

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

Clean Energy Fund Investment Plan: New Construction Chapter

Portfolio: Market Development

Submitted by:

The New York State Energy Research and Development Authority

Revised April 9, 2018

Clean Energy Fund Investment Plan: New Construction		
Revision Date	Description of Changes	Revision on Page(s)
November 1, 2017	Original Issue	Original Issue
April 9, 2018	Updated to add a Net Zero Energy Commercial/Industrial Competition, with associated budget and benefits, reduce the Buildings of Excellence competition from four rounds to three rounds, update the timing for the commercial pilot program to 2019, and correct errors in the LMI values in tables 5 and 8.	Multiple

24 New Construction

NYSERDA aims to influence design and construction of new buildings and substantial renovations to increase efficiency in commercial, multifamily and single family new construction, moving the market to ultimately pursue Net Zero Energy Performance. Through the initiatives in this chapter, NYSERDA will facilitate a new construction market in New York State where residential and commercial building owners, occupants, and developers routinely demand, and the construction community routinely delivers successful deep energy saving and net zero energy performance buildings.

The initiative in the chapter is made up of six activities that will increase the awareness of and confidence in the performance of advanced clean energy buildings. NYSERDA will maintain the current standard offer base incentives to maintain a consistent presence in the market to help overcome initial costs and risk barriers related to building advanced clean energy buildings. In addition to reinforcing and extending this support from the initial filing in the Resource Acquisition Transition Chapter, this initiative will seek out opportunities to engage with more innovative market segments, reduce administrative burdens, and shorten project engagement times through a Commercial Pilot program, which will then be used to inform future base incentive offerings.

NYSERDA will work with various state entities to drive clean energy opportunities throughout the portfolio of offerings, including by creating replicable examples of net zero energy performance through targeted support to economic development agencies. NYSERDA will issue a multi-year competitive solicitation aligned with other state funding mechanisms to leverage economic development opportunities to spur net zero energy commercial and industrial projects that are aligned with their Regional Economic Development Council's Strategic Plan. The competition will provide a unique program model in which technical assistance and incentives for all net zero energy technologies (efficiency, renewables, energy storage, electric vehicle charging, etc.) are provided through a single program to align with economic development project timelines.

NYSERDA will also host a Buildings of Excellence Competition for multifamily buildings. The competition will promote advanced clean energy buildings that are highly replicable, achieve superior energy performance, and demonstrate cost effectiveness. Additionally, NYSERDA will conduct a Performance Analysis to assess actual building and equipment performance, which will be used to provide feedback to modeling software tools to increase accuracy, create a Data Library on measure performance, and develop case studies on successful projects to provide building performance validation and increase market demand for advanced clean energy buildings.

Further Activities conducted under this Chapter include Simplified Design and Tools, and Third-Party Standards Development. These activities will promote market-based solutions by increasing the capacity of design and construction teams through training, creating model measure packages for common building types, utilizing technology solutions to improve design development, and validating third-party organizations to provide quality assurance over performance standards.

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

24.1 New Construction

24.1.1 Overview

<p>Present Situation</p>	<ul style="list-style-type: none"> • Approximately 100 million square feet of new construction is built per year in New York State. Once a building is constructed, it is in operation for 50-100 years, and it becomes much more expensive to execute significant energy saving measures. This makes it essential to build as energy efficiently as possible at the time of construction. • However, a significant portion of construction does not meet current New York State Energy Conservation Construction Code (NYS ECCC), let alone more advanced efficiency standards,¹ creating a significant opportunity once addressed to achieve energy savings that will last for several decades. • NYSERDA's Code to Zero initiative is focused on strengthening compliance and advancing adoption of codes with higher performance goals, yet to achieve net zero energy code in the next 15-25 years, the new construction market will need to build and demonstrate cost-effective construction techniques that can be used to help justify the adoption of codes with higher performance goals. • While over 100 Net Zero Capable and Net Zero Energy buildings have been built in New York², analysis of NYSERDA program data to date has shown these highly efficient buildings cost 5-10% more than standard design and construction, limiting their market penetration. • The success of advanced clean energy buildings relies on setting energy goals early-on in the design process. Generally, architects are reluctant to commit to such energy goals at the beginning of a project because they have little information on how their designs will be implemented. Energy simulation modeling can improve this information but is not being utilized in many cases due to high costs and inconsistent accuracy. • Many developers and building owners do not understand the costs and benefits of various construction decisions, making their decisions based on incomplete or inaccurate information. • Projects supported through NYS economic development efforts, which generally follow expedited construction schedules, do not have an appetite to pursue net zero energy performance in the construction of new buildings or when upgrading existing facilities, due to complex program requirements, lack of awareness of the benefits and costs, and the addition of a time-consuming approval and design process. • Developers in the Low-to Moderate-Income (LMI) market rely on funding awarded from public housing agencies such as New York State Housing and Community Renewal for the construction of LMI housing. Public housing agencies provide these funding opportunities through standard offer programs or competitive solicitations, which have historically required a minimum energy efficiency above code, for new construction projects.
---------------------------------	--

¹ There are a number of advance performance standards that categorize building performance, including, ENERGY STAR, ASHRAE, LEED, Passive House Institute, Passive House Institute-US, Net Zero Energy, and Net Zero Energy-capable. The New Construction initiative aims to be agnostic in the path to performance, therefore all activities that aim for above-code energy performance refer to advanced clean energy building performance, rather than referencing specific performance standards.

² To date, Net Zero Energy activity in New York includes: 60 Net Zero Energy single family homes, plus approximately 80 that are Net Zero Capable; 3 Net Zero Energy low-rise multifamily residential projects, and 8 multifamily projects that are Net Zero Capable; and approximately 60 Commercial projects seeking Net Zero Energy standards, but only a few are built.

	<ul style="list-style-type: none"> Historically, NYSERDA has provided targeted incentives to owners, developers, and builders to offset a portion of the initial cost and risk for design and construction related to building advanced clean energy buildings and Net Zero Energy performance buildings, across all sectors. This support has enabled participation in key conversations with decision-makers early enough in the design and construction process to influence the results, and support more advanced technologies, designs, or deep energy-saving performance-based outcomes.
Intervention Strategy	<ul style="list-style-type: none"> NYSERDA will build on its past efforts to influence energy decision-making in the design and construction of new buildings, working to make the construction of advanced clean energy buildings the norm across all sectors. To that end, NYSERDA will: <ul style="list-style-type: none"> Continue to provide its standard offer new construction incentive program through the Resource Acquisition Transition Chapter for Commercial, Low-rise Residential and Multifamily New Construction in 2018 and through this initiative in 2019 and 2020, to serve the needs of most new construction projects while simultaneously testing alternative incentive structures in the Commercial market sector to drive increased impact. Issue a Buildings of Excellence Competition to drive innovative design and construction approaches in the Multifamily market and create highly replicable use cases to spur public interest and demand for advanced clean energy buildings. Launch a streamlined, targeted, Net Zero Energy Commercial/Industrial Competition to provide incentives and technical support to spur net zero energy performance in commercial and industrial projects aligned with Regional Economic Development Council stated priorities. Provide direct support to the design community to enhance the capabilities of architects, engineers, and construction managers to facilitate more advanced building designs and execution, in support of the Buildings of Excellence Competition. Develop and issue integrated design and construction protocols, provide guidance on effective project delivery, and support the creation and expansion of online platforms that will help streamline the design process of advanced clean energy buildings. Develop data and information resources to document success stories and lessons learned that can be used to provide a cost benefit justification for more advanced technologies, as well as to improve modeling tools. For a visual representation of this strategy, please reference the flow chart entitled “Logic Model: New Construction” which can be found in Appendix A.
Goals	<ul style="list-style-type: none"> Develop tools to make building designs more consistent and reliable and expedite the review and approval process of buildings. Increase the confidence in advanced clean energy building practices and technologies. Reduce the overall costs of advanced clean energy buildings and Net Zero Energy performance construction.
State Energy Plan/Clean Energy Standard Link	<ul style="list-style-type: none"> Generally, 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 buildings, both as a function of how buildings are operated and the efficiency of the installed equipment, 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 2015 New York State Energy Plan states that “NYSERDA will seek to address the diverse set of remaining barriers with new programs and

	<p>strategies that unlock the potential of energy efficiency to reduce operating costs, spur investment, and create jobs throughout the State.” Driving “commercial interest toward Zero Net Energy in new construction and renovated buildings” is listed as a potential strategy to tap into this energy efficiency potential. This initiative lays out a strategy to achieve this goal.</p> <ul style="list-style-type: none"> • 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 number of renewables necessary to meet the 50 by 30 goal.
--	---

24.1.2 Target Market Characterization

Target Market Segment(s)	<p>The target market segment includes owners, developers, architects, engineers, energy modelers, and construction entities for new buildings and substantial renovations in single family and multifamily homes, offices, hotels, retail, education, healthcare, warehouses, agriculture, light industrial, and waste water treatment plants.</p>
Market Participants	<p>Market Participants include:</p> <ul style="list-style-type: none"> • Code Inspectors • Green Building Verifiers • Tenants and Residents • Manufacturers • Distributors and Suppliers • Finance Community • Economic Development Agencies
Market Readiness	<ul style="list-style-type: none"> • Architects and engineers report that if the market asks for advanced clean energy buildings, they can deliver them. Based on a review of NYSERDA program data of projects to date, analysis has shown Net Zero Energy performance buildings cost 5-10% more to design and build than standard construction. This cost premium is likely causing slower market uptake, in addition to a market perception that the cost is more than 5-10%, and the technology is not ready to reliably meet Net Zero Energy goals. • Builders and Developers are often unwilling to guarantee Net Zero Energy performance as a selling-point due to occupant behavior and unregulated plug-loads. However, they have expressed a willingness and interest in building more advanced clean energy buildings. The success of early adopters must be shared with the rest of the market to move them to action.
Customer Value	<ul style="list-style-type: none"> • Occupants of advanced clean energy buildings benefit from energy bill savings, insulation from energy price shocks, improved occupant comfort, a healthier indoor environment, and resiliency and sustained occupancy during extreme weather events. • Consumers will experience an easier, more streamlined decision-making process for assessing advanced clean energy building options early in the design process. • Building owners and developers will benefit from construction processes that are consistent and reliable, and improved communication among the design, construction and trades, and inspections silos. • Building owners and operators will have increased confidence that the predicted energy savings will be achieved and that their profit streams are accurate.

24.1.3 Stakeholder/Market Engagement

Stakeholder/ Market Engagement	<ul style="list-style-type: none"> • NYSERDA has met with members of the design community, who have indicated that they are prepared to build Net Zero Energy buildings if consumer demand grows. They also expressed support for streamlined tools and programs. • NYSERDA has held meetings with industry and government market actors, who have expressed support for an advanced buildings competition. • NYSERDA has met with economic development agencies, who have commented that participation in multiple NYSERDA programs for renewable and energy efficiency incentives leads to construction delays, confusion, and duplicative application and reporting requirements. This has resulted in economic development projects forgoing advanced clean energy building performance to expedite design and construction schedules. • End use customers have expressed a desire for more predictable energy savings, including Net Zero Energy performance. Some consumers also have requested information about the full costs of incorporating energy efficient or renewable energy technologies. • NYSERDA will continue to engage in outreach to market actors, through one-on-one meetings, as activities are launched in the market to determine if any changes are needed to reach wider market adoption.
---	--

24.1.4 Theory of Change

Market Barriers Addressed	<ul style="list-style-type: none"> • Difficulty predicting energy savings. Predicting energy savings can be expensive and inaccurate, and there is often a lack of market feedback that links actual performance to predicted. Simplified tools and resources will improve the speed and accuracy of predicting energy savings and provide verified building performance information to improve feedback and accuracy. • Lack of awareness of integrated design practices. There is a lack of market understanding of and confidence in integrated design and construction protocols, including regarding appropriate costs. Addressing information gaps surrounding this process will increase confidence in the process and reduce perceived risks. • Complex program requirements and offerings. Net zero energy and net zero capable projects feature scopes of work with various efficiency and renewable energy technologies. NYSERDA currently offers support for these technologies, through separate offerings with complex requirements. Commercial and industrial projects that are under tight development schedules cannot keep pace with different program requirements and deliverables. • Lack of confidence in energy performance ratings and standards. There is a lack of confidence in organizations and mechanisms capable of setting and enforcing energy performance ratings and standards. NYSERDA's validation and backing of third-party quality assurance and quality control (QA/QC) organizations will enable regulatory agencies, code enforcement officials, financial institutions and the market to rely on those standards and the certified professionals who enforce them to perform these oversight roles without NYSERDA support. • Lack of verified performance. There are not enough advanced clean energy buildings in operation today to provide a large enough body of evidence about the ever-changing economics and functionality of these buildings in an environment of continuously increasing energy code requirements. Financial support for highly reliable advanced clean energy buildings will enable the development of a broader data set, further proving the technology.
Testable Hypotheses	<ul style="list-style-type: none"> • If building owners and developers are provided more complete and accurate information about predicted building performance, they will seek to include more

	<p>energy efficient and renewable energy technologies in building design and construction, increasing the market penetration of advanced clean energy buildings.</p> <ul style="list-style-type: none"> • If NYSERDA delivers a high-profile multifamily building competition, then Developers will respond by commissioning the design and construction of advanced clean energy buildings utilizing new and innovative technologies and buildings practices at a faster pace than would otherwise be achieved. • If the market has better information about integrated design and construction protocols, then the process will be utilized more, reducing the cost of construction of advanced clean energy buildings. • If building performance resulting from integrated design, Net Zero Energy building practices, and advanced technologies can be verified, and the data incorporated into energy simulation modeling tools, then modeling software discrepancies between predicted performance and actual performance will decrease and models will become more comprehensive and more accurate. • If NYSERDA streamlines access for net zero energy performance incentives and technical assistance into a single, competitive offering for commercial and industrial projects aligned with regional economic development priorities, economic development agencies will have a single technical consultant they can engage with to influence projects in the early stages of design, resulting in a reduced administrative burden and greater number of projects that seek net zero energy performance. • If NYSERDA provides support to achieve net zero energy performance to projects that are aligned with the local Regional Economic Development Council’s Strategic Plan, then similar projects that are a priority for growth within that region will be influenced to achieve net zero energy performance based on the success of the awarded project. • If NYSERDA supports and validates third-party standards and mechanisms to certify building performance, then the market-delivered certification of building performance will be more broadly utilized by LMI regulatory agencies for public housing solicitations. • If there is a comprehensive effort to quantify actual building performance associated with specific measures or packages of measures, the design community and building owners will have confidence to routinely include those measures for advanced clean energy equipment and construction techniques in projects and standards.
<p>Activities</p>	<p>Incentives</p> <ul style="list-style-type: none"> • NYSERDA will continue to provide the current Standard Offer base incentives as indicated in the Resource Acquisition Transition Chapter, providing support via this initiative starting in 2019 (the offering as presented in the Resource Acquisition Transition Chapter provides support through 2018). The incentive program presented as the Standard Offer serves the needs for most new construction projects and will remain intact to maintain a consistent and predictable incentive offer. • Additional incentives may be available for projects which include innovative technologies in a project’s design and scope of work, which are not supported by other NYSERDA programs. • Additional support will be made available through this initiative for multifamily buildings in 2018, in anticipation that the Buildings of Excellence Competition participants will drive increased participation to the Standard Offer incentive program than was originally allocated for in the Resource Acquisition Transition Chapter. • NYSERDA will also test alternative incentive program approaches for advanced clean energy commercial buildings through a pilot program. Potential approaches that will be tested in the market include but are not limited to additional paths to participation for commercial buildings (i.e., through certification via third party Standards such as Passive House), greater program flexibility, reduced administrative burdens, and shortened project engagement time.

- The commercial pilot will be delivered through a competitive solicitation and will drive increased impact by supporting alternative incentive structures. The alternative approaches will be targeted to more innovative market segments that do not respond to traditional program offerings and will allow a more flexible approach to achieve carbon savings in the most cost-effective manner for their project.
- Based on the results of the commercial pilot, NYSERDA will modify its standard offer solicitation as appropriate to provide incentives to commercial buildings to reduce the cost premium associated with advanced clean energy buildings, incorporating proven successful approaches from the pilot program.

Buildings of Excellence Competition

- NYSERDA will issue a competitive solicitation to seek proposals on advanced clean energy building designs. The competition will focus on the multifamily sector, for a total of 3 rounds.
- 5 or more winners will be selected for each round of the competition, and awards of up to \$1,000,000 will be granted.
- Proposals will be evaluated based on:
 - Energy Efficiency (measured as the percent improvement over current energy code)
 - Use of onsite or community renewable or distributed energy generation
 - Demonstration of building economic performance, cost effectiveness, and replicability
 - Innovation, resiliency and contributions to architectural aesthetics, sustainability, occupant health and comfort
 - Additional clean energy building criteria (e.g., on-site electric vehicle charging, advanced controls, battery storage, etc.)
- The proposals must include a plan for market outreach and how the project will impact future construction. NYSERDA will provide market recognition through case studies and press releases on the winning projects.
- NYSERDA will promote the Buildings of Excellence Competition winners as replicable advanced building designs to increase awareness of and demand for advanced clean energy buildings and integrated design and construction protocols.
- NYSERDA will support the design community, through trainings, tools, and promotion, to increase the capabilities and capacity of architects, engineers, and design-build firms to deliver competitive building designs.

Net Zero Energy Commercial/Industrial Competition

- NYSERDA will issue a competitive request for proposals (RFP) aligned with other state funding mechanisms, for net zero energy commercial and industrial projects that are in-line with the Regional Economic Development Councils Strategic Plans. Successful proposers will experience “single-door” access to technical assistance and incentives for energy efficiency, renewables, energy storage, and all other advanced technologies (i.e. solar, geothermal, electric vehicle charging, battery storage, etc.) utilized in a project to achieve net zero energy performance.
- All eligible commercial and industrial projects that are aligned with their region’s Strategic Plan may apply. Eligible projects may choose to apply to either the standard offer program or the competitive solicitation. NYSERDA will utilize economic development agencies to cost-effectively promote this opportunity to prospective projects in each region.
- NYSERDA anticipates selecting at least one winner in each Regional Economic Development Council region annually, with awards up to \$1,000,000. If companies meet additional criteria (i.e. located on a brownfield or in an opportunity zone) additional incentives may be awarded. Projects that are not eligible for CEF-funded

	<p>incentives (i.e. Long Island) may receive incentives paid out of Regional Greenhouse Gas Initiative funding.</p> <ul style="list-style-type: none"> • Proposals will be evaluated on: <ul style="list-style-type: none"> ○ Geographic region ○ Alignment with REDC-designated economic clusters and state priorities ○ Performance ○ Cost effectiveness ○ Resiliency ○ Replicability based on profitability³ for the company • NYSERDA may assess project selection criteria, including the potential to award net zero capable projects through this solicitation, based on market response to the RFP. • Projects will be managed from the time of award through the performance validation stage, and performance analysis will be conducted to create in-depth case studies for economic development agencies, creating a portfolio of projects that are locally based and can be used as models for future regional projects. <p>Performance Analysis</p> <ul style="list-style-type: none"> • NYSERDA will assess actual building and equipment performance to provide confidence in design and construction decisions and validate market models and performance. Data collected will be used to create a Data Library on measure performance. • Case studies and reports on successful projects will be developed, including what made them successful, lessons learned, and building performance validation reports to increase confidence and consumer demand for advanced clean energy buildings. • At least 12 current and future advanced clean energy buildings will be assessed per year, inclusive of commercial and multifamily buildings. <p>Simplified Design and Tools</p> <ul style="list-style-type: none"> • NYSERDA will provide project guidance and information resources, developed, using project data and stakeholder input, to support builders and developers, including: <ul style="list-style-type: none"> ○ Integrated design and construction protocols to help the market understand and properly implement integrated projects, including model solicitations (e.g., on selecting an integrated design team) ○ Specifications that can be used in public housing award processes, to influence bidding from Public Housing Authorities to include advanced clean energy building practices in bid processes. ○ Model measure packages that optimize energy performance for common building types ○ An advisor or coach for first time builders and developers that can provide guidance in understanding integrated design and construction processes, review specifications for competitive construction solicitations and contracts, and review building model and design options. • NYSERDA will also support the development and expansion of online platforms (such as Open Studio, Google, etc.) that facilitate improved design and can potentially help speed and improve code compliance reviews. The online platform will provide architects and engineers a way to submit complete and proper documents for code review, as well as allow Code Enforcement Officials to more simply run quality assurance checks on designs, through the software. Relevant findings from this effort will be shared with and incorporated into NYSERDA's Code to Zero efforts.
--	---

³ Increased profitability is meant to describe situations where the ratio of costs to sales improves for the company. This may include cases where the predictability of operating expenses increases, which then allows the company to incur more risk and do a deeper retro-fit or build a more efficient process than they would otherwise.

	<p>Third-Party Standards Development</p> <ul style="list-style-type: none"> • NYSERDA will provide guidance and feedback to organizations to inform the development of third-party QA/QC standards. • Once developed, NYSERDA will validate the third-party QA/QC protocols, which will enable the use of those standards as alternative compliance paths for NYSERDA’s new construction standard offer incentive programs. • NYSERDA’s validation of third-party QA/QC protocols, will also be used in outreach to LMI funding agencies, as reliable market-based standards for energy performance.
<p>Key Milestones</p>	<p><u>Milestone 1 (2018)</u></p> <ul style="list-style-type: none"> • Issue first competitive solicitation for Buildings of Excellence Competition. <p><u>Milestone 2(2018)</u></p> <ul style="list-style-type: none"> • Contract with awardees for Buildings of Excellence Competition. <p><u>Milestone 3 (2018)</u></p> <ul style="list-style-type: none"> • Issue solicitation to launch Simplified Design and Tools: Model Measure Packages activity. <p><u>Milestone 4 (2018)</u></p> <ul style="list-style-type: none"> • Contract with awardees for Simplified Design and Tools: Model Measure Packages activity. <p><u>Milestone 5 (2018)</u></p> <ul style="list-style-type: none"> • Issue solicitation for Net Zero Energy Commercial/Industrial Competition. <p><u>Milestone 6 (2018)</u></p> <ul style="list-style-type: none"> • Contract with awardees for Net Zero Energy Commercial/Industrial Competition. <p><u>Milestone 7 (2018)</u></p> <ul style="list-style-type: none"> • Issue competitive RFP for Simplified Design and Tools: Online Platform development. <p><u>Milestone 8 (2018)</u></p> <ul style="list-style-type: none"> • Contract with awardees for Simplified Design and Tools: Online Platform development. <p><u>Milestone 9 (2018)</u></p> <ul style="list-style-type: none"> • Issue mini-bid for technical reviewers through existing NYSERDA umbrella contracts to begin Performance Analysis to assess project performance. <p><u>Milestone 10 (2018)</u></p> <ul style="list-style-type: none"> • Contract with technical reviewers for Performance Analysis to assess project performance. <p><u>Milestone 11 (2018)</u></p> <ul style="list-style-type: none"> • Issue solicitation for Simplified Design and Tools: Integrated Design Practices Advisor for first-time Developers. <p><u>Milestone 12 (2018)</u></p> <ul style="list-style-type: none"> • Contract with awardees for Simplified Design and Tools: Integrated Design Practices Advisor for first-time Developers.

	<p><u>Milestone 13 (2019)</u></p> <ul style="list-style-type: none"> • Issue solicitation for commercial incentive pilot. <p><u>Milestone 14 (2019)</u></p> <ul style="list-style-type: none"> • Contract with awardees for commercial incentive pilot. <p><u>Milestone 15 (2019)</u></p> <ul style="list-style-type: none"> • Issue second competitive solicitation for Buildings of Excellence Competition. <p><u>Milestone 16 (2019)</u></p> <ul style="list-style-type: none"> • Contract with awardees for second round of Buildings of Excellence Competition. <p><u>Milestone 17 (2019)</u></p> <ul style="list-style-type: none"> • Issue second solicitation for Net Zero Energy Commercial/Industrial Competition. <p><u>Milestone 18 (2019)</u></p> <ul style="list-style-type: none"> • Contract with awardees for second Net Zero Energy Commercial/Industrial Competition. <p><u>Milestone 19 (2020)</u></p> <ul style="list-style-type: none"> • Issue third competitive solicitation for Buildings of Excellence Competition. <p><u>Milestone 20 (2020)</u></p> <ul style="list-style-type: none"> • Contract with awardees for third round of Buildings of Excellence Competition. <p><u>Milestone 21 (2020)</u></p> <ul style="list-style-type: none"> • Issue third solicitation for Net Zero Energy Commercial/Industrial Competition. <p><u>Milestone 22 (2020)</u></p> <ul style="list-style-type: none"> • Contract with awardees for third Net Zero Energy Commercial/Industrial Competition. <p><u>Milestone 23 (2021)</u></p> <ul style="list-style-type: none"> • Issue fourth solicitation for Net Zero Energy Commercial/Industrial Competition. <p><u>Milestone 24 (2021)</u></p> <ul style="list-style-type: none"> • Contract with awardees for fourth Net Zero Energy Commercial/Industrial Competition. <p><u>Milestone 25 (2022)</u></p> <ul style="list-style-type: none"> • Issue fifth solicitation for Net Zero Energy Commercial/Industrial Competition. <p><u>Milestone 26 (2022)</u></p> <ul style="list-style-type: none"> • Contract with awardees for fifth Net Zero Energy Commercial/Industrial Competition.
Goals Prior to Exit	<p>NYSERDA intends to remain engaged in the New Construction market throughout the Clean Energy Fund although this initiative and budget only focuses on three years due to the comprehensive nature of the strategy, thus the goals prior to exit are reflective of that extended engagement.</p> <ul style="list-style-type: none"> • Reduce incremental cost of building a Net Zero Energy building from the current level of 5-10% to less than 1% by 2030. By 2020, the goal is to reduce the incremental cost of building to Net Zero Energy standards to 3-8%.

	<ul style="list-style-type: none"> • Improve accuracy of predicted energy consumption and cost to be within 10% accuracy of actual verified building performance for more than 50% of new construction by the end of the Clean Energy Fund, and within 18% accuracy at the end of 2020. • Increase space built per year with advanced clean energy building characteristics by 10% by the end of the Clean Energy Fund, and to 4% of space built with advanced clean energy building characteristics at the end of this initiative by 2020.
--	---

24.1.5 Relationship to Utility/REV

Utility Role/Coordination Points	Several utilities have indicated some level of interest in exploring the market potential to operate a standard incentive program. NYSERDA will continue to work with utilities who are exploring this opportunity and ensure complementary rather than duplicative approaches.
Utility Interventions in Target Market	Currently, no utilities offer incentive programs for new construction projects, however, all utilities offer some incentives for existing buildings that could support gut rehabilitation projects.

24.1.6 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. Up to \$1,000,000 of Regional Greenhouse Gas Initiative funding will be used for the Net Zero Energy Commercial/Industrial Competition to offer the program state-wide in areas such as Long Island.

Table 1: Annual Market Development Budget Allocation – Commitment Basis

Budget		2018	2019	2020	2021	2022	Total
Market Rate	Direct Incentives and Services	\$19,908,100	\$28,637,100	\$28,637,100	\$10,000,000	\$10,000,000	\$97,182,300
	Tools, Training, and Replication	\$3,985,617	\$2,612,383	\$2,612,383	-	-	\$9,210,383
	Implementation Support	\$4,483,583	\$5,494,183	\$5,494,183	\$1,200,000	\$1,200,000	\$17,871,949
	<i>Sub-Total</i>	<i>\$28,377,300</i>	<i>\$36,743,666</i>	<i>\$36,743,666</i>	<i>\$11,200,000</i>	<i>\$11,200,000</i>	<i>\$124,264,632</i>
LMI	Direct Incentives and Services	\$3,194,000	\$6,482,500	\$6,482,500	-	-	\$16,159,000
	Tools, Training, and Replication	\$1,818,433	\$1,040,133	\$1,040,133	-	-	\$3,898,699
	Implementation Support	\$1,363,367	\$1,681,867	\$1,681,867	-	-	\$4,727,101
	<i>Sub-Total</i>	<i>\$6,375,800</i>	<i>\$9,204,500</i>	<i>\$9,204,500</i>	<i>-</i>	<i>-</i>	<i>\$24,784,800</i>
Total		\$34,753,100	\$45,948,166	\$45,948,166	\$11,200,000	\$11,200,000	\$149,049,432

Table 2: Annual Expenditures Projection

Expenditures	2018	2019	2020	2021	2022	2023	2024	2025	Total
Total	3%	13%	22%	24%	18%	10%	6%	4%	100%

24.1.7 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 ⁴		Baseline (Before/Current)	2019 (Cumulative)
Activity/Outputs	Number of advanced clean energy housing units in NYS	6,139	15,139
	Number of advanced clean energy commercial buildings in NYS	9	69
	Number of housing units recognized through Buildings of Excellence competition	0	2,900
	Number of projects awarded through the Net Zero Energy Commercial/Industrial Competition	0	32
	Number of participants attending workshops and trainings	0	872
	Number of case studies developed and distributed	0	13
	Number of model measure packages available	0	9
	Number of Projects that utilize coach/advisor	0	280
	Number of projects that complete a Performance Analysis through the program	0	24
	Incremental cost of building a Net Zero Energy building over standard construction practices	5-10% cost above standard construction	3-8% cost above standard construction
Outcomes	Percent market penetration of projects utilizing integrated design and construction practices to achieve Net Zero Energy and Net Zero Energy-capable performance	TBD	4%
	Number of LMI Public Housing solicitations that specify use of integrated design and construction practices, and third-party QA/QC standards	0	2

⁴ 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.

	Projects that utilize model measure packages outside of the program	0	32
	Discrepancies between predicted and actual savings	TBD	Within 18% accuracy for more than 50% of projects

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.

Table 4. Direct Impacts: Market Rate

Primary Metrics ⁵		2018	2019	2020	2021	2022	TOTAL
Energy Efficiency	MWh Annual	39,400	68,900	66,300	9,620	10,900	195,200
	MWh Lifetime	874,000	1,540,000	1,480,000	212,000	239,000	4,351,000
	MMBtu Annual	67,100	151,000	151,000	-	-	368,600
	MMBtu Lifetime	1,500,000	3,470,000	3,470,000	-	-	8,446,000
	MW	-	-	-	-	-	-
Renewable Energy ⁶	MWh Annual	7,660	9,620	7,020	9,620	10,900	44,780
	MWh Lifetime	169,000	212,000	154,000	212,000	239,000	985,100
	MW	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		28,400	49,500	46,700	10,100	11,400	146,200
CO2e Emission Reduction (metric tons) Lifetime		630,000	1,110,000	1,050,000	223,000	251,000	3,264,000
Customer Bill Savings Annual (\$ million)		\$5.72	\$10.3	\$9.97	\$1.28	\$1.44	\$28.74
Customer Bill Savings Lifetime (\$ million)		\$127	\$232	\$224	\$28.1	\$31.8	\$643.3
Private Investment (\$ million)		\$12.9	\$51.1	\$51.1	\$10	\$10	\$135

⁵ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 22-year measure life for Commercial New Construction Projects, and a 25-year measure life for Residential New Construction Projects. 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 NYSEERDA's programs.

⁶ Projects will likely include renewables to meet Net Zero Energy standards. However, the renewables will be supported through other NYSEERDA programs (e.g. NY-Sun) for all projects seeking Net Zero performance, except those projects participating directly in the Commercial/Industrial Competition. Therefore, only renewable savings associated with the Commercial/Industrial Competition are claimed here to avoid double counting.

Table 5. Direct Impacts: LMI

Primary Metrics ⁷		2018	2019	2020	Total
Energy Efficiency	MWh Annual	2,100	8,590	8,590	19,280
	MWh Lifetime	52,600	215,000	215,000	482,000
	MMBTu Annual	8,820	47,400	47,400	103,700
	MMBTU Lifetime	220,000	1,190,000	1,190,000	2,592,000
	MW	-	-	-	-
Renewable Energy ⁸	MWh Annual	-	-	-	-
	MWh Lifetime	-	-	-	-
	MW	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		1,580	7,080	7,080	15,750
CO2e Emission Reduction (metric tons) Lifetime		39,600	177,000	177,000	393,700
Customer Bill Savings Annual (\$ million)		\$0.377	\$1.61	\$1.61	\$3.599
Customer Bill Savings Lifetime (\$ million)		\$9.41	\$40.3	\$40.3	\$90.00
Private Investment (\$ million)		\$12.4	\$33.2	\$33.2	\$78.86

Table 6. Annual Projected Initiative Participation

	2018	2019	2020	2021	2022	Total
Market Rate Housing-Unit Participants	500	3,900	3,900	-	-	8,300
Market Rate Commercial Buildings	53	90	90	18	19	270
Market Rate Training Participants	242	242	242	-	-	726
LMI Housing Unit Participants	500	4,100	4,100	-	-	8,700
LMI Training Participants	194	194	194	-	-	582
Total	1,489	8,526	8,526	18	19	18,578

Benefits shown in Tables 7 and 8 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 NYSERDA initiatives may not be additive due to multiple initiatives operating within market sectors. The values presented below are not discounted, however NYSERDA has applied a discount of 50% to the overall portfolio values in the Budget Accounting and Benefits chapter.

⁷ Impacts are expressed on a commitment-year basis and are incremental additions in each year. Assumes a 25-year measure life for Residential New Construction Projects. 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 NYSERDA's programs.

⁸ Projects will likely include renewables to meet Net Zero Energy standards. However, the renewables will be supported through other NYSERDA programs (e.g. NY-Sun) and therefore are not claimed here to avoid double counting.

Table 7. Estimated Indirect Market Impact Market Rate

Indirect Impact		2020	2025	2030
Energy Efficiency	MWh Cumulative Annual	34,800	224,000	276,000
	MMBtu Cumulative Annual	117,000	1,100,000	1,230,000
Renewable Energy	MWh Cumulative Annual	726	1,940	3,150
	MW	-	-	-
CO2e Emission Reduction (metric tons) Cumulative Annual		25,000	177,000	212,000

Table 8. Estimated Indirect Market Impact LMI

Indirect Impact		2020	2025	2030
Energy Efficiency	MWh Cumulative Annual	6,030	16,100	26,100
	MMBtu Cumulative Annual	31,200	83,200	135,000
Renewable Energy	MWh Cumulative Annual	357	952	1,550
	MW	-	-	-
CO2e Emission Reduction (metric tons) Cumulative Annual		5,050	13,500	21,900

24.1.8 Fuel Neutrality

Fuel Neutrality⁹	<ul style="list-style-type: none"> Offering this initiative on a fuel neutral basis will allow NYSERDA to achieve savings at a cost of \$850 Market Rate¹⁰, and \$1,574 LMI per ton of carbon, compared to a cost of \$984 Market Rate and \$2,444 LMI per ton of carbon in an electric only scenario.
------------------------------------	--

24.1.9 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 Commercial Pilot program for advanced clean energy buildings will provide market feedback based on uptake of alternative pathways to participation, and new project delivery. Voice of Customer will be utilized for feedback throughout the initiative, especially during the early development and delivery of new activities such as simplified tools and trainings. The Net Zero Energy Commercial/Industrial, and Buildings of Excellence Competitions will be evaluated following each round of the competition to assess market response and feedback, and make adjustments for future rounds. <p><u>Market Evaluation</u></p> <ul style="list-style-type: none"> Market Evaluation will draw on the logic model and will include baseline and longitudinal measurement of key indicators of programmatic and broader market success. Baseline measurements of key market indicators will occur within one year following initiative approval and will provide additional insights that will allow NYSERDA to adjust the strategy. These key indicators include but are not limited to:
---	--

⁹ Fuel neutral \$/ton values reflect direct annual CO2e emission reductions.

¹⁰ Market rate values includes both commercial and housing.

	<p>the number of advanced buildings and units built in NYS, participants attending workshops/trainings and projects utilizing model measure packages.</p> <ul style="list-style-type: none">• Regular (e.g., annual or biennial) updates to key performance indicators and measurement of market change, including but not limited to: more projects utilizing integrated design and construction practices, increased use of advanced building practices, and reductions in discrepancies between predicted and actual savings.• Sources of data include intervention data, public and commercially available data, and primary data collection through surveys of key market actors. <p><u>Impact Evaluation/Field Verification</u></p> <ul style="list-style-type: none">• Data from Field Verification/Impact Evaluation can be used to help lend confidence in the market, especially among other end users.• Impact Evaluation will have access to program and other data necessary to validate direct impacts per International Performance Measurement and Verification Protocol (IPMVP) standards.• For projects that include renewables supported through other NYSERDA programs, NYSERDA will develop an approach to identify these projects in the other programs and to represent them in the evaluation for the appropriate program (e.g. NY-Sun).
--	--

Appendix A – Logic Models

LOGIC MODEL: New Construction

