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Commercial Real Estate Tenant Evaluation Work Plan

Market Evaluation

Final

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Program/Initiative Background

Introduction

This workplan for the Commercial Real Estate (CRE) Tenant Initiative provides Opinion Dynamics's (The Contractor's) detailed technical approach, staffing plan and budget for the 2017 baseline market evaluation. Following the 2017 study, NYSERDA will make a determination on whether to move forward with the Contractor to conduct the follow-up assessments in years 2018-2022.

The Contractor is currently conducting NYSERDA's ongoing Commercial Statewide Baseline and Potential Study and, as part of that research, the Commercial Real Estate Customer Decision Making market assessment. The Contractor shall leverage these efforts to time- and cost-efficiently evaluate the CRE Tenant initiative.

As a part of the Commercial Real Estate (CRE) Tenant initiative, NYSERDA is offering to cost-share an energy modeling and package development process for tenant office space within New York State. This will 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/managers, brokers, and architecture and engineering (A&E) firms a cost-effective and replicable approach to delivering those spaces.

NYSERDA has also proposed to offer cost sharing on the development of new tools and resources that allow tenants greater visibility and manageability over their energy. Through PON 3308: Commercial Tenant Program¹, NYSERDA is encouraging building owners/managers and tenants to work together to achieve energy efficiency in commercial buildings. To fulfill these goals, NYSERDA offers cost-shared support for energy modeling and energy efficiency package development for commercial tenant office space.

This Initiative will test the ability to standardize energy efficiency packages for tenant spaces within commercial buildings.

Initiative Details

The initiative's testable hypotheses and goals prior to exit are as follows.

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.

¹ <https://www.nysERDA.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/PON-3308-Commercial-Tenant-Program>

- 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.

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/managers and tenants manage energy resources and optimize the performance of tenant spaces.

Anticipated Impacts

Direct impacts are defined as those impacts expected from pilots/projects directly funded by NYSERDA, either immediate or lagged.

Table 1. Direct Metrics²

Primary Metrics ³		2016	2017	2018	2019	2020	2021	2022	2023	2024	TOTAL
Energy Efficiency	MWh Annual	5,600	13,100	18,600	22,400	26,100	18,600	11,200	5,600	3,700	124,900
	MWh Lifetime	44,800	104,000	149,000	179,000	209,000	149,000	89,500	44,800	29,800	998,900
	MMBtu Annual	5,900	13,800	19,700	23,600	27,500	19,700	11,800	5,900	3,900	131,800
	MMBtu Lifetime	47,200	110,000	157,000	189,000	220,000	157,000	94,400	47,200	31,500	1,053,000
	MW	-	-	-	-	-	-	-	-	-	-
Renewable Energy	MWh Annual	-	-	-	-	-	-	-	-	-	-
	MWh Lifetime	-	-	-	-	-	-	-	-	-	-
	MW	-	-	-	-	-	-	-	-	-	-

² This table is labeled as Table 4 for CRE Tenant in the May 20, 2016 Commercial Chapter for Market Development.

³ Impacts are expressed on a commitment-year basis, and are incremental additions in each year. Assumes an 8-year measure life. Benefits are rounded to three significant figures. Totals may not sum due to rounding. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA’s programs.

CO2e Emission Reduction (metric tons) Annual	3,300	7,600	10,900	13,000	15,200	10,900	6,500	3,300	2,200	72,900
CO2e Emission Reduction (metric tons) Lifetime	26,000	61,000	87,000	104,000	122,000	87,000	52,000	26,000	7,000	582,000
Customer Bill Savings Annual (\$ million)	\$0.776	\$1.81	\$2.59	\$3.11	\$3.62	\$2.59	\$1.55	\$0.776	\$0.518	\$17.34
Customer Bill Savings Lifetime (\$ million)	\$6.21	\$14.5	\$20.7	\$24.8	\$29.0	\$20.7	\$12.4	\$6.21	\$4.14	\$138.7
Private Investment (\$ million)	\$0.544	\$1.27	\$1.81	\$2.18	\$2.54	\$1.81	\$1.09	\$0.544	\$0.363	\$12.15

Indirect impacts are defined as market effects that are expected to accrue over the longer term from follow-on market activity that results from NYSERDA's investments. Indirect impacts across NYSERDA initiatives may not be additive due to multiple initiatives operating within the same market sectors.

Table 2. Indirect Impacts⁴

Indirect Impact		2020	2025	2030
Energy Efficiency	MWh Cumulative Annual	61,600	220,000	411,000
	MMBtu Cumulative Annual	65,000	232,000	433,000
Renewable Energy	MWh Cumulative Annual	-	-	-
	MW	-	-	-
CO2e Emission Reduction (metric tons) Cumulative Annual		20,900	74,700	139,000

Table 3. Performance Metrics⁵

Indicators ⁶		Baseline (Before/Current)	2019 (Cumulative)
Activity/Outputs	Number of tenant spaces participating in the modeling and energy efficiency package offer	0	130
	Number of buildings participating in the modeling and energy efficiency package offer	0	110
	Square footage of participating tenant spaces in the modeling and energy efficiency package offer	0	6,500,000
	Percent of energy saved above code (for participating tenants)	0	15 - 20%

⁴ This table is labeled as Table 6 for CRE Tenant in the May 20, 2016 Commercial Chapter for Market Development.

⁵ This table is labeled as Table 6 for CRE Tenant in the May 20, 2016 Commercial Chapter for Market Development. The indicators listed in this table have been slightly updated from the May 20, 2016 filing and will be reflected in a revised CRE Tenant Investment Plan expected to be refiled in Spring 2017.

⁶ 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/market metrics.

	Partner engagement: Number of CRE building owners/managers and managers that offer building-specific packages	0	130
	Number of case studies developed	0	7
	Partner engagement: Number of brokers and A&E firms trained	0	20
	Partner engagement: Number of Brokers and A&E Firms that include in-depth energy models and package development in their standard practice	0	12
	Direct Cumulative Annual Energy Savings MWH in participant buildings/spaces	0	57,900
	Direct Cumulative Annual Energy Savings MMBTU in participating buildings/spaces	0	99,200
Outcomes	Package development costs of building-specific package per square foot (SF)	\$0.13/SF	\$0.06/SF
	Market Engagement Number of Brokers and A&E Firms that include in-depth energy models and package development in their standard practice	TBD	14
	Percent of the total addressable square footage in NYS that is covered by a building-specific package	0	7%
	Tenant Spaces completed by the market without NYSERDA funding	0	145
	Percentage of Real Estate Broker firms trained on energy efficient space design and including energy in leasing dialogues with tenant	TBD	10%
	Percentage of Architecture and Engineering firms trained to better incorporate energy efficiency options into tenant space designs and providing packages as standard practice	TBD	10%

Initiative Schedule and Budget

Table 4. Annual Market Development Budget Allocation - Commitment Basis⁷

Commitment Budget	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
Incentives & Services	\$521,642	\$1,217,164	\$1,738,806	\$2,086,567	\$2,434,328	\$1,738,806	\$1,043,284	\$521,642	\$347,761	-	\$11,650,000
Tools, Training, and Replication	\$140,833	\$704,167	\$845,000	\$1,126,667	\$1,408,333	\$1,408,333	\$1,408,333	\$845,000	\$563,333	-	\$8,450,000
Implementation Support	\$400,000	\$200,000	\$200,000	\$400,000	\$200,000	\$400,000	\$400,000	\$800,000	\$1,200,000	\$1,200,000	\$5,400,000
Total	\$1,062,475	\$2,121,331	\$2,783,806	\$3,613,234	\$4,042,662	\$3,547,139	\$2,851,617	\$2,166,642	\$2,111,095	\$1,200,000	\$25,500,000

⁷ This table is labeled as Table 1 for CRE Tenant in the May 20, 2016 Commercial Chapter for Market Development.

Outputs/Outcomes/Indicators

The table below lists the outputs, outcomes and indicators to be assessed through this evaluation, with all of the initiative's outputs, outcomes and indicators listed in Appendix B for context.

NOTE: For the purposes of this work plan, program activity/output indicators represent 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. Only some of these initiatives will be provided in annual reporting to the NYS Department of Public Service, as indicated in the table.

Direct impacts are defined as those impacts expected from pilots/projects directly funded by NYSEERDA, either immediate or lagged.

Indirect impacts are defined as market effects that are expected to accrue over the longer term from of follow-on market activity that results from NYSEERDA's investments. Indirect impacts across NYSEERDA initiatives may not be additive due to multiple initiatives operating within the same market sectors.

Table 5. Initiative Outputs/Outcomes/Indicators

The Performance Metrics listed in Table 3 are those that NYSERDA has committed to report to the DPS on an annual basis. TBD denotes that NYSERDA requires more data to quantify baseline/market metrics to the degree needed to measure against in the future. Where Market Evaluation is indicated in the Data Collector column of this table, NYSERDA expects the output/outcome to be addressed through this scope of work.

Outputs/Outcomes	Indicators	Data Source	Annually Reported to DPS?	Used to Estimate Impacts?		Data Collector
				Direct	Indirect	
Awareness of the value of incorporating energy modeling and packages into the leasing process	Percent of building stock integrating above code EE approaches	Survey of A&E Firms, building owners/managers, tenants; secondary data analysis	No		✓	Market Evaluation
Awareness of the value of incorporating energy efficiency options into the leasing process	Percent of real estate brokers aware of the value of incorporating energy efficiency options into leasing process	Survey of brokers, building owners/managers, tenants	No		✓	Market Evaluation
Awareness of the value of incorporating energy efficiency options into the leasing process	Real estate broker practices to incorporate energy efficiency options into leasing dialogue	Survey of RE brokers, building owners/managers, tenants	No		✓	Market Evaluation
Awareness of the value of incorporating energy efficiency options into the leasing process	Percent of A&E firms aware of the value of incorporating energy efficiency options into tenant space design	Surveys of A&E Firms, building owners/managers, tenants	No		✓	Market Evaluation
Awareness of the value of incorporating energy efficiency options into the leasing process	Practices of A&E firms regarding incorporating above code EE into tenant space designs	Surveys of A&E Firms, building owners/managers, tenants	No		✓	Market Evaluation
Modeling & package development trainings are held	Number of brokers and A&E firms trained	Program Data	Yes	✓		Program

Outputs/Outcomes	Indicators	Data Source	Annually Reported to DPS?	Used to Estimate Impacts?		Data Collector
				Direct	Indirect	
Pilot projects using tenant-specific EE packages are completed	Volume and rate of turn-over of leased Class A and B office space	Secondary data analysis	No		✓	Market Evaluation
Pilot projects using tenant-specific EE packages are completed	Number of tenant spaces participating in the modeling and energy efficiency package offer	Program data	Yes	✓		Program
Pilot projects using tenant-specific EE packages are completed	Square footage of participating tenant spaces in the modeling and energy efficiency package offer	Program data	Yes	✓		Program
Building-specific packages are created	Number of buildings participating in the modeling and energy efficiency package offer	Program data	Yes	✓		Program
Building owners/managers & managers offer building-specific packages	Partner engagement: Number of CRE building owners/managers that offer building-specific packages	Program data	Yes	✓		Program
Case studies & Tenant EE Guidance Manual are published on the web	Number of case studies developed	Program data	Yes	✓		Program and Market Evaluation
Demonstration of a cost- and time-effective replicable approach to energy savings	Package development costs of building-specific package per SF	Secondary data analysis, surveys of A&E firms	Yes	✓		Program and Market Evaluation

Outputs/Outcomes	Indicators	Data Source	Annually Reported to DPS?	Used to Estimate Impacts?		Data Collector
				Direct	Indirect	
above code through use of packages						
EE discussion becomes part of the commercial leasing dialogue early in the process	Percentage of Real Estate Broker firms trained on energy efficient space design and including energy in leasing dialogues with tenant	Survey data from Real Estate Brokers, building owners/managers and tenants	Yes	✓	✓	Market Evaluation
EE discussion becomes part of the commercial leasing dialogue early in the process	Percentage of A&E firms trained to better incorporate energy efficiency options into tenant space designs and providing packages as standard practice	Survey data from A&E firms, building owners/managers and tenants	Yes	✓	✓	Market Evaluation
Brokers and A&E firms include in-depth energy models & / package development in their standard practices.	Number and percent of Brokers and A&E Firms that include in-depth energy models and package development in their standard practice	Surveys of A&E firms	Yes	✓	✓	Market Evaluation
Standardized EE packages generate tenant demand for EE build-outs in absence of NYSERDA funding	Number of tenant spaces completed by the market without NYSERDA funding	Survey data from CRE tenants, A&E firms and real estate brokers	Yes		✓	Market Evaluation
Market penetration of building-specific packages	Percent of the total addressable square footage in NYS that is covered by a building-specific package	Program data, secondary data analysis	Yes		✓	Program/Evaluation

EM&V Approach

Table 6. Evaluation Objectives and Main Research Questions

The evaluation objective and main research topics are listed in the table below.

Objective	Evaluation Question(s)	Data Source(s) & Analytic Method(s)
Confirm rate of Class A office space turnover	What is the volume and rate of Class A office space turnover annually?	Secondary data analysis
Baseline market actor awareness on the value of incorporating energy efficiency options, energy modeling and packages into the leasing process and market actor practices for doing so	What percent of Class A office space building stock has integrated above code EE approaches currently?	Survey of A&E firms, building owners/managers and tenants. Secondary data analysis
	What is real estate broker awareness of the value of incorporating EE options into the leasing process?	Survey of brokers, building owners/managers, tenants
	What are real estate broker practices to incorporate EE options into the leasing process?	
	What is the number and percentage of real estate broker firms trained on energy efficient space design and include energy in leasing dialogues with tenant?	
	What is A&E firm awareness of the value of incorporating EE options into tenant space designs?	Survey of A&E firms, building owners/managers and tenants
	What are A&E practices to incorporate above code EE into tenant space designs?	Survey of A&E firms
	What is the number and percentage of A&E firms trained to better incorporate energy efficiency options into tenant space designs and provide packages as standard practice?	
	At what point in the leasing process is EE discussed?	Surveys of brokers, A&E firms, building owners/managers, tenants
Baseline program adoption and uptake	What is the number of CRE building owners and managers offering building-specific packages?	Survey of brokers, A&E firms, building owners/managers and tenants. Secondary data analysis. Interviews with building owners/managers as part of CDM market assessment
	How many tenant spaces and buildings are participating in the modeling and energy efficiency package offer?	
	What is the square footage of participating tenant spaces participating in the modeling and energy efficiency package offer?	
	How many case studies have been developed?	Program data

	What number and percentage of brokers and A&E firms have been trained in modeling and energy-efficiency packages?	Surveys of brokers, A&E firms, program data
Demonstration of cost- and time-effective replicable approaches	What is the current package development cost of a building-specific package per SF?	Survey of A&E firms
Baseline market penetration of building-specific packages	Percent of the total addressable square footage in NYS that is covered by a building-specific package	Program, analysis of secondary data

Evaluation Methodology

The CRE Tenant market evaluation study will identify and assess the theory of change (i.e., how early and intermediate accomplishments lead to long-term results) in the commercial real estate market. Baseline measurements of key market-level indicators shall be conducted first, with periodic follow ups monitoring change over time. The Contractor shall develop baseline measurements that will include, but not be limited to confirming the volume and rate of turn-over in leased commercial office space; building-specific above code energy efficiency approaches currently in use; real estate broker awareness and practices as to the value of incorporating energy efficiency options, energy modeling and packages into leasing dialogue; A&E firm awareness and practices as to the value of incorporating above code energy efficiency into tenant space designs; and market penetration of building-specific packages.

Subsequent follow-ups shall provide updates to the baseline metrics described above and include, but not be limited to assessing the uptake and satisfaction of tenant-specific, building-specific and standardized efficiency packages; replication of building-specific packages unfunded by NYSERDA; identification of tools incorporated into business models; and the change in measure adoption facilitated by packages. The information provided by this baseline study and its subsequent follow ups will inform program design and operation, provide credible quantification of outcomes and market impacts due to the program, and support program evolution and exit decisions. Further description of the follow-up research efforts is described below in the Long-Term Data Collection section.

The Contractor shall inform measurements of these indicators using primary data collection and secondary data analysis; surveys, conducted as phone interviews and in-depth interviews will be conducted of real estate brokers, A&E firms, building owners/managers, and tenants to establish baseline metrics for the identified market indicators. The Contractor shall analyze secondary data resources such as CoStar to provide information on such metrics as the volume and rate of tenant turnover in commercial office space.

This evaluation will focus on leased Class A commercial space and the data collection of market actors working in that space. However, should market actor interviews indicate experience in Class B or Class C space, the Contractor shall collect information about those classes as well.

The Contractor calculated sample size estimates on the initial estimates of population sizes for key market actors provided below by NYSERDA. Given the focus of this baselining effort, the Contractor shall attempt to include only tenants in the sample who are in the early phases of the leasing process or who have recently completed a fit-out/retrofit within the last 12 months.

As part of finalizing the work plan, the Contractor shall work with NYSERDA to ensure indicators and data collection processes align with the initiative’s hypotheses testing. Deliverables shall include a summary of

how the progress of indicators supports the initiative's hypotheses testing summary and be delivered as part of the 2019 and 2021 reports.

Methodology for Primary Data Collection

The Contractor shall use both computer-assisted telephone interviewing (CATI) surveys and in-depth interviews to collect primary data from the four targeted groups in this evaluation. The sampling and data collection task writeups provide more detail on this data collection.

Data Sources for Secondary Data Research

- **Info Group Data:** This data set includes records for commercial (and residential) space including, but not limited to, contact information, detailed location and building information, financial statistics, and demographics.
- **CoStar Data:** This data set includes information on commercial real estate properties throughout NYS including, but not limited to, number of buildings, percent of property leased and owned, average rents, average tenant space square footage, tenant demographics, and building stock data.
- **Natural Resources Defense Council national demonstration projects.** These demonstration projects provide information on the economic benefits of high-performing tenant spaces.⁸

Direct Impacts Calculation Methodology

Direct impacts constitute the direct energy savings resulting from the CRE Tenant initiative activities at the funded pilot (tenant, building) and will be subject to measurement and verification (M&V) over time. This M&V of direct impacts is not part of the work scope requested in this document. However, the results of the M&V and the understanding of the level of savings achieved in pilot facilities will be informative to future work inside of this scope to estimate indirect impacts resulting from replication of these strategies in the broader market.

Indirect Impacts Calculation Methodology

Indirect impacts attributable to the CRE Tenant initiative include market effects that are expected to accrue over the longer term from follow-on market activity that results from NYSERDA's investments. As noted above, NYSERDA proposes measuring indirect impacts in terms of energy efficiency savings (MWh, MMBtu) and renewable energy savings (MWh, MW). Indirect impacts across NYSERDA initiatives may not be additive due to multiple initiatives operating within the same market sectors. In the case of CRE Tenant initiative, indirect savings result from the replication of modeled energy efficient packages or solutions in commercial spaces throughout the state beyond the time-frame of the initiative.

While the 2017 scope of work is focused on developing baseline market indicators, the Contractor shall provide a short memo to NYSERDA at the conclusion of the 2017 work that lays out a recommended methodology for tracking and calculating indirect impacts from the initiative. In this effort, the Contractor shall draw on a mix of resources including its recent literature review synthesizing the current best-practices for market transformation evaluations, results of its 2017 market baselining study, and stakeholder input from NYSERDA. The Contractor shall implement an additional survey

⁸ Summaries of the demonstration projects may be found here: <http://tenantenergy.uli.org/case-studies/>

section to any follow-on research that NYSERDA administers in 2018 and 2020 to update baseline values for key performance metrics. These additional questions will be used to characterize the impact of energy efficiency packages that may have occurred as a result of the initiative and other information (e.g. outreach efforts) necessary to calculate the indirect impacts for this initiative.

The Contractor shall assess indirect impacts in 2019 and 2022 as part of this research. To best meet NYSERDA's needs, the Contractor shall develop the methodology, including survey questions and impact estimation methods, in 2017. However, the Contractor shall not estimate indirect impacts in 2017 since market effects generally take time to emerge and are generally not present in the early years of a new initiative. The Contractor shall include a section in the 2017 report that lays out the methodology for tracking and calculating indirect impacts from the initiative.

The Contractor shall assess indirect impacts by quantifying energy savings and emissions reductions that result in the market from effects of the CRE Tenant initiative but are not directly incented nor quantified by it. The Contractor anticipates that these effects will result from increased awareness among market actors of the value of incorporating energy modeling and tenant- or building-specific packages improvements, and the subsequent market penetration, that would not have occurred in the absence of the initiative. Indirect savings will result when participating architects/engineers, building owners, or brokers apply knowledge from the initiative in other buildings/spaces or with other customers.

To capture these effects, the Contractor shall add additional modules to the surveys to be fielded in 2019 and 2022. The Contractor shall assess these changes and savings from all research efforts to provide a robust estimate of overall indirect impacts resulting from the initiative. The Contractor shall ask more qualitative questions about indirect impacts in the interviews with building owners in 2018 and 2020 to highlight any major changes and further inform the methodology as needed.

Long-Term Data Collection

This evaluation plan describes the research activities to be conducted for the 2017 baseline study; statistically-significant updates to the baseline shall be conducted in 2019 and 2022 to measure key performance indicators and market change and higher-level, less rigorous research will be conducted in alternate years. **NYSERDA shall decide whether to conduct the follow-up assessments after completion of the baseline study and the Contractor shall make no assumption on implementing follow-up measurements without prior written approval from NYSERDA.**

As requested, the Contractor shall conduct follow-up research in 2018, 2019, 2020, and 2022 based on the data collection activities outlined above. To provide statistically-significant updates to the baseline, the 2019 and 2022 updates for all metrics, these studies will follow the same approach outlined in this proposal, including the same sample sizes. The smaller-scale alternate year studies will consist of only a limited number (20) of building owner interviews. Building owners will provide the broadest view possible of market activity given a limited research. The Contractor shall interview building owners accounting for high shares of Class A office space in New York State to maximize market coverage.

Ethics and Operational Standards

NYSERDA's EM&V function is organizationally separate from program implementation. The group takes steps to eliminate opportunities for bias in conducting EM&V activities and contracts with independent third-party consultants who exhibit a high degree of evaluation ethics.

Note that some program participants/customers may require non-disclosure agreements (NDAs) with Evaluation contractors. Refer to Article VIII of the *RFQ 3183 – Market Research and Evaluation Support Services Contract Umbrella Agreement* for confidentiality and NDA guidelines.

Tasks, Budget and Schedule

Timeliness and the ability for quick turnaround on the indicators outlined in this plan, especially those for which NYSERDA has no baseline values (i.e., denoted as “TBD”), is crucial, and this research strategy is developed expressly to meet NYSERDA’s deadlines. For purposes of this work plan, the tasks are defined as follows:

Task 1: Project Kick-Off and Work Plan Finalization

The Contractor shall organize a kickoff meeting with key staff from NYSERDA during the week of April 25, 2017. The Contractor shall hold this meeting at NYSERDA’s offices or at another location convenient to NYSERDA. Antje Flanders and Jake Millette from the Contractor shall attend the meeting with other key staff participating as appropriate.

This meeting shall focus on developing a shared understanding of the research objectives and prioritizing early research activities, including those needed to develop the prioritized metrics. The Contractor shall review details of the draft work plan with NYSERDA, clarify pertinent issues, review the research approach, and review the project timeline. The Contractor shall also discuss the sampling plan and available sources as well as request any relevant data or materials. Finally, the Contractor shall discuss how best to leverage ongoing research and data from the NYSERDA Commercial Baseline Study, in particular the Customer Decision Making (CDM) market assessment, which targets some of the same market actor as the research to be conducted under this scope of work. During the meeting, the Contractor and NYSERDA shall also establish a schedule for regular status calls.

The Contractor shall work with NYSERDA to ensure indicators and data collection processes align with initiative hypotheses testing.

Prior to the kickoff meeting, the Contractor shall review available data and materials about the initiative to obtain a deep knowledge of the initiative’s design. The Contractor shall follow up with additional data requests, as needed.

The Contractor shall make any necessary revisions to this work plan and present it to NYSERDA no later than three business days following the kickoff meeting.

- Deliverables
 - Kickoff meeting and meeting minutes with action items (2017 only)
 - Finalization of evaluation work plan, including schedule, budget, sampling plan, and any updates to indicators to align with hypotheses (2017 only)

Task 2: Secondary Data Analysis

An understanding of the size and features of the New York commercial real estate market is crucial to the effective completion of this study. As an initial step to this evaluation, the Contractor shall request and review existing materials relevant to the research objectives outlined in the Work Plan. At minimum, these materials include:

- **Program materials** from NYSERDA PON 3308: Commercial Tenant Program
- **InfoGroup data** to be used for sampling activities
- **CoStar data** to be used for sampling activities and to quantify the size and turnover rate of Class A space
- **Secondary data** used by NYSERDA in program development, implementation, and EM&V
- **Other relevant information**, including any information available to NYSERDA, information from industry associations, and other relevant New York evaluations.

The Contractor shall review these materials in detail to ensure alignment of the research with NYSERDA's requirements.

The Contractor shall review the results from the NYSERDA Commercial Baseline Study to identify any materials potentially applicable to this study and use the framework developed for evaluating secondary data sources to expedite the review process for this study.

The Contractor shall begin this task immediately after receiving written notice to proceed from NYSERDA, and plan to perform the secondary data review and analysis concurrently with our sampling and Stage 1 survey instrument development activities.

- Deliverables:
 - Summary of applicable secondary data analysis for sampling purposes (2017 only)

Task 3: Sample Strategy

The proposed sampling approach for the four data collection activities is included in this section. As part of this task, the Contractor shall further refine the sampling strategy and sample sizes outlined in this section and summarized in Table 9, based on analysis of the relevant data sets and secondary research. The Contractor shall use the Customer Decision Making (CDM) market assessment in the Commercial Baseline Study to develop samples that are representative of the diverse New York commercial real estate market. As part of the CDM market assessment, the Contractor is already using InfoGroup data (and are awaiting CoStar data) to develop samples, and will be able to leverage that knowledge, and possibly the sample frames themselves, for this evaluation.

Additionally, this baseline study will include phone surveys and on-site audits with thousands of New York businesses, including office buildings, providing additional opportunities to leverage the Commercial Baseline Study research to inform the sampling strategy for this evaluation.

NYSERDA identified four high priority performance metrics that shall be evaluated and the baseline status, including any preliminary results of the evaluation, as soon as possible. The Contractor shall implement a two-phase data collection approach to provide preliminary findings for the prioritized metrics:

- The first phase shall be completed in July and include in-depth interviews with real estate brokers and a survey of A&E firms. These data collection efforts will address all four priority metrics and also collect information on the other baseline research objectives outlined in this document. The Contractor shall also leverage research with building owners and managers, conducted as part of the on-going CDM Market Assessment, to collect additional information on tenant spaces completed by the market without NYSERDA funding.
- The second phase shall be completed by the end of September and will include in-depth interviews with building owners/managers and a survey of CRE tenants.

The table below shows the four prioritized metrics and the data sources the Contractor shall use to develop baseline values for each metric.

Table 7. Prioritized Performance Metrics/Indicators

Metric	Data Source
Number of brokers and A&E firms that include in-depth energy models and packaged development in their standard practice	<ul style="list-style-type: none"> • Real estate broker interviews • A&E survey
Tenant spaces completed by the market without NYSERDA funding ^A	<ul style="list-style-type: none"> • Real estate broker interviews • A&E survey • Building owner/manager survey for Commercial Baseline Study (CDM Market Assessment)
Percentage of real estate broker firms trained on energy efficient space design and include energy in leasing dialogues with tenant	<ul style="list-style-type: none"> • Real estate broker interviews
Percentage of A&E firms trained to better incorporate energy efficiency options into tenant space designs and providing packages as standard practice	<ul style="list-style-type: none"> • A&E survey

^A While this metric relates to tenant spaces, the Contractor plans to address it through the market actor and owner/manager surveys, due to the low expected incidence in the tenant population (projected as 145 in 2019).

Table 9 outlines the planned sampling strategy for this evaluation. The sample size of 68 per survey for the A&E firm and tenant surveys is sufficient to achieve 10% relative precision at 90% confidence for a single estimate (assuming a coefficient of variation of 0.5). The Contractor shall attempt a census of the real estate brokers and Class A office space building owners/managers and will prioritize those firms accounting for the largest market shares to maximize market coverage.

Table 8. Planned Sampling Strategy

Research Approach	Target Group/ Population	Expected Start Date	Estimated Population Size	Estimated Sample Size	Expected Sampling Confidence & Precision	Sampling Method	Primary Sampling Unit
Phase 1 Activities							
In-Depth Interviews	Real Estate Brokers (Class A office space)	May/June 2017	450	50	N/A	Census attempt	Real Estate Broker
CATI Survey	A&E Firms (Class A office space)	May/June 2017	5,673	68	90/10	Stratified Random	A&E Firm
Phase 2 Activities							
In-Depth Interviews	Building owners/managers (Class A office space)	July - September 2017	>100	40	N/A	Census attempt	Building Owner/ Manager
CATI Survey	CRE Tenants (Class A office space)	July - September 2017	TBD	68	90/10	Stratified Random	Tenant

Phase 1

Phase 1 focuses on the research needed to provide NYSERDA with baseline values for the four priority metrics. This phase will include a Computer Assisted Telephone Interviewing (CATI) surveys A&E firms and in-depth interviews with real estate brokers, and it will leverage the ongoing research with building owners/managers as part of the Commercial Baseline Study.

This phase will begin immediately after the project kickoff.

Real Estate Brokers

The Contractor shall develop the sample frame of real estate brokers from a combination of secondary research (e.g., identifying members of various commercial broker associations via web searches) and NYSERDA's InfoGroup database. According to NYSERDA's estimate, the estimated population of brokers is 450.

The Contractor shall attempt to contact all brokers (i.e., a census attempt) to achieve a reasonable number of completed interviews. The Contractor shall conduct as many interviews as possible, with a target of 50 completed interviews. Because this population is hard-to-reach, the Contractor proposes to conduct this research as in-depth interviews, using experienced analysts to complete the interviews.

Census attempts do not have sampling error; therefore, the Contractor does not provide an estimate of the confidence and precision associated with these interviews. However, it is possible that the Contractor's estimates could be subject to non-response bias if the brokers who respond to the survey are different from those who do not, in terms of their energy policies, geographic markets, or size. To assess the possibility of non-response bias, the Contractor shall first compare survey respondents with the population using data available in the InfoGroup database (e.g., NAICS, square foot, number of employees). Even if the sample is different from the population, survey results will only be biased if business characteristics are correlated with the baseline metrics estimated through the survey. Therefore, the Contractor shall also examine whether key survey responses differ by business characteristics. If this analysis suggests the presence of non-response bias, the Contractor shall construct and apply survey weights to correct for this bias.

Architecture and Engineering Firms

The Contractor shall develop the sample frame of A&E firms from a combination of secondary research (e.g., web searches, review of trade association listings, and case studies) and NYSERDA's InfoGroup database. NYSERDA estimates that the population size of A&E firms in New York is 5,673. The Contractor plans to interview 68 of these firms to meet $\pm 10\%$ precision at the 90% confidence level. To capture important geographical differences in the New York commercial real estate market, the Contractor shall stratify the sample by upstate and downstate/New York City.

Phase 2

In Phase 2, the Contractor shall conduct in-depth interviews with building owners and property managers and a survey with commercial tenants. The Contractor is conducting research with these two

groups as part of the Commercial Baseline Study CDM Market Assessment and will rely heavily on the sample development for that study to inform the sampling plan for these two surveys.

Building Owners and Managers

The Contractor shall conduct in-depth interviews with building owners and property managers of Class A office space. Given the small population size (an estimated 100-150 firms) and the difficulty of completing interviews with this stakeholder group, the Contractor shall try to contact all firms (census attempt) and complete as many interviews as possible, with a target of 40 completed interviews. The sample for this study shall be based on four components: (1) InfoGroup database to gather company and contact information; (2) CoStar data to gather building information (e.g., owner or tenant occupied); (3) secondary research (e.g., contacts pulled from BOMA and other relevant associations); and (4) contacts from past research in the commercial real estate sector conducted by the Contractor and/or NYSERDA. The Contractor shall also leverage the building owner and property manager sample developed for the Commercial Baseline Study CDM Market Assessment.

The Contractor will be contacting many, if not most, of these firms in early 2017 as part of the CDM Market Assessment. The length of the current CDM survey prohibits adding all the questions required to address the research objectives of this study in order to conduct both surveys at once. As a result, the Contractor will contact these firms in March - May 2017 as part of the CDM Market Assessment and then again in July - September 2017 for this effort. During the first interview, the Contractor shall ask if the respondent is willing to take part in a follow-up interview in several months. The same analyst will conduct both interviews and reference notes from the first interview to increase the efficiency of the second interview.

Commercial Real Estate Tenants

The Contractor shall field a CATI survey with tenants of Class A office space, with a target of 68 completed interviews. Because of likely differences between the CRE market in upstate and downstate New York, especially New York City, the Contractor shall stratify the sample to ensure sufficient representation of both regions. Similar to the building owner/manager interviews, the Contractor shall leverage sampling work from the Commercial Baseline Study CDM Market Assessment. The sample shall be drawn from a combination of InfoGroup and CoStar data to ensure that the Contractor is calling tenants in Class A space.

- Deliverables
 - List of proposed survey respondents
 - Documentation of how samples were selected
 - Final sample strategy

Task 4: Develop Primary Data Collection Instruments

To address NYSERDA's research objectives for this evaluation, the Contractor shall develop four separate data collection instruments. The Contractor shall submit each draft instrument to NYSERDA for review and comment. The Contractor shall finalize the instruments based on feedback provided and prepare them for fielding.

The Contractor shall create data collection instruments for each of the four primary data collection activities:

- CATI surveys of
 - A&E firms
 - CRE tenants
- In-depth interviews with
 - Real estate brokers
 - Building owners/managers

The Contractor shall design the data collection instruments to ensure that baselines for the performance metrics listed in Table 3, the Initiative outputs/outcomes/indicators applicable to the market evaluation listed in Table 5, and the evaluation objectives and main research questions described in Table 6 are addressed.

- Deliverables
 - Draft and final data collection instruments for the four primary data collection activities
 - Advance letters to potential respondents

Task 5: Administer Data Collection Instruments

Using the data collection instruments described in Task 4 and based on the sampling plan described in Task 3, the Contractor shall field CATI (computer-assisted telephone interviewing) surveys with A&E firms and class A office space tenants. The Contractor shall also conduct in-depth interviews with real estate brokers and building owners/managers.

CATI Surveys

CATI surveys allow the Contractor to efficiently contact many firms, conduct properly timed call backs, and track the outcome of each call. The Contractor's call center staff members are accustomed to conducting interviews on topics related to energy efficiency and "speak the language" of the interviewee.

A key challenge associated with conducting interviews among commercial customers, and to a lesser extent among stakeholders such as architects/engineers, is identifying the appropriate respondent. In the case of CRE tenants, the Contractor will likely look to speak to facility managers and decision makers who are knowledgeable about energy-using equipment.

The Contractor's project team and a survey research member shall review each survey. All surveys shall be programmed internally by the Contractor and shall be tested by at least three analysts and/or field research staff members to ensure that the programming is error-free. The Contractor shall follow the proven data collection and quality control process throughout the survey pre-testing and survey implementation phases of the project. Before calling begins, the Contractor shall train the interviewers dedicated to this project on the purpose of the research, how to identify the appropriate respondent for this project, and the meaning and intended purpose of the individual questions.

To minimize measurement error that can occur during survey fielding, the Contractor shall conduct a pre-test of the survey before the full launch. The pre-test allows the Contractor to verify that the survey questions are working as intended and to make any adjustments as needed. The pre-test itself involves

conducting interviews with a small number of respondents in which the Contractor will listen to each survey and review the survey responses. The Contractor shall check to make sure the survey is programmed correctly and use statistical tests to measure how well a set of questions measures a given concept. In the end, the Contractor shall be confident that survey respondents understand the questions as intended.

For all CATI surveys in support of this effort, the Contractor shall attempt to contact each sample point up to eight times, at different times of the day and across multiple days, to increase the likelihood of completing an interview.

In-Depth Interviews

The Contractor's analytic staff will conduct the in-depth interviews with real estate brokers and building owners and property managers. Experienced analysts, rather than call center staff, shall conduct all in-depth qualitative interviewing.

The two analysts conducting the interviews are Jennifer Watters and Evan Tincknell; they are also conducting interviews with building owners and property managers for the CDM Market Assessment and may be calling on the same contacts for both efforts.

The Contractor records and transcribes each in-depth interview to ensure that all information is obtained and can be easily revisited and searched.

- Deliverables:
 - Survey disposition and methodology reports
 - Administer CATI and Web-based surveys
 - Conduct in-depth interviews with real estate brokers and building owners/property managers

Task 6: Data Analysis

Once the Contractor has completed the data collection activities, the Contractor shall prepare and analyze the data. The quality and usefulness of this study rests on the care and skill with which the data is collected, validated, managed, weighted, aggregated, and reported.

The Contractor shall conduct data QA/QC, management, and analysis throughout the study, particularly during primary data collection tasks. The Contractor's QA/QC process includes, but is not limited to, the following steps completed in advance of developing final deliverables:

- QA/QC all primary data (CATI and in-depth interviews)
- Clean and code data, as necessary
- Prepare data for analysis (i.e., create simple and relevant variables and indicators; keep an updated data dictionary; append customer characteristics from sampling phases)
- Create post-stratification weights as necessary to mitigate differential survey response effects
- Tabulate initial statistics for key indicators from CATI surveys and in-depth interviews
- Examine resulting values in the context of secondary data as a check

- Where applicable, the Contractor shall follow the New York Office of Clean Energy’s Evaluation, Measurement & Verification Guidance⁹ to ensure consistency with NYSERDA, New York utilities, and other evaluators in the Contractor’s analysis.

- Deliverables
 - All data and analysis files collected and constructed as part of the study
 - Tabulations and other statistical analysis outputs on key indicators
 - Survey disposition reports
 - Methodology reports describing analysis

Task 7: Draft Report and Preliminary Findings Presentation

Following the Phase 1 data collection, the Contractor shall provide NYSERDA with an interim results memo in July 2017 that summarizes the findings from the Phase 1 data collection activities, including all research questions addressed through the real estate broker interviews and the A&E firm survey.

Following the completion of Phase 2 of the research, the Contractor shall submit a draft report and findings presentation containing results from both phases of this study. This report shall provide final baseline values for the performance metrics as well as results for the research questions addressed by the building owner/manager interview and the CRE tenant survey. This report will also integrate findings presented in the interim results memo.

The Contractor shall follow NYSERDA’s Evaluation Report Guidelines¹⁰ to ensure consistency and clarity in the deliverables. Through the Contractor’s existing work with NYSERDA, the Contractor is already familiar with the guidelines and appreciate the need for consistent report content and formatting. While the Evaluation Report Guidelines specify that the Contractor does not need to follow the NYSERDA Report Template, the Contractor is also familiar with the Report Template specifications and will use them as applicable to supplement the deliverables.

The Contractor understands NYSERDA’s goal of receiving evaluation reports that are succinct and focused on the needs of various audiences and will ensure the reports are concise in nature. Ultimately, through discussions with NYSERDA, the Contractor shall determine the most appropriate format to follow for the evaluation reports.

- Deliverables
 - Preliminary findings memo
 - Draft findings presentation
 - Draft report

Task 8: Final Report

Following the draft report and preliminary findings presentation deliverable, the Contractor shall incorporate any comments from NYSERDA or other stakeholders and prepare a final report and presentation in accordance with the NYSERDA Evaluation Report Guidelines. The Contractor shall

⁹ Palmero Letter Regarding EM&V Guidance, November 1, 2016.

¹⁰ NYSERDA Report Content and Format Guide for Evaluation Contractors. February 2014, or most recent.

develop a data dictionary of individual data elements and fields to support the NYSERDA Data Classification requirements.

The Contractor shall submit the final report and findings presentation by November 10, 2017.

- Deliverables
 - Final findings presentation
 - Final report
 - Data dictionary that supports the NYSERDA Data Classification requirements

Task 9: Data Transfer

Upon project closeout, the Contractor shall transfer all project-related data files to NYSERDA following the appropriate procedures outlined by NYSERDA staff. Additionally, the Contractor shall follow all NYSERDA data structure and naming conventions outlined in NYSERDA's Data Standards/End of Project Data Guidance memo¹¹ to ensure a smooth transfer of project files.

- Deliverable
 - All project-related data files transferred to NYSERDA (all years)

Task 10: Data Destruction

Following the conclusion of the project and the transfer of all data files to NYSERDA, the Contractor shall destroy any confidential data used as part of the project. The Contractor shall deliver a countersigned letter to NYSERDA certifying that this process has occurred.

- Deliverable
 - Countersigned letter sent to NYSERDA (once after conclusion of the project)

Task 11: Project Management

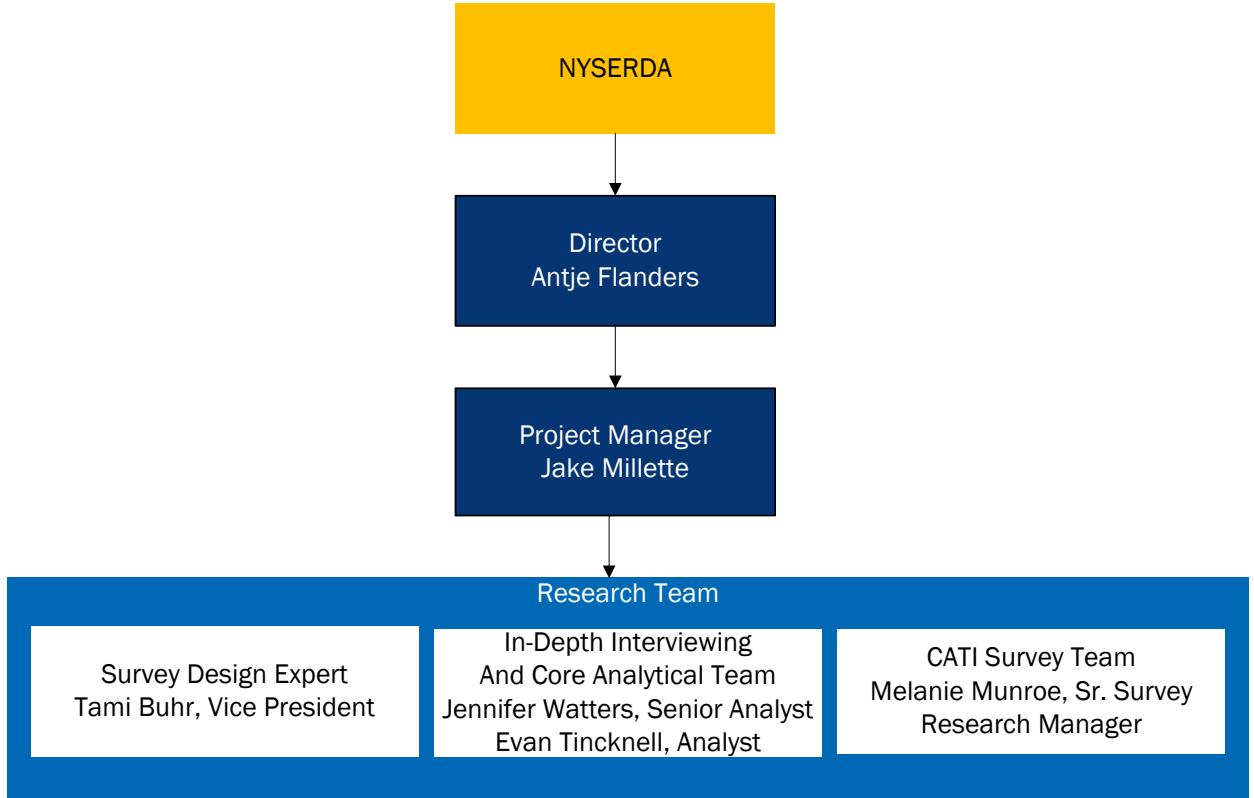
The Contractor shall follow a simple management plan, relying on a blend of team members familiar with the current NYSERDA commercial evaluation activities and others who bring relevant experience from a wide variety of similar projects. Antje Flanders, the project director, and Jake Millette, the day-to-day project manager, co-manage the Commercial Baseline Study and underlying research efforts, including the commercial real estate CDM Market Assessment. Because there is no need for any transfer of knowledge between the two studies, the Contractor project management team can look for efficiencies between the two studies to provide the greatest value possible to NYSERDA.

Ms. Flanders and Mr. Millette shall attend conference calls, participate in regular meetings, and engage in the development of memoranda stating any issues, project status and action items discussed during status calls. The Contractor understands the importance of regular progress reports summarizing completed and proposed activities to date. As part of project management, the Contractor shall develop weekly and monthly progress reports. These reports help to identify the completed activities and planned activities for the coming period.

The Contractor shall use the NYSERDA SharePoint site to host all relevant documentation.

¹¹ Data Standards / End of Project Data Guidance memorandum. To NYSERDA Evaluation Contractors. October 29, 2013.

The Contractor management plan and key staff are depicted in the figure below.

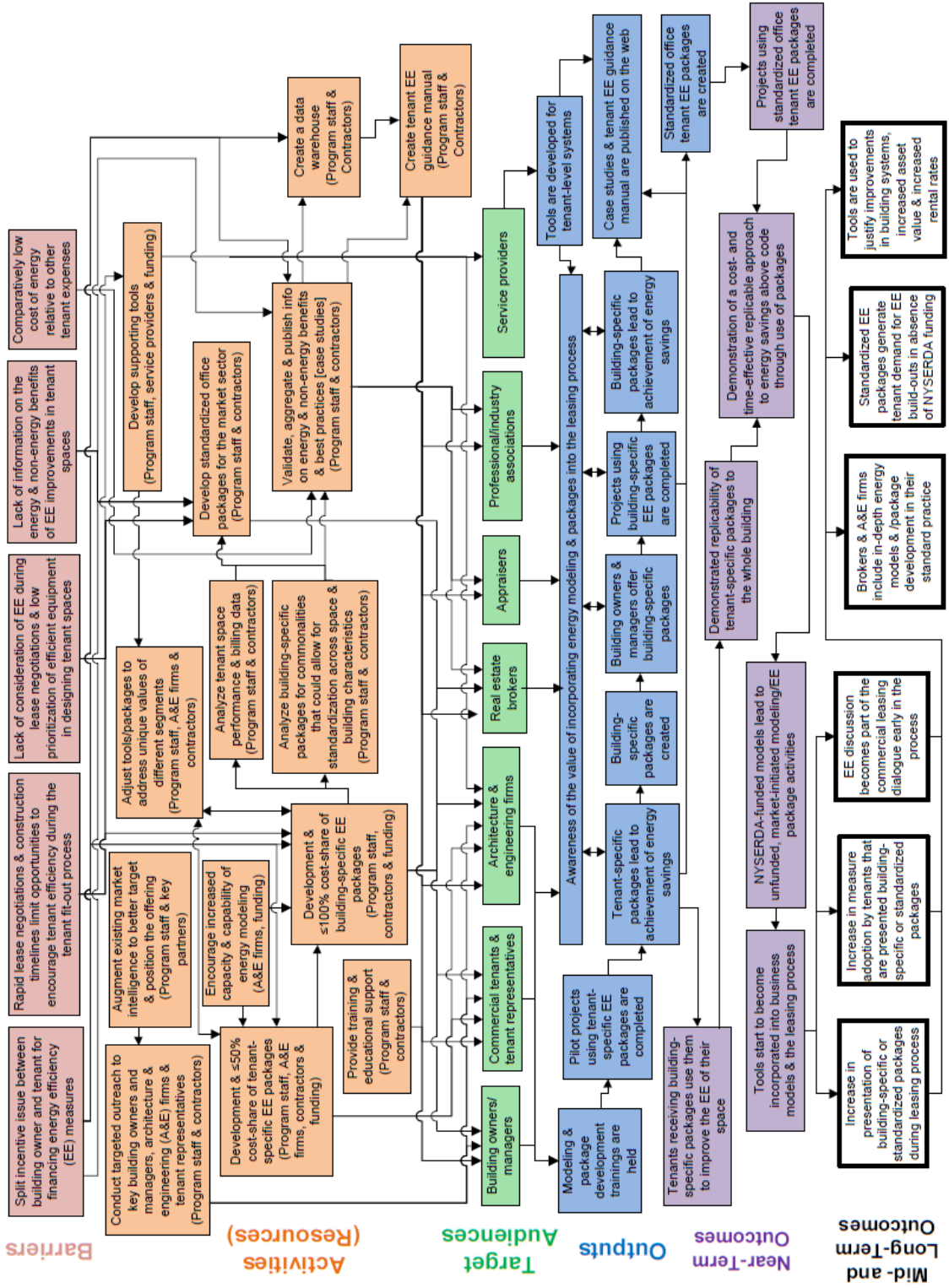


Task and Budget Summary

The total 5-year budget for this evaluation is \$586,200. The budget for the first-year baseline activity is \$189,486.

Appendix A

LOGIC MODEL: Commercial Real Estate Tenant Initiative



Appendix B

Cells highlighted in green reflect those to be assessed as part of this work plan (per Table 5).

Outputs/Outcomes	Indicators	Data Source	Annually Reported to DPS?	Used to Estimate Impacts?		Data Collector
				Direct	Indirect	
Awareness of the value of incorporating energy modeling and packages into the leasing process	Percent of building stock integrating above code EE approaches	Survey of A&E Firms, building owners/managers, tenants; secondary data analysis			✓	Market Evaluation
Awareness of the value of incorporating energy modeling and packages into the leasing process	Estimated savings from above code EE approaches	Surveys of A&E firms, building owners/managers and tenants; secondary data analysis			✓	Impact Evaluation
Awareness of the value of incorporating energy efficiency options into the leasing process	Percent of real estate brokers aware of the value of incorporating energy efficiency options into leasing process	Survey of brokers, building owners/managers, tenants			✓	Market Evaluation
Awareness of the value of incorporating energy efficiency options into the leasing process	Real estate broker practices to incorporate energy efficiency options into leasing dialogue	Survey of RE brokers, building owners/managers, tenants			✓	Market Evaluation
Awareness of the value of incorporating energy efficiency options into the leasing process	Percent of A&E firms aware of the value of incorporating energy efficiency options into tenant space design	Surveys of A&E Firms, building owners/managers, tenants			✓	Market Evaluation
Awareness of the value of incorporating energy efficiency options into the leasing process	Practices of A&E firms regarding incorporating above code EE into tenant space designs	Surveys of A&E Firms, building owners/managers, tenants			✓	Market Evaluation
Tools are developed for tenant-level systems	Number of tools developed	Program data		✓		Program

Tools are developed for tenant-level systems	Types of tools developed	Program data		✓		Program
Modeling & package development trainings are held	Number of brokers and A&E firms trained	Program Data	✓	✓		Program
Modeling & package development trainings are held	Number of trainings held by NYSERDA or qualified A&E Firms	Program data		✓		Program
Pilot projects using tenant-specific EE packages are completed	Volume and rate of turn-over of leased Class A and B office space	Secondary data analysis			✓	Market Evaluation
Pilot projects using tenant-specific EE packages are completed	Number of tenant spaces participating in the modeling and energy efficiency package offer	Program data	✓	✓		Program
Pilot projects using tenant-specific EE packages are completed	Square footage of participating tenant spaces in the modeling and energy efficiency package offer	Program data	✓	✓		Program
Tenant-specific packages lead to achievement of energy savings	Percent of energy saved above code (for participating tenants)	Analysis of projects	✓	✓		Impact Evaluation
Building-specific packages are created	Number of buildings participating in the modeling and energy efficiency package offer	Program data	✓	✓		Program
Building-specific packages are created	Square footage of building projects participating in the	Program data		✓		Program

	modeling and energy efficiency package offer					
Building owners/managers & managers offer building-specific packages	Partner engagement: Number of CRE building owners/managers that offer building-specific packages	Program data	✓	✓		Program
Projects using building-specific EE packages are completed	Number of projects incorporating building-specific EE	Program data		✓		Program
Building-specific packages lead to achievement of energy savings	Percent of energy saved above code (for participants)	Analysis of projects		✓	✓	Impact Evaluation
Case studies & Tenant EE Guidance Manual are published on the web	Number of case studies developed	Program data	✓	✓		Program and Market Evaluation
Case studies & Tenant EE Guidance Manual are published on the web	Tenant EE Guidance Manual is published on the web	Program data		✓		Program
Standardized office tenant EE packages are created	Number of CRE/A&E Firms offering standard office tenant EE Packages	Survey data from participating A&E Firms, tenants and building owners/managers			✓	Market Evaluation
Direct cumulative annual energy savings MWH in participant buildings/spaces	Direct cumulative annual electricity savings	Impact evaluation of projects	✓	✓		Impact Evaluation
Direct cumulative annual energy savings MMBTU in participant buildings/spaces	Direct cumulative annual fuel savings	Impact evaluation of projects	✓	✓		Impact Evaluation
Tenants receiving building-specific packages use them to improve the EE of their space	Percent of tenants implementing building-specific packages	Program Data		✓		Program

Demonstrated replicability of tenant-specific packages to the whole building	Percent of tenants implementing tenant-specific packages within participating buildings	Program Data			✓	Program
Demonstrated replicability of tenant-specific packages to the whole building	Percent of tenant-specific packages applied to buildings	Program data			✓	Program
Demonstrated replicability of tenant-specific packages to the whole building	Satisfaction with tenant-specific packages at building level	Surveys of participating A&E Firms, tenants, and building owners/managers			✓	Market Evaluation
Demonstration of a cost- and time-effective replicable approach to energy savings above code through use of packages	Package development costs of building-specific package per SF	Secondary data analysis, surveys of A&E firms	✓	✓		Program and Market Evaluation
Demonstration of a cost- and time-effective replicable approach to energy savings above code through use of packages	Package development costs of tenant-specific package per SF	Surveys of A&E firms		✓		Program and Market
Projects using standardized office tenant EE packages are completed	Square footage of tenants implementing standardized tenant EE packages	Program data, survey data from participating A&E Firms, building owners/managers, tenants			✓	Market Evaluation
Projects using standardized office tenant EE packages are completed	Satisfaction of standardized office tenant EE packages	Survey data from participating A&E Firms, tenants and building owners/managers			✓	Market Evaluation

Projects using standardized office tenant EE packages are completed	Number of tenants implementing standardized tenant EE packages	Program data, survey data from participating A&E Firms, building owners/managers, tenants			✓	Market Evaluation
NYSERDA-funded models lead to unfunded, market-initiated modeling/EE package activities	Number and Percent of modeling/EE packages unfunded by NYSERDA	Survey data of RE brokers and A&E firms			✓	Market Evaluation
Tools start to become incorporated into business models & the leasing process	Percent of brokers and A&E firms using tools developed by initiative	Survey data of brokers and A&E firms		✓		Market Evaluation
Increase in presentation of building-specific or standardized packages during leasing process	Percent of buildings (weighted by square footage) that have developed a building-specific package or use the standardized package	Survey data from participating CRE and tenants.			✓	Market Evaluation
Increase in measure adoption by tenants that are presented building-specific or standardized packages	Percent of recommended measures implemented	Analysis of project files			✓	Impact Evaluation
Increase in measure adoption by tenants that are presented building-specific or standardized packages	Savings of recommended measures implemented	Analysis of project files			✓	Impact Evaluation
EE discussion becomes part of the commercial leasing dialogue early in the process	Percentage of Real Estate Broker firms trained on energy efficient space design and including energy in leasing dialogues with tenant	Survey data from Real Estate Brokers, building owners/managers and tenants	✓	✓	✓	Market Evaluation
EE discussion becomes part of the commercial leasing dialogue early in the process	Percentage of A&E firms trained to better incorporate energy efficiency options into tenant space designs and	Survey data from A&E firms, building owners/managers and tenants	✓	✓	✓	Market Evaluation

	providing packages as standard practice					
Brokers and A&E firms include in-depth energy models & / package development in their standard practices.	Number and percent of Brokers and A&E Firms that include in-depth energy models and package development in their standard practice	Surveys of A&E firms	✓	✓	✓	Market Evaluation
Standardized EE packages generate tenant demand for EE build-outs in absence of NYSERDA funding	Number of tenant spaces completed by the market without NYSERDA funding	Survey data from CRE tenants, A&E firms and real estate brokers	✓		✓	Market Evaluation
Tools are used to justify improvements in building systems, increased asset value and increased rental rates	Tools identified as drivers in decision making	Survey data from A&E firms, building owners/managers and tenants		✓		Market Evaluation
Market penetration of building-specific packages	Percent of the total addressable square footage in NYS that is covered by a building-specific package	Program data, secondary data analysis	✓		✓	Program/ Evaluation

Appendix C

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

Clean Energy Fund Investment Plan: Commercial Chapter

Portfolio: Market Development

Submitted by:

The New York State Energy Research and Development Authority

Revised May 20, 2016

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 described in this Chapter include: Commercial Real Estate Tenant which pursues energy efficiency in the commercial tenant segment; Real Time Energy Management 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.

Projected additional initiatives under development include: an energy service company (ESCO) and Business Models initiative that will expand Performance Contracting and guaranteed energy savings in promising sectors, build stakeholder involvement from ESCOs and stimulate new business model proposals; Remote Audit that will explore technology and business models for identifying opportunities and converting projects; and an Energy Efficiency Co-Benefits initiative that will look at simple ways to compare the costs and benefits of an energy efficiency investment. NYSERDA also intends to include specific offerings in the retail and small business sectors as well as broaden its building analytics offering.

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

4.1 Real Estate Tenant

4.1.1 Overview

Present Situation	<ul style="list-style-type: none">• 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
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	<p>managers. While heating, ventilation, and air conditioning (HVAC) and lighting are trending downward in energy use per square foot, tenant plug load is growing.</p> <ul style="list-style-type: none"> • 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 in to tenant spaces. While the issue is well known, a solution has not been presented by the market.
Intervention Strategy	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<p>Architecture and Engineering (A&E) firms</p> <ul style="list-style-type: none"> • Present space design options and energy efficiency improvements to tenant • Influence open space layout and perimeter vs interior enclosed space

	<ul style="list-style-type: none"> • 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
<p>Market Readiness</p>	<ul style="list-style-type: none"> • 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.

<p>Customer Value</p>	<p>Developing tenant-specific efficiency options:</p> <ul style="list-style-type: none"> • 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. <p>Cost of the extra investment by the tenant:</p> <ul style="list-style-type: none"> • 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. <p>Value to the tenant using its tenant-specific package:</p> <ul style="list-style-type: none"> • 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. <p>Leveraging specific tenant options to other building tenants with a building specific package:</p> <ul style="list-style-type: none"> • 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. <p>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:</p> <ul style="list-style-type: none"> • 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 to their tenants quantifiable gains in image, controllability, productivity and asset value <p>Value to the A&E firms producing the energy models and packages</p> <ul style="list-style-type: none"> • 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. <p>Value to the Building Owners and Managers</p> <ul style="list-style-type: none"> • Allows building owners and managers to offer a new valued added options during the lease negotiation process.
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	<ul style="list-style-type: none"> • Energy efficient tenant spaces allow base building systems to run more efficiently, lower operating costs, and potentially increase asset value.
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4.1.3 Stakeholder/Market Engagement

Stakeholder/Market Engagement	<ul style="list-style-type: none"> • 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 • NYSERDA will also use the Clean Energy Advisory Council (CEAC) as a way to engage with stakeholders, as appropriate.¹² • 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
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4.1.4 Theory of Change

Market Barriers Addressed	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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

¹² The Clean Energy Advisory Council was established by the Public Service Commission through an Order in the Clean Energy Fund Proceeding (Case 14-M-0094. et al, Proceeding on Motion of the Commission to Consider a Clean Energy Fund, Order Authorizing the Clean Energy Fund Framework, filed January 21, 2016).

	<ul style="list-style-type: none"> ○ Development and up to 50% cost-share of tenant specific, energy efficiency packages. ○ Development and up to 100% cost-share of building specific, energy efficiency packages ○ Target 180 buildings and 200 to 350 tenants ● Augment existing market intelligence to better target and position the offering <ul style="list-style-type: none"> ○ Gain a more precise understanding of the turn-over of leased commercial office space and ○ Learn how best to introduce energy efficiency to the multiple market actors involved in a transaction ○ 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 <ul style="list-style-type: none"> ○ Identify benefits of energy efficiency ○ Provide technical guidance and calculations for energy savings ○ Address energy efficiency measures specific to tenant office space ● Create a data warehouse <ul style="list-style-type: none"> ○ Collect tenant system level metrics to analyze trends in energy efficiency opportunities and tenant space design ○ Share aggregated data with the market place to spur replication of package development, improve existing design and leasing tools, and inspire advancements in tenant level technologies ● Develop supporting tools <ul style="list-style-type: none"> ○ A tool that combines tenant level data (sub-meter and tenant system level) with whole building data ○ Energy Efficiency add-ins for existing modeling/design software ○ Templates for leasing contracts with performance bonus/expectations for energy savings for A&E firms
<p>Key Milestones</p>	<p><u>Milestone 1: Tenant Modeling Drives Implemented Energy Efficiency Measures (2016-2020)</u></p> <ul style="list-style-type: none"> ● Tenants will incorporate energy efficiency measures from tenant-specific packages into their designs. Observed gains from NRDC, were 25-40% of energy saved above 2007 code; NYSERDA is projecting gains of 15-20% against the 2010 and 2012 code. The actual savings will be identified through measurement and verification (M&V). <p><u>Milestone 2: Building Modeling Drives Initial Wave of Replication (2018-2024)</u></p> <ul style="list-style-type: none"> ● Building specific packages demonstrate replicability of tenant-specific model to the whole building for development of building-specific packages ● Engagement with stakeholders involves all identified Market Actors

	<ul style="list-style-type: none"> • Secure commitments from building owners and managers and brokers to provide building-specific packages to new tenants with leasing materials • New tenants use building-specific energy efficiency packages (actual participation identified from results reported by building owner) • Projects demonstrate that building-specific packages can be used within the normal timeframe of the tenant fit-out process and do not slow-down the process • NYSERDA validates energy models, energy savings, incremental cost, and return on investment for tenant projects • NYSERDA confirms economic savings/value while presenting soft cost (i.e., productivity) opportunities as additional benefits to the market • NYSERDA gathers data on tenant productivity, satisfaction, and wellness through surveys created with each tenant’s Corporate Social Responsibility and Human Resource teams • For buildings that offer tenant efficiency packages, 30% of new tenants use the package to implement energy efficiency measures that go above code <p style="text-align: center;"><u>Milestone 3: Market Demand Drives second wave of replication (2020-2025)</u></p> <ul style="list-style-type: none"> • Market actors seek to develop tenant and/or building-specific packages for new participating buildings, initially with cost share • Tenants and architects and engineers realize the value of energy modeling and packages in the design process (measured by participation in the Intervention and training initiatives) • Building owners and managers, architects and engineers, and brokers incorporate package development into their existing business models • Tenants inquire about and demand energy efficiency in prospective spaces • Standardized packages developed for tenant office spaces, if significant commonalities are identified among building-specific packages <p style="text-align: center;"><u>Milestone 4: Long Term Benefits to Building Owners and Managers (2020-2025)</u></p> <ul style="list-style-type: none"> • Building owners and managers attain lower operating costs and greater asset value
<p>Goals Prior to Exit</p>	<ul style="list-style-type: none"> • 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

<p>Utility Role/Coordination Points</p>	<ul style="list-style-type: none"> • 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. • NYSERDA will also take advantage of the CEAC Clean Energy Implementation and Coordination Working Group to coordinate planning and implementation with the New York State utilities.
<p>Utility Interventions in Target Market</p>	<ul style="list-style-type: none"> • While none of the investor owned utilities has a dedicated CRE Tenant initiative at this point in time, 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 & Expenditures

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

Table 9. Annual Market Development Budget Allocation – Commitment Basis

Commitment Budget	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
Incentives & Services	\$521,642	\$1,217,164	\$1,738,806	\$2,086,567	\$2,434,328	\$1,738,806	\$1,043,284	\$521,642	\$347,761	-	\$11,650,000
Tools, Training, and Replication	\$140,833	\$704,167	\$845,000	\$1,126,667	\$1,408,333	\$1,408,333	\$1,408,333	\$845,000	\$563,333	-	\$8,450,000
Implementation Support	\$400,000	\$200,000	\$200,000	\$400,000	\$200,000	\$400,000	\$400,000	\$800,000	\$1,200,000	\$1,200,000	\$5,400,000
Total	\$1,062,475	\$2,121,331	\$2,783,806	\$3,613,234	\$4,042,662	\$3,547,139	\$2,851,617	\$2,166,642	\$2,111,095	\$1,200,000	\$25,500,000

Table 10. Annual Expenditures Projection

Expenditures	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total
Total	2%	4%	4%	5%	7%	10%	10%	11%	11%	11%	12%	13%	100%

4.1.7 Progress and Performance Metrics

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

Table 11. Initiative Specific Metrics

Indicators ¹³		Baseline (Before/Current)	2019 (Cumulative)
Activity/Outputs	Number of tenant spaces participating in the modeling and energy efficiency package offer	0	130
	Number of buildings participating in the modeling and energy efficiency package offer	0	110

¹³ 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.

	Square footage of participating tenant spaces in the modeling and energy efficiency package offer	0	6,500,000
	Percent of energy saved above code (for participants)	0	15 - 20%
	Partner engagement: Number of CRE building owners and managers that offer building-specific packages	0	130
	Number of case studies developed	0	7
	Partner engagement: Number of brokers and A&E firms trained	0	20
	Partner engagement: Number of Brokers and A&E Firms that include in-depth energy models and package development in their standard practice	0	12
	Direct Cumulative Annual Energy Savings MWH in participant buildings/spaces	0	57,900
	Direct Cumulative Annual Energy Savings MMBTU in participating buildings/spaces	0	99,200
Outcomes	Package development costs of building-specific package per square foot (SF)	\$0.13/SF	\$0.06/SF
	Market Engagement Number of Brokers and A&E Firms that include in-depth energy models and package development in their standard practice	TBD	14
	Percent of the total addressable square footage in NYS that is covered by a building-specific package	0	7%
	Tenant Spaces completed by the market without NYSERDA funding	TBD	145
	Percentage of Real Estate Broker firms trained on energy efficient space design and including energy in leasing dialogues with tenant	TBD	10%
	Percentage of Architecture and Engineering firms trained to better incorporate energy efficiency options into tenant space designs and providing packages as standard practice	TBD	10%

Benefits shown in Table 4 and Table 5 are direct, near term benefits associated with this initiative's projects. These benefits will be quantified and reported on a quarterly basis and will be validated through later evaluation.

Table 12. Direct Impacts

Primary Metrics ¹⁴		2016	2017	2018	2019	2020	2021	2022	2023
	MWh Annual	5,600	13,100	18,600	22,400	26,100	18,600	11,200	5,600
	MWh Lifetime	44,800	104,000	149,000	179,000	209,000	149,000	89,500	44,800
	MMBtu Annual	5,900	13,800	19,700	23,600	27,500	19,700	11,800	5,900
	MMBtu Lifetime	47,200	110,000	157,000	189,000	220,000	157,000	94,400	47,200
	MW	-	-	-	-	-	-	-	-
	MWh Annual	-	-	-	-	-	-	-	-
	MWh Lifetime	-	-	-	-	-	-	-	-
	MW	-	-	-	-	-	-	-	-
CO2e Emission Reduction (metric tons) Annual		3,300	7,600	10,900	13,000	15,200	10,900	6,500	3,300
CO2e Emission Reduction (metric tons) Lifetime		26,000	61,000	87,000	104,000	122,000	87,000	52,000	26,000
Customer Bill Savings Annual (\$ million)		\$0.776	\$1.81	\$2.59	\$3.11	\$3.62	\$2.59	\$1.55	\$0.776
Customer Bill Savings Lifetime (\$ million)		\$6.21	\$14.5	\$20.7	\$24.8	\$29.0	\$20.7	\$12.4	\$6.21
Private Investment (\$ million)		\$0.544	\$1.27	\$1.81	\$2.18	\$2.54	\$1.81	\$1.09	\$0.544

Table 13. Annual Projected Initiative Participation

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Participants (includes modeling and energy)	46	141	141	152	168	188	178	168	168

¹⁴ Impacts are expressed on a commitment-year basis, and are incremental additions in each year. Assumes an 8-year measure life. Benefits are rounded to three significant figures. Totals may not sum due to rounding. Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA's programs.

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

Table 14. Estimated Indirect Market Impact

Indirect Impact		2020	2025	2030
Energy Efficiency	MWh Cumulative Annual	61,600	220,000	411,000
	MMBtu Cumulative Annual	65,000	232,000	433,000
Renewable Energy	MWh Cumulative Annual	-	-	-
	MW	-	-	-
CO2e Emission Reduction (metric tons) Cumulative Annual		20,900	74,700	139,000

4.1.8 Fuel Neutrality

Fuel Neutrality	<p>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.</p> <p>Offering the program on a fuel neutral basis will allow NYSERDA to achieve a ton of carbon savings at a cost of \$350/metric ton, compared to a cost of \$388/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.</p>
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4.1.9 Performance Monitoring and Evaluation Plans

<p>Performance Monitoring & Evaluation Plan</p>	<p>NYSERDA’s approach to monitoring and assessing the effectiveness of the initiative and overall market development is described below.</p> <p><u>Test-Measure-Adjust Strategy</u></p> <ul style="list-style-type: none"> • 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 <p><u>CRE Tenant Strategy M&V</u></p> <ul style="list-style-type: none"> • 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 <p><u>Market Evaluation</u></p> <ul style="list-style-type: none"> • Market Evaluation will draw on the logic model and will include baseline and longitudinal measurement of key indicators of programmatic and broader market success • Baseline measurements of key market indicators will occur soon following initiative approval and will 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.
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	<ul style="list-style-type: none">• Sources of data include intervention data, public and commercially available data, and primary data collection through surveys of key market actors. <p style="text-align: center;"><u>Impact Evaluation/Field Verification</u></p> <ul style="list-style-type: none">• 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.
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Appendix A – Logic Models

