

Matter Number 16-00681, In the Matter of the Clean Energy Fund
Investment Plan

Clean Energy Fund Investment Plan: Residential Chapter

Portfolio: Market Development

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25 Residential

The one-to-four family residential market consists of more than five million low-rise (three stories or less) residential buildings with up to four living units. Approximately 75% of homes were built prior to 1979, when the Energy Conservation Construction Code became effective in New York State. To date, energy efficiency programs have only marginally tapped the potential energy savings of this sector. NYSERDA seeks to scale the rate at which residential building owners undertake energy efficiency improvements. To achieve this goal, NYSERDA will seek to increase consumer awareness and understanding of homes energy performance, and the means to obtain quality installation of energy efficiency improvements, as well as increase the number of contractors providing such services.

To address the wide variety of home types in New York, and the wide array of motivators for consumers, a multi-faceted approach will be used to encourage homeowners to undertake energy efficiency improvements. The first initiative described in this chapter, Engaging New Markets, will engage new markets in energy efficiency by leveraging home investment decisions already taking place, and encouraging the addition of energy efficiency improvements into those investments. The activities under this initiative will pilot various strategies, make adjustments to improve the impact of the strategies as needed, and at the conclusion of the pilots, deploy tools and other means to expand successful activities statewide.

This initiative will be anchored by investments in mid-stream and up-stream market actor training and consumer education. The investments made in these areas will not only support market transformation related directly to the Engaging New Markets work, but also transfer to additional strategies to be added to this chapter in the coming years, and improve the cost effectiveness of those later investments. Such additions may include the following:

- Working within the home seller market to leverage the increasing value of energy efficient homes, to encourage home sellers to invest in the most cost-effective energy efficient improvements prior to placing the home on the market.
- Working with home insurers and mortgage lenders on means to recognize the value, including non-energy benefits, of an energy efficient home in their rates or underwriting practices.
- Using data to identify successful standard approaches to cost-effective energy efficiency improvements in common building types, thereby streamlining the customer acquisition and energy efficiency project implementation process.
- Demonstrating the use of contractor performance data, such as typical savings achieved and quality installation performance, to improve consumer confidence in energy efficiency projects and increase contractor sales rates.
- Supporting the emergence of new business models that leverage energy savings data to increase third-party investment in project financing, or in business expansions, by increasing confidence of investors.
- Demonstrating the use of publicly available data to better target specific energy efficiency services to homes that can benefit most from those services, which will lower customer acquisition costs.

Program investments and activities will be informed via engagement with stakeholders and subject matter experts.

25.1 Engaging New Markets

25.1.1 Overview

<p>Present Situation</p>	<ul style="list-style-type: none"> • The residential sector has unique challenges to energy efficiency due to wide variations in homes, many market actors, and the way homeowners make decisions about investments in their home. • New York State homeowners currently spend an estimated \$26 billion annually on home improvements, with 20% of those improvements being energy-related,¹ and 60% of home owners² have invested in home improvements in the past two years. However, these energy-related improvements frequently don't include beyond-code energy efficiency improvements, or equipment that exceeds the minimum federal standards, even when it would make sense to include them from a purely economic perspective. • Homeowners invest in their homes to meet their family and lifestyle needs, and to maintain or improve the value of their home. However, homeowners don't understand the full value of energy efficiency, and don't see it as a tool to address their needs. They are hesitant to invest without knowing there is adequate return on the investment, particularly when there are many competing priorities. Additionally, homeowners tend to be more reactive to home energy system failures, rather than proactive regarding energy improvements. • However, concern over global climate change is growing, as is concern that the federal government will not address it, and homeowners are currently open to learning what they can do to make a difference. This provides an opportunity for a focused consumer education and awareness initiative to provide consumers with a path to action regarding their own homes. • The home improvement services market, which also greatly impacts the residential sector, includes many small contractors. These contractors are routinely in customers' homes every year, but many are not currently selling energy efficiency upgrades or upselling to high efficiency equipment. • Home Performance with ENERGY STAR® (HPwES) established a competent, but small, network of residential energy efficiency services providers, reaching a small number of homeowners, who tended to be early adopters of energy efficiency. Activities being undertaken in this initiative will support the continued growth of the home performance industry through greater consumer understanding of the value of home performance services, and continued development of the home performance network, even as incentives provided by NYSERDA's market rate transition program are phased out, • Comprehensive home performance services will likely still represent a piece of the overall home improvement services market, providing an opportunity to also influence the business practices of many other home improvement contractors, such as remodelers, HVAC, insulation, and siding contractors. • Numerous tools currently exist in marketplace to support sales of energy efficiency improvements, but are underutilized. By introducing and helping market actors leverage these existing tools, it is expected consumers will better understand the benefits and value of energy efficiency, and that contractors will be more likely to include it in their business models.
<p>Intervention Strategy</p>	<ul style="list-style-type: none"> • To overcome market barriers in the residential sector, NYSERDA will pursue a multi-faceted approach that addresses both the supply and demand side.

¹ InfoGroup USA, December 2016 data

² NYSERDA. 2015. *2012-2013 Home Performance with ENERGY STAR Process Evaluation/Market Characterization Assessment*. Albany: NYSERDA.

	<ul style="list-style-type: none"> • To increase consumer demand, NYSERDA will pilot different means of providing clear, relevant and actionable information on energy efficiency to assess if the information, the presentation of the information, or the market actor presenting the information impacts decision-making regarding energy efficiency projects. Some pilots will build on purchasing decisions already taking place in the residential market, and will include: <ul style="list-style-type: none"> ○ Home inspectors providing home energy ratings at the time of a home purchase, and identifying opportunities for improvement, to determine whether the rating encourages home energy improvements by the buyer. ○ Testing up to two home energy rating systems that have been developed for existing homes, evaluating their effectiveness in closing a project sale when delivered by contractors. ○ Home improvement retailers and their service network providing home energy performance information and options. ○ Marketing and outreach to the broader residential consumer market to educate and increase awareness of the benefits of home energy improvements, pilot activities, strategies and outcomes. • To expand energy efficiency service delivery, NYSERDA will pilot means to increase the number of contractors providing energy efficiency services, leveraging trusted relationships in the products and services industry to: <ul style="list-style-type: none"> ○ Train contractors on the benefits and opportunities associated with including energy efficiency offerings as a business model. ○ Facilitate energy efficiency skills training to a greater number of contractors and service providers ○ Use home energy ratings as a sales tool. • For a visual representation of this strategy, please reference the flow chart entitled “Logic Model: Residential - Engaging New Markets,” which can be found in Appendix A.
Goals	<ul style="list-style-type: none"> • Increase the number of businesses selling or providing energy efficiency services. • Increase consumer awareness of and demand for energy efficiency services. • Increase interaction between residential market actors, enabling cross-selling and referrals to drive more energy efficiency projects. • Increase the demand for efficient homes in the real estate market, and quantify any increase in the value of those homes. • Increase the number of one-to-four family home energy efficiency projects being completed.
State Energy Plan/Clean Energy Standard Link	<ul style="list-style-type: none"> • The 2015 State Energy Plan identifies buildings as a major source of energy use and greenhouse gas (GHG) emissions in the State. This strategy will reduce energy consumption and GHG emissions associated with one-to-four family homes, contributing to State Energy Plan goals to reduce GHG emissions by 40% and to implement a 600 trillion BTU increase in statewide energy efficiency. • The State Energy Plan also highlights the importance of energy efficiency and calls on NYSERDA to “seek to address the diverse set of remaining barriers with new programs and strategies that unlock the potential of energy efficiency to reduce operating costs, spur investment, and create jobs throughout the State.” Facilitating measurement and disclosure of building energy performance and serving as a credible information source – both of which are included in this initiative – are identified as potential strategies to tap into this energy efficiency potential. This initiative lays out a strategy to achieve this goal. • This initiative also supports achievement of the Clean Energy Standard goal for renewable resource electric generation (50% renewable electric generation by 2030 – “50 by 30”) by reducing the overall electric load, and therefore the amount of renewables necessary to meet the 50 by 30 goal.

25.1.2 Target Market Characterization

Target Market Segment(s)	This intervention will target the one-to-four family residential market segment; in particular, owners of existing homes undergoing general home improvements or equipment replacements, buyers of existing homes, and contractors performing home improvements and equipment replacements
Market Participants	<p>Market participants include:</p> <ul style="list-style-type: none"> • Homeowners, renters, and buyers • Manufacturers, professional, and trade organizations who have relationships with residential contractors • Retailers who provide home improvement services and have an existing network of contractors • Home improvement contactors and system installers • Real estate sector professionals • Community leaders, local government, Chambers of Commerce and other local influencers
Market Readiness	<ul style="list-style-type: none"> • Many tools to educate homeowners, contractors and other market actors, and drive energy efficiency sales, already exist but are underutilized (e.g. home energy performance ratings, home energy audits, green mortgages, green addendum for appraisals etc.). Homeowners have indicated an interest in receiving "energy facts" reports on their homes, including clear information about home energy opportunities, and have indicated that such information can have an impact on purchase decisions, supporting the theory that there may be market support for increased use of such tools.³ • NYSERDA has years of relationships with retailers, professional, and trade associations, laying the groundwork for expanding energy efficiency services infrastructure and achieving scale. • NYS has approximately 9,000 residential contractors, with large potential to increase the share of contractors working in energy efficiency. Market research of upstream partners shows an interest and demand from residential contractors for information about business opportunities for energy efficiency services provided through a trusted, third party source.⁴ Additionally, contractors require training and business development resources to make informed decisions about business model changes. There is increased consumer awareness of climate change and the environmental impact of energy use; and perhaps now an even greater willingness for community leaders to work with businesses and residents at the local level to make positive impacts.
Customer Value	<ul style="list-style-type: none"> • End-user customers value a more comfortable home with a healthier indoor environment and lower operating costs. • As homeowners begin to understand the value of an energy efficient home, they will also value an increased selling price due to energy efficiency improvements. • Service providers will see value in the form of: <ul style="list-style-type: none"> ○ Increased opportunities for acquiring customers at a lower cost ○ Improved conversion from sales pitch to project ○ Larger work scopes with higher profits ○ New tools and resources to improve performance, reputation, and marketability

³ NYSERDA Corporate Strategy Assessment, Residential Chapter, 2014

⁴ Market participant interviews conducted by NYSERDA staff, 2017

25.1.3 Stakeholder/Market Engagement

<p>Stakeholder/Market Engagement</p>	<ul style="list-style-type: none"> • NYSERDA has met with a number of market actors, including realtors, appraisers, home inspectors, large retailers, distributors, manufacturers, residential contractors, municipal staff, and program administrators associated with similar projects. • The stakeholders provided information on what specific consumer market segments to target for pilots, including: <ul style="list-style-type: none"> ○ Consumers already engaged in home improvements, but not yet energy improvements ○ Homeowners who need data or evidence to support decision-making ○ Home buyers who may invest in improvements when they purchase their home • They also identified business sector actors who can make a difference in the outcome, such as: <ul style="list-style-type: none"> ○ Home improvement retailers who have a network of contractors for installations ○ Manufacturers and distributors ○ Professional and trade associations ○ Home inspectors ○ Home improvement contractors • Other feedback was incorporated into the initiative specific activities, including the need for consumer awareness and education on the benefits of energy improvements and the value of a whole-house approach to improvements (meaning whole house audit, proper sizing of systems, comprehensive view of needs even if all are not undertaken at once). The feedback indicated that service providers could also benefit from education, particularly on potential customers and new business models. They indicated that demonstration projects, case studies, and tools to help make the business case would help mitigate risks of new business models. • During pre-pilot development work, NYSERDA will met with local governments, including New York City, to better understand the opportunities related to the tools and resources presented in this investment plan; with local leadership and businesses within Clean Energy Communities to gain insight on approaches and opportunities for consumer and contractor outreach and education; with retail establishments to better understand business model opportunities and constraints; and with real estate sector market actors to better understand the strengths and weaknesses of various home energy rating systems and their delivery to homeowners and home buyers.
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25.1.4 Theory of Change

<p>Market Barriers Addressed</p>	<p><u>Barriers Impacting Consumer Demand</u></p> <ul style="list-style-type: none"> • Lack of consumer awareness and understanding of energy needs and savings opportunities. Many consumers do not understand that properly done energy efficiency improvements can address comfort, durability, and health and safety problems in their home. This initiative will provide consumer education and awareness regarding the needs and opportunities within their homes, and the benefits of the energy improvements. • Concern about value and payback of EE improvements. Homeowners are concerned that they will not be able to recoup their energy investment before they leave their home. This initiative will educate consumers on the ability of
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	<p>energy efficiency to meet comfort, indoor air quality, structural durability, operational costs and other related needs of the residents of the home, making an efficient home a more attractive option in a real estate transaction. The initiative will also work with the appraisal industry and others to provide guidance on valuing energy improvements..</p> <ul style="list-style-type: none"> • Lack of credible home energy performance data. Some homeowners have expressed a lack of trust in residential contractors, and may question audit results because contractors who are providing the audit stand to benefit from the sale of recommended improvements. A home energy performance rating that is delivered through a third-party rating system may provide improved confidence to homeowners trying to understand the energy needs of their home. • Competing consumer home improvement priorities. Energy efficiency improvements must compete for home improvement dollars with other projects. This initiative will leverage home improvements already taking place, introducing energy efficiency into the existing option. <p><u>Barriers Impacting Delivery of Energy Efficiency Services</u></p> <ul style="list-style-type: none"> • Customer acquisition challenges and related cost. Contractors report that customer acquisition is one of the highest costs of doing business in the energy efficiency sector. Contractors cite customer education as one of the greatest challenges they face, consuming significant time during the sales process. This initiative will provide new educational resources for consumers that are expected to open new markets for contractors, by engaging consumers who may not have previously understood the benefits of energy efficiency projects, and reduce soft costs for the contractors. • Lack of home energy performance data. Some contractors have declined to participate in NYSERDA’s energy efficiency programs, in part, due to the need to estimate energy savings using complicated energy modeling software. Some homeowners also question the validity of the audit results. A home energy performance rating that is delivered through a third-party rating system , can be leveraged by contractors to inform homeowners of the opportunities to improve the energy performance of their home. • Lack of interest and training among home services market actors. The number of contractors providing energy efficiency services is limited compared to the number of home services contractors operating in the state. This initiative will work through upstream market actors, such as manufacturers, distributors, trade associations, and through home improvement retailers, to introduce opportunities in the energy efficiency services market to home services contractors, as well as training them to ensure they can properly deliver the service.
<p>Testable Hypotheses</p>	<ul style="list-style-type: none"> • If homeowners are provided with clear, relevant, and actionable third party information regarding their home’s efficiency performance and the value of energy efficiency they will more readily undertake energy efficiency improvements during other home investments. • If residential market actors are provided with information from trusted market partners or effective demonstrations regarding the business case for undertaking energy efficiency work, they will add it to their business model.
<p>Activities</p>	<p>NYSERDA will engage residential markets through multiple pilots to prove the value proposition and effectiveness of new approaches. The pilots will be focused on two main areas: increasing consumer demand for services by providing customers with clear, relevant and actionable information; and increasing the delivery of services by expanding the pool of contractors working in the energy efficiency space. If proven successful, NYSERDA will expand the activity statewide. Where appropriate, after the installation of energy efficiency measures, NYSERDA will utilize advanced</p>

measurement & verification (M&V) approaches⁵ to measure results and gather data to inform the business case of the technologies installed for future projects, as well as to provide contractors information about their performance.

Increasing Consumer Demand for Services by Providing Clear, Relevant and Actionable Information

NYSERDA will enable market actors to provide customers with clear, relevant and actionable energy performance information about their home, which will allow customers to make informed decisions about energy improvements. NYSERDA will test different means of providing this energy information to assess if the type of information provided, the presentation of the information, and the market actor presenting the information has an impact on its effectiveness. Tactics NYSERDA will assess include:

- Embedding home energy ratings in real estate transactions
 - NYSERDA will pilot providing home buyers an energy performance rating⁶ at the time of home purchase to determine whether this leads to an increase in energy efficiency improvements. The information will be provided through the home inspectors, who will also provide the home buyer information on how to locate qualified contractors in their area to increase the likelihood the homeowner will act to improve their home energy rating. NYSERDA will work with utilities to further reinforce the pilot through utility interventions with new homeowners.
 - The pilots, which will test up to two home energy rating systems, will be implemented in specific communities.⁷ To avoid market confusion, NYSERDA will only pilot one type of home energy rating per community.
 - Home inspectors will be trained to offer home energy performance ratings to their customers as part of the home inspection associated with a home purchase. Other related market actors within the community, such as realtors, appraisers and lenders will also be trained so they can explain the information provided by a home energy rating if needed, and so they can understand the potential value a home energy rating brings to a real estate transaction. The hosting community leaders (such as government officials, chambers of commerce, relevant not-for-profits, employers, etc) will help identify and engage the local real estate market actors and facilitate homeowner education and awareness.
 - NYSERDA will subsidize the cost to deliver home energy ratings; the level of subsidy will ramp down to zero over the course of the pilot.
 - If the pilot is successful, NYSERDA will develop a “How To” kit that will be provided to other communities, enabling them to encourage similar activity among real estate sector market actors and home buyers in their area. The local leadership of the pilot communities will be essential in ensuring the kit is useable and effective. The kit, along with the results of successful pilots, can also serve as a resource to communities who are interested in the

⁵ Advanced M&V is generally defined as technologies and practices that include, but are not limited to, automated M&V software, data analytics, advanced metering or sub-metering, building or home energy management systems, load monitoring systems, utilization of data science practices, and other emerging technologies. A defining criterion for automated M&V software is that it continuously analyzes data as it becomes available.

⁶ Through pre-pilot research, rating systems will be pre-screened for their ability to meet select criteria, and those meeting the criteria will be included in the pilot. NYSERDA intends to pilot no more than two, very different, home energy ratings.

⁷ Through pre-pilot research, Clean Energy Communities will be pre-screened for their ability to meet select criteria; and discussions with market actors and leaders/energy champions within those communities will be used to understand their level of interest in engaging in a pilot. Those communities responding favorably will be identified to the pilot implementers as possible host communities. Final community selection will be based on the ability of the community to provide the necessary resources and strategies to fulfill their role in the pilot.

	<p>development of local laws or initiatives to disclose building energy performance information during real estate transactions. The kit will be distributed in coordination with NYSERDA's Clean Energy Communities activities.</p> <ul style="list-style-type: none"> • Energy information provided by home improvement market actors <ul style="list-style-type: none"> ○ Retailers who sell heating and cooling systems, appliances, lighting, windows and doors, and siding in the residential sector are already engaged with customers implementing home improvements. NYSERDA will leverage this relationship to increase energy efficiency awareness and engagement through home energy audits and ratings. ○ NYSERDA will issue a solicitation to select up to six retail establishments to participate in a pilot to test the effectiveness of providing a home energy rating or audit (either directly from the retailer or through a third party) to customers already engaged with home improvement retailers, to determine if it leads to additional energy work in the project. NYSERDA will subsidize the cost of the audits or ratings to reduce the risk for the retailers to try this new business model, and to reduce barriers for customer participation. ○ The selected retailers will be trained on the fundamentals of building science and energy efficiency and provided with consumer education materials to ensure that sales staff can properly convey the information regarding the energy opportunities to customers. • NYSERDA will complement the targeted pilots with consumer awareness campaigns to drive participation in the pilots, as well as increase general awareness of energy efficiency benefits and opportunities. As part of the consumer awareness efforts, NYSERDA will identify appropriate content to add to its web site, in collaboration with utilities and other market participants. The content will be curated to ensure that NYS residents can find information and resources regarding residential energy topics and break down information and awareness barriers cited by energy service providers. Additional consumer awareness and education activities will focus on online targeting, campaigns through large employers or membership-based organizations, and localized messaging campaigns. <p><u>Expanding the Delivery of Energy Efficiency Services</u></p> <p>There are many contractors providing home improvement services, but many of those contractors are not including quality installation of energy efficiency measures or high efficiency equipment as a service. Market research shows many contractors do not understand the opportunities, value or potential of offering energy efficiency services, or that they do not have quality assurance systems in place within their company to ensure best practices.⁸ NYSERDA will provide training and other resources to demonstrate the benefits of providing energy efficiency services to various market actors and to determine which approaches are most effective. Pilots will include:</p> <ul style="list-style-type: none"> • Leveraging the relationship that upstream partners, including manufacturers, distributors, and industry associations, have with residential contractors to provide information about successful energy efficiency business opportunities. <ul style="list-style-type: none"> ○ NYSERDA will issue a solicitation to select a firm to develop energy efficiency business training for residential contractors. This training will be delivered through existing channels of manufacturers, distributors, and trade organizations who routinely offer their customers training. NYSERDA will work with utilities to promote this opportunity to their contractor
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⁸ NYSERDA Corporate Strategy Assessment, Residential Chapter and voice of the customer research conducted in 2016-2017 by NYSERDA program staff.

	<p>network, sharing information about the training available through upstream partners.</p> <ul style="list-style-type: none"> ○ The selected firm will train the sales or client relations staff of these upstream partners on how to sell the benefits of an energy efficiency business model, as well as develop materials and training resources to be utilized by the partners. The selected firm will also provide business development consultations and marketing and sales support to the upstream partners during the pilot period. ○ NYSERDA will collaborate with industry partners to identify appropriate certifications or other credentials that should be encouraged for contractors who install energy efficiency measures, such as Building Performance Institute (BPI) certifications, North American Technician Excellence (NATE) certifications, etc. ○ Financial assistance for energy efficiency technical skills and knowledge certifications for those upstream partners and contractors participating in the training pilot will be made available through NYSERDA. ○ Changes in the contractors' business models and energy efficiency sales will be tracked to determine the effectiveness of the training. Post pilot, NYSERDA will communicate information on the most effective models of training, effective business models, as well as the training materials, to key influencers, such as professional and trade associations, major retailers and manufacturers who are part of the broader market. ● Using home energy ratings as a sales tool. <ul style="list-style-type: none"> ○ In addition to using a third party approach to delivering home energy ratings during real estate transactions, NYSERDA will collaborate, through participation agreements, with home performance, home improvement and single trade contractors to pilot home energy rating and certificate methods to determine whether: <ul style="list-style-type: none"> ▪ Using home energy performance ratings or certificates developed by third parties but delivered by contractors improves the close rate on projects, or increases the size of the project ▪ One type of home energy rating or certificate is more effective than another ○ NYSERDA will subsidize the cost to deliver home energy ratings; the level of subsidy will ramp down to zero over the course of the pilot. ○ NYSERDA and the contractors will compare projects where a rating was provided, to a control group not provided with a rating to determine which group saw greater activity and conversion to project implementation. For projects testing the efficacy of one rating or certificate over another, a group utilizing each method, delivered by the same contractor will be compared. The test will be conducted in different communities to avoid confusion. Through the pilots, best practices regarding the use of home energy performance ratings as an energy efficiency project sales tool will be identified and documented. ○ NYSERDA will broadly distribute the findings of the pilot to contractors throughout the state, using manufacturers, professional associations, Chambers of Commerce, utilities and other means as appropriate, in coordination with the other activities of this initiative. It is expected that by identifying successful means to increase sales of energy efficiency measures, more contractors will adopt those practices and expand their work in the energy efficiency field.
Key Milestones	<p><u>Milestone 1 (2018)</u></p> <ul style="list-style-type: none"> ● Develop a package of energy efficiency related trainings for market actors prior to pilot implementation

	<p><u>Milestone 2 (2018)</u></p> <ul style="list-style-type: none"> • Deploy new content on NYSERDA website <p><u>Milestone 3 (2018)</u></p> <ul style="list-style-type: none"> • Launch first of targeted consumer education and awareness campaigns <p><u>Milestone 4 (2018)</u></p> <ul style="list-style-type: none"> • Implement initial pilot for contractors delivering home energy ratings as a sales tool. <p><u>Milestone 5 (2018)</u></p> <ul style="list-style-type: none"> • Implement initial pilot to imbed home energy ratings into real estate transactions <p><u>Milestone 6 (2018)</u></p> <ul style="list-style-type: none"> • Implement initial pilot for leveraging relationships that upstream market actors have with contractors <p><u>Milestone 7 (2019)</u></p> <ul style="list-style-type: none"> • Implement initial pilot for providing energy efficiency information to consumers from home improvement retailers and their contractor network <p><u>Milestone 8 (2020)</u></p> <ul style="list-style-type: none"> • Develop resources, such as templates or toolkits, for market actors to support the business case for incorporating energy efficiency into their business models. <p><u>Milestone 9 (2021)</u></p> <ul style="list-style-type: none"> • Data collection and analysis from all pilots completed and results distributed to additional market actors to support intervention adoption. <p><u>Milestone 10 (2021)</u></p> <ul style="list-style-type: none"> • Kits available for communities to use in imbedding home energy ratings in the home sales process.
<p>Goals Prior to Exit</p>	<ul style="list-style-type: none"> • At least one major home improvement retailer adopts energy efficiency sales as a business model across multiple of its outlets. • Upstream partners maintain their trainer status and regularly include energy efficiency in training delivered to affiliated contractors. • Upstream manufacturing or wholesale partners report increases in sales of energy efficient equipment, products and materials. • Increase in BPI certified qualified residential energy efficiency contractors from 4% to 10% of the total residential contractor market. • Home inspector associations regularly provide training on the value of delivering a home energy rating, and information on how to become trained to deliver ratings. • Realtors understand the value of an energy efficient home and regularly advise home buyers on means to improve the efficiency of their new home. • Home energy ratings are available broadly across the state, and 10% of contractors are offering the rating as part of their business model.

25.1.5 Relationship to Utility/REV

<p>Utility Role/Coordination Points</p>	<p>NYSERDA has had a series of initial discussions with various utilities on the potential roles for them in this initiative. While formal roles have yet to be established, the following ideas have been discussed and will continue to be investigated with all NYS investor-owned utilities:</p>
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	<ul style="list-style-type: none"> • Provide new homeowner kit that includes information about how to undertake energy projects • Provide access to home energy improvement contractors through the utility marketplace web site • Provide access to a home energy rating through the utility marketplace web site • Provide rebates on some energy efficiency upgrades <p>Potential additional roles to be considered and discussed with the utilities include the following:</p> <ul style="list-style-type: none"> • Encourage energy efficiency training for contractors participating in utility rebate programs • Provide incentives to the broader market at the conclusion of pilots, where needed as a bridge to a sustainable activity (for example, incentives for home energy ratings for a period of time) • Expand consumer and/or contractor incentives to technologies not currently supported by all utilities, such as insulation and air sealing, by leveraging an expanded network of qualified professionals
Utility Interventions in Target Market	Utilities currently provide incentives for certain cost-effective energy efficiency appliances and equipment. In addition, utilities are providing web-based “marketplaces” for their customers, who may locate energy efficient products and access the utility rebates, manufacturer rebates or other offers. Some utilities are promoting home energy audits delivered through NYSERDA’s Home Performance with ENERGY STAR program, and providing the means for home performance contractors to promote their services through the utility marketplace.

25.1.6 Budgets & Expenditures

An annual commitment budget for all activities included in this chapter is shown in Table 1. The annual expenditure projection is included in Table 2. Budgets and expenditures do not include Administration, Evaluation, or Cost Recovery Fee; these elements are addressed in the Budget Accounting and Benefits chapter filing. The budget as presented in the Budget Accounting and Benefits Chapter will serve as the basis for any subsequent reallocation request. The additional level of detail presented within the table below is intended for informational purposes only.

Table 1: Annual Market Development Budget Allocation – Commitment Basis

Commitment Budget	2018	2019	2020	2021	Total
Direct Incentives and Services	\$234,000	\$939,500	\$1,140,500	\$0	\$2,314,000
Tools, Training, and Replication	\$3,433,000	\$1,903,000	\$1,460,000	\$150,000	\$6,946,000
Implementation Support	\$4,538,305	\$1,566,815	\$622,895	\$0	\$6,728,015
Total	\$8,205,305	\$4,409,315	\$3,223,395	\$150,000	\$15,988,015

Table 2: Annual Expenditures Projection

Expenditures	2018	2019	2020	2021	Total
Total	30%	32%	35%	3%	100%

25.1.7 Progress and Performance Metrics

Table 3 provides program Activity/Output indicators representing measurable, quantifiable direct results of activities undertaken in the initiative. Outputs are a key way of regularly tracking progress, especially in the early stages of an initiative, before broader market changes are measurable. Outcome indicators can encompass near-term through longer-term changes in market conditions expected to result from the activities/outputs of an intervention. Outcome indicators will have a baseline value and progress will be measured periodically through Market Evaluation.

Table 3. Initiative Specific Metrics

Indicators ⁹		Baseline (Before/Current)	2020 (Cumulative)
Activity/ Outputs	Number of upstream partners that include energy efficiency training resulting from this initiative	0	10
	Number of residential contractors whose staff have been trained and/or certified ¹⁰ in new skills as a result of this initiative	0	332
	Number of home inspectors providing home energy ratings in NYS as a result of this initiative	0	32
	Number of home energy ratings delivered in NYS as a result of this initiative	0	3,844
	Number of energy efficiency projects contracted, as a result of this initiative	0	8,200
Outcomes	Home improvement retailer adopts energy efficiency sales as a business model	0	1
	Real estate market actors offer energy efficiency basics and home energy training	0	3
	Increase in sales of energy efficient equipment, products and materials by upstream manufacturing or wholesale partners	TBD	2% increase
	Increase in residential contractors offering energy efficiency services	4%	6%

Benefits shown in Table 4 and Table 5 are direct, near term benefits associated with this initiative's projects. These benefits will be quantified and reported on a quarterly basis and will be validated through later evaluation. Due to the nature of the activities, estimating energy savings impacts at

⁹ TBD denotes that NYSERDA requires more data in order to quantify baseline/market metrics to the degree needed to measure against in the future. Baseline measurements of key market indicators are anticipated to occur soon following initiative approval and NYSERDA will update the information in this table as the information becomes available, which is anticipated within 9-12 months of initiative approval. A 0 (zero) denotes that the actual value is currently believed to be zero for baseline/market metrics.

¹⁰ Certified and qualified contractors refers to those with professional credentials, training certifications, or other evidence of manufacturer or professional trade association-approved training. Such credentials may include, but are not limited to, Building Performance Institute (BPI) certifications or completion of training that supports those certifications, North American Technician Excellence (NATE) certifications, training to become a Residential Energy Services Network (RESNET) auditor or rater, and manufacturer training certificates.

this stage is difficult because the specific technologies that will be supported are not known. However, energy savings for projects supported by this initiative will be tracked and reported.

Table 4. Direct Impacts¹¹

Primary Metrics ¹²		2018	2019	2020	TOTAL
Energy Efficiency	MWh Annual	25	465	704	1,194
	MWh Lifetime	375	6,980	10,600	17,920
	MMBtu Annual	1,880	34,900	52,800	89,580
	MMBtu Lifetime	46,900	872,000	1,320,000	2,239,000
	MW	-	-	-	-
Renewable Energy	MWh Annual	-	-	-	-
	MWh Lifetime	-	-	-	-
	MW	-	-	-	-
CO ₂ e Emission Reduction (metric tons) Annual		124	2,310	3,500	5,930
CO ₂ e Emission Reduction (metric tons) Lifetime		2,970	55,300	83,700	142,000
Customer Bill Savings Annual (\$ million)		\$0.031	\$0.575	\$0.870	\$1.475
Customer Bill Savings Lifetime (\$ million)		\$0.73	\$13.6	\$20.6	\$34.99
Private Investment (\$ million)		\$0.76	\$10.8	\$16.6	\$28.17

Table 5. Annual Projected Initiative Participation

Additional Performance Tracking Metrics		2018	2019	2020	Total
Participants ¹³	Customer	492	4,234	6,618	11,344
	Market Actor	26	86	146	258
	Total	518	4,320	6,764	11,602

Benefits shown in Table 6 represent the estimated indirect market effects expected to accrue over the longer term as a result of this investment and follow on market activity. The indirect benefits that accrue from this investment will be quantified and reported based on periodic Market Evaluation studies to validate these forecasted values. Market Evaluation may occur within one year (-/+) of the years noted in the table and projected future indirect benefits and/or budgets necessary to achieve them may be updated based on the results of market evaluation. Indirect impact across NYSEDA initiatives may not be additive due to multiple initiatives operating within market sectors. The values presented below are not discounted, however NYSEDA has applied a discount of 50% to the overall portfolio values in the Budget Accounting and Benefits chapter.

¹¹Education and awareness activities are assumed to contribute to direct savings of other initiatives. No additional direct impacts have been estimated for consumer education and awareness activities even though they are anticipated.

¹²Impacts are expressed on a commitment-year basis, and are incremental additions in each year. Assumes a 15-year measure life for electric saving measures and a 25-year measure life for heating fuel saving measures. Benefits are rounded to three significant figures. Totals may not sum due to rounding. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSEDA's programs.

¹³Customer participants are defined as individuals or businesses that participate in these pilots. A customer participant is someone who undertook an energy rating, audit, or energy retrofit as a result of the pilot. If a customer participated in more than one activity, they are counted one time. Market Actors participants are defined as organizations or businesses who are an active part of a pilot – such as an energy rater, trained home inspector, participating residential contractor, or retail establishment.

Table 6. Estimated Indirect Market Impact¹⁴

Indirect Impact		2020	2025	2030
Energy Efficiency	MWh Cumulative Annual	0	3,420	16,500
	MMBTu Cumulative Annual	0	257,000	1,240,000
Renewable Energy	MWh Cumulative Annual	0		
	MW	0		
CO2e Emission Reduction (metric tons) Cumulative Annual		0	17,000	82,000

25.1.8 Fuel Neutrality

Fuel Neutrality	<p>NYSERDA intends to offer this initiative in a fuel neutral manner as heating fuel savings provide larger opportunities for energy savings in the one-to-four family household sector. Offering the strategies in this initiative on a fuel neutral basis will allow NYSERDA to achieve savings at a cost of \$2,696 per ton of carbon, compared to a cost of \$6,739 per ton of carbon in an electric only scenario.</p>
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25.1.9 Performance Monitoring and Evaluation Plans

Performance Monitoring & Evaluation Plan	<p>NYSERDA’s approach to monitoring and assessing the effectiveness of the initiative and overall market development is described below.</p> <p><u>Test-Measure-Adjust Strategy</u></p> <ul style="list-style-type: none"> • The strategy design will be tested to gauge the target population’s reaction to the strategy. This information will be used to help inform decisions about how to allocate time and resources within the initiative and to confirm market interest and preparedness for full scale implementation. • Insights as to how the initiative can be optimized will be gathered and applied to initiative design to ensure greatest market impacts within the identified market sectors. • Collect, analyze and report on progress of the initiative by comparing progress against identified goals on a regular basis (i.e., quarterly, bi-annually). • Aggregate and analyze data from NYSERDA-supported projects to verify realized energy savings and persistence of savings. Measure results and gather data to inform the business case of the technologies installed for future projects, as well as to provide contractors information about their performance. <p><u>Market Evaluation</u></p> <ul style="list-style-type: none"> • Given the targeted market groups and barriers addressed by this intervention, it is anticipated that market evaluation of this initiative will leverage the update of the Residential Statewide Building Stock (RSBS) study planned for 2018. The objective of the RSB study will be to update key metrics from the baseline activity reported in 2014 with particular focus on metrics including, but not limited to, energy use and the penetration of energy-efficient equipment, building characteristics, and energy management practices in the residential single-family sector. Information on respondent household characteristics and the stocking practices of upstream market actors is also planned to be collected.
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¹⁴ Education and awareness activities are assumed to contribute to indirect savings of other initiatives. No additional indirect impacts have been estimated for consumer education and awareness activities even though they are anticipated.

	<ul style="list-style-type: none"> • Many of the metrics collected as part of the RSBS will inform this specific initiative directly and potentially offset separate initiative-specific data collection needs. Further, evaluations conducted by utilities and other stakeholders will be utilized as appropriate to inform the evaluation of this initiative and triangulate results of primary data collection. Any additional market evaluation specific to this initiative will draw on the logic model and will include baseline measurements of the key market indicators listed below. Regular longitudinal measurements (e.g., annual or biennial) will include updates of the baseline metrics as well as additional measurements to assess market change resulting from the initiative. • Key market indicators for any initiative-specific evaluation activity will include, but not be limited to, the number of qualified and active energy-focused firms; the rate at which clean energy activities specific to this initiative are adopted and replicated by participants and non-participants; knowledge of and confidence in the benefits of clean energy approaches and technologies by homeowners, contractors, real estate professionals and other key market actors; and the impact that changes to incentive offerings have on measure adoption, participation, and demand for energy efficiency information and services. • A market-based evaluation approach will leverage industry sales data, market actor survey responses, and awareness studies and will seek to measure the adoption rate of clean energy for homeowners influenced by initiative market actors and related activities. Primary data collection will include surveys of manufacturers and upstream market actors and will be supplemented with secondary data including sector-level market studies. Publicly and commercially available data will be utilized to inform the measurement of key market indicators . <p><u>Impact Evaluation/Field Verification</u></p> <ul style="list-style-type: none"> • Evaluation will be conducted for a representative sample of projects completed through the program. Survey activities will be carried out to determine a Measure Adoption Rate (MAR) for participants and will also seek to understand the impact of any incentives or funding utilized to support the implementation of recommended measures. Determination of the savings realization may include billing analysis or open-site verification, as appropriate. • Evaluation measurement and verification (EM&V) of direct savings will focus on areas of greatest impact and will draw upon project-level data collected by the program. Where feasible, advanced EM&V approaches will be applied to gain a "near-real-time" understanding of energy impacts as well as additional insights that will help inform contractor performance. <ul style="list-style-type: none"> ○ Depending on the extent of replication identified in market evaluation activities, impact evaluation may also be conducted on a sample of replication projects. • Data from impact evaluation activities can be used to help build confidence in the market, especially among other end users.
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Appendix A – Logic Models

LOGIC MODEL: Engaging New Markets in the Residential Sector

