specific to multistage retrofit programs include

- Common one- to three-year program cycles that may deter customers and market actors from pursuing multistage retrofits over longer timelines, given uncertainty over the availability of program supports as well as the availability and level of program incentives

⁹ There was an apparent drafting error. See <https://www.irs.gov/credits-deductions/energy-efficient-home-improvement-credit> and <https://punchbowl.news/letter-to-irs-on-25c-implementation-1/>.

- Challenges for program administrators stemming from the need to claim savings from multistage retrofit measures over multiple years, which complicates funding and reporting
- Lack of mechanisms to justify ongoing support and incentives for the later stages of the retrofit that may not be as cost effective as earlier stages due to the home's reduced energy use baseline
- Year-over-year budgeting that makes it difficult to plan and support long-term strategies

Evolution in the regulatory arena can help. Successful models are being replicated across states, often with adaptations for local context.

Summary of recommendations

Programmatic supports for multistage retrofits

- **Bundled measure packages** with **bonus incentives** for doing more over time
- **Expanded customer support** through roadmapping and concierge-style services
- **Simplified participation** with streamlined paperwork and/or midstream and upstream incentives to encourage contractor and distributor participation and minimize burden on customers
- **Training** for contractors on business development and soft skills equipment purchases and installations
- **Technical support** for contractors interested in expanding their services to include new offerings
- **Partner support and peer exchange networks** to share best practices and lessons learned

Policy tools to promote retrofits over time

- **Renovation passports/roadmaps**
A tool that gives each homeowner a personalized plan to track improvements and energy savings across the life of the home.
- **Time-of-sale requirements**
Policies that trigger a **Home Energy Score (HES)** or other evaluation at the time of resale to drive market awareness and future investment.
- **Expanded annual tax credit limits**
Allow homeowners to access incentives each year—like a renovation budget for upgrades over time.
- **Reduced regulatory barriers**
Expanded program planning, budgeting, and implementation timelines to better support longer-term customer support and incentives for multistage retrofits

Next steps

Initial research with contractors and program administrators suggests that multistage retrofits are a promising mechanism for achieving more comprehensive retrofits in homes. Retrofit roadmaps can help homeowners make more informed decisions about the sequence and timing of home retrofit projects to improve outcomes and potentially reduce overall costs. For contractors and programs, multistage retrofits provide a platform for increasing the number and depth of projects completed, resulting in expanded business opportunities and program participation and savings.

Further research and development of the multistage retrofit concept is needed. Important next steps include

- Further engagement with contractors, particularly HVAC and solar contractors, to inform the development and implementation of more effective ways to expand partnerships across different trades and increase the number of contractors offering critical services, including insulation and electrical upgrades
- Consumer research to understand consumer interest in multistage retrofits and the tools, services, and messaging that will resonate with homeowners and encourage them to develop and stick with a multistage retrofit roadmap
- Research on funding mechanisms to support the multistage retrofit process, including guaranteed or reserved incentives, flexible financing tools, innovative mortgage products that support renovations following purchase or that provide home equity lines of credit, and other innovative financing models to reduce risks for consumers and contractors pursuing multistage retrofits
- Further research on the most effective standardized measure packages for different climates and housing types; use findings to develop pilot program designs for implementation and evaluation
- Research on the most effective ways to make the enhanced value of improved homes visible throughout the homeownership life cycle, particularly the home sale and refinance transactions, and the impacts of this enhanced visibility on buyer responses, appraisals, and sale prices
- Research on opportunities and challenges for multistage retrofits in larger multifamily buildings
- Convenings of interested contractors, manufacturers, trade partners, and program administrators to share our findings, gather additional feedback, and engage them in development and implementation of pilot programs

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