

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

Clean Energy Fund: New Construction Chapter

Portfolio: Market Development

Submitted by:

The New York State Energy Research and Development Authority

Revised June 15, 2020

Clean Energy Fund: 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
April 19, 2019	<p>Moved all LMI content, including budget and benefits, to LMI Chapter. Revised contents to reflect Market Rate components specifically.</p> <p>Updated initiative name to align with Clean Energy Dashboard (now New Construction – Market Rate).</p> <p>The Commercial Pilot program was removed and the associated budgets and benefits were reappropriated as to not duplicate efforts with the Net Zero Energy/Carbon Competition.</p> <p>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.</p>	Multiple
June 15, 2020	<p>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.</p> <p>Funding from New Construction Transition Chapter initiatives that closed in 2019 has been transferred to continue Market Rate operations and is reflected in Appendix B. Output/outcome indicators updated to include additional targets.</p>	Multiple

24 New Construction

NYSERDA aims to influence design and construction of new buildings and substantial renovations to increase the efficiency and incorporation of storage, renewables, and electric vehicle charging infrastructure in constructional building types. The strategic goal of the initiative is to move the market to pursue net zero energy/carbon performance 5-15 years before code requirements are adopted. Through the initiatives in this chapter, NYSERDA will facilitate a market in New York State where building owners, occupants, and developers routinely demand, and the construction community routinely delivers successful deep energy saving and net zero energy/carbon performance buildings.

The initiative 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 and renovating net zero energy, carbon neutral, and 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.

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/carbon performance through targeted support to economic development and affordable and healthy housing efforts. NYSERDA will issue multi-year competitive solicitations aligned with other state funding mechanisms to leverage economic development opportunities to spur net zero energy/carbon projects that are aligned with their Regional Economic Development Council's Strategic Plan and State Priorities. The competition will provide a unique program model in which technical assistance and incentives for all net zero energy and decarbonization technologies (efficiency, renewables, energy storage, electric vehicle charging, embodied carbon, low GWP refrigerants, etc.) are provided through a single program to align with economic development project timelines. This program model will also support the planning of community-level projects to achieve net zero energy/carbon performance.

NYSERDA will also host a Buildings of Excellence Competition for multifamily buildings. The competition will promote net zero energy and ultra-low or carbon neutral buildings that are highly replicable, resilient, achieve superior low/zero carbon performance (efficiency, renewables, energy storage, electric vehicle charging, embodied carbon, low GWP refrigerants, etc.), and demonstrate cost effectiveness. Additionally, NYSERDA will conduct Performance Analyses 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.

Additional activities conducted under this Chapter include Simplified Design Packages, Tools, Resources, Performance Validation, 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.

The New Construction Program offers identical activities in the Low-to-Moderate Income (LMI) housing sector as it offers in the Market Rate housing sector. Budgets and benefits of the New Construction Program for the LMI sector are presented in the CEF LMI Chapter. Outcomes that influence the broader market, such as the adoption rates of integrated design practices, will be presented in the New Construction Outputs and Outcomes tables.

24.1 New Construction – Market Rate

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, and the average building age in New York is over 60 years old. 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, and to design buildings to be more easily retro-fitted in the future with on-site renewable energy, energy storage, and electric vehicle charging equipment. • 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. Recent data published by the New Buildings Institute indicates a 4% premium, indicating a national trend of decreasing costs for net zero buildings. • The Market success of building 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 have confidence in the costs and benefits of various construction decisions relating to advanced clean energy building, 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.
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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/carbon 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. Historically, most of NYSERDA’s program services have supported individual buildings. Going forward, increased efforts will be made to support the integration of net zero energy/carbon aspects into larger community/campus scale development and redevelopment efforts, as well as the development and dissemination of tools and other resources that can be used by a broader percentage of the market.
Intervention Strategy	<ul style="list-style-type: none"> NYSERDA will build on its past efforts to influence energy decision-making in the design, construction, renovation and capital planning process, working to make the construction, renovation and operation 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 programs through this initiative in 2019 and 2020. 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/Carbon Competition to provide incentives and technical support to spur net zero energy/carbon performance in projects and campuses/communities aligned with Regional Economic Development Council stated priorities, and State 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 provide funding for customers to develop and use 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/carbon performance construction and embodied carbon.
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

	<p>40% and to implement a 600 trillion BTU increase in statewide energy efficiency.</p> <ul style="list-style-type: none"> • The 2015 New York State Energy Plan states that “NYSERDA will seek to address the diverse set of remaining barriers with new programs and strategies that unlock the potential of energy efficiency to reduce operating costs, spur investment, and create jobs throughout the State.” 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. • 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.
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24.1.2 Target Market Characterization

Target Market Segment(s)	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, municipal and waste water treatment plants.
Market Participants	<p>Market Participants include:</p> <ul style="list-style-type: none"> • Code Inspectors • Green Building Verifiers • Tenants and Residents • Manufacturers • Distributers 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. A recent New Buildings Institute report indicates that more current data is at a four percent cost premium. There continues to be a market perception that the cost is more than 5-10%, and the technology is not ready to reliably meet net zero energy/carbon 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.

	<ul style="list-style-type: none"> • Building owners and operators will have increased confidence that the predicted energy savings will be achieved and that their profit streams are accurate.
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24.1.3 Stakeholder/Market Engagement

<p>Stakeholder/Market Engagement</p>	<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.
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24.1.4 Theory of Change

<p>Market Barriers Addressed</p>	<ul style="list-style-type: none"> • Difficulty predicting energy savings. Predicting energy savings and building performance 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/carbon and net zero capable projects feature scopes of work with various efficiency, renewable energy and storage, and electric vehicle charging technologies. NYSERDA currently offers support for these technologies, through separate offerings with complex requirements. 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
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	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 energy efficient, renewable energy, storage and electric vehicle charging technologies in building design, construction, and renovation, increasing the market penetration of advanced clean energy buildings. • 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/carbon 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/carbon performance incentives and technical assistance into a single, competitive offering for projects aligned with regional economic development and State priorities, economic development agencies will have a single point of contact 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/carbon 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 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.
Activities	<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 and into 2019). The incentive program presented as the Standard Offer serves the needs for most new construction projects seeking low or zero carbon performance buildings and will remain intact to maintain a consistent and predictable incentive offer. • Additional incentives may be available for projects which include mentoring support for first-time developers, as well as for projects which include innovative technologies in a project’s design and scope of work, which are not supported by other NYSERDA programs, as well as expanded design support. • NYSERDA will also test alternative incentive program approaches for advanced clean energy projects from-time-to-time through pilot programs, or pilot components to existing programs. • Based on the results of the Net Zero Energy/Carbon Competition, 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 competitive program.

Buildings of Excellence Competition

- NYSERDA will issue a competitive solicitation to seek proposals on advanced clean energy building designs. The competition will initially focus on the multifamily sector, but may expand to other similar building types (i.e. dorms, hotels, etc.).
- 10 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:
 - Low-Carbon Performance (operational and embodied carbon)
 - 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, low GHW potential refrigerants 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/Carbon Competition

- NYSERDA will issue a competitive request for proposals (RFP) aligned with other state funding mechanisms, for net zero energy/carbon projects that are in-line with the Regional Economic Development Councils Strategic Plans or State Priorities. Successful proposers will experience “single-door” access to technical assistance and/or 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/carbon performance, or other related planning or design support.
- All eligible commercial, industrial and community-level projects that are aligned with their region’s Strategic Plan or State Priorities may apply. Eligible projects may choose to apply to either the standard offer program or the competitive solicitation. NYSERDA will utilize economic development agencies as well as Channel Partner engagements to cost-effectively promote this opportunity to prospective projects in each region.
- NYSERDA anticipates selecting projects with geographic and other characteristic distribution. If projects meet additional criteria (i.e. located on a brownfield or in an opportunity zone) additional incentives may be awarded. Projects that are located in Long Island, and therefore not eligible for CEF-funded incentives, may receive incentives paid out of alternative funding sources.
- Proposals will be evaluated on:
 - Geographic region
 - Alignment with REDC-designated economic clusters and state priorities
 - Low-Carbon Performance (including operational and embodied carbon, and low GHW potential refrigerants)
 - Cost effectiveness
 - Resiliency

	<ul style="list-style-type: none"> ○ 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. Additional data may be collected on occupant comfort, health and satisfaction • 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) ○ 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. <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.
Key Milestones	<p><u>Milestone 1 (2018) - Complete</u></p> <ul style="list-style-type: none"> • Issue solicitation for Net Zero Energy/Carbon Competition.

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><u>Milestone 2 (2018) - Complete</u></p> <ul style="list-style-type: none"> • Contract with awardees for Net Zero Energy/Carbon Competition. <p><u>Milestone 3 (2019) - Complete</u></p> <ul style="list-style-type: none"> • Issue first competitive solicitation for Buildings of Excellence Competition. <p><u>Milestone 4 (2019) - Complete</u></p> <ul style="list-style-type: none"> • Contract with awardees for Buildings of Excellence Competition. <p><u>Milestone 5 (2019) - Complete</u></p> <ul style="list-style-type: none"> • Issue second solicitation for Net Zero Energy/Carbon Competition. <p><u>Milestone 6 (2019) - Complete</u></p> <ul style="list-style-type: none"> • Contract with awardees for second Net Zero Energy/Carbon Competition. <p><u>Milestone 7 (2019) - Complete</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 8 (2019) - Complete</u></p> <ul style="list-style-type: none"> • Issue solicitation to launch Simplified Design and Tools: Model Measure Packages activity. <p><u>Milestone 9 (2020) - Complete</u></p> <ul style="list-style-type: none"> • Issue second competitive solicitation for Buildings of Excellence Competition. <p><u>Milestone 10 (2020)</u></p> <ul style="list-style-type: none"> • Issue competitive RFP for Simplified Design and Tools: Online Platform development. <p><u>Milestone 11 (2020)</u></p> <ul style="list-style-type: none"> • Issue awards for Round 2 of Buildings of Excellence. <p><u>Milestone 12 (2020)</u></p> <ul style="list-style-type: none"> • Issue awards for Round 3 of Net Zero Energy Commercial/Carbon Competition. <p><u>Milestone 13 (2021)</u></p> <ul style="list-style-type: none"> • Issue awards for round 3 of Buildings of Excellence. <p><u>Milestone 14 (2021)</u></p> <ul style="list-style-type: none"> • Issue awards for round 4 of Net Zero Energy Commercial/Carbon Competition. <p><u>Milestone 15 (2022)</u></p> <ul style="list-style-type: none"> • Release online platform to market. <p><u>Milestone 16 (2022)</u></p> <ul style="list-style-type: none"> • Announce awards for Round 5 of Net Zero Energy Commercial/Carbon 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%. • 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.
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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

An annual commitment budget for all activities included in this chapter is shown in Appendix B. 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 in Appendix B is intended for informational purposes only. Up to \$1,000,000 of alternative funding sources will be used annually for the Net Zero Energy Commercial/Industrial Competition to offer the program state-wide in areas such as Long Island.

24.1.7 Progress and Performance Metrics

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.

Benefits shown in Appendix B, listed as direct, 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.

Benefits shown in Appendix B, 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 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 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.

24.1.8 Fuel Neutrality

Fuel Neutrality⁴	<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/annual ton of carbon, compared to a cost of \$984/annual ton of carbon in an electric only scenario.
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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. 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.</p> <p><u>Test-Measure-Adjust Strategy</u></p> <ul style="list-style-type: none"> 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 are currently underway and will provide additional insights that will allow NYSERDA to adjust the strategy. These key indicators include but are not limited to: the number of advanced buildings and units built in NYS, participants attending workshops/trainings and projects utilizing model measure packages. Annual 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.
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⁴ Fuel neutral \$/ton values reflect direct annual CO₂e emission reductions.

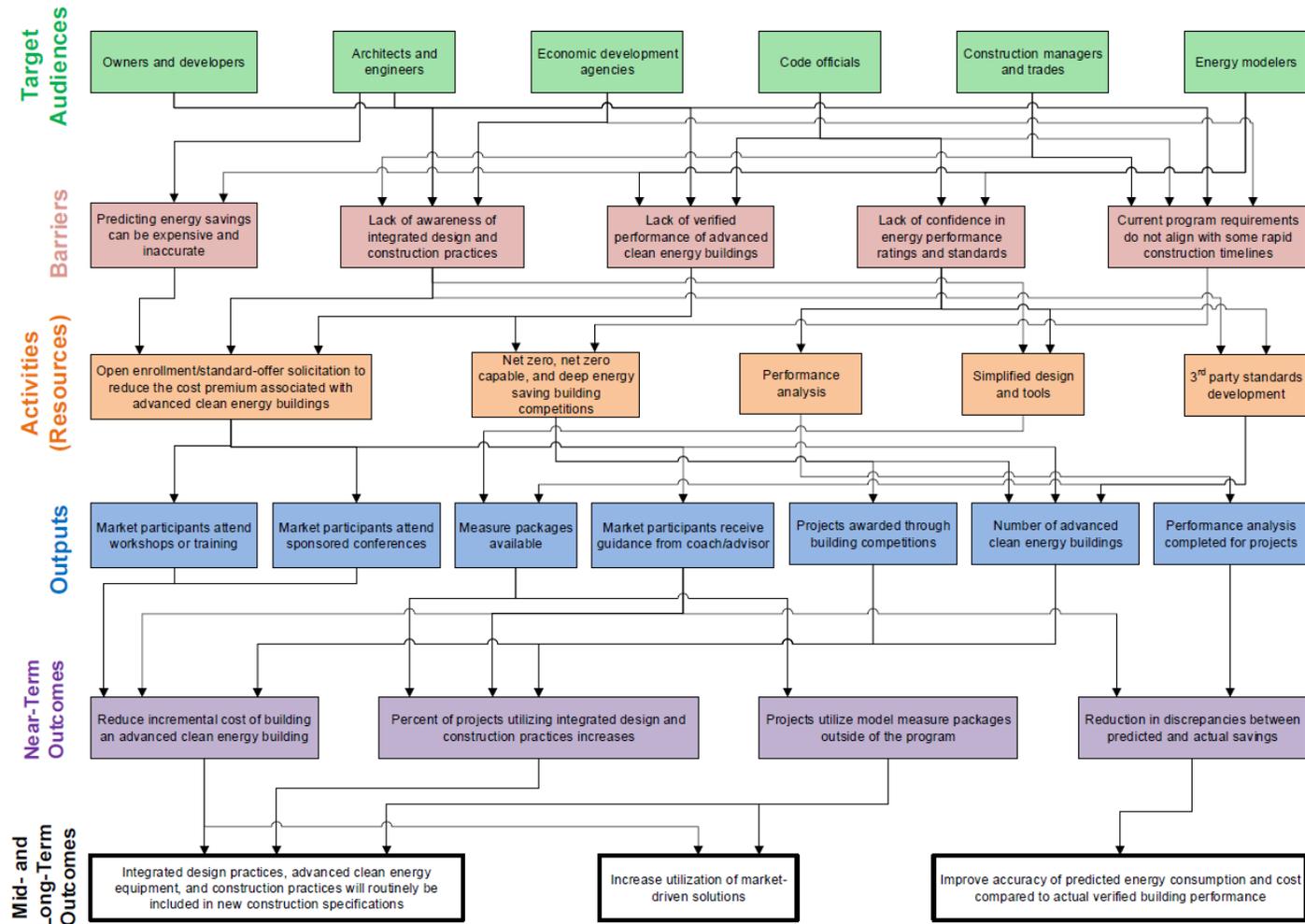
	<p><u>Impact Evaluation/Field Verification</u></p> <ul style="list-style-type: none">• An initial impact evaluation is planned for 2021 and an update is planned for 2023.• Data from Field Verification/Impact Evaluation can be used to help lend confidence in the market, especially among other end users.• 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).
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Verified Gross Savings Specifications

Verified Gross Savings Specification Form	
Date of ETIP/SEEP/CEF filing: See Cover Page	
CEF Chapter Name: New Construction	
Initiative Name	New Construction – Market Rate and LMI
Sub-Initiative Name(s)	Net Zero Energy/Carbon Competition (2018)
	Buildings of Excellence Competition (2017)
Initiative Period	This initiative was originally launched in 2017.
Initiative Description	<p>Approximately 100 million square feet of new construction is built in New York State annually. These buildings are typically in operation for 50-100 years and often do not meet current NYS Energy Conservation Construction Code (NYS ECCC).</p> <p>This initiative provides incentives to spur net zero energy/carbon performance in construction projects. It will also provide support to the design community including developing design and construction protocols. These efforts will increase the energy efficiency of construction projects around the state for which benefits will be experienced for decades over the lifetime of the buildings.</p> <p>All efforts in this initiative are mirrored in the LMI chapter, except for the Net-Zero Buildings sub-initiative.</p>
Gross Savings Methodology	<p>Direct energy savings are estimated for the Incentives effort only and are calculated by independent third-party contractors who utilize site-specific energy models to estimate savings above code.</p> <p>Direct energy savings are estimated for New Construction – LMI in the same manner as New Construction – Market Rate.</p>
Realization Rate (RR)	No RR has been determined for this program within the preceding five-year time frame.
Planned VGS Approach	<p>The Incentives subinitiative listed in this Investment Plan is planned to undergo Gross Savings Analysis for program period 2017-2020. An independent evaluation contractor will be procured by NYSERDA in Q4 2020 to perform this analysis and details related to the Gross Savings Analysis methodology will be submitted in an EM&V Plan in Q4 2020. The estimated completion of the GSA report is Q4 2021.</p> <p>Impact evaluation activity is planned to include independent third-party desk reviews of projects with follow-on onsite metering and monitoring to assess project performance.</p>
Exemption from EAM Status	N/A

Appendix A – Logic Models

LOGIC MODEL: New Construction – Market Rate



Appendix B | Initiative Budget and Benefits Summary

New Construction - Market Rate

Direct Benefit	Actuals	Actuals	Actuals	Actuals	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Plan	Total
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Energy Efficiency MWh Annual	-	-	5,394	5,058	59,153	54,691	30,027	-	-	-	-	-	-	-	-	154,323
Energy Efficiency MWh Lifetime	-	-	120,990	113,936	1,335,716	1,237,552	668,694	-	-	-	-	-	-	-	-	3,476,888
Energy Efficiency MMBtu Annual	-	-	-	2,032	49,500	49,500	21,050	-	-	-	-	-	-	-	-	122,082
Energy Efficiency MMBtu Lifetime	-	-	-	48,200	1,224,000	1,224,000	523,100	-	-	-	-	-	-	-	-	3,019,300
Energy Efficiency MW	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	0
Renewable Energy MWh Annual	-	-	5,394	4,755	23,703	19,241	21,727	-	-	-	-	-	-	-	-	74,820
Renewable Energy MWh Lifetime	-	-	120,990	106,899	521,466	423,302	477,994	-	-	-	-	-	-	-	-	1,650,651
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	-	-	5,397	5,017	44,137	39,672	27,034	-	-	-	-	-	-	-	-	121,258
CO2e Emission Reduction (metric tons) Lifetime	-	-	121,066	113,049	995,510	897,285	602,054	-	-	-	-	-	-	-	-	2,728,963
Participant Bill Savings Annual	-	-	1,376,588	1,350,129	11,340,088	10,153,196	7,019,465	-	-	-	-	-	-	-	-	31,239,466
Participant Bill Savings Lifetime	-	-	30,902,583	30,475,807	254,923,874	228,812,250	155,893,699	-	-	-	-	-	-	-	-	701,008,213
Leveraged Funds	-	-	2,458,888	6,592,425	46,625,000	46,625,000	23,650,000	-	-	-	-	-	-	-	-	125,951,313

Indirect Benefit	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Energy Efficiency MWh Annual	-	-	-	-	27,194	-	-	-	-	208,034	-	-	-	-	208,034	443,262
Energy Efficiency MMBtu Annual	-	-	-	-	112,779	-	-	-	-	1,097,462	-	-	-	-	1,097,462	2,307,703
Renewable Energy MWh Annual	-	-	-	-	726	-	-	-	-	1,214	-	-	-	-	1,210	3,150
Renewable Energy MW Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	-	-	-	-	20,042	-	-	-	-	163,226	-	-	-	-	163,224	346,491
CO2e Emission Reduction (metric tons) Lifetime	-	-	-	-	456,633	-	-	-	-	3,629,352	-	-	-	-	3,629,302	7,715,287

Energy Usage	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	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	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Commercial Buildings	-	-	7	15	47	48	26	-	-	-	-	-	-	-	-	143
Dwelling Units	-	-	-	50	4,000	4,000	-	-	-	-	-	-	-	-	-	8,050
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	7	65	4,047	4,048	26	-	-	-	-	-	-	-	-	8,193

Budget	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Direct Incentives and Services	3,652,161	-	5,947,176	17,865,106	30,890,000	30,890,000	22,420,000	-	-	-	-	-	-	-	-	111,664,443
Implementation Support	-	6,060	723,891	3,170,781	6,865,735	4,288,492	-	-	-	-	-	-	-	-	-	15,054,959
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	-	-	899	808,893	1,750,000	1,750,000	-	-	-	-	-	-	-	-	-	4,309,792
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	3,652,161	6,060	6,671,966	21,844,780	39,505,735	36,928,492	22,420,000	-	-	-	-	-	-	-	-	131,029,194

Table Notes:

a. 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. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

b. 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) 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.

Appendix C | Initiative Outputs and Outcomes Summary

New Construction - Market Rate

	Indicators	Baseline (Before/Current)	2019 (cumulative)	2020 (cumulative)	2021 (cumulative)	2022 (cumulative)	2023 (cumulative)	2024 (cumulative)	2025 (cumulative)
			Target						
Outputs	Number of housing units recognized through Buildings of Excellence competition	0	0	1359	2359				
	Number of advanced clean energy housing units in NYS	1,584	6,017	8610	12610	13910			
	Number of advanced clean energy commercial buildings in NYS	9	69	178	208	215			
	Number of projects awarded through the Net Zero Energy/Carbon Competition	0	32	33	45				
	Number of participants attending workshops and trainings	0	660	2400	3400				
	Number of case studies developed and distributed	0	9	38	48				
	Number of model measure packages available	0	9	5	10				
	Number of Projects that utilize coach/advisor	0	60	12	22				
	Number of projects that complete a Performance Analysis through the program	0	17	10	20				
	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	0.08	0.08	0.07	0.07	0.06	0.05
	Number of attendees at sponsored conferences	0	0	5000	10000				
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%	2%	3%	3%	4%	4%	5%
	Projects that utilize model measure packages outside of the program	0	22	5	15	25	40	60	100
	Discrepancies between predicted and actual savings	TBD	Within 18% accuracy for more than 50% of projects	Within 18% accuracy for more than 50% of projects	Within 18% accuracy for more than 50% of projects	Within 15% accuracy for more than 50% of projects	Within 15% accuracy for more than 50% of projects	Within 12% accuracy for more than 50% of projects	Within 10% accuracy for more than 50% of projects

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.