

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

Clean Energy Fund: **Residential Chapter**

Portfolio: Market Development

Submitted by:

The New York State Energy Research and Development Authority

Revised May 7, 2021

Clean Energy Fund: Residential Chapter		
Revision Date	Description of Changes	Revision on Page(s)
November 1, 2017	Original Issue.	Original Issue.
April 19, 2019	As part of the Annual Investment Plan & Performance Report (IPPR) process, NYSERDA has updated budget and benefit values to align with actuals for past years and adjusted budget and benefit forecasts for future years, as appropriate, based on experience to date. Budget and benefit tables have been moved to Appendix B of this chapter and output/outcome tables have been moved to Appendix C of this chapter. Updated rounding convention has been applied to budget and benefit tables. Updated expected timing of two milestones based on experience to date.	Multiple
February 12, 2020	Engaging New Markets revised and expanded.	Multiple
February 25, 2020	Revised Outputs/Outcomes table.	Appendix C
May 15, 2020	Updated name of Engaging New Markets initiative to "Residential". Clarified Heat Pump Ready Pilot will be marketed as Comfort Home. Removed 'Leveraging Upstream Partners' component of plan which will now be executed under the Clean Heating and Cooling plan.	Multiple within the plan. Appendix A, B, & C
June 5, 2020	Plan was recently updated and is being refiled here as part of the Annual Investment Plan & Performance Report (IPPR) process in which all plans are collectively filed. No changes to plan documents.	None
May 7, 2021	As part of the Annual Investment Plan & Performance Report (IPPR) process, NYSERDA has updated budget and benefit values to align with actuals for past years and adjusted budget and benefit forecasts for future years, as appropriate, based on experience to date. The chapter has been updated to provide a bridge between committed and acquired planning. Committed budget and benefits summaries have been added to plan text, while Appendix B has been updated to reflect expenditure & acquired benefits plans.	Appendix B 12, 13, Appendix B

25 Residential

There are approximately 2.6 million market rate¹ one-to-four unit households in New York. Approximately 70% of NY homes were built prior to adoption of the first NYS Energy Conservation Construction Code in 1979. To date, energy efficiency programs in NY have only marginally tapped the potential energy savings of this sector. NYSERDA seeks to scale the market for providers of energy efficiency and clean energy services and accelerate the rate at which homeowners adopt energy efficiency and clean energy technologies.

The Residential initiative is a critical part of NYSERDA's building electrification market enablement strategy, as it will focus on strategies that not only save energy directly but also reduce thermal loads aimed at mitigating demand peaks, improving comfort for occupants, and reducing the customer's first cost of investing in a heat pump, by making the home "heat pump ready."

NYSERDA's residential strategy targets four key audiences with the following interventions:

- **For individual consumers:** Free energy audits, energy ratings or scores, and access to financing to help them set goals and get on the path to carbon neutrality, including low cost financing for residents in low-to-moderate income communities and other communities that might be defined as disadvantaged communities in accordance with the Climate Leadership and Community Protection Act of 2019.
- **For home improvement contractors:** Develop standardized packages of envelope improvement measures and tools to target and simplify customer acquisition and sales and help inform customers that envelope improvements can help them save on their energy bill and investments in clean energy equipment.
- **For HVAC companies:** Help them grow their businesses and open new sales opportunities by creating access to qualified leads for energy efficiency and heat pump sales and provide training, tools, and resources they can use to deliver quality installations of those clean energy solutions.
- **For the public at large:** Help consumers learn about energy efficiency and new clean energy solutions and how these solutions can work for them during key decision points in the home ownership cycle by combining awareness campaigns, targeted marketing, and customized home energy assessments to drive homeowners to get on a path toward their own clean energy future.

The initiatives included within the Residential strategy support the state's energy and environmental policy objectives, in particular:

- The goals of New Efficiency: New York to accelerate the adoption of energy efficiency and heat pump installations in existing residential buildings.

¹ Defined as households making more than 80% of the area median income. Source: American Community Survey, U.S. Census Bureau, based on 4.3 million total occupied households statewide

- The Climate Leadership and Community Protection Act (CLCPA) mandates an 85% reduction in emissions below 1990 levels, including a 40% reduction in carbon emission by 2030. Additionally, the CLCPA codifies the New Efficiency: New York target of 185 Tbtu on-site energy savings by 2025. This strategy will reduce energy consumption and GHG emissions associated with one-to-four family homes, contributing to these efficiency and emission goals, while also reducing load.

25.1 Residential

25.1.1 Theory of Change

The approach is designed to “meet the customer where they are” and provide them with the information needed to make sound choices while putting them on a path toward carbon neutrality. These strategies will leverage home investment decisions already taking place to promote energy efficiency and clean energy improvements. The initiatives supporting this strategy will use pilots for proof of concept, make adjustments to improve impact as needed, engage utilities in collaborative approaches, and at the conclusion of the pilots, deploy incentives, tools and other means to expand successful activities statewide via utilities or the market itself. Program investments and activities will be informed via continued engagement with stakeholders and subject matter experts.

<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 usage patterns and savings opportunities. The initiatives will target key decision points to 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. The initiatives will educate consumers on the ability of energy efficiency and load reduction measures in conjunction with clean heating technologies to improve comfort and reduce operational costs for the occupants of the home, and make an efficient home a more attractive option in a real estate transaction. • Lack of credible home energy performance data. Homeowners may question energy improvement recommendations because contractors stand to benefit from up selling these improvements. A home energy audit or rating delivered through a third-party, on-line, or self-serve tools in easy to understand formats may improve homeowner confidence in the audit recommendations. • Competing consumer spending priorities. Energy efficiency improvements must compete for consumer dollars with other home improvement and major life expenses. NYSERDA will help consumers prioritize spending by leveraging home improvements already taking place, making energy efficiency and clean energy desirable options, and providing pathways to make upgrades over time. In addition, NYSERDA will help to simplify the customer-contractor experience by making it easier for the customer to identify qualified contractors, providing contractors tools and resources to contractors to qualify customer leads and reduce the number of touch-points and time needed to get to a signed contract. • Complexity of sales process. Delivery of comprehensive whole house energy audits can be costly, confusing and time consuming for both the customer and contractor. This initiative will reduce the burden of the energy audit process by better aligning the audit process with how customers make decisions and reducing the time to complete an audit from several hours or even days down to
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	<p>two hours or less. The streamlined approach will be more consumer and business friendly, focused on helping customer reach informed decisions without over-analyzing. NYSERDA will provide tools supporting simplified presentation of energy improvement options and enable paths for consumers to invest in energy-related home improvements over time at their own pace.</p> <p><u>Barriers Impacting Energy Efficiency Services</u></p> <ul style="list-style-type: none"> • Customer acquisition challenges and related cost. Customer education is one of the greatest challenge’s contractors face, consuming significant time and generating significant costs during the sales process. This initiative will provide educational resources for consumers to engage those who may lack awareness of the benefits of energy upgrades. • Lack of home energy performance data. Some homeowners question the validity of energy audit results as they apply to their own homes, which can adversely impact the conversion of an audit to a sale of energy efficient measures for the contractor. New methods of presenting home energy performance data such as a home energy ratings delivered through a third-party, remote energy auditing, and standardized energy upgrade packages (for example, packaging an air sealing with insulation offer that most homes will benefit from and doesn’t require detailed custom analysis and pricing) can be used to help contractors communicate options to customers in terms that will resonate with them. •
<p>Testable Hypotheses</p>	<ul style="list-style-type: none"> • If homeowners are provided with clear, relevant, well-timed, and actionable information regarding their home’s energy performance and the value of energy efficiency and clean energy options, they will more readily undertake energy efficiency improvements. • If homeowners are provided with a clear, actionable path toward a clean energy goal, they will make incremental investments toward achieving those goals. • If residential supply chain actors are provided with information from trusted market partners or effective demonstrations regarding the business case for providing energy efficiency and clean energy services, they will add it to their business model. • If contractors provide marketing of simplified measure packages to targeted customers, then their sales process can improve through reduced customer acquisition costs, faster sales process, and increased consumer adoption of energy efficiency home improvements.
<p>Activities</p>	<p>NYSERDA seeks to promote tools that engages customers at key decision points in the home ownership life cycle by providing customized energy information for homeowners based on their home’s needs and their home investment goals. This includes home energy ratings, energy audits, and the offering of standard packages to help a customer’s decision-making process. The comprehensive home energy audit approach has been successful in reaching a segment of customers with the interest and means to act upon a whole-home proposal, but the market it reaches is inherently limited, and a variety in approaches is needed to reach more customers and achieve scale. Where appropriate, after the installation of energy efficiency and clean energy measures, NYSERDA will consider advanced measurement & verification (M&V) approaches² to measure results and gather data to inform the business case for future projects and provide contractors with performance feedback.</p>

² 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.

Consumer Awareness and Education

Support for a Home Energy Ratings Pilot

- NYSERDA will test different means of providing consumers with clear, relevant, and actionable information about the energy performance of their homes to help them make informed decisions about energy improvements. NYSERDA will conduct a pilot to test delivery models for home energy ratings targeting both home buyers and homeowners seeking to improve their homes. The pilot will test two rating systems including the Department of Energy’s Home Energy Score and the Pearl Certification. The pilot will engage with residential contractors and home inspectors to deliver these home energy ratings. Initially, there will be no cost to the customer for the energy rating, and the rating providers will be compensated. The pilot will compare projects where a rating was provided, to a control group without ratings to determine which saw greater conversion to project implementation.
- Post-pilot, NYSERDA will deploy tools to support scaling the market for home energy ratings. Tools could include a “How To” kit provided to communities, in coordination with our Clean Energy Communities campaigns, to encourage energy rating activity among real estate 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.
- Based on learnings from the pilot and customer’s interest and use of rating systems, NYSERDA will further seek to develop legislation mandating home energy ratings and disclosure. The kit, along with the results of successful pilots, can also serve as a resource for communities interested in establishing local laws or initiatives supporting disclosure of building energy performance during real estate transactions.

Consumer Awareness

- NYSERDA will develop complementary strategies with consumer awareness campaigns to drive participation and increase general awareness of home energy benefits and opportunities. NYSERDA launched a series of targeted messages in its “life moments” campaign in 2019 designed to drive consumers who are in the process of making home improvement decisions to resources that will help them make energy efficient and clean energy choices. The early results have been promising and show a large-scale increase in traffic to NYSERDA’s website and indications that customers are spending more time to read and download educational content. NYSERDA will continue to leverage this approach to further promote general awareness activities, energy audits, ratings, and participation in the Heat Pump Ready pilot offering standard packages.
- Other activities include collaboration with utilities and coordination with NYSERDA’s market awareness campaign for Westchester County to ensure that NY residents can find information and resources regarding residential energy topics.
- Additional activities will focus on online targeting, campaigns through large employers or membership-based organizations, and localized messaging campaigns, coordinating with NYSERDA’s Clean Energy Communities program and Clean Heating and Cooling Community campaigns.

Expanding the Delivery of Energy Efficiency Services

Comfort Home

	<ul style="list-style-type: none"> • NYSERDA has developed³ a standard-package offer that seeks to create a strong residential market for heat pumps by demonstrating that simplified packages of whole house load reduction measures (air sealing, insulation, duct repair/sealing, and windows) can facilitate sales of envelope improvements and prime customers for accelerated heat pump adoption by making them “heat pump ready.” NYSERDA will market this pilot as “Comfort Home”. The pilot combines the standard package offer with facilitating proper heat pump equipment selection and design, as well as enabling an innovative service model for contractors combining market segmentation, customer targeting, and a streamlined sales process. Cooperative marketing efforts will provide additional support the contractor in the customer acquisition process. • NYSERDA will use data-driven market segmentations, leveraging resources created through the Information Products & Brokering initiative, to identify customers who are prime candidates for both envelope improvements and heat pumps. Customers who undertake load reduction measures will receive financial incentives and will be provided with information about heat pumps specific to their home and referred to utility heat pump programs and service providers. • Referrals from the load reduction contractor to the heat pump contractor will include a “preliminary heat pump design” report intended to expedite the heat pump contractor’s estimating and sales process and support the use of industry standard best practices for heat pump design and equipment selection. Participating contractors will be provided with tools and support, such as technical training, sales tools and calculators, and cooperative advertising funds, and financial incentives, to assist their companies in selling higher efficiency products and adopting effective sales and delivery models. • NYSERDA will collaborate with utilities to align with their residential energy efficiency and heat pump programs and identify opportunities for more rapid expansion and longer-term deployment statewide. Other packages designed to get customers on a path to electrification may be explored. <p><i>Green Jobs - Green New York (GJGNY) Audits</i></p> <ul style="list-style-type: none"> • NYSERDA will update the standard home energy audit process, as prescribed by the Green Jobs – Green NY Act of 2009, and support the delivery of free energy audits to consumers. Contractors will be paid for in-home audits. The new process will launch in 2020, coordinated with new tools developed to support the “heat pump ready” initiative, and will enable the use of remotely available data sources to pre-populate energy audit data, using the field visit to verify site conditions and provide health and safety checks as needed. Beginning in 2021, NYSERDA will seek to deploy additional automated remote data collection to further reduce the necessity of lengthy on-site inspections. • These efforts will be coordinated with the utilities to align with their on-line customer engagement tools to the extent possible, enable sharing of leads acquired via the GJGNY energy audit to connect homeowners with all available incentive offers, and provide access to financing through the state’s On-Bill Recovery and Smart Energy Loan offers. •
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³ Offering is being tested in limited markets in 2019-2020, co-funded using NYSERDA’s Market Characterization and Design demonstration funding. This investment plan will expand this offer to a broader market and wider range of contractors in 2020-2022.

25.1.2 Target Market Characterization

<p>Target Market Segment(s)</p>	<p>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. Reaching the entire residential market will ultimately be necessary to achieve the state’s energy and environmental goals.</p> <p>Other Market participants include:</p> <ul style="list-style-type: none"> • Homeowners, renters, and buyers • Manufacturers, distributors, professional, and trade organizations who have relationships with residential contractors • Home improvement and HVAC contactors and system installers • Real estate sector professionals • Community leaders, local government, Chambers of Commerce and other local influencers
<p>Stakeholder/Market Engagement</p>	<ul style="list-style-type: none"> • NYSERDA has met with and sought input from dozens 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 interventions, 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"> ○ Manufacturers and distributors ○ Professional and trade associations ○ Home inspectors ○ Home improvement contractors, particularly high-volume companies • 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 home energy assessment. 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. • NYSERDA also met with local governments, including New York City, to better understand the opportunities related to the tools and resources offered through this initiative; with local leadership and businesses within Clean Energy Communities to gain insight on approaches and opportunities for consumer and contractor outreach and education; 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. Research shows customers prefer a rating system that compares their home to other homes, uses easy-to-use graphics or scales, is clear about how the scoring methodology works, and provides actionable next steps. The Home Energy Score and Pearl Certification ranked high in these categories among existing rating systems. The two systems use different rating scales

	<p>and different approaches to customer engagement so the pilot will examine the pros/cons of the different systems.</p> <ul style="list-style-type: none"> • In 2019, NYSERDA established a Residential Market Advisory Group to bring together residential market actors to envision the next generation of residential efficiency solutions and to guide NYSERDA’s development of offerings that spur market growth, deliver customer value and enable achievement of New York State’s energy policy goals. NYSERDA will continue to leverage the insights from this group, and other stakeholder groups, and seek on-going input via in person meetings, webinars, and engagement of ad hoc work groups to ensure offerings continue to be relevant and effective.
<p>Relationship to Utility Programs and REV Initiatives</p>	<p>NYSERDA has completed a series of discussions with various utilities regarding the potential coordination points and 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> <ul style="list-style-type: none"> • Provide access to qualified home energy improvement contractors through the utility marketplace web sites • Provide access to a home energy rating or audit through the utility marketplace web site • Provide rebates on energy efficiency upgrades including load reduction measures in coordination with heat pump installations • Coordinated referrals of customers between NYSERDA and the utilities to optimize each customer’s experience and access to incentives • Provide a “new homeowner” kit that includes information about how to undertake energy projects • Coordinate data-driven market segmentation and customer targeting to optimize customer messaging and provide clear pathways for customers to obtain energy efficiency and clean energy services • Coordinate on contractor qualification criteria, leveraging industry-accepted training and certifications to deliver services within pilots and programs to ensure consistency • Leverage NYSERDA’s investments in delivery models and tools by adopting successful program elements into the utilities’ energy efficiency implementation plans • Utility participation in NYSERDA’s Residential Market Advisory Group • 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 and load reduction packages for a period of time) • Leverage on-line self-serve and remote data collection to support remote energy audit strategies and further streamline the customer’s experience. Many utilities offer home energy reports or quick DIY online assessments that could be coordinated with NYSERDA’s customer targeting efforts and to provide a source of leads for GJGNY energy audits and home energy ratings.

Key Implementation Milestones

<p>Key Milestones</p>	<p><u>Milestone 1 (2018) – Complete</u></p> <ul style="list-style-type: none"> • Deploy new content including updated and refreshed residents and homeowners’ pages and simplified navigation to consumer education materials on NYSERDA website <p><u>Milestone 2 (2019) - Complete</u></p> <ul style="list-style-type: none"> • Launch first of targeted consumer education and awareness campaigns
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	<p><u>Milestone 3 (2019) - Complete</u></p> <ul style="list-style-type: none"> • Develop trainings for market actors prior to pilot for home energy ratings <p><u>Milestone 4 (2019) - Complete</u></p> <ul style="list-style-type: none"> • Launch pilot for contractors delivering home energy ratings as a sales tool <p><u>Milestone 5 (2019) - Complete</u></p> <ul style="list-style-type: none"> • Implement initial pilot to imbed home energy ratings into real estate transactions <p><u>Milestone 6 (2020) - Complete</u></p> <ul style="list-style-type: none"> • Deploy standard package approach for energy load reduction measures <p><u>Milestone 7 (2020) - Complete</u></p> <ul style="list-style-type: none"> • Deploy revised GJGNY energy audit standards <p><u>Milestone 8 (2021)</u></p> <ul style="list-style-type: none"> • Implement a remote energy audit available to all consumers <p><u>Milestone 9 (2022)</u></p> <ul style="list-style-type: none"> • Develop and distribute resources, such as templates or toolkits, for industry associations and communities to integrate home energy ratings as part of home sales. <p><u>Milestone 10 (2023)</u></p> <ul style="list-style-type: none"> • Data collection and analysis from the Comfort Home Pilot is completed and results distributed to utilities to support intervention adoption. <p><u>Milestone 11 (2023)</u></p> <ul style="list-style-type: none"> • Reach agreement with utilities on delivery of statewide energy audit offer
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25.1.3 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 \$41 per lifetime ton of carbon, compared to a cost of \$162 per lifetime ton of carbon in an electric only scenario.</p>
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25.1.4 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 interventions will be tested to gauge the target population’s responsiveness to and resulting impact of the strategy. This information will be used to 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.
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	<ul style="list-style-type: none"> • 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. • Quality Assurance and Quality Control activities will be conducted, when appropriate, to ensure that measures are installed as reported and they meet quality standards. <p><u>Market Evaluation</u></p> <ul style="list-style-type: none"> • Given the targeted market groups and barriers addressed by this intervention, NYSERDA leveraged the Residential Building Stock Assessment⁴ (RBSA), published in Q1 2020. The objective of the RBSA is to update key metrics from the baseline activity reported in 2015 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 was also collected and will be utilized to inform the residential interventions. • Many of the metrics collected as part of the RBSA will inform this 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; influence and knowledge of and confidence in the benefits of clean energy approaches and technologies by homeowners, contractors, home inspectors, 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. • Where appropriate, evaluation efforts for this initiative may be combined with other NYSERDA evaluation studies to optimize resources where technologies, market actors, strategy or geographical regions overlap. While serving to reduce and mitigate potentially duplicative evaluation efforts, this approach will also
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⁴ <https://www.nysERDA.ny.gov/About/Publications/Building-Stock-and-Potential-Studies/Residential-Building-Stock-Assessment>

	<p>reduce uncertainty in evaluation findings where discrete, initiative-level assessments are otherwise difficult to discern due to such overlaps.</p> <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, where applicable, 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 on-site verification, as appropriate. • Additionally, 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 initiative. 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. • Where appropriate, evaluation efforts for this initiative may be combined with other NYSERDA evaluation studies to optimize resources where technologies, market actors, strategy or geographical regions overlap. While serving to reduce and mitigate potentially duplicative evaluation efforts, this approach will also reduce uncertainty in evaluation findings where discrete, initiative-level assessments are otherwise difficult to discern due to such overlaps.
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25.1.5 Budgets

The commitment budget for all activities included in this chapter is as follows:

Funding Commitments		----- Commitments Plan -----						
Budget	Plan Total	Previously Committed	2020	2021	2022	2023	2024	2025
Incentives and Services	28,130,346	9,857	530,882	2,309,520	4,471,907	5,972,000	8,454,000	6,382,180
Implementation	6,344,833	2,574,441	(304,177)	2,225,022	1,045,000	460,000	210,000	134,547
Research and Technology Studies	-	-	-	-	-	-	-	-
Tools, Training and Replication	14,366,187	1,972,033	2,252,461	4,939,826	2,634,116	1,731,748	750,000	86,003
Business Support	800,000	-	25,000	325,000	300,000	50,000	50,000	50,000
Total	49,641,366	4,556,331	2,504,166	9,799,368	8,451,023	8,213,748	9,464,000	6,652,730

An annual expenditure budget for all activities included in this investment plan is shown in Appendix B alongside expected acquired benefits. Budgets 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 Appendix B is intended for informational purposes only.

25.1.6 Progress and Performance Metrics

The anticipated commitment benefits totals for the initiative with respect to CEF Order target metrics is as follows:

Benefit Commitments

Direct Benefit (2016-2025)	Plan Total
Energy Efficiency MWh Annual	12,350
Energy Efficiency MMBtu Annual	722,451
Renewable Energy MWh Annual	-
CO2e Emission Reduction (metric tons) Lifetime	1,181,601
Participant Bill Savings Lifetime	301,389,083
Leveraged Funds	44,816,490

Indirect Benefit (2016-2030)	Plan Total
Energy Efficiency MWh Annual	5,610
Energy Efficiency MMBtu Annual	493,500
Renewable Energy MWh Annual	-
CO2e Emission Reduction (metric tons) Lifetime	790,869

Benefits summarized in Appendix B represent the plan for acquiring impacts through completed projects or activities.

Benefits listed as direct, are near term benefits directly associated with this initiative’s projects. These benefits will be quantified and reported on a quarterly basis and will be validated through later evaluation.

Benefits listed as indirect 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 Appendix 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 NYSERDA initiatives may not be additive due to multiple initiatives operating within market sectors. The values presented above and in Appendix B are not discounted, however NYSERDA has applied a discount of 50% to the overall portfolio values in the Budget Accounting and Benefits chapter.

Appendix C 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.

NYSERDA will monitor the adoption rate of clean energy offerings among qualified services providers, the sales of energy efficiency and clean energy products and services as an indication of consumer adoption, and improvements in the customer sales process.

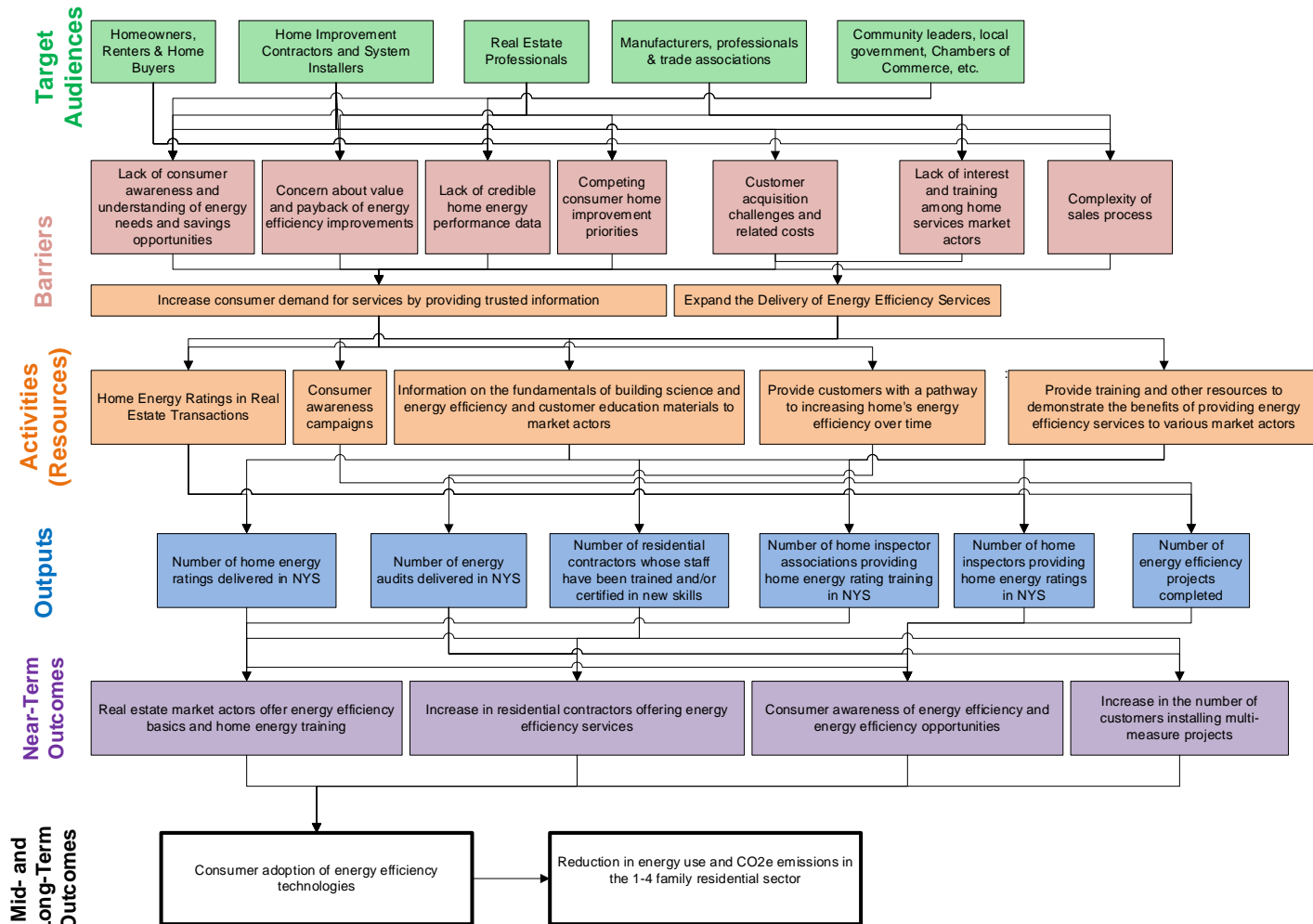
Verified Gross Savings Specification	
Date of CEF filing: <i>see cover page</i>	
CEF Chapter Name	Residential
Initiative Name	Residential
Initiative Period	Originally launched as Engaging New Markets in 2017
Sub-initiatives (and period)	Home Energy Ratings Pilot (2019)
	Consumer Awareness (2019)
	Comfort Home (formerly Heat Pump Ready) (2019)
	Green Jobs Green New York Audits (2005)
Initiative Description	<p>The Residential initiative includes the following sub-initiatives: Home Energy Ratings Pilot, Consumer Awareness, Comfort Home, and Green Jobs Green New York Audit.</p> <p>NYSERDA seeks to scale the market for providers of energy efficient and clean energy services and accelerate the rate at which homeowners adopt energy efficiency and clean energy technologies. The sub initiatives will use pilots for proof of concept, make adjustments to improve impact as needed, engage utilities in collaborative approaches, and at the conclusion of the pilots, deploy tools and other means to expand successful activities statewide via utilities or the market itself.</p> <p>The Gross and Planned Verified Gross Savings Methodologies are described for each sub-initiative below.</p>
Gross Savings Methodology	For the following sub-initiatives, where NYSERDA is encouraging market adoption of energy efficient technologies or practices, energy savings will be calculated using the formulas and factors found in the Technical Resource Manual (TRM).
	Methodologies specific to each sub-initiative are described below.
	Home Energy Ratings Pilot – the savings of this sub-initiative are based on the TRM and deemed values. These deemed values are informed by historic savings, per measure, in NYSERDA residential program offerings as well as secondary research conducted by an independent evaluation contractor.
	Consumer Awareness – N/A – direct savings are not associated with this sub-initiative.
	Comfort Home – this sub-initiative will utilize Energy Plus modeling to estimate energy savings. The Energy Plus model inputs are based on the TRM and comply with custom measure option for whole building simulation. This sub-initiative includes Measurement & Verification of installations according to IPMVP standards and include preliminary estimates of energy consumption and logging of data at site.
Green Jobs Green New York (GJGNY) Audits – the savings of this sub-initiative are based on the TRM and deemed values. These deemed values are informed by historic savings, per measure, in NYSERDA residential program offerings as well as secondary research conducted by an independent evaluation contractor.	
Realization Rate (RR)	No realization rates have been determined for these sub-initiatives within the preceding five-year time frame.
Planned Verified Gross Savings Approach	Residential sub-initiatives are planned to undergo Gross Savings Analysis. An Independent evaluation contractor will be procured by NYSERDA to perform these analyses.

	<p>For sub-initiatives where direct measure installation occurs, evaluation measurement & verification will be conducted for a sample of participating projects, according to the International Performance Measurement & Verification Protocol (IPMVP) method(s) most appropriate.</p> <p>Verified Gross Savings approaches specific to each sub-initiative are described below.</p> <p>Home Energy Ratings Pilot – NYSERDA will continue to assess program participation to determine timing for conducting verified gross savings. This VGS approach will include a Measure Adoption Rate (MAR) assessment. TRM and deemed savings values will be used to determine savings of installed measures.</p> <p>Consumer Awareness – N/A – direct savings are not associated with this sub-initiative.</p> <p>Comfort Home - Savings verification of this sub-initiative will be conducted for a representative sample of projects. This impact evaluation will include the determination of a realization rate at the project level. TRM and deemed savings values will be used to determine savings associated with installed measures.</p> <p>Green Jobs Green New York Audits – For GJGNY audit recipients, periodic surveys conducted by independent Evaluation contractors is planned on an annual basis. This assessment will include but is not limited to a MAR, and other consumer decision making research objectives. Where possible, these impact assessments will be designed to leverage market evaluation activities. A MAR of GJGNY Audit-only⁵ projects is currently underway with results expected in Q2 2020.</p>
Exemption from EAM Status	N/A

⁵ GJGNY Audit-only Project is a project where the recipient of the GJGNY audit does not pursue completing installations of recommended measures within the NYSERDA residential program offerings.

Appendix A – Logic Model

LOGIC MODEL: Residential



Appendix B | Initiative Budget and Benefits Summary

Residential

		Benefits Acquisition Plan														
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Benefit	Plan Total															
Energy Efficiency MWh Annual	12,350	-	-	-	10	48	910	2,075	2,635	3,211	3,084	377	-	-	-	-
Energy Efficiency MWh Lifetime	185,250	-	-	-	143	727	13,652	31,128	39,520	48,158	46,265	5,657	-	-	-	-
Energy Efficiency MMBtu Annual	722,451	-	-	-	489	4,035	52,301	120,418	154,399	193,702	177,874	19,233	-	-	-	-
Energy Efficiency MMBtu Lifetime	18,061,276	-	-	-	12,222	100,871	1,307,535	3,010,451	3,859,967	4,842,557	4,446,855	480,817	-	-	-	-
Renewable Energy MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	49,736	-	-	-	33	273	3,591	8,279	10,636	13,333	12,259	1,331	-	-	-	-
CO2e Emission Reduction (metric tons) Lifetime	1,181,601	-	-	-	777	6,588	85,222	196,585	252,729	317,272	291,046	31,381	-	-	-	-
Participant Bill Savings Annual	12,836,202	-	-	-	8,070	72,860	918,177	2,127,007	2,749,882	3,463,412	3,160,988	335,806	-	-	-	-
Participant Bill Savings Lifetime	301,389,083	-	-	-	183,719	1,744,970	21,516,434	49,896,320	64,584,263	81,512,643	74,151,441	7,799,291	-	-	-	-
Leveraged Funds	44,816,490	-	-	-	42,720	905,560	3,726,471	8,064,239	9,100,000	13,650,000	9,327,500	-	-	-	-	-
Indirect Benefit	Plan Total															
Energy Efficiency MWh Annual	5,610	-	-	-	-	-	-	-	425	475	525	777	807	837	867	897
Energy Efficiency MMBtu Annual	493,500	-	-	-	-	-	-	-	31,875	35,625	39,375	72,825	75,075	77,325	79,575	81,825
Renewable Energy MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	32,758	-	-	-	-	-	-	-	2,105	2,353	2,601	4,842	4,991	5,140	5,288	5,437
CO2e Emission Reduction (metric tons) Lifetime	790,869	-	-	-	-	-	-	-	50,508	56,450	62,392	117,173	120,739	124,304	127,869	131,434
Energy Usage	Plan Total															
Direct Energy Usage MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Participants	Plan Total															
Customer Participants	137,147	-	-	-	30	2,190	11,863	23,449	28,200	33,900	33,253	4,261	-	-	-	-
Market Actors	248	-	-	-	7	86	38	30	40	40	7	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	137,395	-	-	-	37	2,276	11,901	23,479	28,240	33,940	33,260	4,261	-	-	-	-
		Budget Expenditures Plan														
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Budget	Plan Total															
Incentives and Services	28,130,346	-	-	-	9,857	517,382	1,888,395	4,316,930	6,140,477	8,454,000	5,914,135	889,170	-	-	-	-
Implementation	6,344,833	-	-	175,406	1,068,492	(51,714)	1,111,484	1,274,176	1,046,596	748,689	653,666	318,037	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	14,366,187	-	-	44,053	913,291	1,397,772	2,794,188	3,044,903	2,319,188	1,618,295	1,614,283	620,214	-	-	-	-
Business Support	800,000	-	-	-	-	25,000	75,000	150,000	150,000	150,000	100,000	100,000	-	-	-	-
Total	49,641,366	-	-	219,459	1,991,640	1,888,440	5,869,067	8,786,009	9,656,261	10,970,984	8,332,084	1,927,421	-	-	-	-

Table Notes:

* With the May 2021 IPPR filing of all investment plans, each Appendix B table that accompanies an investment plan was transitioned from yearly commitment-based budget and benefit plans to plans that forecast expenditures and acquired benefits.

- Benefits are expressed on an acquired-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. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.
- Education 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.
- 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.
- Customer 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.

Appendix C | Initiative Outputs and Outcomes Summary

Residential

	Indicators	Baseline (Before/Current)	2020 (cumulative)	2025 (cumulative)
			Target	Target
Outputs	Number of residential contractors whose staff have been trained and/or certified in new skills as a result of this initiative	0	25	288
	Number of home inspectors providing home energy ratings in NYS as a result of this initiative	0	10	20
	Number of home energy ratings delivered in NYS as a result of this initiative	0	500	3,844
	Number of energy efficiency projects contracted, as a result of this initiative	0	5,000	76,000
	Number of homes that reduce energy loads in their homes to prepare for heat pump installations	0	800	8,775
Outcomes	Increase in certified/qualified residential energy efficiency contractors or home energy auditors/raters compared to total residential contractor market	4%	5%	10%
	Real estate market actors offer energy efficiency basics and home energy training	0	3	3
	Improvements to customer sales process as demonstrated by participating contractor reported reduced customer acquisition costs	Customer acquisition soft costs represents 27% of total soft cost	10% decrease	20% decrease

Table notes

a. 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.

b. 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.