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

Clean Energy Fund: Commercial Chapter

Portfolio: Market Development

Submitted by:

The New York State Energy Research and Development Authority

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Clean Energy Fund: Commercial Chapter		
Revision Date	**Description of Changes**	**Revision on Page(s)**
April 29, 2016	Original Issue	Original Issue
May 20, 2016	Real Estate Tenant: Clarifying language added to Tables 3 and 5. Real Time Energy Manager: Corrections made to Tables 9 and 10.	9-11 and 21-22
June 23, 2017	Real Estate Tenant: Revised Tables 1, 2, 4, and 5 to reflect revised timing of budget and benefits. Real Time Energy Manager: Revised initiative name to Energy Management to better reflect initiative; increased funding to reflect Remote Energy Metering activities. Revised text and Tables 7, 8, 9, 10, 11 and 12 to reflect these revisions as well as shift in timing of budget and benefits. REV Campus Challenge: Increased funding based on initial market response; Revised Tables 13, 14, 16, and 17 to reflect shift in timing of budget and benefits and benefits associated with additional funding.	Multiple
November 1, 2017	Energy Management: Updated the baseline values in Table 3 to reflect latest data available and adjusted cumulative targets accordingly to incorporate baseline findings. Real Estate Tenant: Updated the baseline values in Table 9 to reflect latest data available. K-12Schools: New initiative filed.	Multiple
March 1, 2019	Energy Management: Increased funding for Market-Rate Multifamily Real Time Energy Management (RTEM) Program based on increased market response; Revised Tables 7, 8, 9, 10, 11, and 12 to reflect actual values and budgets and benefits associated with additional funding.	Multiple
April 19, 2019	K-12 Schools: Renamed initiative P-12 Schools; and updated milestones Energy Management: Renamed initiative Energy Management Technology 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.	Multiple
June 15, 2020	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.	Multiple

	Energy Management Technology has been revised to incorporate the Industrial RTEM component previously approved under Energy Management Practices. Appendix B & C updated to reflect this move. RTEM Measure life has been adjusted (increased) following detailed data analysis. Appendix C of Real Estate Tenant has been updated to eliminate some outputs/outcomes that are no longer relevant to the plan.	
Feb 12, 2021	<u>Energy Management Technology</u> – increased funding for Multifamily Real Time Energy Management (RTEM); closed Commercial and Industrial RTEM program due to achievement of market exit goals; added funding for a new program "RTEM + Tenants" to support deployment of Energy Management systems and services in commercial leased office spaces; added funding for RTEM program targeted at difficult to reach commercial sub-sectors such as small-medium businesses. Revised text and budget and benefits to reflect these changes. <u>Real Estate Tenant</u> – reduced initiative funding by $10 million and closed technical assistance funding opportunity for tenant space efficiency studies and analysis. These funds will be transferred to the Energy Management Technology initiative to support the RTEM + Tenants initiative. Revised budget and benefits to reflect these changes.	Multiple
May 3, 2021	As part of the Annual Investment Plan & Performance Report (IPPR) process, NYSERDA has updated budget and benefit values to align with actuals for past years and adjusted budget and benefit forecasts for future years, as appropriate, based on experience to date. The investment plans have been updated to provide a bridge between committed and acquired planning. Committed budget and benefits summaries have been added to plan text, while Appendix B has been updated to reflect expenditure & acquired benefits plans. Appendix C updated for Energy Management Technology; properly listing indicators that were mistakenly listed under Energy Management Practices.	Appendix B 10-11, 22, 29-30, 39-40, Appendix B Appendix C
September 17, 2021	P12 Schools – added $36M to support the Gap 2 initiative listed in milestone 9. This Clean Green Schools initiative will provide professional services, technical assistance, and incentives for demonstrations. Revised budget and benefits reflect these changes.	Appendix B & C

4 Commercial

NYSERDA aims to enable business models in the Commercial sector that can broadly impact a diversity of buildings, owners, tenants and businesses. This work initially will focus on enabling both existing energy service companies and other types of entities that could provide energy efficiency as a combined offering, a service, or energy efficiency as by-product or an embedded offering in another service. NYSERDA will also seek to accelerate the deployment of smarter technology whether it's smart fixtures, equipment or building systems, or a comprehensive approach to a portfolio of buildings – taking advantage of the rapid development of smart devices streaming data to the internet and smarter applications for managing equipment and building services.

The Commercial strategy is anchored by decision-makers being able to more easily determine their options and have confidence in their investment decisions. NYSERDA's efforts in reducing soft costs and time frames and supporting credentialing, matchmaking and quality assurance in the marketplace will support increased investment opportunities and more affirmative investment decisions.

Initial initiatives launched in 2016 include: Commercial Real Estate Tenant which pursues energy efficiency in the commercial tenant segment; Real Time Energy Management (RTEM) which supports smart technology on a building or portfolio basis; and REV Campus Challenge, a segmentation strategy to use peer ratings, sharing, and supports to drive deeper energy efficiency and renewable energy in colleges and universities. Updates to those initiatives are included herein as follows:

- Uptake to the initial Commercial Real Estate offering was slower than anticipated and did not meet its 2016 projected targets. Beginning in October 2016, aggressive outreach and meetings with potential applicants revealed a minimum three-month development cycle between learning about the offering and committing to a project could be the likely cause, though continued market research is being conducted to inform the strategy. It is anticipated the strategy will still achieve its 2025 projected benefits; however, the investment plan was updated in June 2017 to reflect 2016 activity and a shifting of activity in years 2017-2025.
- Real Time Energy Management did not meet its 2016 projected targets. RTEM vendors began applying to the initial offer in October 2016, and NYSERDA has seen a steady increase in applications since. Market feedback indicates the strategy is on target to achieving its overall goals, although NYSERDA anticipates a six-month lag in its original projected 2016 targets. The investment plan was updated in June 2017 to reflect actual 2016 results and a shifting of projected achievements accordingly. This section of the chapter was also renamed Energy Management Technology to broaden the scope to explore less sophisticated remote energy management (REM) opportunities and to expand into other sectors, i.e. industrial and multifamily. In addition, market feedback and vendor capabilities have identified untapped potential in RTEM system enhancements and the targeted market

segment. As a result, $7 million was added to the pool of incentives and services to support the installation of additional controls components on RTEM systems, as well as projects outside of the commercial sector. These new projects are anticipated to achieve additional benefits at the same $/CO2 ton as originally projected. Budget and benefits were updated to reflect these adjustments.

- REV Campus Challenge exceeded its 2016 target of 40 colleges, signing 63 members. Workshops held in 2016 confirmed interest and need in additional financial support to obtain technical guidance, intern support and community reaching initiatives. As a result, an additional $2 million was added in June 2017 to the pool of incentives and services REV Campus Challenge is offering with additional direct benefits at the same $/CO2 ton as originally projected. Budget and benefits were updated to reflect these additions.

In 2017, a Technical Services initiative was filed and approved in the Multi-Sector Solutions Chapter, which commercial facilities are eligible for. This initiative will engage consultants and customers in exploring approaches to providing and receiving clean energy recommendations through technical analysis. The P-12 Schools initiative was also launched through the Commercial Chapter in 2017. This effort will provide schools and their service providers a framework for clean energy awareness and adoption that leverages existing capital planning cycles schools are already accustomed to.

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

In 2021, the Energy Management Technology initiative sunset its Real Time Energy Management program for commercial and industrial sectors due to high levels of market uptake and achievement of market exit goals. New funds were added to this initiative to continue to support market growth of Real Time Energy Management in Multifamily buildings. In addition, funds were added to this initiative to support a new program “RTEM + Tenants” to support energy management systems and services in leased commercial office spaces. As commercial office buildings seek a return to work, energy management systems and services for tenant spaces can help building owners and operators deliver a healthy and sustainable office environment to tenants. To support the new “RTEM + Tenants” initiative, the Real Estate Tenant initiative funding was reduced by $10 million; with these funds transferred to the Energy Management Technology initiative.

4.1 Real Estate Tenant

4.1.1 Overview

Present Situation	• New York State has the highest percentage of non-building owner (tenant) occupied space of any state and most of the tenant occupied space is concentrated in New York City. • In an individual commercial office building, somewhere between 40 to 60% percent of energy consumption is controlled by tenants and not the building's owners and managers. While heating, ventilation, and air conditioning (HVAC) and lighting are trending downward in energy use per square foot, tenant plug load is growing. • Energy is most often omitted from lease negotiations and not a priority in the space design process in part due to the split incentive between the tenant and the building owner. • The energy and non-energy benefits of energy efficiency improvements in tenant spaces are not well known and are overshadowed by the high cost of rent and other tenant expenses. • The split incentive issue between tenants and building owners and managers has been an ongoing barrier to incorporating clean energy technologies and practices into tenant spaces. While the issue is well known, a solution has not been presented by the market. •
Intervention Strategy	• NYSERDA will initiate this intervention with an offer to cost share an energy modeling and package development process for tenant office space within New York State. This would help to drive energy efficiency efforts during the commercial tenant lease and build out process by demonstrating to tenants a cost-effective approach to energy efficient high-performance office space as well as demonstrating to building owners and managers, brokers and architecture and engineering firms a cost- effective and replicable approach to delivering those spaces. • NYSERDA will also offer cost sharing on the development of new tools and resources that allow tenants greater visibility and manageability over their energy consumption, as well as tools that connect tenant level data with base building data. • For a visual representation of this strategy, please reference the flow chart entitled "Logic Model: Commercial Real Estate Tenant Initiative," which can be found in Appendix A.
Goals	• Build capacity, capability, and interest of architects and engineers to design and deliver above code energy efficiency in the commercial office space market. • Encourage building owners and managers to offer highly efficient office space as a value-added upsell during lease negotiations. • Stimulate demand for and investment in energy efficiency improvements in tenant spaces.
State Energy Plan/Clean Energy Standard Link	• The State Energy Plan identifies buildings as a major user of energy (~60%) and greenhouse gas (GHG) emissions in the State. Commercial office buildings account for 12% of this energy use. This strategy specifically addresses 7% of the total energy used in New York State. • The State Energy Plan also discusses the need to manage electricity demand to ensure efficient and reliable operation of the grid. This strategy is focused on the buildings which have the biggest impact on peak load and will enhance their ability to manage and reduce peak load.

4.1.2 Target Market Characterization

Target Market	The target market is commercial tenant space within Class A and B office buildings.
Market Participants	Architecture and Engineering (A&E) firms • Present space design options and energy efficiency improvements to tenant • Influence open space layout and perimeter vs interior enclosed space • Influence daylighting, lighting controls, and product selection (lighting design firms) Building Owners and Managers • Have knowledge of inventory of space to be turned over and timing of lease expirations. • Have leverage over the options presented to potential tenants and the associated pricing Real Estate Brokers • Present building and space options • Guide and influence the lease negotiation process • Educate tenants on energy efficient buildings and tenant spaces Commercial Real Estate (CRE) Tenants and Tenant Representatives • Demand energy efficiency improvements to base building systems • Demand high performing office space • Demand control over their energy usage and comfort within their space • Embrace opportunities for energy efficiency improvements Appraisers • Understand and evaluate energy efficiency improvements to base-building and tenant systems • Determine increase in building asset value due to improved tenant spaces Professional/Industry Associations • Advocate for different market participants and their needs • Trusted source of information and best practice sharing Energy Service Companies • Help A&E firms develop efficiency packages • Provide new energy saving technologies, tools, and software
Market Readiness	• Previous national demonstration projects conducted by the Natural Resources Defense Council (NRDC), have shown the economic benefits of high performing tenant spaces and have successfully engaged several industry leaders. Those projects which include some New York City (NYC) buildings, including NYSERDA's New York City office, have saved an average of 30% more energy than current code and $19,000 in annual energy bills. In the roll out of NRDC's work, NYSERDA funded five additional tenant spaces through its Technology & Market Development (T&MD) Funded Emerging Technology & Accelerated Commercialization (ETAC) initiative which will provide NYSERDA with more granular data to inform the overall strategy and approach to building capacity, capability and replicability of energy modeling. • An increasing amount of law firms, technology companies, and banks have corporate sustainability goals and see high performing office space as a necessity to recruit and retain new employees. • Energy-efficient improvements are often viewed as state-of-the art add-ons and as something that tenants use to showcase their space. • TenantStar, the federal initiative to benchmark energy consumption in tenant spaces, is currently under development and expected to launch in 2022. New York City is interested in being an early adopter of TenantStar and in preparation is working to launch a Landlord/Tenant Carbon Challenge in early

	2017. NYSERDA is working with the City in its efforts to launch the Challenge and will target its members for participation in this strategy.
Customer Value	Developing tenant-specific efficiency options: • The building owner or tenant chooses to model one tenant office space, averaging 50,000 square feet and an 8-year lease. • The cost of an energy model and packaged energy efficiency options specific to one tenant space is approximately $50,000. • In the initial years of the strategy NYSERDA will provide up to 50% of the cost of modeling without a project cap. These levels will be adjusted based upon market response and reduced if there is strong uptake by the market. Cost of the extra investment by the tenant: • The incremental cost to choose and implement packaged energy efficiency options is approximately $54,000. • Implementation of packaged energy efficiency options is projected to save an average of $19,000 in annual energy bills. Value to the tenant using its tenant-specific package: • At $19,000 in annual energy bill savings, high performing tenant spaces can expect to have a 4.2-year simple payback which fits within the typical 8-year lease term. This payback is 5.5 years without NYSERDA cost-share. • High performing tenant spaces also offer quantifiable gains in image, controllability, productivity and asset value. Leveraging specific tenant options to other building tenants with a building specific package: • The additional cost of creating a building-specific package for any tenant in the previously modeled building is approximately $6,500. • In the initial years of the strategy NYSERDA will provide up to 100% of the cost of modeling without a project cap. These levels will be adjusted based upon market response and reduced if there is strong uptake by the market. Value to the tenant when building owners and managers offer tenant specific design based upon a building-specific package and spread costs across multiple tenants: • At $19,000 in annual energy bill savings, high performing tenant spaces can expect to have a 2.9-year simple payback which fits within the typical 8-year lease term. This payback would increase slightly to 3.2 years without NYSERDA cost-share. • High performing tenant spaces also offer tenants quantifiable gains in image, controllability, productivity and asset value Value to the A&E firms producing the energy models and packages • Firms can offer clients an additional service during the design process due to the enhanced skills and experience of their designers. • Allows designers to gain confidence in their ability to model and deliver energy savings. Value to the Building Owners and Managers • Allows building owners and managers to offer new value-added options during the lease negotiation process. • Energy efficient tenant spaces allow base building systems to run more efficiently, lower operating costs, and potentially increase asset value.

4.1.3 Stakeholder/Market Engagement

Stakeholder/Market Engagement	• Voice of Customer data collection from one-on-one meetings with tenants, building owners and managers, architecture and engineering firms, and commercial real estate brokers. • NYSERDA will continue to work with stakeholder organizations and the commercial real estate market to inform, optimize and promote the strategy • Engage key market partners to gather real-time feedback on the success of the strategy, remaining barriers, and market changes • Outreach: In –person meetings, webinars

4.1.4 Theory of Change

Market Barriers Addressed	• Split incentive issue between building owner and tenant for financing of energy efficiency measures • Rapid lease negotiations and construction timelines limits opportunities to encourage tenant efficiency during the tenant fit-out process • Lack of consideration of energy efficiency during lease negotiations and low prioritization of efficient equipment in designing tenant spaces • Lack of information on the energy and non-energy benefits of energy efficiency improvements in tenant spaces • Comparatively low cost of energy relative to other tenant expenses
Testable Hypotheses	• If a tenant is presented with a custom modelled package demonstrating the potential energy savings, incremental project cost, and return on investment, then they will be motivated to choose an energy efficient space design, change behaviors and office culture. • If new tenants are presented with building-specific packages, then they will not need to model their space and will also choose an energy efficient space design, change behaviors and office culture. • If data, case studies, and testimonials from key market actors are developed, then peers will have more confidence in the packages and savings and will replicate energy efficient space design, change behaviors and office culture without NYSERDA cost share.

Activities	• Conduct targeted outreach to key building owners and managers, architecture and engineering firms, and tenant representatives
	• Encourage increased capacity and capability of energy modeling to architecture and engineering firms
	  o Development and up to 50% cost-share of tenant specific, energy efficiency packages.
	  o Development and up to 100% cost-share of building specific, energy efficiency packages
	  o Target 180 buildings and 200 to 350 tenants
	• Augment existing market intelligence to better target and position the offering
	  o Gain a more precise understanding of the turn-over of leased commercial office space and
	  o Learn how best to introduce energy efficiency to the multiple market actors involved in a transaction
	  o Learn how best to expand stakeholder relationships beyond building owners and managers and large tenants
	• Provide training and educational support
	• Adjust tools/packages to address unique values of different market segments
	• Analyze tenant space performance and billing data

	• Analyze building-specific packages for commonalities that could allow for standardization across space and building characteristics
	• Develop standardized office packages for the market sector
	• Validate, aggregate, and publish information on energy and non-energy benefits and best practices
	• Create tenant energy efficiency guidance manual
	  o Identify benefits of energy efficiency
	  o Provide technical guidance and calculations for energy savings
	  o Address energy efficiency measures specific to tenant office space
	• Create a data warehouse
	  o Collect tenant system level metrics to analyze trends in energy efficiency opportunities and tenant space design
	  o Share aggregated data with the marketplace to spur replication of package development, improve existing design and leasing tools, and inspire advancements in tenant level technologies
	• Develop supporting tools
	  o A tool that combines tenant level data (sub-meter and tenant system level) with whole building data
	  o Energy Efficiency add-ins for existing modeling/design software
	  o Templates for leasing contracts with performance bonus/expectations for energy savings for A&E firms

Key Milestones	<u>Milestone 1 (2020)</u> - Complete • Launch training to educate stakeholders about energy efficient tenant spaces <u>Milestone 2 (2021)</u> • Develop and disseminate tools and resources to promote landlord-tenant collaboration <u>Milestone 3 (2022)</u> • Create platform for tenant engagement, tools and resources <u>Milestone 4 (2023)</u> • Publish an informational resource on the impact of energy efficiency on tenant satisfaction and other co-benefits.
Goals Prior to Exit	• Architects and Engineers, and Brokers incorporate packages into existing business models and energy modeling and energy efficiency options are a standard service offering. • Class A Building Owners and Managers routinely meet tenant demand for energy efficiency above code and 20% of them, by square footage, present building-specific packages to prospective tenants during lease negotiations. • Penetration of methods and energy efficiency offerings into class B and C space will be an indicator that the modeling is efficient and precise and that tenants are acting on the packages. • An ever-increasing number of tenants that are presented building-specific or standardized packages adopt energy efficiency measures, generating demand for energy efficiency office space. • NYSERDA cost-share for energy modeling and package development decreases as market uptake increases • The strategy will progress from offering cost-sharing for energy modelling to enable energy efficiency package development and offerings in the market to providing resources in the form of tools or technologies that help building owners and tenants manage energy resources and optimize the performance of tenant spaces.

4.1.5 Relationship to Utility/REV

Utility Role/Coordination Points	• NYSERDA has shared information and met with each of the investor-owned utilities (IOUs) as well as with the Joint Utilities (JU) to discuss commercial initiatives, including CRE Tenant. The primary uptake of the initiative is likely in Con Edison territory. As this initiative gains traction with architecture and engineering firms, building owners and managers and tenants, it is expected to result in energy savings during tenant fit-outs and lease negotiations. Additional coordination is getting underway to provide a clear path for opportunities that are identified to seek out incentive support from IOU energy efficiency programs. Historically, given the nature of tenant fit-outs, projects were eligible for new construction incentives offered through NYSERDA and not the utilities. Therefore, this effort is also being closely coordinated with the evolution of new construction-based strategies. • Sub metering efforts and potential tenant level system data are additional points of coordination planned with the IOUs.
Utility Interventions in Target Market	• While none of the investor-owned utilities have a dedicated CRE Tenant initiative now, the target market in 2016-18 overlaps with utility key account initiatives. NYSERDA will coordinate with utilities on key accounts to optimize the overall impact of both NYSERDA and utility offerings and to avoid confusion and multiple outreach efforts. If successful with this initiative, NYSERDA foresees the potential for targeted tenant-based efforts to be an integral part of utility offerings in the future and will adjust its initiative accordingly.

4.1.6 Budgets

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

Funding Commitments

Budget	Plan Total	Previously Committed	Commitments Plan 2020	2021	2022	2023	2024	2025
Incentives and Services	10,243,251	4,600,251	3,643,000	2,000,000	-	-	-	-
Implementation	3,297,049	2,680,306	616,743	(0)	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-
Tools, Training and Replication	2,258,089	1,340,089	918,000	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-
Total	**15,798,390**	**8,620,647**	**5,177,743**	**2,000,000**	**-**	**-**	**-**	**-**

An annual expenditure budget for all activities included in this investment plan is shown in Appendix B alongside expected acquired benefits. Budgets do not include Administration, Evaluation, or Cost Recovery Fee; these elements are addressed in the Budget Accounting and Benefits chapter filing. The budget as presented in the Budget Accounting and Benefits Chapter will serve as the basis for any subsequent reallocation request. The additional level of detail presented within Appendix B is intended for informational purposes only.

4.1.7 Progress and Performance Metrics

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

Benefit Commitments

Direct Benefit (2016-2025)	**Plan Total**
Energy Efficiency MWh Annual	99,959
Energy Efficiency MMBtu Annual	111,456
Renewable Energy MWh Annual	-
CO2e Emission Reduction (metric tons) Lifetime	447,486
Participant Bill Savings Lifetime	111,277,997
Leveraged Funds	28,450,238

Indirect Benefit (2016-2030)	**Plan Total**
Energy Efficiency MWh Annual	341,000
Energy Efficiency MMBtu Annual	86,600
Renewable Energy MWh Annual	-
CO2e Emission Reduction (metric tons) Lifetime	1,401,684

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

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

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

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

4.1.8 Fuel Neutrality

Fuel Neutrality	NYSERDA intends to offer this program in a fuel neutral manner, offering cost-sharing to encourage more efficient use of all fuel types. It is anticipated that most tenant-based savings will be electric in nature, however, to properly model the tenant space, all systems regardless of fuel type will need to be included in the model to provide an accurate picture of energy consumption. Additionally, building owners and managers who participate on a building–wide basis will need to assess other fuels as part of the optimization on a building-wide basis. The model is fuel neutral and will provide recommended energy saving measures regardless of fuel type. This will help develop the market at the scale needed to achieve New York State's clean energy goals. Offering the program on a fuel neutral basis will allow NYSERDA to achieve a ton of carbon savings at a cost of $350/annual metric ton, compared to a cost of $388/annual metric ton in an electric only scenario. The cost of modeling will not be significantly

	impacted whether the approach is fuel-neutral or electric only. Therefore, potential electric efficiency reductions will remain the same but valuable potential fuel savings could be lost for the same funding.

4.1.9 Performance Monitoring and Evaluation Plans

Performance Monitoring & Evaluation Plan	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. <u>Test-Measure-Adjust Strategy</u> • Year 1-2: Test assumptions on the cost-effectiveness of converting a single tenant-specific energy model and package to an entire building-specific package. Assess the ability of energy modeling to fit within the tenant space design timeline. Evaluate the ability to extrapolate a single tenant-specific energy model and package to an entire building-specific package and the ability of energy modeling to fit within the tenant space design timeline. Test how building-specific packages can advise design without slowing down the leasing and fit-out process by a survey of current participants. Receive input from projects and Commercial Tenant stakeholders. Adjust program design if warranted. • Year 3: Test willingness of new tenants to use building-specific packages in lieu of custom tenant packages; survey to understand key decision points affecting the offering of tenant energy efficiency packages as a standard offering. Repeat Year 1-2 assessment. • Year 4-5: Aggregate and analyze data from NYSERDA-supported projects to verify realized energy savings above code and persistence of savings. Evaluate the ability of energy models to accurately predict energy savings for tenant spaces. Repeat Year 1-2 assessment. Annually gather market characterization data from CRE real estate databases <u>CRE Tenant Strategy M&V</u> • Validate energy model predictions • Validate energy savings through one-year M&V and five-year utility bill analysis. • Compare the CRE Tenant participating tenant spaces energy saving between and across building system types, within portfolios and across Classes <u>Market Evaluation</u> • 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 were completed in 2019 and provide additional insights that will allow NYSERDA to adjust the strategy. They include: volume and rate of turn-over of leased commercial office space, current use of building-specific above code energy efficiency approaches, real estate broker awareness and practices around incorporating energy efficiency into options into leasing dialogue, awareness and practices of architects and engineers regarding incorporating above code energy efficiency into tenant space designs, etc.

	• Regular (e.g., annual or biennial) updates to key performance indicators and measurement of market change, including: usefulness, uptake and outcomes of standardized efficiency packages; replication of commercial real estate building-specific packages into non-NYSERDA funded facilities; the models for replication; and the associated benefits. The first of these updates is planned for 2021. • Sources of data include intervention data, public and commercially available data, and primary data collection through surveys of key market actors. <u>Impact Evaluation/Field Verification</u> • The first impact evaluation is currently underway with the first update planned for 2021. • Evaluation M&V will be conducted for a sample of participating spaces/buildings, according to the International Performance Measurement & Verification Protocol (IPMVP) method(s) most appropriate given the improvements made. Evaluation M&V will rely heavily on the CRE data stream and analysis to validate program estimated savings. • Depending on the extent of replication identified in Market Evaluation, impacts will be examined for a sample of replication projects to ascertain the level of savings. • Data from Field Verification/Impact Evaluation can be used to help lend confidence in the market, especially among other end users.

4.2 Energy Management Technology

4.2.1 Overview

Present Situation	Energy Management (EM) is the common name for the management of building energy consumption from a combination of building data collection systems (e.g., meters, sensors, equipment feeds), analytics, and building data information services. There is a full spectrum of EM sophistication ranging from the basic, Remote Energy Management (REM), to the more advanced Real Time Energy Management (RTEM). The market includes vendors of systems and information services, with many vendors providing both. REM is a virtual building assessment tool that can provide a baseline of whole building performance quickly and cost-effectively, detecting energy savings potential and targeting energy efficiency projects. RTEM can show building management the actual state of building performance at any point in time. RTEM is utilized to capture the discreet data such as set points, power loads, flow rates, temperature and humidity, and feed the information back to building operators with key insights about operations and systems that they then use to fine-tune the building energy system operations and identify capital projects. EM is an enabling technology/service, however, and not the direct source of energy reductions. The site-specific opportunities are a function of the individual building in its current physical condition and the way it is operated. As such, there is wide variability in both the size of the opportunity and the degree to which the building managers needs to change how they operate the building. Since energy consumption is just one of many factors to be considered in operating a building, some opportunities may be discarded due to non-energy impacts, such as staffing,

	cost or tenant/occupant impact. Some installed systems have been abandoned or are underutilized due to site-specific issues and therefore have failed to produce economic returns. Furthermore, EM related services and technologies are advancing at a rate more rapid than most potential customers can keep up with, which leads to a significant knowledge and confidence gap in the market. Due to the RTEM initiative's success in reducing market uncertainty in performance and return on investment of RTEM systems and services in large commercial and industrial buildings, the RTEM offering for commercial and industrial customers will be wound down in Q1 2021. NYSERDA will subsequently launch a new initiative called "RTEM + Tenants" to accelerate investment in EM systems and services for commercial office tenants. Extending EM monitoring and analytic capabilities to more systems, integrating those which were previously siloed (HVAC, occupancy, lighting) as well as tenant-controlled loads offers a significant opportunity for further energy conservation and building optimization. There are a number of solution providers beginning to offer EM solutions for tenant spaces and it is anticipated that demand for these services will grow in light of COVID-19 and a return to office work.
Intervention Strategy	The market is ripe for leveraging the value of EM and driving scale as the upfront costs are dropping and the potential sites for application of EM are growing both from a financial and technical perspective. Inclusion of commercial tenant energy monitoring and management in EM systems has previously been cost prohibitive and deferred due to leasing and split incentive issues. However, current market conditions offer an opportunity to overcome these barriers as insights into occupancy by time and location is an important element of COVID-safe operations. The EM intervention strategy have four elements that build on NYSERDA's reputation as a source of objective and credible technical advice and information, in addition to catalyzing private investment through NYSERDA investment in focused areas of: • Assisting building owners in the identification of EM system and service that meet threshold qualifications. • Providing independent technical advisement to building owners that invest in EM. • Investing in EM systems and services to stimulate the current market and leverage the expected natural growth. • Gathering, analyzing and sharing learning and successes to further stimulate investor confidence and growth. For a visual representation of this strategy, please reference the flow chart entitled "Logic Model: Energy Management (EM)," which can be found in Appendix A.
Goals	• Increase awareness of EM and data analytics capabilities in the market. • Reduce customer acquisition costs and project development costs. • Reduce soft costs for a broad segment of building owners interested in obtaining information about their building energy performance. • Leverage natural market growth by addressing upfront risk and downstream returns through an open enrollment offering and technical support to double the expected year over year growth rate of 16% to 32% for the next five years. • Improve the predictability of returns from RTEM investments by engaging in studies/pilots which provide replicable approaches and assessment tools.

	• Assist in the development of the capabilities and business models of the RTEM service vendor community through sharing of data, case studies, best practices and identification of qualifications. • Demonstrate cost-effectiveness of RTEM projects that extend into tenant-controlled loads
State Energy Plan/Clean Energy Standard Link	• The State Energy Plan identifies buildings as a major user of energy (~60%) and GHG emissions in the State. This strategy further reduces energy consumption in buildings by 8-20% as a function of how buildings are operated above and beyond the efficiency of the installed equipment. This approach should apply to buildings accounting for 60% of energy usage. It specifically addresses 4% of the total energy used in New York State. • The State Energy Plan also discusses the need to manage electricity demand to ensure efficient and reliable operation of the grid. This strategy is focused on the buildings which have the biggest impact on peak load and will enhance their ability to manage and reduce peak load.

Target Market Characterization

Target Market Segment(s)	EM techniques are applicable to all building types and organizational structures. Existing and new construction commercial, industrial, and multifamily buildings can benefit. The initial target sector for this initiative was existing commercial buildings. However, due to interest from building owners and vendors, the initiative was expanded to support Multifamily and Industrial sectors. After an initial period of slow growth, the EM market for commercial buildings saw high uptake in commercial office, retail and healthcare sub-sectors, particularly for buildings located in downstate New York. Due to the level of market uptake, NYSERDA sunset its commercial and industrial RTEM offer in Q1 2021. Multifamily buildings are still eligible to participate in this initiative and NYSERDA will release targeted EM offerings to support adoption of EM systems and services in hard to reach commercial sub-sectors. EM in commercial tenant spaces is widely applicable to the commercial office market. NYSERDA expects interest from real estate portfolio owners as well as large office tenants who are looking for better data to inform building optimization in a COVID-context as well as cost-effective energy efficiency strategies to ensure compliance with NYC Local Law 97 greenhouse gas emissions caps.
Market Participants	• EM system providers • EM service providers • ESCOs • Building owners/management firms • Building operators • Office tenants
Market Readiness	• Many end users currently employing EM have indicated that EM is ready for broader deployment. • EM system and service providers see specific opportunity in the target market segments that have been identified above. • Potential end users in the target market segments are receptive to the technology and its potential impact on energy consumption. Both end users and RTEM system and service providers have expressed interest in partnering with NYSERDA to help demonstrate and "de-risk" EM investments.

	• Both EM system and service providers have interested potential customers that are reluctant to invest due to the lack of independent technical advice to better understand their site-specific risks and opportunities. The risk includes both system design and post-installation application of the information to change building operations. • Current EM system and service providers have expressed an ability to meet increased market demand. • EM platforms and service delivery models are maturing at a rate more rapid than customer awareness can keep up with, making it more difficult for customers to understand the various options available. • Building owners are actively searching for solutions to address tenant energy consumption as a means of limiting exposure to fines associated with NYC LL97 • New York utilities have expressed interest in offering RTEM type programs to their customers and NYSERDA is in current discussion with multiple NY Utilities about results to date from the RTEM program.
Customer Value	• Installing EM provides the typical end-user with annual energy bill savings ranging from 8 to 10% across all fuels. ○ Expansion of EM into commercial tenant space is expected to result in additional energy savings to the end user • EM will help reduce operations and maintenance costs, in addition to energy bill savings by identifying the relationships between equipment settings and actual conditions as well as indicating when equipment performance is degrading. • Building owners/management firms can leverage the benefits of installing EM systems by applying the knowledge and operating methodologies learned across their portfolios. • NYSERDA's identification of qualifications and companies that meet those qualifications as well as provision of independent technical advice will reduce customer procurement time and costs. • Provision of post installation advice and training for building operators will accelerate the application of information obtained from EM and maximize the value obtained from the investment. • NYSERDA's investments in specific projects will decrease the payback period and increase the persistence of projects (e.g., decrease the risk of projects being abandoned or EM being under-utilized). This will help to build a library of learnings and successful case studies to further stimulate confidence and growth in the EM market.

Stakeholder/Market Engagement

Stakeholder/Market Engagement	Engagement To-Date: • Consulted with the New York Power Authority's (NYPA's) NY Energy Management Team, which is assisting state buildings in adopting Executive Order (EO) 88 guidelines through the deployment of RTEM, to capitalize on their expertise and incorporate lessons learned into this strategy. • U.S. Department of Energy (DOE) Better Buildings Team have launched the Energy Management Information Systems (EMIS) campaign of which EM is a component. NYSERDA has participated in this effort and utilized materials and data obtained from this effort to inform this strategy. • Consulted with NRDC, which has run a national RTEM pilot with buildings like NY buildings, in developing requirements for vendors and strategy. • Market Interviews with EM vendors and customers have informed this strategy.

	• Launched EM Qualified Vendors List in coordination and consultation with NYPA. • Continued engagement with industry experts and New York stakeholders to review progress and help guide evolution of EM strategy to maximize impact • Established Peer-to-Peer Exchanges between and among current users of EM. • Periodically solicit the EM system and service providers for identification of both issues and new opportunities to improve results and expand the EM market. • Supported commercial and multifamily real estate portfolio owners' efforts to integrate RTEM into their capital planning processes. • Conduct regular on-site visits to buildings investing in EM to maintain an understanding of their experiences, needs, and challenges. Solicit suggestions for improving results and NYSERDA's role. • Conduct webinars for potential customers and the EM system and service providers to understand both supports available and learnings from installed EM projects and studies. • Market evaluation activities are conducted on an annual basis to understand and respond to customer and vendor satisfaction. The results of the evaluations are communicated to program staff where necessary customer engagement and process efficiency improvements are later implemented. • Conducted round table discussions with members of REBNY and NY Energy Consumers' Council to understand challenges and opportunities of commercial tenant energy management.

Theory of Change

Market Barriers Addressed	• **Customers uncertain of necessary vendor qualifications or best approach to procure:** Potential customers are often interested in the concept of EM and the potential benefits it could provide but are unsure of how to identify a qualified vendor and select either the system or service provider that best meets their needs. • **Lack of unbiased information on qualifications and performance:** Lack of centralized third-party independent information with regard to either qualifications or system performance compounds the issue and most customers ultimately do not invest in EM due to the lack of readily available and reliable information to assist them. • **Difficulty in assessing site-specific design requirements and associated cost:** Site-specific design often leads to the need to work through many options during the initial installation of meters and information technology (IT) equipment. • **Difficulty in assessing site-specific return on investment:** Investment does not guarantee a return; the return comes from changing the method of operating the building and is impacted by the condition of the building and its operating characteristics prior to installation. For EM in tenant spaces, the benefits of investment will accrue to both building owner and tenant and will vary based on lease arrangement and tenant space configuration. • **Lack of persistence due to learning curve between receiving information and how best to apply it:** EM systems can provide a large volume of new information and point to many potential issues. Building owners and tenants without proper support or understanding have limited the use of the information and in extreme cases some have abandoned their systems.

	• **Challenge of integrating multiple systems:** EM systems can integrate multiple previously siloed building systems, including tenant-controlled loads, into a centralized platform that leads to improved building performance and automation, but technical complexity, cost, and vendor uncertainty are significant deterrents holding back private sector investment.
Testable Hypotheses	• If NYSERDA provides incentives for EM systems and information services, it will accelerate the growth of the EM market in NYS, helping it to mature faster than currently forecasted. • If there is easy access to qualified vendors, a simplified implementation process, proof of energy savings, and demonstrated O&M benefits of EM then customers will incorporate EM into their building operations without need for further NYSERDA incentives. • If NYSERDA provides education and focused vendor support for operators, the depth and persistence of energy savings will improve, and EM will better inform future capital investments.

Activities	<u>Stimulate the market to invest in EM and enhance the success rate of these installations</u>:
	• Create a qualified vendor list for both systems and services.
	• Provide open enrollment incentives for EM systems/installation
	• Provide open enrollment incentives for EM service subscriptions/analytics
	• Provide independent expert EM advisory services and training.
	
	<u>Stimulate the market to invest in EM for tenant spaces and enhance the success rate of these installations</u>
	• Create a qualified vendor list for vendors that have capabilities to integrate building systems beyond HVAC to RTEM platform, including in tenant spaces
	• Provide open enrollment incentives for EM systems and services that integrate tenant spaces
	• Provide independent expert EM advisory services and training
	
	<u>Apply the knowledge and experience gained from initial installations to replicate success and build market confidence in EM investment</u>:
	• Create EM technical guidance documents of best practices, including for EM in tenant spaces
	• Incentivize pilot and demonstration projects that provide greater insight into EM benefits by:
	  ○ targeting sectors that traditionally have not utilized EM such as small and medium businesses
	  ○ monitoring data points not regularly trended to find deeper energy savings
	  ○ exploring EM applicability to load management on top of energy efficiency
	  ○ working more closely with service providers to learn about successful business models that could be replicated
	• Publish case studies
	• Establish peer-to-peer exchanges
	
	<u>Improve the effectiveness of this strategy and build assets to support its effectiveness</u>:
	• Enable the creation of an EM analytics training platform
	• Solicit ongoing market feedback from stakeholders, service providers and end users to confirm usefulness of intervention efforts

	• Establish data warehousing to collect project and system level EM performance metrics. Analyze trends in identified energy efficiency opportunities, persistence and common practices to share with the marketplace to spur replication. • Partner with utilities and building owners to conduct load flexibility pilots, leveraging the capabilities of RTEM systems
Key Milestones	Milestone 1 (2016) - Complete • RTEM Advisor under contract to begin development of market standards. Milestone 2 (2016) - Complete • Open enrollment incentive offering for RTEM released. Milestone 3 (2016)- Complete • Request to establish a list of qualified RTEM vendors released. Milestone 4 (2017) - Complete • RTEM Program revision to incorporate Test-Measure-Adjust. Milestone 5 (2017) – Complete • Develop and release RFP for qualified EMIS vendors. Milestone 6 (2017) - Complete • Solicit and contract with EMIS assessment provider(s). Milestone 7 (2017) – Complete • Develop and disseminate a matrix or list of qualified EMIS vendors Milestone 8 (2017) – Complete • Develop solicitation for participants. Milestone 9 (2018) - Complete • Competitive solicitation for REM vendors released. Milestone 10 (2019)- Complete • RTEM vendors begin to use RTEM incentives to integrate multiple systems within a building. Milestone 11 (2019) – Complete • Distribute list of qualified EMIS vendors. Milestone 12 (2019)- Complete • RTEM Technical Guidance Document is published with plans to add content and update as needed. Milestone 13 (2019) – Complete • RTEM vendors begin to use RTEM incentives to offer small and medium building owners RTEM subscriptions with no upfront cost. Milestone 14 (2021) • NYSERDA makes publicly available anonymized RTEM project data to support market confidence in performance of RTEM systems and services. Milestone 15 (2021)

	• NYSERDA issues challenge to entrepreneurs and innovators to explore RTEM data sets to advance efforts at demand reduction and peak load shaping. <u>Milestone: 16 (2021)</u> • RFQ issued to qualify vendors that meet advanced capability and performance standards for RTEM + Tenants projects <u>Milestone: 17 (2021)</u> • PON issued with open enrollment incentives for RTEM projects that extend into commercial tenant spaces <u>Milestone: 18 (2021)</u> • PON issued with open enrollment incentives for RTEM projects that serve small-medium businesses and other hard to reach commercial buildings <u>Milestone: 19 (2022)</u> • NYSERDA publishes first year progress report with information on the vendors, portfolio owners, and market feedback on the RTEM + Tenants program <u>Milestone: 20 (2024)</u> • NYSERDA releases case studies and publicly available aggregated data sets of RTEM + tenants projects documenting energy savings achieved in tenant spaces, proving out cost-effectiveness
Goals Prior to Exit	• REM is recognized as a reliable means to monitor facility's energy usage patterns and identify opportunities for energy and cost savings. • The termination of this intervention will be based upon a significant reduction in both the upfront costs of RTEM design/installation and Return on Investment uncertainty associated with implementing RTEM in a specific vertical. NYSERDA will survey the market periodically to measure progress in these areas. NYSERDA plans to invest equal amounts in systems and information services for five years. If system costs drop faster than anticipated, NYSERDA will reduce or eliminate its incentives for system costs earlier than planned. • Due to reduced customer uncertainty in the performance and return on investment of RTEM systems and services, as well as the quantity and quality of vendors with RTEM offerings, NYSERDA is winding down its base building RTEM program for large commercial and industrial sectors in Q1 2021. • A market penetration rate of 10% in commercial buildings greater than 500,000 sqft in the target market sectors (Commercial Office, Retail, University/College, Healthcare) has been achieved and should be significant enough to address the aims of this incentive investment and initial offerings. A market penetration rate of 20% of total commercial office square footage was achieved. • NYSERDA expects significant gains in the development of this technology. As performance is proven and cost reductions are achieved a market penetration rate of 5% will be achieved across all Multi-Family buildings greater than 100,000 sqft. Prior to market exit, the goal is for ten of the largest multifamily portfolio owners to deploy RTEM across four or more of their buildings. • The strategy will progress from offering open enrollment incentives for base building systems to targeted initiatives that address harder to reach market segments such as commercial office tenants, affordable multifamily housing, and small-medium businesses. • Market exit for the RTEM + Tenants strategy will occur once a 5% market penetration rate in NYC commercial office buildings, estimated at approximately 30 million square feet, has been achieved. NYSERDA expects to work with fifteen

	of the largest portfolio owners to support two to four successful and replicable projects within each of their portfolios. Once commercial portfolio owners have confidence that RTEM + tenants projects are a cost-effective approach to reducing tenant energy consumption, it is expected that additional subsidy will not be required.

Relationship to Utility/REV

Utility Role/Coordination Points	• NYSERDA has shared information and met with each of the Investor-Owned Utilities (IOUs) as well as with the Joint Utilities (JU) to discuss commercial initiatives, including EM. The likelihood of EM market activity in New York City and other dense urban environments led to additional discussions with Consolidated Edison and National Grid. Additional coordination is underway to connect energy efficiency opportunities identified by EM projects with IOU offerings. • In addition to helping to identify energy efficiency retrofit and infrastructure opportunities, EM develops building specific load profiles. These profiles can serve as a basis for better informed and more flexible building operations that act as grid assets under Reforming the Energy Vision (REV) Pilots and innovative rates. The launch of REV pilots and rates benefits by customers who have the data and information to understand their load shape, and its potential for flexible response to price signals. • Continued collaboration will also be imperative as refinements and changes are made to related utility offerings under energy efficiency transition implementation plans (ETIPs) and REV.
Utility Interventions in Target Market	• NYPA's New York Energy Manager is promoting and installing EM across New York State buildings under EO 88 compliance. Some of those buildings pay into the System Benefits Charge (SBC) and are therefore eligible to participate in Clean Energy Fund initiatives. NYPA is participating as an RTEM vendor for its project portfolio. • NYSERDA sees EM as a critical tool that helps customers build the business case for capital investments in energy efficient equipment. In addition, there are sectors of the market where uptake of EM continues to lag, such as small-medium businesses, low-to-moderate income multifamily buildings, small commercial office buildings and grocery stores. NYSERDA is sharing RTEM program and project data with utilities to assist in their program planning efforts. • Con Edison recently launched a Building Efficiency Marketplace REV Demonstration project. Participants in the demonstration program are comprised of large commercial customers who have interval meter data. The project will provide the participants with access to analysis driven by REM data and insights, and later link that information to a wider platform that will allow energy service providers to subscribe to and get access to the analysis.

Budgets

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

Funding Commitments

Budget	Plan Total	Previously Committed	2020	2021	2022	2023	2024	2025
		---------- Commitments Plan ----------						
Incentives and Services	103,861,394	35,943,059	20,361,335	17,082,000	12,985,000	10,310,000	7,180,000	-
Implementation	6,710,681	3,840,815	956,441	661,970	561,456	410,000	280,000	-
Research and Technology Studies	-	-	-	-	-	-	-	-
Tools, Training and Replication	11,826,026	4,930,140	2,023,999	2,086,887	1,465,000	780,000	540,000	-
Business Support	-	-	-	-	-	-	-	-
Total	**122,398,101**	**44,714,013**	**23,341,775**	**19,830,857**	**15,011,456**	**11,500,000**	**8,000,000**	**-**

An annual expenditure budget for all activities included in this investment plan is shown in Appendix B alongside expected acquired benefits. Budgets do not include Administration, Evaluation, or Cost Recovery Fee; these elements are addressed in the Budget Accounting and Benefits chapter filing. The budget as presented in the Budget Accounting and Benefits Chapter will serve as the basis for any subsequent reallocation request. The additional level of detail presented within Appendix B is intended for informational purposes only.

Progress and Performance Metrics

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

Benefit Commitments

Direct Benefit (2016-2025)	Plan Total
Energy Efficiency MWh Annual	1,328,400
Energy Efficiency MMBtu Annual	2,114,796
Renewable Energy MWh Annual	-
CO2e Emission Reduction (metric tons) Lifetime	8,079,231
Participant Bill Savings Lifetime	1,954,229,379
Leveraged Funds	1,048,407,313

Indirect Benefit (2016-2030)	Plan Total
Energy Efficiency MWh Annual	4,467,914
Energy Efficiency MMBtu Annual	6,144,027
Renewable Energy MWh Annual	-
CO2e Emission Reduction (metric tons) Lifetime	26,026,372

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

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

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

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

Fuel Neutrality

Fuel Neutrality	NYSERDA intends to offer this program in a fuel neutral manner, offering incentives on EM systems and services that identify energy efficiency reduction opportunities for all applicable fuel sources that a customer may utilize (electric, natural gas, oil). Offering the program on a fuel neutral basis will allow NYSERDA to achieve an annual ton of carbon savings at a cost of $158, compared to a cost of $230 in an electric only scenario[1].

Performance Monitoring and Evaluation Plans

Performance Monitoring & Evaluation Plan	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. <u>Test-Measure-Adjust Strategy</u> • Year 1: Reassess market requirements for Qualified Vendors List. Receive input from projects, industry experts, and other stakeholders. • Year 2: Receive input from projects, industry experts, and other stakeholders • Year 3: Review market response to open enrollment incentives. Analyze aggregated data from NYSERDA-supported projects to understand performance and market capabilities. • Year 4: Assess the success of EM pilots/demonstrations to inform new EM programming and initiatives. • Year 5: Wind down base building RTEM program for commercial and industrial sectors; reduce Multifamily RTEM incentive levels to sustain market funding. • Year 6: Assess requirements for Qualified Vendors list for RTEM + Tenants program through feedback from industry experts as well as initial response and capabilities of vendors applying to join Qualified Vendors List. Evaluate market response to reduced Multifamily incentive levels to determine if further reduction is necessary.

[1] If the Program were to operate on a fuel neutral basis, program funds would identify both electric and natural gas efficiency opportunities. If the Program were only to support electric efficiency the magnitude of savings would increase with the budget (i.e., all the program funds could be used to identify electric efficiency opportunities)

	• Year 7: Execute phase out of Multifamily market-rate incentive funding, based on achieving market exit goals. Assess project requirements and level of cost-share for RTEM + Tenants program based on projects submitted, real estate portfolio owner and vendor feedback. • Year 8: Assess project cost-share and RTEM + Tenants exit timing based on volume of projects submitted, remaining funding, and level of market interest. • Year 9: Execute market exit for RTEM + Tenants. <u>EM M&V Strategy</u> Programmatic M&V will provide the following: o Validate data quality of meters, sensors and systems o Validate energy savings and determine independent variables that can identify correlation for predicted saving models o Compare the EM-related energy savings between and across building types, within large building portfolios and across market sectors <u>Market Evaluation</u> • Market Evaluation will be aligned with the logic model and will include baseline and longitudinal measurement of key indicators of programmatic and broader market success. • Baseline measurements of key performance indicators were completed in 2018 and address indicators including: awareness of EM among owners, operators and providers, size of the current EM market, use of EM by decision makers to assess operational risk, use of EM to support broader energy efficiency goals, etc. • Regular updates (e.g., annual or biennial) and measurement of market change will occur once the program is underway. The first update was completed in 2019, and update is planned for 2021. • Sources of data for market evaluation include the open enrollment program, pilot data, public and commercially available data, and primary data collection through surveys of key market actors. <u>Impact Evaluation/Field Verification</u> • Measurement and verification at a sample of pilot facilities, according to the IPMVP method(s) most appropriate given the improvements made. It is anticipated that operational, maintenance and capital improvement projects will occur. M&V for pilot facilities will rely heavily on the EM data stream to validate program estimated savings. • Depending on the extent of replication identified in Market Evaluation, field verification with a sample of replication projects will potentially occur to ascertain the level of savings and compare it to potential identified, if feasible. • Data from Field Verification/Impact Evaluation will be used to help lend confidence in the market, especially among other end users.

4.3 REV Campus Challenge

4.3.1 Overview

Present Situation	• Some colleges and universities in New York State have demonstrated leadership in adopting clean energy practices and technologies while others have not advanced as far. • Various clean energy initiatives, challenges, peer groups, conferences and events to increase and encourage participation in energy initiatives exist in the current higher education market, but with only moderate to minimal uptake and resulting impacts.
Intervention Strategy	• Drive the implementation of additional clean energy projects and strategies at institutions of higher education and their surrounding communities in the state of New York by leveraging existing national and local Clean Energy Challenges and peer-based sustainability scorecards. NYSERDA will identify and acknowledge achievement of leaders and support and track the progress of all institutions. • Of the approximately 250 higher education institutions in New York State some have made substantial progress in energy efficiency gains and others are struggling to begin. For colleges and universities that have acted there is often little public recognition given for their adoption of clean energy projects, progress, and results. Recognition that does occur is limited in its distribution. Alternatively, colleges and universities embarking on their path to clean energy adoption would benefit from the lessons learned and knowledge transfer available from their peers. Increased recognition and a platform for peer exchange will stimulate knowledge of and implementation of clean energy projects in this sector. • In addition to recognizing accomplishments in clean energy, NYSERDA will work with the sector to identify gaps in available resources and provide solutions in the form of technical assistance, how to guides, competitions, or peer mentorship. This support will increase the rate at which clean energy technologies are adopted in the sector. • For a visual representation of this strategy, please reference the flow chart entitled "Logic Model: REV Campus Challenge," which can be found in Appendix A.
Goals	• To establish the value of and increase implementation of clean energy projects and strategies on campuses and within their surrounding communities in the State of New York. • Utilize higher education's capacity to conduct research and demonstrations, develop curricula and provide education and training to spur adoption and replication of innovative and successful clean energy projects both within and outside of institutions of higher education. • Engage students, faculty, and staff through the exchange of information within and among peer institutions • To generate an environment where campuses engage with surrounding communities to foster clean energy initiatives, and prospective students are more aware of an institution's commitment to clean energy/sustainability. This initiative called the REV Campus Challenge was launched in 2015 in conjunction with NYPA. Funding for the initiative to date has come from sources other than the CEF.
State Energy Plan/Clean Energy Standard Link	The REV Campus Challenge is part of the Sustainable and Resilient Communities efforts mentioned in the NYS Energy Plan. It is a joint NYSERDA-NYPA initiative, and some participating institutions will receive funding directly from NYPA or other non-CEF sources such as Regional Greenhouse Gas Initiative (RGGI) proceeds.

4.3.2 Target Market Characterization

Target Market Segment(s)	The target market is all New York State higher education institutions, at all levels of clean energy progress. This strategy will challenge institutions that are committed to clean energy goals to make progress toward those goals and engage and support institutions that have not yet set goals to take the necessary steps. REV Campus Challenge Member institutions will select one of three membership levels (Participant, Achiever, or Leader) illustrating their current progress toward clean energy goals. These membership levels will enable NYSERDA to more clearly identify and react to barriers to clean energy implementation and encourage peer-to-peer exchange of best practices and lessons learned. Additional sources of funding such as NYPA and RGGI will provide direct support to institutions that are not eligible for CEF funds. The most effective strategy for driving impact is to have an open initiative in the market itself.
Market Participants	• Institutional decision-makers will be targeted, with focused efforts on engaging: facility/energy managers, sustainability directors/coordinators, deans/faculty engaged in curriculum development, workforce training, and community outreach, as well as finance and other high-level executives as appropriate. • Several other key stakeholders will be engaged and leveraged to assist in driving REV Campus Challenge Membership, scaling clean energy implementation and incorporation into classroom and community activities, and sharing project validation data to recognize Member institutions, such as: o Second Nature (supporting organization for the Climate Commitments) o Association for the Advancement of Sustainability in Higher Education (AASHE) o Commission on Independent Colleges and Universities (CICU) o State University of New York (SUNY) Administration o NYPA
Market Readiness	• The market currently offers a number of clean energy commitment opportunities and resources targeting institutions that enable tracking and reporting of energy and GHG reduction: o The Climate Commitments (Formerly the American College and University Presidents' Climate Commitment) o NYC Carbon Challenge o AASHE's Sustainability Tracking, Assessment & Rating System (STARS) o NYPA Build Smart (EO 88) o DOE EnergyStar Portfolio Manager o University of New Hampshire's Campus Climate Calculator • Research by NYSERDA indicates that: o <30% of NYS private institutions have completed a climate action plan o 52 NYS institutions have committed to the Carbon Commitment (formerly the American College & University Presidents Climate Commitment or ACUPCC) as of December 2015, but over half of them have not updated their climate action plans since 2010 or earlier • Institution-based peer groups have begun to emerge to create a space for sharing knowledge, best practices, and lessons learned such as those below. Research by NYSERDA indicates that only about 30% of NYS institutions take advantage of New York Coalition for Sustainability in Higher Education (NYCSHE) membership and its benefits. The REV Campus Challenge will partner with these groups to find ways to increase membership and enhance discussions and resource opportunities: o NYCSHE o New York Presidents for Climate Action (NYPCA)
Customer Value	Recognition for the implementation of clean energy projects and strategies increases understanding and demonstrates the direct value (energy savings, GHG reduction) and indirect value (student recruitment, improved community relations) of these projects, which in turn results in the scale-up of the adoption of clean energy projects and

	initiatives as a means of recruiting students, managing energy costs, and improving public relations. Projected Benefit to Customer include: • Direct benefits to institutions will be realized as energy savings from the implementation of clean energy projects, which will result in cost savings for the institution. • The implementation of clean energy projects will also result in the reduction or mitigation of GHG emissions, a critical value-add to those institutions with GHG reduction goals. • As many prospective students look for institutions actively engaged in sustainability and clean energy initiatives on campus, participation in the REV Campus Challenge and other available market opportunities will increase the institution's visibility with regards to clean energy initiatives and will help recruit prospective students. • The REV Campus Challenge expands on current market clean energy opportunities to include community engagement in clean energy initiatives as a strategic goal for member institutions. Greater engagement of the community will improve public relations and increase visibility of positive actions within the institution.

4.3.3 Stakeholder/Market Engagement

Stakeholder/ Market Engagement	• June 2015 workshop to obtain feedback on REV Campus Challenge concept
	  ○ Approximately 70 representatives of Colleges and Universities attended
	  ○ Survey results indicated:
	  ▪ 76% of workshop attendees would recommend participation in the REV Campus Challenge to their institution. This included campuses that were already involved in national or local challenges.
	  ▪ 80% were interested in learning more about the REV Campus Challenge as it continued to develop
	• NYSERDA will continue to work with stakeholder organizations and the College and University market to inform, optimize and promote the strategy
	•

4.3.4 Theory of Change

Market Barriers Addressed	• Lack of state-level recognition for clean energy projects and strategies • Lack of knowledge and resources needed to develop an initial college and university specific roadmap/energy master plan for improving energy efficiency and reducing GHG emissions • Lack of knowledge sharing, and lessons learned among New York State institutions • Lack of coordination between campuses and communities in implementing clean energy projects • Lack of funding for clean energy projects and strategies
Testable Hypotheses	• If NYSERDA recognizes progress toward and achievement of NYS institutions' clean energy goals, then the adoption of clean energy projects and strategies on NYS campuses will increase. • If NYSERDA drives participation in existing clean energy commitment opportunities, resources and peer groups, then clean energy implementation on NYS campuses will accelerate because of improving knowledge sharing and demonstrating the value of clean energy projects and strategies.

	• If NYSERDA identifies gaps in the availability of needed resources and works with the market to fill the gap, then institutions will have greater confidence in and improved understanding of the value of clean energy projects leading to a greater number of projects being implementation and accelerated progress toward achieving clean energy goals.
Activities	• **Market Segmentation and Identifying Barriers**: Obtain an understanding of how institutions view their peers and how this relates to needs associated with clean energy implementation through market segmentation as well as identifying barriers and gaps to clean energy implementation. • **Steering Committee**: A steering committee of key market partners to provide insights and feedback during strategy development and implementation was created to launch the REV Campus Challenge in 2015. This committee continues to be a valuable resource. • **REV Campus Challenge Membership**: Targeted outreach and communication to drive REV Campus Challenge membership and ascertain needs. • **REV Campus Challenge Website**: Utilize a REV Campus Challenge website to provide access to membership, as well as information on resources, case studies, and links to encourage knowledge building and sharing of best practices. • **Leverage Existing Events**: NYSERDA will leverage existing events such as conferences and sustainability working groups. • **Leverage Existing Funding**: NYSERDA will leverage existing funding available from NYSERDA and utilities. • **Funding Support and Competitions**: Provide targeted and limited funding support for exceptional college and university based clean energy and sustainability projects. • **Knowledge Transfer**: Encourage knowledge transfer and the sharing of ideas, best practices, and lessons learned; provide targeted resources and professional connections. • **Leverage Existing Market Resources**: Encourage participation in other local, regional, or national sustainability initiatives to leverage existing market resources. • **Recognition**: Provide recognition of progress toward and achievement of clean energy goals by REV Campus Challenge Members, setting these institutions apart from their peers while demonstrating the value of clean energy projects. Recognition will take the form of website updates, press releases, and other college and university identified valuable practices. • **REV Campus Challenge Member Impact**: Gather information on member GHG emission reductions and energy savings to demonstrate REV Campus Challenge Member impact.
Key Milestones	<u>Milestone 1(2016-2019) - Complete</u> • 120 out of 250 institutions sign up to be REV Campus Challenge Members <u>Milestone 2 (2016-2019) - Complete</u> • Members make progress and receive recognition as demonstrated by new and revised planning, new commitments to sustainability goals and clean energy projects started and completed.
Goals Prior to Exit	• 60% of NYS institutions of higher education are REV Campus Challenge Members • 80% of all REV Campus Challenge Members have actualized road map/energy master plan for reducing GHG emissions. • Increase participation in peer groups (i.e. NYCSHE) by 30%

4.3.5 Relationship to Utility/REV

Utility Role/ Coordination Points	• The REV Campus Challenge will be operated in close collaboration with NYPA, who has a vested interest in the clean energy commitments and progress of its energy users and of public institutions in general. Representatives from Con Edison, National Grid, and NYPA are on the REV Campus Challenge Steering Committee. REV Campus Challenge Members will be encouraged to look to NYSERDA, NYPA, and other utility programs for funding and support opportunities as they move to implement projects. NYSERDA will coordinate closely with utilities to ensure institutions are aware of programs and offerings that may be relevant to their clean energy goals. • To operate a statewide effort within the CEF order language, direct support for institutions not eligible to receive CEF funds will come from other sources such as NYPA and RGGI. NYSERDA will also utilize outside funding support to leverage the investment of rate payer funds. •
Utility Interventions in Target Market	Utility prescriptive and custom incentive programs currently exist in and are available to the NYS College and University market.

4.3.6 Budgets

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

Funding Commitments

Budget	Plan Total	Previously Committed	2020	2021	2022	2023	2024	2025
		---------- Commitments Plan ----------						
Incentives and Services	14,262,212	6,385,030	6,515,573	240,000	360,000	420,000	240,000	101,609
Implementation	4,659,394	2,306,852	19,754	686,000	450,000	500,000	285,000	411,787
Research and Technology Studies	-	-	-	-	-	-	-	-
Tools, Training and Replication	2,728,396	184,042	50,000	300,000	523,339	523,339	523,339	624,338
Business Support	-	-	-	-	-	-	-	-
Total	**21,650,002**	**8,875,924**	**6,585,327**	**1,226,000**	**1,333,339**	**1,443,339**	**1,048,339**	**1,137,735**

An annual expenditure budget for all activities included in this investment plan is shown in Appendix B alongside expected acquired benefits. Budgets do not include Administration, Evaluation, or Cost Recovery Fee; these elements are addressed in the Budget Accounting and Benefits chapter filing. The budget as presented in the Budget Accounting and Benefits Chapter will serve as the basis for any subsequent reallocation request. The additional level of detail presented within Appendix B is intended for informational purposes only.

4.3.7 Progress and Performance Metrics

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

Benefit Commitments

Direct Benefit (2016-2025)	**Plan Total**
Energy Efficiency MWh Annual	108,199
Energy Efficiency MMBtu Annual	671,000
Renewable Energy MWh Annual	8,810
CO2e Emission Reduction (metric tons) Lifetime	1,413,823
Participant Bill Savings Lifetime	289,577,407
Leveraged Funds	71,130,066

Indirect Benefit (2016-2030)	**Plan Total**
Energy Efficiency MWh Annual	58,800
Energy Efficiency MMBtu Annual	365,000
Renewable Energy MWh Annual	3,870
CO2e Emission Reduction (metric tons) Lifetime	761,376

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

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

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

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

4.3.8 Fuel Neutrality

Fuel Neutrality	NYSERDA intends to offer this strategy to engage NYS colleges and universities in a fuel neutral manner. This will help develop the market at the scale needed to achieve New York State's clean energy goals. Offering the strategy on a fuel neutral basis will allow NYSERDA to achieve an annual ton of carbon savings at a cost of $223, compared to a cost of $381 in an electric only scenario.[2]

[2] Fuel neutral and electric only scenarios differ only in the assumed rates of implementation for electric and gas clean energy projects. The fuel neutral scenario assumes that, for active institutions, 65% of electric and gas clean energy projects will be implemented as a direct result of this strategy. The electric-only scenario assumes a higher implementation rate for electric projects (75%), but no gas projects resulting from this strategy.

4.3.9 Performance Monitoring and Evaluation Plans

Performance Monitoring & Evaluation Plan	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. **<u>Test-Measure-Adjust Strategy</u>** The REV Campus Challenge will roll out a number of resources, competitions, and initiatives to address C&U market barriers to implementation and to accelerate adoption of clean energy projects on NYS campuses. Validate energy savings resulting from competitions and initiatives through project specific reporting and M&V tailored to the clean energy project. Energy baseline and progress data is publicly available on those colleges and universities that are enrolled in AASHE STARS, the NYC Carbon Challenge or subject to EO 88. Data from these resources will be utilized to assist in documenting trends and validating energy consumption reduction. In addition, progress associated with this initiative will primarily be measured through a periodic (e.g., annual or semi-annual) survey of REV Campus Challenge Members. Data to be collected will include: "Has your institution –" • Reached any clean energy milestones or achieved any clean energy goals? • Hired new staff whose primary objective is to make sustainability/clean energy progress on campus? • Joined a clean energy initiative/commitment (i.e. the Carbon Commitment, AASHE STARS, etc.)? • Completed an energy master plan, climate action plan, GHG inventory? • Updated an energy master plan, climate action plan, GHG inventory? • Implemented a clean energy project with the goal of obtaining recognition through the REV Campus Challenge? • Leveraged NYSERDA or utility energy programs? • Installed a renewable energy on campus? • Implemented a clean energy project with the intent of improving campus resiliency? Responses to the survey will indicate general market shifts toward clean energy and sustainability and changes to the status quo and will be used by NYSERDA to ascertain the effectiveness of the initiative and adjust activities accordingly. Should an institution respond that they have implemented a project with the intent of obtaining recognition through the REV Campus Challenge, NYSERDA will reach out directly to get more information on the impact of that project. **<u>Market Evaluation</u>** • Market Evaluation consist of the activities described above under Test-Measure-Adjust. Evaluators will work closely with program staff to collect this data routinely and assess the effectiveness of the initiative. • Baseline measurements are scheduled to be completed in 2020 with an update in 2021.

	<u>Impact Evaluation/Field Verification</u> • Evaluation M&V is currently underway for a sample of participating spaces/buildings, according to the IPMVP method(s) most appropriate given the improvements made. It is expected that Evaluation M&V will rely heavily on pre- and post- project energy usage data to validate program estimated savings. • Data from Field Verification/Impact Evaluation can be used to help lend confidence in the market, especially among other end users.

4.4 P-12 Schools

4.4.1 Overview

Present Situation	• There are over 6,000 public and private schools in New York State that are estimated to spend approximately $1 billion on energy costs annually. • Schools are tolerant of longer paybacks (up to 18-years) as compared to other sectors, many of which prefer a payback of three years or less. • The Commissioner of Education requires schools to create five-year capital facilities plans and submit the executive summary to the New York State Education Department (SED) Facilities Planning Office when they plan to implement projects. Deeper retrofits and comprehensive projects are more common in schools as compared to other sectors due to these mandated capital planning financial cycles. • The average age of school buildings is over 60 years, and schools manage their assets with the expectation that they will always be there and own the structure. However, competition for resources and funding can limit or deprioritize investment in energy efficiency projects. • Schools have a history of use and trust of performance contracting and are interested in further assessing their clean energy opportunities. • Some schools in NYS have demonstrated leadership in adopting clean energy practices and technologies, while others have not advanced as far. Decision makers frequently lack sufficient information and the necessary staff time to execute clean energy investments. • The New York Public Authorities Law was amended to create the School Energy Efficiency Collaborative Act of 2016, naming NYSERDA as the lead agency in developing a collaborative program to reduce redundancy, raise awareness and promote the efficient implementation of public-school energy projects across New York State.
Intervention Strategy	• NYSERDA will engage the Pre-kindergarten through Grade 12 (P-12) sector in pursuing carbon savings and clean energy projects. This strategy will build on NYSERDA's reputation to provide independent and accurate information, by offering the following activities: o Coordinate a benchmarking program to encourage schools to measure, track, assess and compare their clean energy impacts across NYS. o Identify, leverage and promote existing market resources including funding programs, recognition programs[3] and clean energy events. o Provide direct financial incentives to schools for projects that the investor owned (IOU) utilities and other assistance programs do not cover, which will accelerate clean energy planning, analysis and installations. o Identify, publish and distribute clean energy case studies, as well as templates and guidance documents to facilitate replication of successful strategies as a matter of course during capital planning cycles. o Utilize guidance documents to provide a process for schools and their service providers to follow, starting at benchmarking and carrying through to implementation and maintenance of clean energy activities. • For a visual representation of this strategy, please reference the flow chart entitled "Logic Model: P-12 Schools," which can be found in Appendix A.

[3] Existing recognition programs have low participation rates from New York limiting the positive benefits such as sharing lessons learned and exposure of success stories that could occur. Two specific recognition programs this effort will target include the NYS Green Ribbon Schools Program and the NYS Environmental Excellence Awards.

Goals	• Stimulate demand and investment in clean energy across the P-12 sector. • Increase awareness of the value of energy efficiency and efficient operations and maintenance practices, for infrastructure that is almost entirely existing buildings. • 40% of school districts in NYS utilize clean energy benchmarking tool by 2025. • Service providers utilize the guidance documents as reference guides and have increased opportunities to facilitate clean energy investments in schools.
State Energy Plan/Clean Energy Standard Link	• The State Energy Plan identifies buildings as a major user of energy (60%) and greenhouse gas (GHG) emissions in the State. It further identifies NYSERDA to seek to address market gaps with new strategies that "unlock the potential of energy efficiency to reduce operating costs, spur private investment, and create jobs throughout the state", specifically naming benchmarking, expanding access to financing tools, serving as a credible information source, and helping to demonstrate value propositions as mechanisms to do so. • Through an increase in the use of benchmarking and providing targeted incentives, this initiative will help reduce commercial sector consumption, which is 30% of New York State's primary energy use. [4]. • This initiative also supports achievement of the Clean Energy Standard goal for renewable resource electric generation (50% renewable electric generation by 2030 – "50 by 30") by reducing the overall electric load, and therefore the amount of renewables necessary to meet the 50 by 30 goal.

4.4.2 Target Market Characterization

Target Market Segment(s)	The target market is P-12 public and private schools in New York State, the engineering consultants and contractors who serve them, and stakeholder groups with vested interest such as the New York State Education Department (NYSED) and the School Business Officials.
Market Participants	There are several market participants in the P-12 sector and many different stakeholder groups interested in impacting energy usage, student performance, and health in schools. The larger stakeholder groups and some of the major participants include: • New York Power Authority • NYS Office of General Services • State Education Department • BOCES • Superintendents of Schools (including NYS Council of School Superintendents) • Facilities Staff (including the NYS School Facilities Association) • School Business Officials (including NYS Association of School Business Officials) • The NYS School Boards Association • Energy Service Companies • Architects and Engineers • School Health Advocacy Organizations
Market Readiness	• The P-12 Schools sector is prepared to take on new initiatives and capital improvement projects relating to energy efficiency and renewable energy, particularly with the development and launch of the School Energy Efficiency Collaboration Program in 2017.

[4] Commercial sector produces 24 million tons of CO2 equivalent per the State Energy Plan.

	• Aging school infrastructure needs upgrades, which presents an opportunity to upgrade with high performance, energy efficient and energy mindful technologies. • Schools across the state regularly create capital facilities plans and the building stock and usage is consistent, which provides an opportunity to leverage guidance documents to standardize energy planning processes. • Schools are also currently motivated to make improvements that increase student performance and health, in addition to supporting initiatives that reduce their carbon footprint, making it an opportune time for clean energy projects.[5]
Customer Value	• School districts are consistently operating within tight budgets due to tax caps and local economic factors. Providing schools with utility benchmarking information in a timely manner, pathways to reduce the costs of implementing energy upgrades, and a means to track and share results will increase the adoption of the energy efficiency improvements, renewables and performance contracting. This will provide educational, environmental and economic value to the customers, including: o Allowing schools to reduce their energy costs. o Enabling schools to operate at high energy efficiency levels, which have been shown to improve student performance and health, especially in the areas of lighting, building envelope, thermal comfort, and ventilation. • Recognition of schools for the implementation of clean energy increases understanding and demonstrates the value of the energy improvements to other schools who may be considering similar projects. This can, in turn, result in the scale-up of the adoption of clean energy in the P-12 school sector as a means of managing energy costs and positive public perception.

4.4.3 Stakeholder/Market Engagement

Stakeholder/ Market Engagement	• To date, NYSERDA has engaged with the New York Power Authority, the New York State Education Department, the New York Association of School Business Officials, the New York State School Facilities Association, the NYS School Boards Association, 20 P-12 school districts, energy service companies, and utilities to gain feedback on the P-12 Schools strategy. The groups provided input on the barriers schools face when implementing clean energy projects, the funding process for capital projects and the clean energy project priorities for the P-12 sector. The stakeholders will continue to be a source of insight going forward. • NYSERDA will also seek to participate in relevant stakeholder associations in the P-12 sector such as the New York State Education Department's Green Ribbon Schools Committee. This committee reviews the US Department of Education's Green Ribbon Schools award program applications for New York State. The New York State Education Department is permitted to nominate up to four schools and one district each year.

[5] It is not anticipated that health benefits will be quantified in this strategy. However, recent studies are showing a connection between energy efficiency and health (i.e., Harvard Study, Foundations for Student Success – How School Buildings Influence Student Health, Thinking and Performance).

4.4.4 Theory of Change

Market Barriers Addressed	• **Limited school staff time.** School staff time is a finite resource, and time constraints present a challenge to staff in terms of acquiring and receiving approval for energy performance contracts (EPC) and capital improvement projects. This will be addressed through providing third party oversight on EPC contracts, leveraging operations and maintenance operational efficiency guidance documents and promoting energy efficient equipment by offering technical assistance. • **Limited funding.** School districts are consistently operating within tight budgets due to tax caps and local economic factors. Providing schools with funding to execute benchmarking and gap assistance projects will increase the implementation of clean energy initiatives. • **Schools do not fully understand the full benefits of clean energy initiatives.** Making the business case for clean energy initiatives can be challenging in the current environment of low energy prices, lack of confidence in clean energy investments, and limited debt load of schools. Providing assistance to create energy master plans that show return on investment to the schools as well as multi-year planning will reduce time to identify optimal measures and increase the implementation of clean energy initiatives. The more schools are recognized for their efforts, the more their peers will become aware of successes and be encouraged to implement clean energy projects. Also, to the extent these efforts can improve student performance and health (non-energy benefits) the schools will be provided with mission driven insights. • **Limited insight into the energy management performance of the schools**. The majority of NYS schools do not benchmark their facility energy usage, and current capital plans contain limited energy use information. Without this insight, schools do not know where, when or if they could reduce energy usage, or if previous projects have resulted in energy reduction. This will be addressed through providing funding to utilize existing benchmarking software either directly or with assistance from NYSERDA consultants.
Testable Hypotheses	• If NYSERDA promotes the use of benchmarking, schools can measure, track, assess and compare their clean energy impacts across NYS, leading to the identification of operational improvements, resulting in reduced energy use. • If NYSERDA works with the schools to fulfill and follow their existing capital facilities planning cycles by filling knowledge gaps through conducting energy master plans and assessments,[6] publishing market research and case studies, and leveraging existing market resources, the value proposition for clean energy will be demonstrated, increasing the likelihood that clean energy technologies will be implemented. • If NYSERDA assists schools with increasing efficiency in replicable ways, including through funding assistance from both NYSERDA and the utilities, and by working with the schools and their existing required procurement and planning policies, and showcases those successes, it will lead to increased clean energy adoption amongst peers. • If NYSERDA supports recognition programs, such as the State Education Departments Green Ribbon Schools award program, it will lead to increased awareness of the benefits of clean energy, in turn increasing clean energy adoption. • If NYSERDA provides templates and guidance documents that identify ways to replicate successful strategies in schools, that target schools, service providers and applicable financing mechanisms available, it will lead to increased clean energy adoption.

[6] Energy master plans and assessments will be conducted through the FlexTech Program approved in the Resource Acquisition Transition Chapter and included in the Tech Services initiative in the Multi-Sector Solutions Chapter.

Activities	**Clean Energy Benchmarking** • NYSERDA will provide funding to school districts to collect data on energy consumption and costs. The funding will be provided through an open enrollment solicitation for a specified amount of time. NYSERDA intends to use initial benchmarking as a stepping off point to engage the schools in the use of this resource, with the intention of it leading to greater understanding of their energy use, patterns and opportunities for improvement. • An existing benchmarking tool will be selected via a competitive procurement for use by the schools wishing to participate in this program. Schools will receive multiple benchmarks and have the option to be trained on use of the tool as well as receive an operational assessment report based on the benchmarking findings. In coordination with the State Education Department and School Business Officials, this information may then be: o Used to benchmark energy and sustainability metrics between schools o Displayed to encourage a sense of competition between schools o Used as a method of tracking success in the P-12 market • NYSERDA will use the benchmarking results to further streamline the process for schools to engage in deeper clean energy analysis to support capital plans created every 5 years and updated annually. NYSERDA will deliver the deeper clean energy analysis under its Technical Services initiative, outlined in the Multi-Sector Solutions Chapter, but efforts to minimize hard and soft costs for performing this work will be analyzed in this initiative. The projects that can be served by Technical Services are listed in the Dissemination of Resources activity below. **Dissemination of Resources** • NYSERDA will develop a centralized website to encourage and direct P-12 schools to participate in and leverage existing market resources and complimentary programs including but not limited to: o Existing state-supported strategies and funding programs such as NYSERDA's Energy Management program, NY-Sun, the New York Truck-Voucher Incentive Program and Renewable Heat NY o Investor-Owned Utility prescriptive and custom incentive programs that are available to P-12 schools o CEF Technical assistance programs in the Commercial section of the Resource Acquisition Transition Chapter and the Technical Services initiative in the Multi-Sector Solutions Chapter, which can provide funding for the following projects: ▪ Develop energy master plans ▪ Provide on-site energy manager assistance ▪ Assess and analyze energy performance contracts to confirm anticipated savings ▪ Assist in investigating rate analysis and power purchase agreements ▪ Provide information and support regarding the development and execution of clean energy-focused operations and maintenance plans o NYPA's K-Solar Program o Recognition programs such as the State Education Departments Green Ribbon Schools award program and the NYS Department of Environmental Conservation's Environmental Excellence awards program o Events such as clean energy conferences and working groups to connect with their peers and share success stories **Gap Assistance** • NYSERDA will provide targeted and limited funding for identified gaps in the market. The gaps include funding for projects that utilities and other assistance programs do not cover, as well as opportunities learned through the execution of the

	benchmarking effort and marketplace input. The funding will be provided through a competitive solicitation. Projects could include: o Incentives for comprehensive, deep energy retrofits of school districts o Coordinated clean energy competitions among schools o Incentives for boiler replacement projects, which are not incentivized by local utilities o Assistance in applying to existing recognition or funding programs **Publish and Promote Guidance Documents and Project Results** • NYSERDA will publish case studies and promote green design documents for various project types. NYSERDA will: o Promote the utilization of green building guidance documents during the design process for new construction or renovation projects (e.g. Northeast Collaborative for High Performance Schools- NE CHPS and/or Leadership in Energy and Environmental Design Schools). o Publish clean energy case studies and encourage sharing of project results funded under this initiative. o Create guidance documents that will serve as a template for schools and their service providers to replicate successful projects and efforts to adopt clean energy. The documents will also show successful financing mechanisms that may increase the rate of replicability. • These documents will be presented to schools and service providers at existing school conferences, during NYSERDA webinars, through the NYSERDA website and through P-12 association list serves and corresponding websites.
Key Milestones	<u>Milestone 1 (2017) - Complete</u> • Develop a list of P-12 clean energy resources and update the P-12 Schools website. Use the website to disseminate resources across schools in NYS. <u>Milestone 2 (2017)- Complete</u> • Promote the utilization of FlexTech and fund energy master planning and performance contracting assistance oversight for schools. <u>Milestone 3(2018)- Complete</u> • Develop and launch a competitive solicitation to select an existing benchmarking tool for the benchmarking program. <u>Milestone 4 (2018) - Complete</u> • Launch a clean energy benchmarking open enrollment program. <u>Milestone 5 (2018)- Complete</u> • Begin examining efforts to minimize hard and soft costs associated with delivering technical analysis for schools such as energy master plan development. <u>Milestone 6 (2019) - Complete</u> • Launch a competitive solicitation to provide gap assistance. <u>Milestone 7 (2021)</u> • Distribute first annual survey for schools to provide feedback on clean energy progress specific to energy use intensity and greenhouse gas emissions data, projects and recognition. <u>Milestone 8 (2021)</u> • Deploy clean energy case studies and guidance documents based on successful execution of prior milestones and other plan activities.

	Milestone 9 (2022) • Launch second gap assistance funding program showcasing demonstrations of decarbonization and electrification in disadvantage community schools.
Goals Prior to Exit	• 40% of school districts participate in the NYSERDA benchmarking effort and 30% of school districts utilize tools to make decisions about their energy usage. Tools include case studies and benchmarking data to make informed decisions towards future clean energy projects. • NYSERDA transfers the benchmarking efforts to a P-12 Association to promote continuous utility benchmarking across NYS.

4.4.5 Relationship to Utility/REV

Utility Role/ Coordination Points	• The P-12 Schools Program will work in close collaboration with NYPA and other utilities. P-12 schools will be encouraged to look to NYSERDA, NYPA, and other utility programs for funding and support opportunities as they move to implement projects. NYSERDA will coordinate closely with utilities to ensure P-12 schools are aware of programs and offerings that may be relevant to their clean energy goals. In addition to the programs listed in the activities section such as NYPA's P-12 solar initiative, the IOUs offer prescriptive and custom incentives that schools are eligible for. NYSERDA will make schools aware of these offerings and connect them with appropriate utility contacts.
Utility Interventions in Target Market	• Utility prescriptive and custom incentive programs currently exist in and are available to the P-12 schools' sector. This P-12 Schools Initiative will complement those programs by providing direct financial incentives to schools for projects and measures that other assistance programs, including those of the utilities, do not cover.

4.4.6 Budgets

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

Funding Commitments

Budget	Plan Total	Previously Committed	2021	2022	2023	2024	2025
		---------- Commitments Plan ----------					
Incentives and Services	47,606,683	2,803,500	700,000	14,000,000	7,000,000	16,103,183	7,000,000
Implementation	4,500,000	1,666,863	65,000	750,000	750,000	750,000	518,137
Research and Technology Studies	-	-	-	-	-	-	-
Tools, Training and Replication	5,493,317	1,953,362	71,455	900,000	500,000	1,700,000	368,500
Business Support	-	-	-	-	-	-	-
Total	**57,600,000**	**6,423,725**	**836,455**	**15,650,000**	**8,250,000**	**18,553,183**	**7,886,637**

NYSERDA's commitment of funds in this case is to competitively select contractors who will distribute the benchmarking funding or assistance to customers on NYSERDA's behalf over a longer period of time as illustrated by this plan.

An annual expenditure budget for all activities included in this investment plan is shown in Appendix B alongside expected acquired benefits. Budgets do not include Administration, Evaluation, or Cost Recovery Fee; these elements are addressed in the Budget Accounting and Benefits chapter filing. The budget as presented in the Budget Accounting and Benefits Chapter will

serve as the basis for any subsequent reallocation request. The additional level of detail presented within Appendix B is intended for informational purposes only.

4.4.7 Progress and Performance Metrics

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

Benefit Commitments

Direct Benefit (2016-2025)	**Plan Total**
Energy Efficiency MWh Annual	134,315
Energy Efficiency MMBtu Annual	1,150,172
Renewable Energy MWh Annual	-
CO2e Emission Reduction (metric tons) Lifetime	1,996,685
Participant Bill Savings Lifetime	428,717,965
Leveraged Funds	88,050,847

Indirect Benefit (2016-2030)	**Plan Total**
Energy Efficiency MWh Annual	53,000
Energy Efficiency MMBtu Annual	430,000
Renewable Energy MWh Annual	11,200
CO2e Emission Reduction (metric tons) Lifetime	851,431

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

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

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

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

Note: There are approximately 6,000 schools in New York State of which roughly 4,000 contribute to the SBC fund and will be eligible to receive NYSERDA and IOU funding.

4.4.8 Fuel Neutrality

Fuel Neutrality	• NYSERDA intends to offer this strategy to engage P-12 schools in a fuel neutral manner. This will help develop the market at the scale needed to achieve New York State's clean energy goals. Offering the strategy on a fuel neutral basis will allow NYSERDA to achieve an annual ton of carbon savings at a cost of $287, compared to a cost of $392 in an electric only scenario.

4.4.9 Performance Monitoring and Evaluation Plans

Performance Monitoring & Evaluation Plan	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. <u>Test-Measure-Adjust Strategy</u> • Collect, analyze and report on progress of the initiative by comparing progress against identified goals on a regular basis (i.e., quarterly, bi-annually). • The strategy design will be tested to gauge the target population's reaction to the strategy. This information will be used to help inform decisions about how to allocate time and resources. • Insights as to how the initiative can be optimized will be gathered and applied to future initiative design to ensure greatest market impacts within the identified market sectors. • Aggregate and analyze data from NYSERDA-supported gap assistance projects to verify realized energy savings and persistence of savings. <u>Market Evaluation</u> • Baseline measurements are planned for 2021, with updates planned for 2022 and 2024. • Market evaluation will draw on the logic model and will include baseline measurements of key market indicators. Regular longitudinal measurements (e.g., annual or biennial) will include updates of the baseline metrics as well as additional measurements to assess market change resulting from the initiative. • Key market indicators will include, but not be limited to, the number of benchmark reports, awareness and utilization of utility programs and NYSERDA for measure installation, number of schools receiving recognition for clean energy activities, and the number of schools with understanding of the benefits of clean energy and efficient operations. • As appropriate, the market evaluation will leverage sector-level market studies as well as publicly and commercially available data to inform the tracking of key market indicators. <u>Impact Evaluation/Field Verification</u> • An initial impact evaluation is planned for 2021 with an update planned for 2022. • Evaluation M&V will be conducted according to the International Performance Measurement and Verification Protocol (IPMVP) method(s) most appropriate given

	the measures promoted by this initiative. Data from the impact evaluation can be used to help lend confidence in the market, especially among other end users. • Evaluation M&V of direct savings will focus on areas of greatest impact and will draw upon project-level data collected by the program. • Depending on the extent of replication identified in market evaluation activities, impact evaluation may be conducted on a sample of replication projects to assess outcomes.

Verified Gross Savings Specifications

Verified Gross Savings Specification Form	
Date of CEF filing: See Cover Page	
CEF Chapter Name: Commercial	
Initiative Name	Real Estate Tenant
Initiative Period	This initiative was initially launched in 2016 as a new initiative.
Initiative Description	New York State has the highest percentage of non-building owner (tenant) occupied space. This type of real estate has split incentives for energy efficiency between tenants and owners as tenants typically account for 40 to 60% of energy consumption and are not under the control of owners and managers. This initiative provides cost-sharing of energy analysis and modeling for tenant office spaces, as well as the development of new tools and resources to allow tenants greater visibility and manageability over their energy consumption. This will drive energy efficiency efforts during the commercial tenant lease and build out process by demonstrating to tenants a cost-effective approach to achieving energy efficient high-performance office spaces. It will also demonstrate to owners, managers, brokers, and architecture and engineering firms a cost-effective and replicable approach to delivering those spaces.
Gross Savings Methodology	Energy savings are estimated by applying a ratio to the cost share provided ($91/MWh and $86/MMBtu). It is assumed that the projects with larger cost shares will achieve greater energy savings.
Realization Rate (RR)	No RR has been determined for this program within the preceding five-year time frame.
Planned VGS Approach	Real Estate Tenant is undergoing Gross Savings Analysis for program period 2016-2018. Details on the Gross Savings Analysis methodology can be found in the Clean Energy Fund Commercial Chapter Impact Evaluation Plan finalized in March 2020. Independent evaluators DNV-GL and ERS are performing the Gross Savings Analysis which is comprised of billing analysis for initiative projects as well as metering and monitoring for a sample of initiative projects. The estimated completion of this work is Q1 2021. Additionally, a measure adoption rate (MAR) assessment is being conducted through surveys of building owners, managers, and tenants to assess the installation rate of recommended clean energy measures and to assess self-reported energy savings. This assessment is being conducted by DNV-GL and is anticipated to be completed by Q1 2021. Depending upon the extent of the replication identified in Market Evaluation, impacts will be examined for a sample of replication projects to ascertain the level of savings.
Exemption from EAM Status	N/A

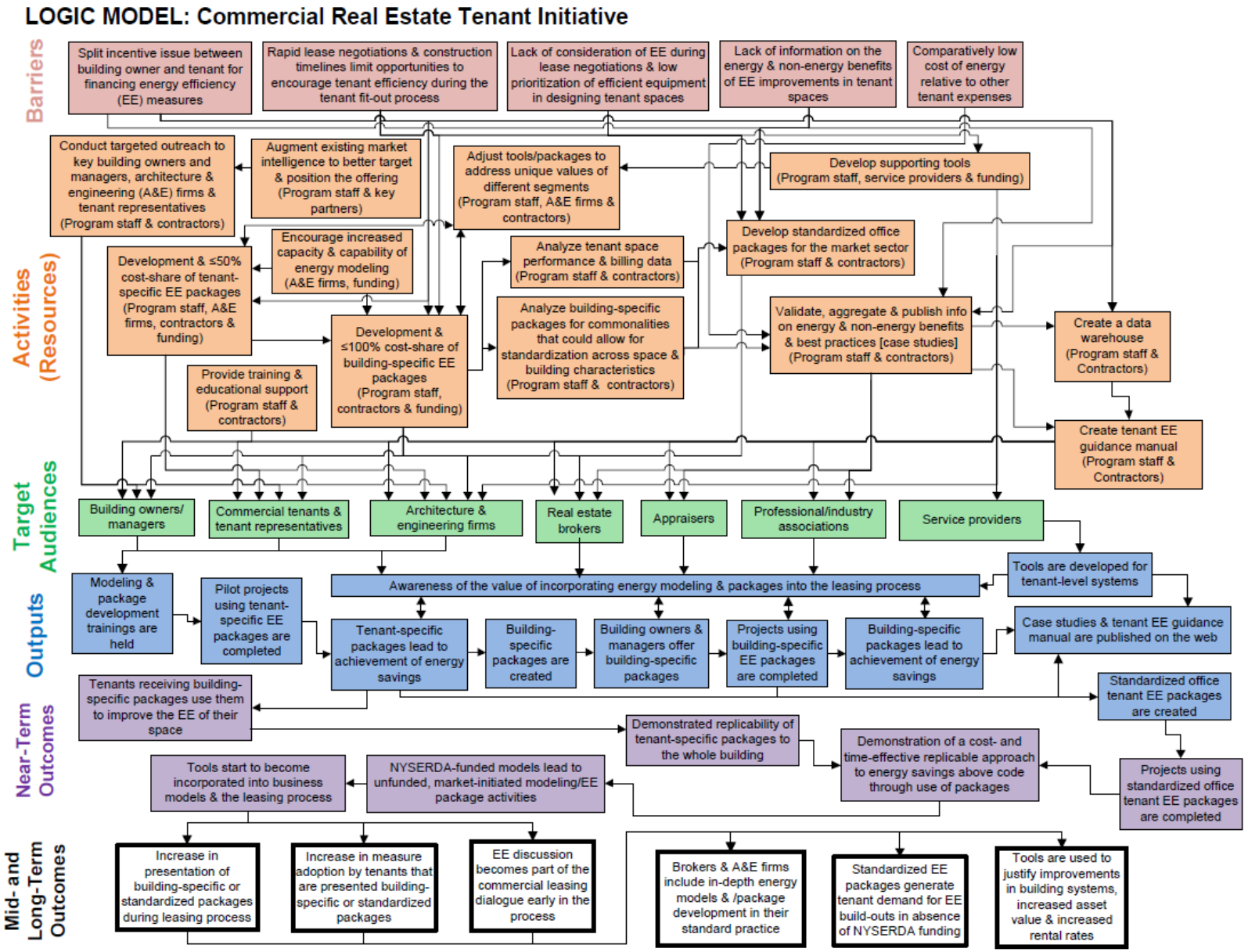
Verified Gross Savings Specification Form	
Date of CEF filing: See cover page	
CEF Chapter Name: Commercial	
Initiative Name	Energy Management Technology
Sub-Initiative Name(s)	None
Initiative Period	This initiative was initially launched as a new initiative in mid-2016.
Initiative Description	Energy Management (EM) is the common name for the management of building energy consumption from a combination of building data collection systems (e.g. meters, sensors, equipment feeds), analytics, and building data information services. There is a full spectrum of EM sophistication ranging from the basic, Remote Energy Management (REM), to the more advanced Real Time Energy Management (RTEM). The market includes vendors of systems and information services, with many vendors providing both and targets sectors including Commercial Office, Retail, University/College, and Healthcare and Commercial tenant spaces. Multifamily and Industrial buildings are also eligible to participate in this initiative. RTEM can show building management the actual state of building performance at any point in time. RTEM is utilized to capture the discreet data such as set points, power loads, flow rates, temperature and humidity, and feed the information back to building operators with key insights about operations and systems that they then use to fine-tune the building energy system operations and identify capital projects.
Gross Savings Methodology	Energy savings are calculated by vendors using the formulas and factors found in the Technical Resource Manual. Analysis of these energy savings are used to find independent variables which can be correlated to predicted energy savings in various sectors and building types, e.g. in the commercial sector capital expenditure budgets can be correlated to future energy savings. Further, validation of the data quality meters, sensors, and systems will be conducted by reviewing real time energy data sets. Additionally, in-program Measurement and Verification of the savings is done using Option C methods set in the International Performance Measurement & Verification Protocol (IPMVP) by an independent RTEM advisor. .
Realization Rate (RR)	No RR has been determined for this program within the preceding five-year time frame.
Planned VGS Approach	This initiative will undergo Gross Savings Analysis for program period 2017-2019. Details related to the Gross Savings Analysis methodology will be submitted in an EM&V Plan in Q1 2021 and undertaken by DNV-GL and ERS. The estimated completion of the Gross Savings Analysis Report is Q3 2021. Measurement and verification will be conducted for a sample of facilities, according to the IPMVP method(s) most appropriate given the improvements made and is anticipated to rely heavily on the EM data stream to validate estimated program savings. Depending on the extent of replication identified in Market Evaluation, field verification with a sample of replication projects will potentially occur to ascertain the level of savings and compare it to potential identified, if feasible.
Exemption from EAM Status	N/A

Verified Gross Savings Specification Form	
Date of CEF filing: See Cover Page	
CEF Chapter Name: Commercial	
Initiative Name	REV Campus Challenge
Initiative Period	This initiative was initially offered in 2016. It was a new initiative and was not known by another name.
Initiative Description	Colleges and universities in New York State have already demonstrated leadership in adopting clean energy practices. This initiative promotes further clean energy actions by providing recognition to higher education institutions for completing such actions. Knowledge transfer about clean energy actions is also promoted between peers.
Gross Savings Methodology	Energy savings are calculated using the formulas and factors found in the Technical Resource Manual and through other sound engineering practices. These engineering practices are industry standard and implemented by independent contractors. These methods are reviewed and verified by NYSERDA. The FlexTech RR finalized in 2012 and determined to be 86% for electric and 77% for fuel will be used as a guide for projects that are cost-shared through this initiative. For Energy to Lead projects, awardees will conduct appropriate M&V at their sites depending upon the actions taken. This M&V is reported to NYSERDA and will be used to adjust estimated savings.
Realization Rate (RR)	No RR has been determined for this program within the preceding five-year time frame.
Planned VGS Approach	REV Campus Challenge will undergo Gross Savings Analysis for program period 2016-2018. Details on the Gross Savings Analysis methodology can be found in the Clean Energy Fund Commercial Chapter Impact Evaluation Plan finalized in March 2020. Independent evaluators DNV-GL and ERS are performing the Gross Savings Analysis which is comprised of billing analysis and possible on-site logging or custom engineering assessments, as needed. The estimated completion of this work is Q3 2021. Additionally, a measure adoption rate (MAR) assessment is being conducted through surveys of colleges and university campuses across New York State are being conducted to obtain a measure adoption rate (MAR) of clean energy measures and to assess self-reported energy savings by higher education institutions. This assessment is also being conducted by DNV-GL and ERS and is anticipated to be completed by Q3 2021.
Exemption from EAM Status	N/A

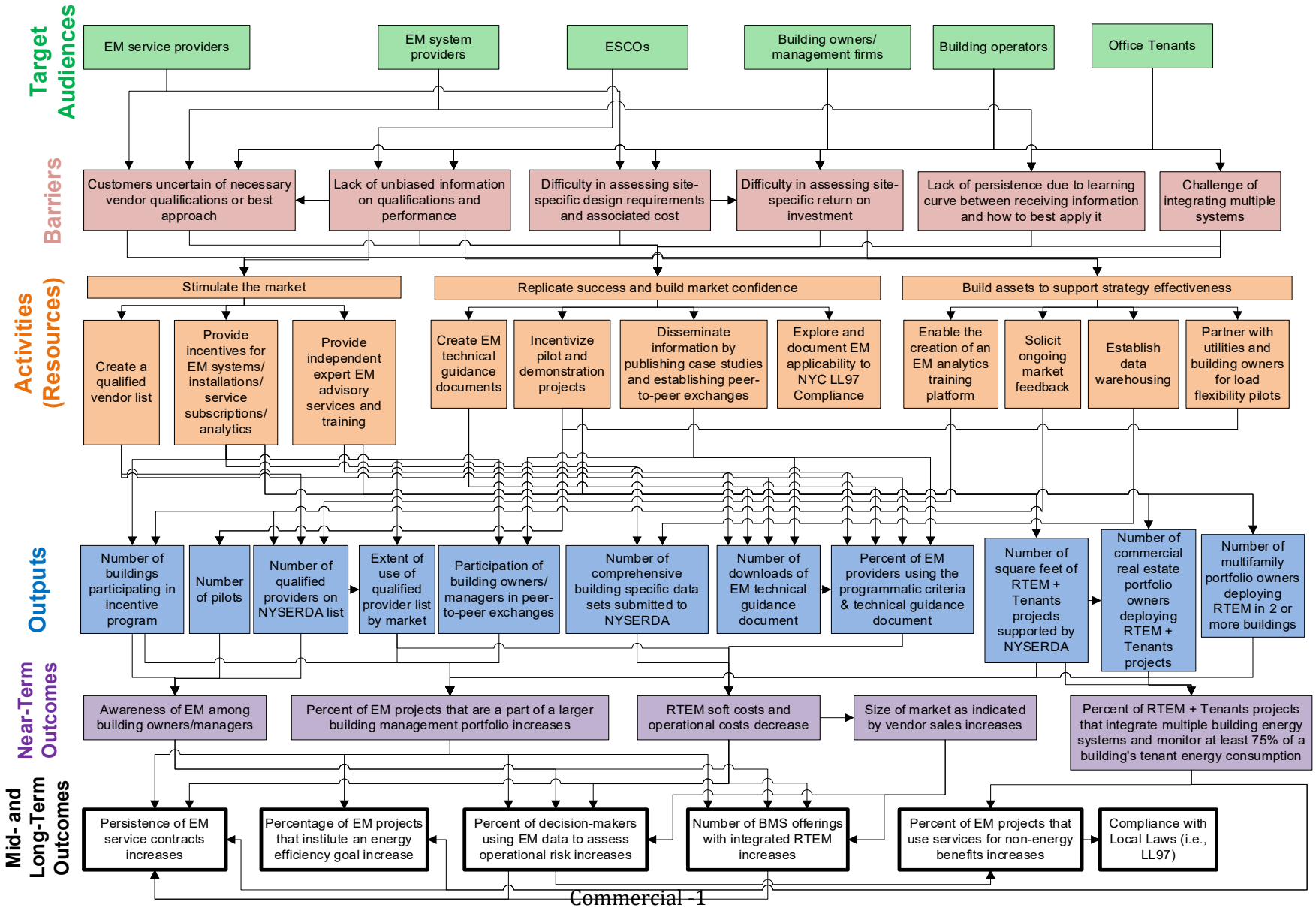
Verified Gross Savings Specification Form	
Date of CEF filing: See Cover Page	
CEF Chapter Name: Commercial	
Initiative Name	P-12 Schools
Initiative Period	This initiative was initially offered in 2017. This was a new initiative and was previously known as K-12 Schools prior to April 2019.

Initiative Description	There are over 6,000 public and private schools in New York State that spend approximately $1 billion on energy costs annually. NYSERDA will engage with these schools to leverage and promote market resources for clean energy actions. NYSERDA will offer free Benchmarking Services to schools and will also provide direct financial incentives to schools to accelerate clean energy planning, analysis, and installations.
Gross Savings Methodology	Energy savings are calculated using the formulas and factors found in the Technical Resource Manual or through other sound engineering practices. These engineering practices are industry standard methodologies which are implemented by independent contractors and reviewed and verified by NYSERDA. The FlexTech RR finalized in 2012 and determined to be 86% for electric and 77% for fuel will be used as a guide for projects that are cost-shared through this initiative.
Realization Rate (RR)	No RR has been determined for this program within the preceding five-year time frame.
Planned VGS Approach	P-12 Schools will undergo Gross Savings Analysis for program period 2019. Further details of the Gross Savings Analysis methodology can be found in the Clean Energy Fund Commercial Chapter Impact Evaluation Plan finalized in March 2020. The estimated completion of the Gross Savings Analysis report is Q3 2021. Independent evaluators DNV-GL and ERS will perform the Gross Savings Analysis. EM&V will be conducted using utility billing analysis to verify gross savings and on-site logging and custom engineering assessments, if needed. Depending upon the extent of replication identified in a market evaluation, impact evaluation may be conducted on a sample of replication projects to assess outcomes.
Exemption from EAM Status	N/A

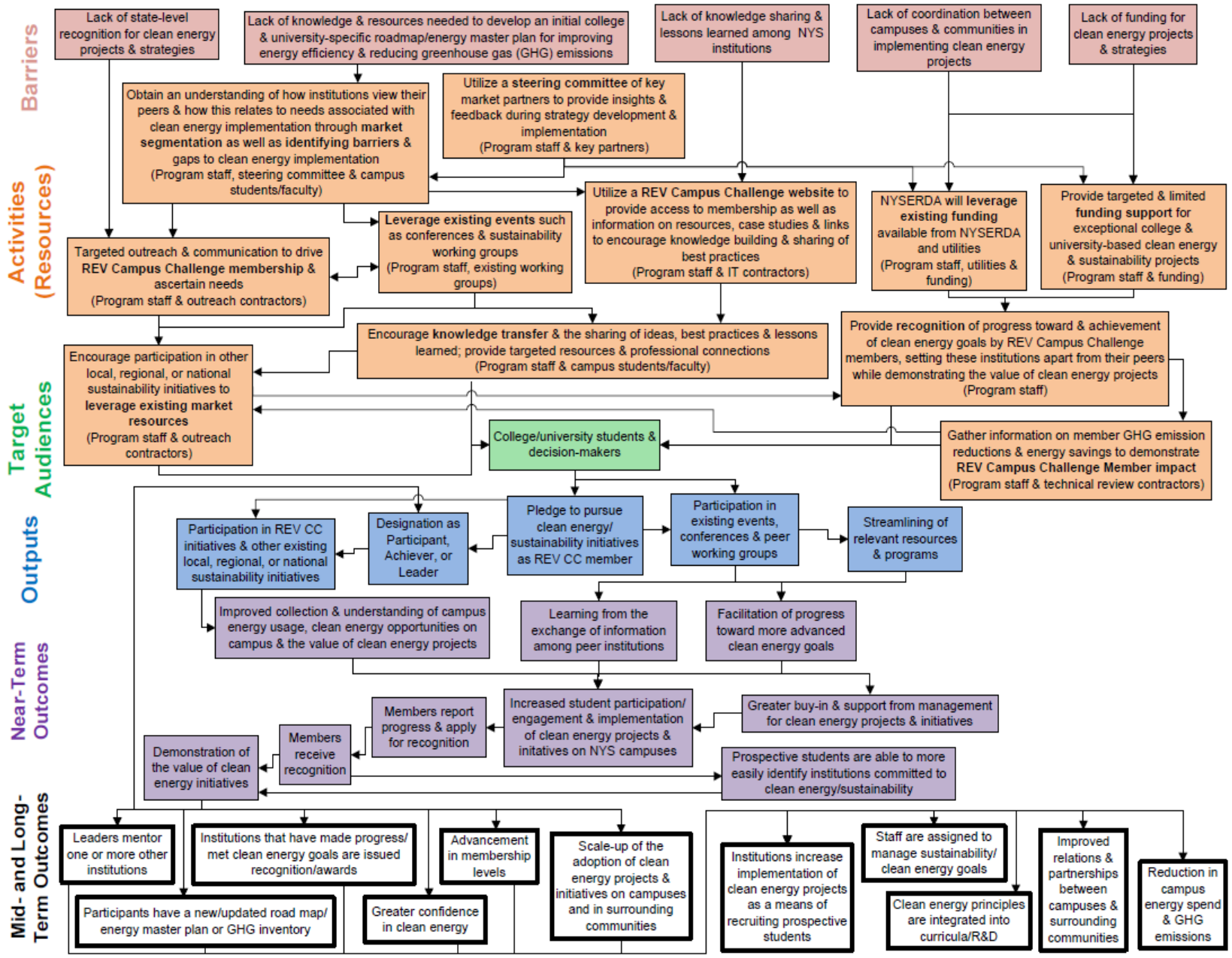
Appendix A – Logic Models



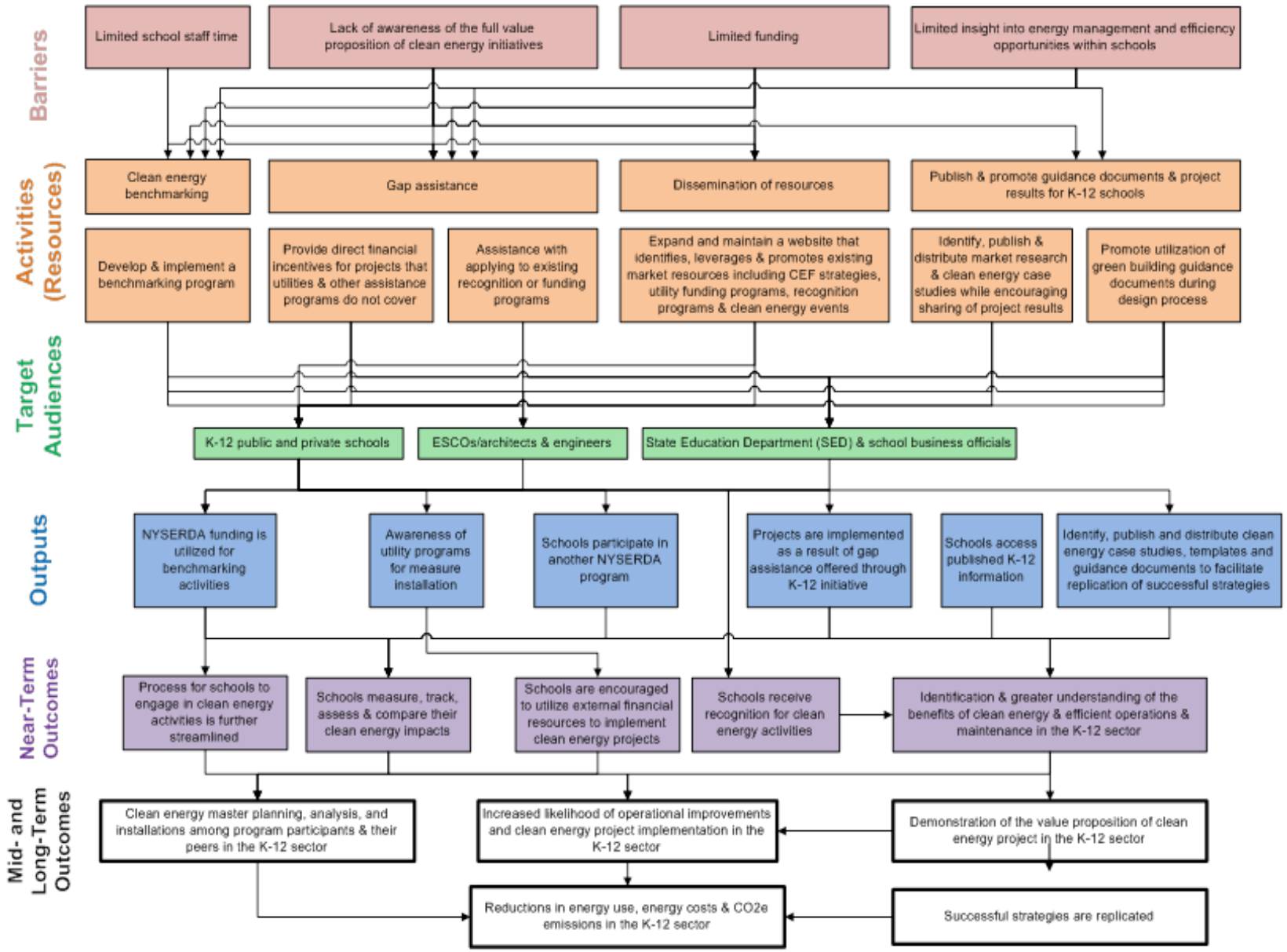
LOGIC MODEL: Energy Management Technology



LOGIC MODEL: REV Campus Challenge



LOGIC Model: P-12 Schools



Appendix B | Initiative Budget and Benefits Summary

Real Estate Tenant

Benefits Acquisition Plan

Direct Benefit	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh Annual	99,959	-	-	-	-	-	-	14,796	28,388	28,388	28,388	-	-	-	-	-
Energy Efficiency MWh Lifetime	799,670	-	-	-	-	-	-	118,366	227,102	227,102	227,102	-	-	-	-	-
Energy Efficiency MMBtu Annual	111,456	-	-	-	-	-	-	7,485	27,485	29,001	47,485	-	-	-	-	-
Energy Efficiency MMBtu Lifetime	891,645	-	-	-	-	-	-	59,879	219,879	232,007	379,879	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	55,936	-	-	-	-	-	-	7,800	15,664	15,744	16,727	-	-	-	-	-
CO2e Emission Reduction (metric tons) Lifetime	447,486	-	-	-	-	-	-	62,403	125,311	125,956	133,817	-	-	-	-	-
Participant Bill Savings Annual	13,909,750	-	-	-	-	-	-	2,009,143	3,927,279	3,935,648	4,037,679	-	-	-	-	-
Participant Bill Savings Lifetime	111,277,997	-	-	-	-	-	-	16,073,147	31,418,235	31,485,181	32,301,435	-	-	-	-	-
Leveraged Funds	28,450,238	-	-	-	-	-	-	1,910,265	8,846,658	8,846,658	8,846,658	-	-	-	-	-

Indirect Benefit	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh Annual	341,000	-	-	-	-	-	-	-	-	32,750	61,650	61,650	61,650	61,650	30,825	30,825
Energy Efficiency MMBtu Annual	86,600	-	-	-	-	-	-	4,330	4,330	12,990	12,990	12,990	12,990	12,990	6,495	6,495
Renewable Energy MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	175,210	-	-	-	-	-	-	230	230	17,076	31,535	31,535	31,535	31,535	15,767	15,767
CO2e Emission Reduction (metric tons) Lifetime	1,401,684	-	-	-	-	-	-	1,842	1,842	136,607	252,279	252,279	252,279	252,279	126,139	126,139

Energy Usage	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Participants	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Commercial Tenants	1,145	-	-	-	-	-	308	418	418	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**1,145**	**-**	**-**	**-**	**-**	**-**	**308**	**418**	**418**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Budget Expenditures Plan

Budget	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	10,243,251	-	94,114	759,854	1,799,272	2,724,661	1,500,000	1,200,000	1,200,000	965,351	-	-	-	-	-	-
Implementation	3,297,049	19,443	453,014	487,819	681,319	492,818	407,892	407,892	346,853	-	-	-	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	2,258,089	8,703	84,862	99,950	574,687	284,755	658,127	547,004	-	-	-	-	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**15,798,390**	**28,146**	**631,990**	**1,347,624**	**3,055,279**	**3,502,234**	**2,566,019**	**2,154,896**	**1,546,853**	**965,351**	**-**	**-**	**-**	**-**	**-**	**-**

Table Notes:

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

Appendix B | Initiative Budget and Benefits Summary

Energy Management Technology

Benefits Acquisition Plan

Direct Benefit	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh Annual	1,328,400	-	-	31,199	79,465	76,748	99,047	170,258	243,031	281,292	225,335	94,311	27,714	-	-	-
Energy Efficiency MWh Lifetime	13,733,082	-	-	311,994	794,646	767,481	990,469	1,671,661	2,478,309	2,971,319	2,411,752	1,058,311	277,140	-	-	-
Energy Efficiency MMBtu Annual	2,114,796	-	-	8,372	351,255	70,458	75,669	195,702	405,719	310,123	360,007	196,807	140,684	-	-	-
Energy Efficiency MMBtu Lifetime	21,558,194	-	-	83,718	3,512,547	704,584	756,689	1,947,256	4,099,185	3,239,831	3,738,670	2,068,871	1,406,843	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	783,274	-	-	16,055	58,608	42,443	53,806	96,211	144,463	157,977	132,971	58,522	22,219	-	-	-
CO2e Emission Reduction (metric tons) Lifetime	8,079,231	-	-	160,545	586,078	424,425	538,058	946,122	1,470,880	1,666,387	1,416,323	648,219	222,195	-	-	-
Participant Bill Savings Annual	189,223,670	-	-	5,238,275	14,864,154	10,870,173	13,800,434	22,759,409	31,143,527	37,942,288	32,910,163	14,431,229	5,264,017	-	-	-
Participant Bill Savings Lifetime	1,954,229,379	-	-	52,382,751	148,641,539	108,701,727	138,004,337	223,428,369	318,051,111	401,255,155	350,933,907	160,190,310	52,640,173	-	-	-
Leveraged Funds	1,048,407,313	-	-	7,544,990	31,019,162	58,453,987	91,504,828	149,660,048	194,037,894	269,126,765	162,746,391	66,400,000	12,000,000	5,913,250	-	-

Indirect Benefit	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh Annual	4,467,914	-	-	-	-	-	-	210,496	345,695	461,069	889,863	746,830	578,872	413,714	385,088	436,287
Energy Efficiency MMBtu Annual	6,144,027	-	-	-	-	-	-	91,529	239,775	316,619	1,273,005	1,006,457	734,489	462,268	462,203	1,557,682
Renewable Energy MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	2,583,738	-	-	-	-	-	-	110,236	186,111	248,025	516,961	430,556	331,047	232,923	218,598	309,280
CO2e Emission Reduction (metric tons) Lifetime	26,026,372	-	-	-	-	-	-	1,079,344	1,831,096	2,443,225	5,125,587	4,377,848	3,375,748	2,384,705	2,270,097	3,138,722

Energy Usage	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Participants	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Real Time Energy Management Buildings	1,580	-	-	27	256	167	237	272	249	246	126	-	-	-	-	-
Remote Energy Management Buildings	210	-	-	-	-	-	-	210	-	-	-	-	-	-	-	-
RTEM and Tenants	75	-	-	-	-	-	-	-	8	25	25	18	-	-	-	-
RTEM Small/Medium Businesses	200	-	-	-	-	-	-	-	10	70	80	40	-	-	-	-
Total	**2,065**	**-**	**-**	**27**	**256**	**167**	**237**	**482**	**267**	**341**	**231**	**58**	**-**	**-**	**-**	**-**

Budget Expenditures Plan

Budget	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	103,861,394	-	159,029	1,257,417	5,417,852	6,517,532	8,993,924	18,498,289	15,307,086	18,644,762	13,903,527	9,211,362	3,950,615	2,000,000	-	-
Implementation	6,710,681	20,049	552,986	962,945	1,352,716	1,042,711	541,527	663,890	822,572	459,339	291,767	179	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	11,826,026	3,750	42,574	170,292	602,898	832,598	946,294	2,480,385	2,593,936	2,568,183	919,714	665,404	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**122,398,101**	**23,799**	**754,589**	**2,390,654**	**7,373,465**	**8,392,841**	**10,481,744**	**21,642,564**	**18,723,593**	**21,672,283**	**15,115,008**	**9,876,945**	**3,950,615**	**2,000,000**	**-**	**-**

Table Notes:

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

Appendix B | Initiative Budget and Benefits Summary

REV Campus Challenge

Benefits Acquisition Plan

Direct Benefit	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh Annual	108,199	-	-	-	49,329	10,550	9,010	9,010	9,300	10,500	10,500	-	-	-	-	-
Energy Efficiency MWh Lifetime	1,622,985	-	-	-	739,935	158,250	135,150	135,150	139,500	157,500	157,500	-	-	-	-	-
Energy Efficiency MMBtu Annual	671,000	-	-	-	317,318	37,667	41,015	65,000	70,000	70,000	70,000	-	-	-	-	-
Energy Efficiency MMBtu Lifetime	10,065,000	-	-	-	4,759,770	565,005	615,225	975,000	1,050,000	1,050,000	1,050,000	-	-	-	-	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh Annual	8,810	-	-	-	346	-	-	-	-	4,232	4,232	-	-	-	-	-
Renewable Energy MWh Lifetime	132,150	-	-	-	5,190	-	-	-	-	63,480	63,480	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	94,255	-	-	-	41,765	7,281	6,688	7,963	8,374	11,092	11,092	-	-	-	-	-
CO2e Emission Reduction (metric tons) Lifetime	1,413,823	-	-	-	626,470	109,211	100,323	119,449	125,613	166,378	166,378	-	-	-	-	-
Participant Bill Savings Annual	19,305,160	-	-	-	8,397,414	1,611,072	1,424,733	1,557,130	1,623,300	2,345,756	2,345,756	-	-	-	-	-
Participant Bill Savings Lifetime	289,577,407	-	-	-	125,961,207	24,166,078	21,370,992	23,356,950	24,349,500	35,186,340	35,186,340	-	-	-	-	-
Leveraged Funds	71,130,066	-	-	-	17,705,406	2,811,660	8,000,000	9,000,000	11,013,000	11,300,000	11,300,000	-	-	-	-	-

Indirect Benefit	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh Annual	58,800	-	-	-	-	5,300	5,300	5,300	5,300	5,300	5,300	5,300	5,300	5,300	5,300	5,800
Energy Efficiency MMBtu Annual	365,000	-	-	-	-	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	35,000
Renewable Energy MWh Annual	3,870	-	-	-	-	-	-	-	-	-	3,870	-	-	-	-	-
Renewable Energy MW Annual	3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	50,758	-	-	-	-	4,406	4,406	4,406	4,406	4,406	6,342	4,406	4,406	4,406	4,406	4,762
CO2e Emission Reduction (metric tons) Lifetime	761,376	-	-	-	-	66,090	66,090	66,090	66,090	66,090	95,133	66,090	66,090	66,090	66,090	71,437

Energy Usage	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Participants	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Participants	151	-	94	10	29	8	3	3	2	1	1	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**151**	**-**	**94**	**10**	**29**	**8**	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**

Budget Expenditures Plan

Budget	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	14,262,212	-	-	468,339	830,316	1,388,715	1,499,842	2,500,000	2,500,000	1,750,000	1,325,000	1,000,000	1,000,000	-	-	-
Implementation	4,659,394	-	249,357	326,987	543,414	515,284	400,000	500,000	508,000	536,000	602,000	478,353	-	-	-	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	2,728,396	-	39,490	14,191	2,209	40,000	210,000	300,000	435,470	580,627	870,940	235,470	-	-	-	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**21,650,002**	**-**	**288,847**	**809,517**	**1,375,938**	**1,943,999**	**2,109,842**	**3,300,000**	**3,443,470**	**2,866,627**	**2,797,940**	**1,713,823**	**1,000,000**	**-**	**-**	**-**

Table Notes:

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

a. Assumes a 15-year measure life. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

Appendix B | Initiative Budget and Benefits Summary

P-12 Schools

Benefits Acquisition Plan

Direct Benefit	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh Annual	134,315	-	-	-	-	-	2,151	4,564	7,800	12,000	27,000	24,000	16,000	25,000	15,800	-
Energy Efficiency MWh Lifetime	2,014,725	-	-	-	-	-	32,265	68,460	117,000	180,000	405,000	360,000	240,000	375,000	237,000	-
Energy Efficiency MMBtu Annual	1,150,172	-	-	-	-	-	11,886	25,206	45,000	80,000	165,000	145,000	200,000	300,000	178,080	-
Energy Efficiency MMBtu Lifetime	17,252,580	-	-	-	-	-	178,290	378,090	675,000	1,200,000	2,475,000	2,175,000	3,000,000	4,500,000	2,671,200	-
Energy Efficiency MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Energy MW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	133,112	-	-	-	-	-	1,757	3,728	6,481	10,588	22,964	20,317	19,466	29,700	18,110	-
CO2e Emission Reduction (metric tons) Lifetime	1,996,685	-	-	-	-	-	26,360	55,919	97,219	158,825	344,461	304,755	291,996	445,499	271,652	-
Participant Bill Savings Annual	28,581,198	-	-	-	-	-	396,837	841,881	1,456,710	2,341,440	5,128,470	4,543,110	3,991,600	6,120,400	3,760,749	-
Participant Bill Savings Lifetime	428,717,965	-	-	-	-	-	5,952,551	12,628,223	21,850,650	35,121,600	76,927,050	68,146,650	59,874,000	91,806,000	56,411,242	-
Leveraged Funds	88,050,847	-	-	-	-	-	4,483,559	6,405,085	7,686,102	8,967,119	14,091,186	11,529,152	18,405,085	16,483,559	-	-

Indirect Benefit	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Efficiency MWh Annual	53,000	-	-	-	-	-	-	-	2,500	2,500	8,000	8,000	8,000	8,000	6,000	10,000
Energy Efficiency MMBtu Annual	430,000	-	-	-	-	-	-	-	10,000	10,000	40,000	40,000	40,000	40,000	100,000	150,000
Renewable Energy MWh Annual	11,200	-	-	-	-	-	-	-	500	500	800	800	800	800	1,000	6,000
Renewable Energy MW Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual	56,762	-	-	-	-	-	-	-	2,074	2,074	6,695	6,695	6,695	6,695	9,233	16,601
CO2e Emission Reduction (metric tons) Lifetime	851,431	-	-	-	-	-	-	-	31,110	31,110	100,425	100,425	100,425	100,425	138,493	249,016

Energy Usage	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Direct Energy Usage MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct Energy Usage MMBtu Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MWh Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu Annual	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indirect Energy Usage MMBtu Lifetime	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Participants	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
School Buildings	2,403	-	-	-	-	-	54	334	340	350	350	350	350	225	50	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**2,403**	**-**	**-**	**-**	**-**	**-**	**54**	**334**	**340**	**350**	**350**	**350**	**350**	**225**	**50**	**-**

Budget Expenditures Plan

Budget	Plan Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Incentives and Services	47,606,683	-	-	31,074	177,167	464,116	925,000	2,000,000	3,553,747	5,500,000	5,000,000	5,000,000	9,000,000	10,455,580	5,500,000	-
Implementation	4,500,000	-	-	116,829	281,496	563,261	200,000	437,914	450,500	450,000	400,000	400,000	400,000	400,000	400,000	-
Research and Technology Studies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tools, Training and Replication	5,493,317	-	-	6,881	284,663	317,350	400,000	300,000	600,000	600,000	600,000	600,000	600,000	600,000	584,423	-
Business Support	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**57,600,000**	**-**	**-**	**154,783**	**743,325**	**1,344,727**	**1,525,000**	**2,737,914**	**4,604,247**	**6,550,000**	**6,000,000**	**6,000,000**	**10,000,000**	**11,455,580**	**6,484,423**	**-**

Table Notes:

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

Real Estate Tenant

	Indicators	Baseline (Before/Current)	**2019** Target (cumulative)	**2022** Target (cumulative)
Outputs	Number of tenant spaces participating in the modeling and energy efficiency package offer	0	130	1,200
	Number of buildings participating in the modeling and energy efficiency package offer	0	110	400
	Square footage of participating tenant spaces in the modeling and energy efficiency package offer	0	6,500,000	65,000,000
	Partner engagement: Number of CRE building owners and manageers that offer building specific packages	0	130	40
	Number of case studies developed	0	7	30
	Partner engagement: number of brokers and A&E firms trained	0	20	100
	Partner engagement: number of brokers and A&E firms that include in depth energy models and package development in their standard practice	0	12	40
Outcomes	Package Development costs of building specific package per square foot	$0.13/SF	$0.06/SF	$0.05/SF
	Market Engagement: Number of Brokers and A&E firms that include in depth energy models and package development in their standard practice	6	20	40
	Percent of the total addressable square footage in NYS that is covered by a building specific package	0	7%	10%
	Tenant Spaces completed by the market without NYSERDA funding	141	286	400
	Percentage of Real Estate Broker firms trained on energy efficient space design and including energy in the leasing dialogues with tenant	<5%	10%	5%
	Percentage of Architecture and Engineering firms trained to better incorporate energy efficiency options into tenant space designs and providing packages as standard practice	0	<10%	60%

Table notes

a. TBD denotes preliminary results have been collected but NYSERDA requires additional analysis to confirm the values. A 0 (zero) denotes that the actual value is currently believed to be zero for baseline/market metrics.

Energy Management Technology

	Indicators	Baseline (Before/Current)	2022 Target (cumulative)	2025 Target (cumulative)
Outputs	Number of buildings participating in incentive program	0	2000	
	Number of pilots	0	15	
	Number of qualified providers on NYSERDA list	0	90	
	Extent of use of qualified provider list by the market (%increase in NY EM revenue by listed vendors)	0	90%	
	Participation of building owners/ managers in peer-to-peer exchanges (from incentive progam)	0	120	
	Number of Comprehensive building specific data sets submitted to NYSERDA	0	400	
	Number of downloads of EM technical guidance document	0	1000	
	Percent of EM providers using the programmatic criteria & technical guidance document (as reported through annual survey)	0	90%	
	Number of qualified EMIS providers	6		10
	Number of EMISs deployed in NYS as a result of this initiative	0		50
	EMIS subscription renewal rate	75%		85%
	Number of EMIS assessments/audits as a result of this initiative	0		60
Outcomes	Awareness of EM among building owners/managers	23.6%	40%	
	Percent of EM projects that are a part of a larger building management portfolio	0	50%	
	Persistence of EM service contracts (i.e how many customers extend their subscription with an RTEM provider beyond 5 years)	0	60%	
	Percent in RTEM soft costs and operational costs	0	25%	
	Percentage of EM projects that institute an energy efficiency goal	0	65%	
	Size of market as indicated by vendor sales	$10M	$40M	
	Percent of decision-makers using EM data to assess operational risk (as reported through annual survey)	4.1%	45%	
	Number of BMS offerings with integrated RTEM	TBD	50%	
	Percent of EM projects that use services for non-energy benefits (e.g long-term asset management, capital investment strategies, risk mitigation analyses)	0	25%	
	Number of facility-wide EMIS deployments as a result of this initiative			45
	Number of enterprise-wide EMIS deployments as a result of this initiative			4
	Qualified EMISs with industrial operational control			3-5

Appendix C | Initiative Outputs and Outcomes Summary

Table notes

a. Because the market transformation efforts with these initiatives, additional time is needed to assess the persistence of adoption. TBD denotes that NYSERDA requires more data in order to quantify baseline/market metrics to the degree needed to measure against in the future. A 0 (zero) denotes that the actual value is currently believed to be zero for baseline metrics.

'b. Baseline measurements of the Commercial Energy Management initiatives were evaluated and reported in 2018. The report is available on the NYSERDA website - https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2018-12-CEM-Market-Baseline-Evaluation-Report.pdf

c. Cumulative values provided for 2018 are outputs measured and reported using program data.

d. In the 2018 baseline evaluation, all responding BMS providers indicated that their products have the hardware/software features necessary for RTEM (100%). However, most market actors indicated that only a small percentage of installations currently are used in such a manner. Market actors were unable to provide rigorous, quantitative estimates of what percentage of systems are used for RTEM purposes, but most market actors indicated that this would be a very small percentage. The baseline evaluation report is available on the NYSERDA website - https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2018-12-CEM-Market-Baseline-Evaluation-Report.pdf

REV Campus Challenge

	Indicators	Baseline (Before/Current)	**2019** Target (cumulative)	**2023** Target (cumulative)
Outputs	Number of REV Campus Challenge Members	0	120	0
	Number of NYS institutions participating in AASHE STARS	44 (21 with STARS rating)	60	0
	Number of NYS institutions attending existing clean energy events/conferences	22 institutions (2015 baseline)	48	52
	Number of NYS institutions participating in REV Campus Challenge initiatives/competitions	0	70	75
	Number of REV Campus Challenge Members collecting and reporting energy usage (as reported through annual survey)	0	71	75
	Number of REV Campus Challenge Members reporting new clean energy projects on campus(as reported through annual survey)	0	63	68
	Number of REV Campus Challenge Members reporting new clean energy curricula or curriculum integration (as reported through annual survey)	0	27	35
	Number of REV Campus Challenge Members reporting new or improved community partnerships to expand clean energy goals (as reported through annual survey)	0	28	32
	Number of REV Campus Challenge Members receiving recognition	0	26	32
Outcomes	Number of REV Campus Challenge Members with new or updated climate action plans, energy master plans, or GHG inventories	0	52	58
	Number of REV Campus Challenge Members with staff assigned to manage sustainability/clean energy goals (as reported through annual survey)	82% (18/22)	63	68
	Number of REV Campus Challenge Members reporting a greater understanding of clean energy opportunities on their campus (as reported through annual survey)	0	54	60
	Number of REV Campus Challenge Members reporting greater student engagement with clean energy initiatives (as reported through annual survey)	0	38	44
	Number of REV Campus Challenge Members reporting greater buy-in and support from management for clean energy projects and initiatives (as reported through annual survey)	0	53	58
	Number of REV Campus Challenge Members reporting improved community relations as a result of clean energy strategies (as reported through annual survey)	0	33	36

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.

Appendix C | Initiative Outputs and Outcomes Summary

P-12 Schools

	Indicators	Baseline (Before/Current)	2021 Target (cumulative)	2022 Target (cumulative)	2023 Target (cumulative)	2024 Target (cumulative)	2025 Target (cumulative)
Outputs	Number of schools engaging with NYSERDA to conduct clean energy benchmarking	0	310	500	525	550	600
	Number of NYS K-12 schools that receive NYSERDA funding	0	45	100	100	350	500
	Number of schools that receive energy efficiency funding from IOUs.	0	500	500	500	550	600
	Number of projects implemented as a result of Gap Assistance offered*	0	4	4	4	15	30
	Number of information downloads from website	0	1000	1100	1150	1200	1350
	Number of case studies developed and disseminated	0	20	20	22	25	30
Outcomes	Number of NYS K-12 schools utilizing clean energy case studies to make informed decisions towards future clean energy projects	0	150	150	150	175	200
	Number of NYS K-12 schools utilizing benchmarking data and energy master plans to make informed decisions towards future clean energy projects	0	75	75	75	80	100
	Number of NYS K-12 schools reporting a greater understanding of benefits of clean energy at their school	0	800	800	800	900	1000
	Number of NYS K-12 schools receiving recognition	0	3	3	3	4	6

*26 of 30 projects expected in disadvantaged communities.

Table notes

a. A 0 (zero) is set for the majority of the baseline/market metrics to reflect that these indicators will be tracked and reported from the time the effort begins and are not reporting activities prior to its launch.

b. This metric represents funding that is delivered to schools from other relevant NYSERDA Programs such as those listed in the Dissemination of Resources activity (i.e. technical services, energy management, renewable heating and cooling).