

**ADVANCED BUILDINGS EMERGING TECHNOLOGIES AND  
ACCELERATED COMMERCIALIZATION PROGRAM**

Final Initiative Level Logic Model Report

Prepared for

**The New York State  
Energy Research and Development Authority**

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## INTRODUCTION

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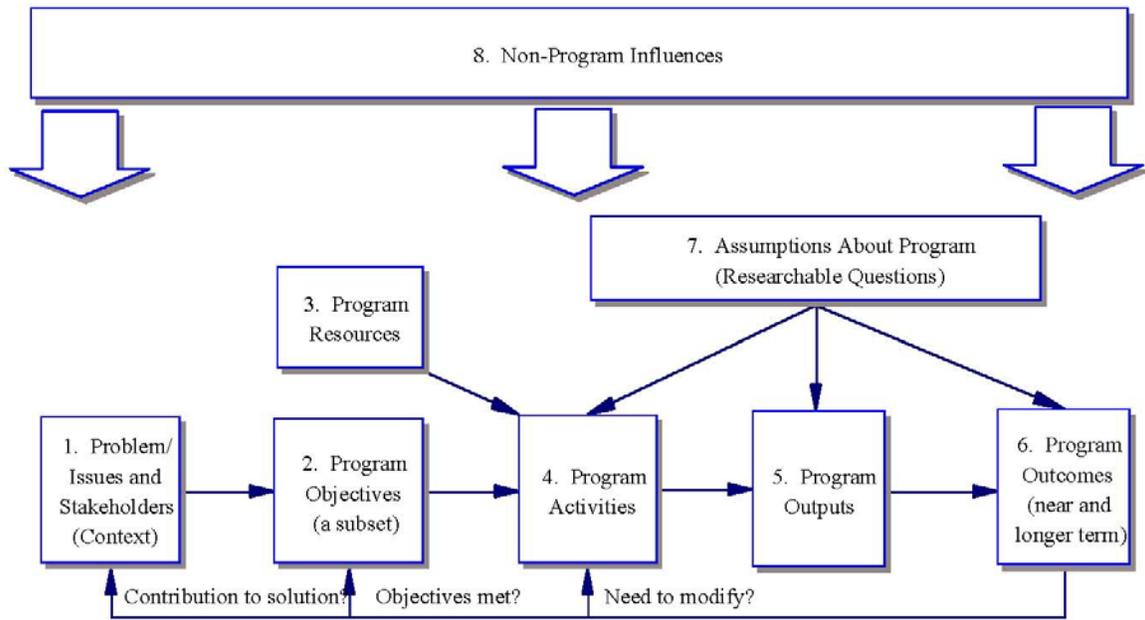
The Systems Benefits Charge (SBC) Plan funds public policy initiatives not expected to be adequately addressed by New York’s competitive electricity markets to advance the achievement and realization of the New York Public Service Commission (PSC) policy objectives. Furthermore, the SBC is designed to effect long-term changes in the New York energy sector to optimize the system and ratepayer benefits. The activities funded by the SBC include energy programs targeting efficiency measures, technology research and development, behavior and market change, and support for the low-income sector. The PSC issued the Order Continuing Systems Benefit Charge and Approving the Operating Plan for a Technology and Market Development (T&MD) Portfolio of System Benefits Charge-Funded Programs (The Order) on October 24, 2011. The Order approved the T&MD portfolio proposed by the New York State Energy Research and Development Authority (NYSERDA) for the five-year period of January 1, 2012, through December 31, 2016. The Emerging Technology/Accelerated Commercialization Program under the SBC plan implements a new, deliberate approach to accelerate commercial introduction of emerging or underused building technologies and strategies.

The Purpose of this document is to present the overarching logic model for the Advanced Buildings Emerging Technology and Accelerated Commercialization (ETAC) program. This document’s organization is as follows:

1. **Program Context, Stakeholders, Intent and Design:** Describes the problem(s) the program is attempting to solve, or issues it will address and the regulatory and stakeholder environments (context) within which the program is working.
2. **Program Objectives:** Describes, at a high level, the program’s ultimate purpose and targets.
3. **Program Resources:** Identifies the funding, workforce, partnership, and other resources the program is providing.
4. **Program Activities:** Describes the program’s various stakeholder engagement, demonstration and commercialization progress, support activities, and marketing and outreach activities.
5. **Program Outputs:** Describes the anticipated immediate results associated with program activities.
6. **Program Outcomes:** Describes expected achievements in the near, intermediate and longer term.
7. **Assumptions about Program:** Describes assumptions about how program activities and outputs will lead to the desired near, intermediate, and longer-term outcomes, including spillovers.
8. **External Influences:** Describes factors outside the program that may drive or constrain the achievement of outcomes.

Figure I-1 details the relationship between these eight items.

**Figure I-1. Program Design Template (Numbers indicate Section in this report.)**



## **PROGRAM CONTEXT, STAKEHOLDERS, INTENT, AND DESIGN**

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The Emerging Technologies and Accelerated Commercialization (ETAC) Program is one of three initiatives funded under the Technology & Market Development (T&MD) portfolio's Advanced Buildings Initiative. The ETAC Program seeks to implement a deliberate approach to accelerating the commercial adoption of high-performance, high-efficiency building technologies and strategies that are underused in commercial/institutional, residential, or multifamily facilities. The approach involves two components:

- The approach builds upon lessons learned from program precedents and will serve as a feeder program to support the New York Energy Efficiency Portfolio Standard (EEPS) and other New York clean energy programs.
- The ETAC Program also seeks to encourage market adoption of commercially-available, energy-efficient technologies and strategies without the assistance of additional incentive resources. The ETAC Program addresses barriers to adoption that are unique to each building sector.

The purpose of the ETAC Program is to accelerate the adoption of emerging and underused technologies and strategies. The Program accomplishes this by demonstrating benefits and diffusing information to buyers and existing market infrastructure, including producers and distributors. These underused technologies and strategies can be used to unlock energy savings in the buildings sector in New York. The building stock is responsible for 62% of the state's total energy consumption and 50% of the state's greenhouse gas emissions. These technologies may contribute to more dynamic load control in buildings and enhance the reliability of the electric grid.<sup>1</sup> ETAC defines "emerging technology" as follows:

An emerging technology is a commercially available technology with a proven strategy for energy efficiency but is not yet widely adopted. The products associated with an emerging technology are tested, licensed, code compliant, and exceed minimum standards for energy efficiency. Performance data on the technology is already available. There should be pre-existing analysis and measurement/validation of the technology that provide a better understanding of performance or reduce barriers to better performance. Thorough tracking of costs and benefits should be in place.<sup>2,3</sup>

Innovative strategies are important in addition to technologies. Emerging and underused strategies may represent new approaches to building design or innovative implementation of energy-efficient technologies, such as whole building design and zero net energy buildings. Other strategies for improving energy efficiency may include harnessing new service delivery channels, connecting previously independent stakeholders, bundling previously disparate components or services, energy-saving contests and competitions, or other market-based approaches to improving the efficiency of energy use by buildings.

Emerging, and underused technologies and strategies bridge all three components of the Advanced Buildings Initiative. The other two components of the Advanced Buildings Initiative are closely related to ETAC but are operated as separate programs. The Technology Development Program is developing the

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<sup>1</sup> NYSERDA T&MD Operating Plan, February 2013, Section 9.2.1-Targeted Problem (9.32).

<sup>2</sup> ETAC Residential Single-Family Advisory Group meeting notes, June 8, 2012.

<sup>3</sup> ETAC C/I Advisory Group meeting presentation, October 1, 2012.

next generation of new and improved, market-ready building technologies and systems.<sup>4</sup> The Enabling Demand Response and Load Management Program is developing a large capacity of Smart Grid-ready, demand-side resources at various end use customer sites throughout the state.<sup>5,6</sup>

The major difference between the Technology Development program and ETAC is that Technology Development focuses on the technology/supply issues surrounding pre-commercial technologies, and ETAC focuses on the market/demand issues faced by commercialized technologies. The ETAC program focuses on accelerating adoption of technologies that are already commercialized, that is, are in production and have distribution channels but are not yet in widespread use. The Technology Development program focuses on accelerating the development of new and improved pre-commercial technologies. These technologies (or products, services or measures) may be at the initial prototype stage or nearer to commercialization with remaining needs before launch such as redesign or compliance or integration with complementary systems or protocols.

ETAC and Technology Development program staffs consider the needs and resources of the other program during the planning stage. Program staffs understand that the two programs can be resources for each other given their common goal of moving new technologies toward utilization and realizing the benefits that come from that utilization.

NYSERDA will implement the Advanced Buildings Initiative, including ETAC, across the full range of residential, multifamily, and commercial and institutional building sectors.<sup>7</sup> ETAC will address the infrastructure diversity of the buildings sector and address unique barriers and technology needs in these sectors. This builds upon the evidence that some vendors are targeting growing market opportunities in the New York clean energy sector and that building owners and managers have increasing interest in reducing operating costs associated with energy.

Within the context in which the ETAC Program operates, there are numerous obstacles to the program's success. They fall into two broad categories:

- Some of the barriers to accelerating the adoption of emerging and underused technologies and strategies are specific to this ETAC Program; these barriers that are unique to NYSERDA's market have been considered during and accounted for in the design of the program. Solving these challenges will be seen as meeting program objectives. These barriers are the subject of the remainder of this section.
- Other obstacles are more general and beyond program control or influence, such as general economic conditions. For example, broader market conditions may affect suppliers' interest in bringing new products to market, affect customers' risk appetite or ability to introduce new products into their operations, and the ability of contractors to meet the demand for installation and maintenance services. These will be discussed in Section 8.

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<sup>4</sup> The Technology Development logic model is being developed in parallel to the ETAC logic model.

<sup>5</sup> NYSERDA T&MD Operating Plan, February 2013, Section 9.2.1 (pages 9-36 through 9-38).

<sup>6</sup> The Demand Response logic model will be updated in the next iteration of the Existing Facilities Program logic model.

<sup>7</sup> NYSERDA T&MD Operating Plan, February 2013, Section 9.2.1-Program Goals (9.33-9.34).

The current section discusses the challenges to accelerating the adoption of emerging and underused technologies and strategies that the program is addressing; this section categorizes these challenges – or barriers – into three high-level and somewhat overlapping areas: Economic, Informational, and Institutional challenges. These barriers can differ based on the building sector, but many apply to all building types.

## 1.1 ECONOMIC BARRIERS

A key and complex barrier to the adoption of an emerging technology or strategy is that the **actors in a particular building sector do not perceive a compelling value proposition** for emerging technologies or strategies.<sup>8</sup> These risks can be actual or perceived, but these economic barriers persist across building sectors. For example, the following market actors may perceive different deficiencies in the value proposition:

- *Likely customers* see negatives of adopting the technology or strategy, such as the risk of using a technology or strategy that is perceived to be unproven, or have **higher upfront costs** and potentially longer payback periods, or potential under-performance relative to the marketer's promise. This could also include risks associated with potential disruption to commercial- or home-based activities.
- *Financial markets* see the risk and are uncertain of returns.
- *Firms in the supply chain* from manufacturers to distributors to installers do not yet see sufficient demand to invest in supplying the technology or implementing the strategy.
- *Utilities, energy efficiency program administrators and the Public Service Commission (PSC)* are primarily focused on the cost- effectiveness of technologies and strategies when selecting them for inclusion in energy efficiency resource programs. As a result, certain underused but viable technologies and strategies can be overlooked and excluded from programs overseen by these market actors. The requirements for benefit-cost screening limit EEPS support to measures and projects that include robust data to prove cost-effectiveness. One reason is that they may offer value, such as ease of use, which typical measures of cost-effectiveness do not capture.

The value proposition is a combination of perceived benefits and cost.<sup>9</sup> It is worthwhile to discuss these separately:

- **Benefits:** The societal benefits of energy efficient technologies and strategies, such as reduced air pollution for everyone, are not all reflected in private savings or price. The direct benefits to the adopter often have not been validated by a credible third party, or experienced firsthand by that adopter or someone they know and trust; thus, there is a perception of risk that may be higher than actual risk. It is also possible that the current value proposition does not yet capture non-financial or non-energy benefits that are valuable to consumers, such as compatibility with other system components, comfort, or ease of use.
- **Costs:** Barriers also include the **high upfront cost** of emerging technologies and strategies and the long payback time for returns to the adopter. Costs other than purchase price can also be

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<sup>8</sup> NYSERDA T&MD Operating Plan, February 2013, Section 9.2.1-Targeted Problem (9-32).

<sup>9</sup> Pater, Jane E. 2005. *A Framework for Evaluating the Total Value Proposition of Clean Energy Technologies*. National Renewable Energy Laboratory. TP-620-38597. <http://www.nrel.gov/docs/fy06osti/38597.pdf>

important, such as transaction costs and time needed to learn how to use the technology or implement the strategy, disruption of business during installation, or disruption to usual business practices, such as purchasing or maintenance services.

These considerations can thwart demand for a technology, and low demand is a disincentive for technology developers and funders. Without sufficient demand, the value proposition for an emerging technology diminishes across the value chain. These factors combine to **limit the interest of private sector firms in being the first to invest in a higher-risk** commercialized but underused technology or strategy, particularly if the energy-savings claims of the technology or strategy are not verified. Instead, the private sector often prefers to wait for others to test and refine the technology or strategy.

In addition, there are barriers inherent to specific building sectors that can challenge emerging technologies, such as the **split-incentive issue** in rental properties.<sup>10</sup> The ETAC Program works to address these economic barriers that impact a variety of market actors.

## 1.2 INFORMATIONAL BARRIERS

Informational barriers are inevitable for emerging technologies and strategies during their early adoption. At this point, even early adopters<sup>11</sup> may not have an awareness of the technology or strategy and its benefits or the personal knowledge that comes from first-hand experience with the new technology or strategy. This first-hand experience is often a time for refining the technology and its integration into specific building systems. Awareness and trial of a new technology or strategy, often through dedicated knowledge dissemination and technology transfer activities, can move a new technology or strategy into adoption by an increasing number of early adopters who confirm the benefits, leading to repeated use and even inclusion in standard operating procedures. If early adopters are also leaders who are well known to many potential customers, their word about the experience is likely to be credible and to influence the market.

More generally, lack of information can challenge market development because more **customers and contractors are not aware of the energy-efficient technology or strategy options** available in the marketplace. This lack of awareness fuels additional informational barriers for emerging technologies and strategies, including **low confidence in performance of the technology or strategy or its reliability** on the part of distributors, contractors, and purchasers. This can create systemic informational barriers in the marketplace.

Adoption of emerging technologies and strategies can be thwarted by confusion about the technologies or strategies. Customers in particular may have a difficult time differentiating between varieties of technologies and strategies available to them. Alternatively, they may be **confused about how these technologies or strategies benefit them specifically**. It may be that certain building users perceive that only building owners or managers benefit from adoption of the technology or strategy. Contractors and distributors, on the other hand, may be confused by conflicting data validating performance claims of a

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<sup>10</sup> The split incentive occurs in a transaction in which the benefits do not accrue to the person who pays for the transaction. In energy, this means that a building owner pays for the energy efficiency measures but cannot recover savings from reduced energy use because those savings accrue to the tenant. Source: PlaNYC. December 31, 2011. Energy-Aligned Lease Language: Solving the Split Incentive Problem. [http://www.nyc.gov/html/planyc2030/downloads/pdf/111213\\_eal\\_presentation.pdf](http://www.nyc.gov/html/planyc2030/downloads/pdf/111213_eal_presentation.pdf)

<sup>11</sup> Innovators and then early adopters would include up to 15 percent of the target market. Between 15 and 50 percent is called the “early majority.” (See Rogers, Everett M. (1962). *Diffusion of Innovations*. Glencoe: Free Press.)

technology or strategy. There may be myths that need to be debunked, or original data may need to be generated by third-party validators to create market confidence, increase demand, and move technologies and strategies into standard operating procedures. ETAC activities are designed to generate data and increase market confidence associated with informational barriers by engaging Program participants in outreach to the broader market to disseminate information about underused technologies and strategies.

### 1.3 INSTITUTIONAL BARRIERS

Each building sector and the technology developers that serve that sector maintain institutional barriers that can impede the adoption of emerging technologies and strategies. The broader buildings segment may be held back by **deep-seated risk aversion**. In addition, a **supply chain that lacks active purchasing channels and services networks for an emerging or underused technology or strategy** can also hinder the market; the absence of these channels can contribute to the lack of momentum behind these technologies or strategies. Supply chain development requires participant cooperation, which may not be well established. It could also be the case that a supply chain exists for similar technologies or strategies but the developers of the underused technology or strategy are not aware or do not have established relationships with companies in that supply chain.

Because ETAC solicitations are open to good proposals in any relevant area, any number of informational challenges may be addressed. These could include the general lack of coordination in the industry that creates **variances in construction or installation practices** for underused technologies or strategies. It could include **group decision-making** in multifamily housing that complicates the integration of technologies and strategies or a **general reluctance to integrate new technologies and strategies** when building infrastructure is not obviously in need of updates.

Table 1-1 provides a summary list of these three types of barriers addressed by the ETAC Program. The check marks indicate whether each ETAC Program building sector seeks to address these barriers. Currently, many of the identified barriers affect all of these building types.

**Table 1-1. Problems to Be Addressed by NYSERDA’s ETAC Program**

Barriers	ETAC Building Sector C/I	ETAC Building Sector Multifamily (Res)	ETAC Building Sector Single-Family (Res)	Stakeholders Impacted and/or Involved
<b>Economic Barriers</b>				
a) Value proposition for adopting an energy-efficient technology is not yet strong or is not well defined or understood and creates real or perceived risks	√	√	√	Building owners, Energy managers, Product developers, Private sector investors, Engineering firms, Builders, Contractors, Customers, Suppliers, ESCOs
b) High upfront costs for energy-efficient technologies and their installation	√	√	√	
c) Private sector reluctant to be the first to invest in a higher-risk technology, preferring to wait for others to test and refine the technology.	√	√	√	
d) Split incentive issues lead to underinvestment in energy-efficient technologies, depending on the ownership structure	√	√	√	
<b>Informational Barriers</b>				
a) Low levels of customer and/or contractor awareness of available energy-efficient technologies	√	√	√	Technology suppliers (wholesalers and retailers), Building owners and managers, Technology end users, Building designers/ Architects/Engineers, Energy service companies (ESCOs) Builders, Contractors,
b) Low levels of confidence in newer energy-efficient technologies due to lack of hands-on experience and education on a technology and its use, and/or lack of cost, performance, or savings data widely available and validated by third parties	√	√	√	
c) Conflicting information or other confusion about programs and technologies, or a belief that only management gains from new technologies	√	√	√	

Barriers	ETAC Building Sector C/I	ETAC Building Sector Multifamily (Res)	ETAC Building Sector Single-Family (Res)	Stakeholders Impacted and/or Involved
<b>Institutional Barriers</b>				
a) Building sector is risk averse and adopting new technologies disrupts usual business practices	√	√	√	Product developers, Commercial & institutional construction trades, Builders, Contractors, Building owners, Energy managers, ESCOs
b) Insufficient supply chain development and integration, including insufficient purchasing channels and service networks	√	√	√	
c) Variances in construction and installation practices currently used in the market, which leads to difficulty replicating technology or strategy implementation	√	√	√	
d) Group decision-making requirements can complicate technology implementation		√		
e) Reluctance to touch what isn't broken, rather will focus on other building priorities	√	√	√	

**Sources:**

NYSERDA TMD Operating Plan, February 2013, Section 9.2.1-Current State of Technology (9.32-9.33)

ETAC MPP – 09 10 2012



Section 2:

## **OBJECTIVES (HIGH LEVEL)**

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The ultimate goal of the ETAC Program is to contribute to NYSERDA's clean energy goals by improving the performance and reliability of New York's building stock.<sup>12</sup> By achieving this over-arching goal, the ETAC Program will also create benefits in a variety of categories. For example, economic development benefits include increased demand for product manufacturing capacity and for skilled labor. Environmental benefits include reductions in greenhouse gas emissions. Customer cost savings benefits include achieving energy savings at lower cost with increased functionality. Other benefits to New York include reducing the operating costs of buildings.

The objectives of the ETAC Program are consistent across the three building sectors included in the program although segments differ in terms of market actors and specific barriers addressed. The ETAC Program accomplishes these objectives by targeted support for underused, commercially-available building technologies and strategies such as solid-state lighting, condensing boilers, wireless building energy management systems, and zero net energy buildings. The ETAC Program will achieve these objectives by spurring actions and investments to encourage commercial adoption of emerging technologies and strategies but will do so in a way distinct from incentive-based programs.

The targeted outcomes of the ETAC Program include the following.<sup>13</sup>

- Deep retrofit design and construction methods, materials, and equipment offering energy savings of 25-40% for existing buildings and 40% or more for new buildings;
- Introduction of new and improved high-impact technologies and practices into EEPs programs to achieve New York's 15x15 goal;
- Demonstration of 8-17 improved technologies to stimulate adoption by the market or further support by deployment programs;
- Savings of 10,500 MWH from supported demonstration projects;
- Savings of 78,000 MMBtu from supported demonstration projects;
- Achievement of 2,300 kW peak demand reduction;
- Savings of 29,800 MWH from replication of supported projects/technologies;
- Savings of 231,800 MMBtu from replication of supported projects/technologies; and
- Achievement of 7,100 kW peak demand reduction from replication of supported projects/technologies.

These high-level objectives are the foundation for establishing actions that will reduce barriers, including non-financial barriers, to adoption of emerging technologies and strategies. These actions will have

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<sup>12</sup> NYSERDA T&MD Operating Plan, February 2013, Section 9-Technology & Market Development Initiatives; page 9-39 to 9-40.

<sup>13</sup> NYSERDA T&MD Operating Plan, February 2013, Section 9-Technology & Market Development Initiatives; pages 9-34 and 9-45 through 9-47 (Table 9-8).

measurable outputs and outcomes both in the near term and the long term in New York. Specifically, the program plans to accomplish the following:

- Broadly demonstrate the value proposition for selected underused technologies and strategies through 17-36 *contracted* reference demonstration projects across the commercial and residential sectors. These contracted reference demonstration projects are intended to cause more customers to adopt the technologies/strategies and then to repeat that adoption behavior, to set an example for other potential adopters, and to encourage broader adoption;
- Validate technologies and/or strategies and accelerate market readiness in New York through targeted stakeholder engagement formalized in 13-22 stakeholder meetings on emerging and underused technologies and strategies to identify program opportunities and disseminate knowledge;
- Encourage market replication of the reference projects during and after the five-year T&MD program through 38-70 Knowledge/Technology Transfer Activities across the commercial and residential sectors and standardizing the integration of technologies and strategies;
- Leverage \$6.5M-\$13M (co-funding and outside investment) for demonstration projects;
- Leverage \$21M-\$35M (co-funding and outside investment) for replication of demonstration projects.
- Increase the knowledge base on emerging technologies for buildings including increased number of service providers familiar with emerging technologies; and
- Increase the marketing and promotion of emerging technologies resulting from knowledge gained; thereby increasing market confidence and uptake of underused or emerging building technologies;

Table 2-1 summarizes the main objectives of the ETAC Program.

**Table 2-1. Objectives of NYSERDA’s ETAC Program**

Objectives
Save 40,300 MWH from supported demonstration projects and replication of them.
Save 309,800 MMBtu from supported demonstration projects and replication of them.
Achieve 9,100 kW peak demand reduction from supported demonstration projects and replication of them.
Demonstrate 8-17 improved technologies for adoption by the market or further support by deployment programs.
Contract and complete 17-36 demonstration projects across the commercial and residential sectors.
Leverage \$27.5M - \$48M for demonstration projects and replication of them.
Conduct 13-22 stakeholder meetings.
Engage in 38-70 Knowledge/Technology Transfer Activities across the commercial and residential sectors.

**Source:**

T&MD Operating Plan, pages 9-45 and 9-46

Section 3:

## RESOURCES

This section identifies the dollar, workforce, and partnership resources that the ETAC Program requires. Table 3-1 outlines the resources (or inputs), including funding sources, staff resources, external and intangible resources for the overall System Benefits Charge budget for the ETAC Program. Resources for each of the building sectors are detailed, where available.

**Table 3-1. Program Resources**

<b>SBC Funding*</b>
<ul style="list-style-type: none"> <li>• Advanced Buildings: \$75,336,160 (2012-2016)               <ul style="list-style-type: none"> <li>○ Emerging Technology/Accelerated Commercialization: \$33,596,149                   <ul style="list-style-type: none"> <li>▪ C/I Budget: \$18,827,127                       <ul style="list-style-type: none"> <li>• Implementation: \$8,472,191</li> <li>• Streamlined Demonstrations: \$3,350,000</li> <li>• Large-scale Demonstrations: \$7,004,936</li> </ul> </li> <li>▪ Residential-Multi Family Budget: \$7,069,022                       <ul style="list-style-type: none"> <li>• Mixed Use Pilot: \$1,617,819</li> <li>• Multifamily Deep Energy Retrofit Competition: \$2,902,696</li> <li>• Technology Demonstration Program: \$2,548,507</li> </ul> </li> <li>▪ Residential Single Family Budget: \$5,000,000</li> </ul> </li> <li>○ Additional \$2.7 million for C/I Deep Energy Savings Initiative</li> </ul> </li> </ul>
<b>NYSERDA Staff Resources</b>
<ul style="list-style-type: none"> <li>• Number of FTEs               <ul style="list-style-type: none"> <li>○ Single Family FTEs: 0.75</li> <li>○ Multifamily FTEs: 0.95</li> <li>○ C/I FTEs: 1.5</li> </ul> </li> </ul>
<b>Resources External to the ETAC Program</b>
<ul style="list-style-type: none"> <li>• Partnership with Consortium for Energy Efficiency’s Emerging Technology Collaborative</li> <li>• Coordination with New York Power Authority’s Energy Efficiency Innovation Collaborative</li> <li>• Advisory Group members</li> <li>• Energy Efficiency Portfolio Standard</li> <li>• Stakeholder networks associated with different building sectors (e.g. residential construction contractor network)</li> </ul>

<b>Closely Related NYSERDA Programs</b>
<ul style="list-style-type: none"> <li>• Multifamily Performance Program</li> <li>• Existing Facilities Program</li> <li>• New Construction Program</li> <li>• Technology Development Program</li> <li>• Business Partners Program</li> <li>• Home Performance with Energy Star</li> <li>• Assisted Home Performance with Energy Star</li> <li>• Residential New Construction</li> <li>• New York Energy Smart Products Program</li> </ul>
<b>Intangible Resources</b>
<ul style="list-style-type: none"> <li>• NYSERDA’s credibility and relationships with the industry, key players, and stakeholders</li> <li>• NYSERDA’s experience with product development, demonstration, and information dissemination projects</li> </ul>

Sources:

ETAC Commercial and Institutional Project Planning Request (PPR) for PON 2689

Input from ETAC program staff

NYSERDA TMD Operating Plan, February 15, 2013, Table 7-1 (7-2)

- \* SBC Funding included in this table is for program budgets only; administrative budgets, evaluation budget, marketing budget, and New York State Cost Recovery Fee are not included.

## ACTIVITIES

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This section describes the activities that the ETAC Program delivers in order to achieve its objectives. There are a core set of five activities that are consistent across all three building sectors within the program. Within the technology demonstration and measurement and verification (M&V) activities, each building sector takes a unique approach; as such, each building sector-specific approach to conducting technology demonstrations and M&V are described under activities #3 and #4 below.

1. **Engage stakeholders.** The ETAC Program directly engages some stakeholders in targeted building sectors to provide support in the form of program feedback, review of technologies and strategies, and prioritization. The nature of this engagement is building sector-specific, drawing on the unique strengths of market actors and catering to the unique needs of those markets.

“Stakeholders” encompass Advisory Group members specifically as well as other market actors more broadly. Three groups of people and organizations constitute “stakeholders” as they relate to the ETAC program. They include the following:

- **Advisors:** This group engages directly with the program to inform NYSERDA’s selection of technology and strategy areas to include in their PONs
- **Allies:** This group works formally with the program to support accomplishing program goals. Allies may leverage their supply chain networks to support deployment of underutilized technologies through the program. Allies may also be staff of deployment programs at NYSERDA and at utilities.
- **Other market actors:** This group includes entities active in the marketplace that do not interact with the program.

Each building sector develops an Advisory Group made up of members who are engaged in the building sector-specific activities. Each member may provide the perspective of one or more types of market actors, including technology manufacturers, contractors, builders, industry experts, and others. These stakeholders can, when called upon, help identify categories of technologies or strategies (e.g., solid state lighting, daylighting) ready for multi-site demonstrations and the efforts required to address various impediments to commercialization. This collaboration will be formalized through participation in periodic Advisory Group meetings, during which stakeholders can provide input on program design, priorities, and target categories of technologies and strategies (though not on selection of projects). The ETAC Program engages stakeholders to ensure that it is addressing high-value, commercially-available technologies and strategies. This engagement is also important to technology transfer efforts where the program will utilize strategic market actors to conduct outreach to the broader market, disseminating information about the technologies and strategies that are included in the ETAC Program.

An important group of allies is the NYSERDA deployment program managers and staff and other deployment support programs that could be convinced by ETAC efforts to take up promising underused technologies to include in their programs. Frequent meetings are held within NYSERDA with staff of these other programs.

2. **Select technologies and strategies.** The ETAC Program seeks to leverage cross-cutting stakeholder input as well as NYSERDA staff expertise and market research to identify underused commercially-available technologies and strategies in order to select those to support in

accelerating their adoption across New York. Examples of categories of technologies and strategies that may be addressed include the following:

- Solid-state lighting
- Daylighting
- Advanced HVAC rooftop units and controls
- Automated fault detection and diagnostics
- Load management-enabling technologies
- Net-zero, net-zero capable, or deep energy savings approaches/strategies
- Strategies such as remote metering, whole building design, bundled services, and design-construction practices such as appropriate sizing of heating systems.

Proposals will be submitted based on ETAC Program Opportunity Notice (PON) requirements. The requirements include addressing design of data collection to report on the status of the technology or strategy, quantification of monetary and energy savings created by the technology or strategy, and a plan for technology transfer. Proposers may be required to identify and develop infrastructure initiatives. The solicitations will either be competitive in nature or selected during open enrollment, available to all participants until the program ends or until funds are exhausted. Each building sector may approach solicitations differently. In some cases, the submitted proposals will be evaluated by a Technical Evaluation Panel (TEP) composed of external and internal parties.

The ETAC Program aims to support technologies and strategies that remain under-addressed by other financial or informational programs available in New York State where cost-effectiveness is a primary litmus test for participation. The measures in the EEPS programs are restricted by the requirement that measure payback be greater than one year in commercial settings, and six months in industrial settings. Thus, sectors of the ETAC program are focused on technologies and strategies that are both underused and face some substantial financial barriers.

3. ***Fund demonstrations of emerging technologies and strategies.*** Underused energy-efficient technologies and strategies will be installed or utilized at demonstration sites across the state. For the purposes of this program, a demonstration project is defined as a highly visible, large-scale demonstration of one or more technologies or strategies at one or more sites. For example, a demonstration of a load-shedding ballast in a number of different building locations would be considered one demonstration.

Other types of demonstrations may utilize different implementation mechanisms, such as a competition, to engage the market. In general, demonstrations of commercialized but underused technologies and strategies allow market actors to experience the technologies and strategies first-hand, to integrate them into their current systems and procedures, and to see for themselves the benefits and costs (or value). Engaging with other ETAC-like programs around the country to conduct multi-state demonstrations may provide the opportunity to display large-scale market opportunities, which would create more attractive investment opportunities for funders and technology developers. The demonstration projects may identify the need for infrastructure initiatives, such as training, certification, or development of the supply chain. Other NYSERDA programs could then respond to these needs.

Table 4-1 describes the unique approaches to technology demonstration and M&V taken by each building sector.

4. **Conduct M&V on demonstrations.** The program performs the M&V on installations that it funds through technology demonstrations. It also performs M&V on some installations funded entirely by others (e.g., technology developer or host site). For example the ETAC Program's C/I building sector offers Energy Performance Validation as an M&V-only type of demonstration. Energy Performance Validation is targeted to technology developers seeking third-party validation or to building owners seeking assurance of performance before investing heavily in a new technology or strategy. Previous performance data for the technology must be available.

M&V is important because it provides credible data regarding the performance of the technology or strategy. This includes data on energy savings achievements and how easy or difficult it was to implement the technology or strategy. This information is important to the actors involved in the specific demonstration and is also the basis for outreach and knowledge transfer activities. Barriers and challenges may be identified through M&V and addressed to the extent practicable; additional problems identified can be fed back to the Technology Development initiative or to NYSERDA programs that deal with the lack of technology infrastructure.

5. **Conduct outreach and technology transfer.** The results of the demonstration and M&V projects will be communicated to selected stakeholders and the public via technology transfer<sup>14</sup> initiatives. These may include case studies, webinars, presentations at conferences, and press releases. Technology transfer will be led by NYSERDA but will require contributions from demonstration teams. This information raises awareness of these technologies and strategies and communicates an improved value proposition for each. It can also persuade more companies in the supply chain to engage and consumers to consider and adopt them. Thus, the demonstrations stimulate adoption and if consumers confirm the value of the technology or strategy, they will repeat using it and share their experience with others so adoption will be replicated and utilization will increase.

ETAC Program staff will leverage resources from stakeholders in the broader market to support outreach and technology transfer for demonstrations in which they have participated. Stakeholders will share with others their hands-on experience and contribute to efforts to integrate selected technologies and strategies into existing supply chains, building systems, and patterns of work and management. Thus, these stakeholders will also participate in standardizing operating procedures for selected technologies and strategies through dedicated market outreach activities, and word of their experience will influence others to follow.

This approach enables the ETAC Program to leverage its good relationships with the existing infrastructure in each building sector. Tying into existing networks lessens the number of changes that must be made to accommodate a new technology or strategy; for example, leveraging existing trade associations to conduct training on a specific technology means that the association's

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<sup>14</sup> Technology transfer initiatives may include a variety of activities, such as presentations to trade associations or key target market audiences, web or other collateral materials (e.g., case studies), webinars, outreach to specific market influencers, and providing technology- or strategy-specific feedback to other NYSERDA programs (e.g., Technology Development or deployment programs), among others.

members do not have to join a new group in order to learn how to use the technology. Simplifying the mechanism for adoption means that it is more likely to be successful.

**Table 4-1. Building Sector-Specific Technology Demonstration and M&V Project Approaches**

Program Name	Demonstration Activities
<p><b>ETAC C/I Program</b></p>	<p>a) <b>Focused demonstrations:</b> NYSERDA cost-shares installation or implementation at two or more sites, and provides performance M&amp;V. NYSERDA will cost-share up to 60% of installation costs, capped at a maximum of \$150,000 per project, and will provide pre- and post-installation M&amp;V. Third-party independent performance data must be available to participate, and project must fall within NYSERDA’s targeted areas of interest.</p>
	<p>b) <b>Energy performance validation:</b> NYSERDA will provide performance M&amp;V of multiple demonstrations implemented by any individual, organization or entity electing to gain independent verification of performance and energy savings. Prior performance data from previous project(s) is required. NYSERDA will not provide funding for project costs beyond that which is provided for performance M&amp;V.</p>
	<p>c) <b>Large-scale demonstrations:</b> NYSERDA cost-shares installation or implementation and provides performance M&amp;V. These projects are anticipated to exceed \$150,000 each, have broader statewide impact, and will be selected competitively under periodic deadlines.</p>
	<p>d) <b>Deep energy savings pilot:</b> This effort will seek to achieve deeper energy savings in new and existing buildings. Pilot activities may focus on investing in design assistance to optimize high energy performance. ETAC Program staff are coordinating with New Construction and Existing Facilities Program staff to develop this pilot.</p>
<p><b>ETAC Multifamily Program</b></p>	<p>a) <b>Technology demonstration:</b> Activities include coordination with existing R&amp;D and deployment programs and utilities and application of strategies, such as targeted market research, large-scale demonstration at multiple sites, and integration into existing programs. Highly visible, large-scale reference projects will demonstrate opportunities, performance economics and impediments. Coordination with other ETAC programs around the country will allow sharing of information and expertise and potential to stimulate a broader market.</p>
	<p>b) <b>Deep energy retrofit competition:</b> The ETAC Program will develop a competition to promote deep energy retrofits in the multifamily sector. It will include both market rate and affordable housing segments of the market.</p>
	<p>c) <b>Mixed use pilot:</b> The mixed use pilot is comprised of several elements: auditing and modeling protocols, eligibility guidelines, incentive structure, and a health and safety protocol. The mixed use pilot is still in the design phase.</p>
<p><b>ETAC Residential Single Family Program</b></p>	<p>a) <b>Technology demonstration:</b> Technology demonstrations will include installation or implementation of technology at demonstration sites and data collection. Data collection will include costs, non-energy impacts, logistics, and operations. The demonstration projects will also identify and develop infrastructure initiatives, including training needs, certification needs, development of supply and distribution channels, and operations and maintenance. Other NYSERDA programs will support these infrastructure initiatives.</p>
	<p>b) <b>Develop ETAC demonstration partner clearinghouse.</b> Demonstration participants will be encouraged to collaborate with others in the energy-efficiency field, such as contractors, architects, builders, and technology manufacturers. To facilitate team creation, NYSERDA will conduct outreach to potentially interested parties, and create a clearinghouse to allow possible participants to identify one another.</p>

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Section 5:

## OUTPUTS

This section describes the anticipated immediate results associated with program activities in a table of outputs with indicators and potential data sources for those indicators.

**Table 5-1. Outputs, Indicators, and Potential Data Sources**

Outputs	Indicators	Data Sources and Potential Collection Approaches
<b>1. Outputs from Engage Stakeholders</b>		
<b>Stakeholder meetings held</b>	Number of stakeholder meetings held by group (Advisory, internal NYSERDA, etc.) Number of stakeholders participating in each meeting Diversity of Type of stakeholders participating (e.g. industry-specific, technology-specific) Repeat attendance over time	Attendance logs from stakeholder meetings collected at time of meeting, including participant name, organization, title, and type of organization (check box preferred)
<b>Technology categories identified (where barriers appear surmountable)</b>	Descriptions of the barriers and opportunities for furthering adoption of “promising technology categories” Energy savings and load reduction potential represented by technology categories identified Extent to which process used to identify promising technology categories considers both market and technology factors	Documentation of the process for selecting promising technology categories, including categories selected and those not selected Review PONs for technology categories eligible for funding Review the number of proposals received for each category
<b>2. Outputs from Select Technologies To Support</b>		
<b>PONS written based on priorities</b>	Number of PONs released Description of the PON, including dollars made available through PONs relative to overall program budget, technology categories included, etc.	Review of PONs

Outputs	Indicators	Data Sources and Potential Collection Approaches
<b>Projects selected and contracts issued</b>	<p>Number and type of project applications received and selected by building sector, industry, technology category, etc.</p> <p>Consideration of risk-reward profile of portfolio of technologies and obstacles anticipated to be addressed by the project</p>	<p>Potential program database that includes the following information about projects (including either proposed or selected): type of project (e.g., M&amp;V or demonstration), building sector, industry addressed, funding requested and awarded, requesting organization, partner organizations, etc.</p> <p>Documentation of due diligence about risk-reward tradeoff completed on each project considered, when materials are available</p>
<b>3. Outputs from Fund Demonstrations</b>		
<b>Demonstrations funded</b>	<p>Number and description of demonstrations (e.g., number of sites, budget, dates for achievement of major milestones)</p> <p>Obstacles anticipated to be addressed and those actually addressed by the demonstration</p>	<p>Potential program database that includes the following information about demonstration projects under contract: all items mentioned for indicators in Select Technologies to Support, plus dates for achievement of major milestones, number of physical sites included in the demonstration, number of site host participants, and other information useful in describing the character and reach of demonstration projects</p> <p>Documentation of obstacles to adoption anticipated to be addressed by the demonstration</p>
<b>Funds leveraged</b>	<p>Volume of funds leveraged (through co-funding or outside investment) in each demonstration and total</p>	<p>Potential program database that includes funds leveraged for each demonstration project and source of leveraged funds</p>
<b>Market actors and end users involved</b>	<p>Number of individuals and diverse market positions represented by unique market actors in the market participating in each ETAC demonstration project</p>	<p>Log of individuals involved in each demonstration, including name, organization, title, type of organization (check box preferred), and role of organization in the demonstration.</p>
<b>4. Outputs from Perform M&amp;V</b>		
<b>Performance data collected</b>	<p>Number of M&amp;V studies and reports completed as part of demonstration projects and as stand-alone M&amp;V projects</p> <p>Extent to which M&amp;V efforts and results addressed the intended obstacles</p>	<p>Potential program database that captures M&amp;V project type (e.g., part of demonstration or standalone), budget, etc.</p> <p>Original assessment of obstacles to adoption that the M&amp;V intended to address</p>

Outputs	Indicators	Data Sources and Potential Collection Approaches
<b>5. Outputs from Outreach and Technology Transfer</b>		
<b>Information provided</b>	Number and type of materials produced (brochures, webinars, etc.) Number of people reached, number compared to target audience Number of downloads of web-based resources Quality of demonstration and M&V reports (e.g., appropriate level of analytical rigor) published as judged by experts	Materials produced Log of information dissemination Website activity statistics Final reports of M&V results and related analysis
<b>Technology transfer activities conducted</b>	Number of technology transfer activities completed (events, site tours, collaborations, technical assistance, licensing, etc.)	Log of technology transfer activities, including type of activity, date, audience reached, participant lists for in-person or online events, etc. Documentation of technology transfer activities (e.g., recordings of webinars, notes from conferences or meetings held, text from websites or publications) Technology transfer materials produced
<b>Market actors engaged</b>	Number of market actors participating in technology transfer activities (by type of firm) Types of activities that market actors conduct for technology transfer independent of the program	Log of technology transfer activities, including type of activity, date, audience reached, participant lists for in-person or online events, and entity carrying out the activity (e.g., NYSERDA or name/contact information for specific market actor) Interviews with market actors to gather data on technology transfer activities



Section 6:

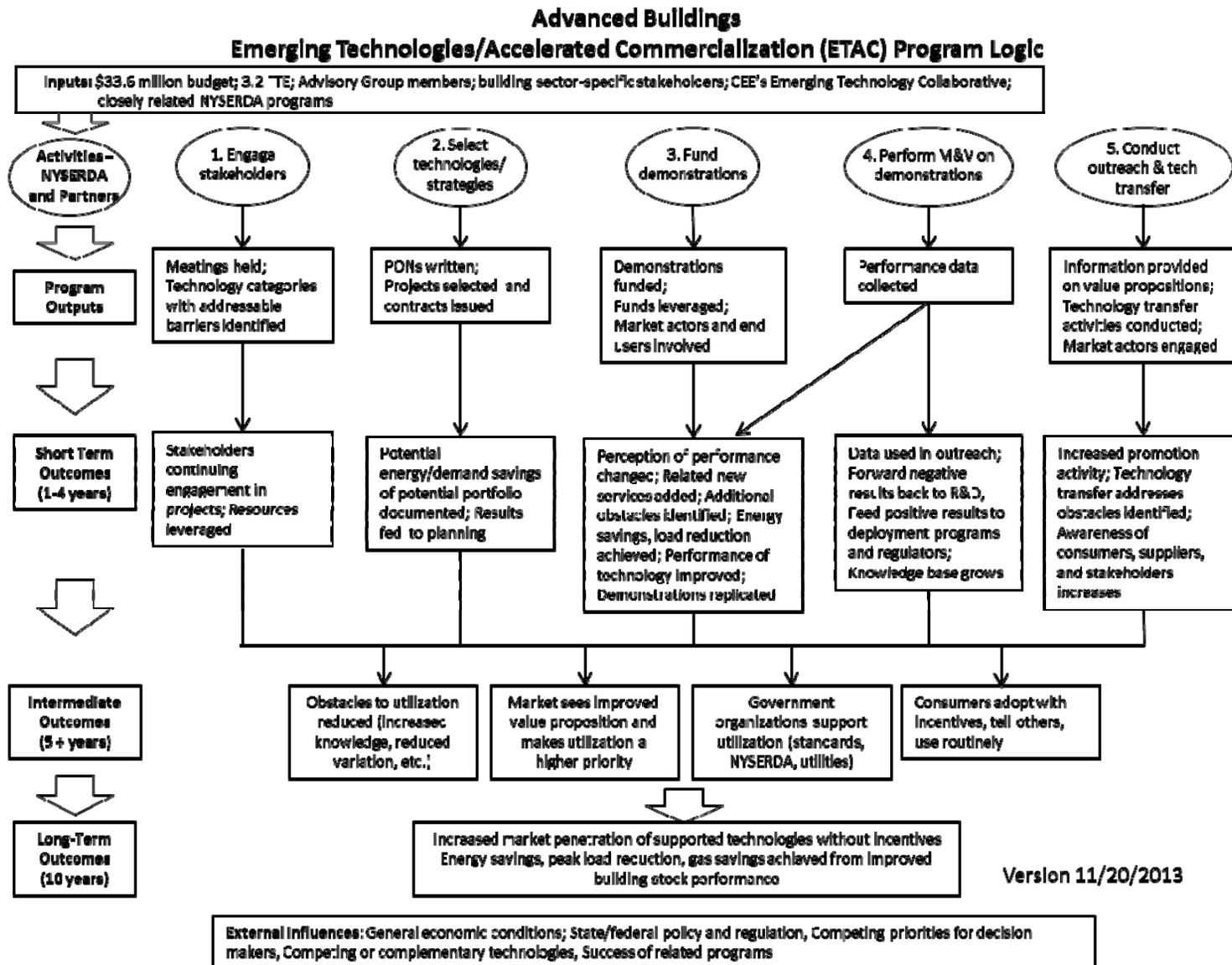
## **OUTCOMES AND LOGIC DIAGRAM**

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This section presents NYSERDA's Advanced Buildings ETAC Program logic model diagram (Figure 6-1) showing inputs, activities, outputs, a series of outcomes, external influences and the relationships among these. The diagram presents information provided in Sections 2 through 8 at a higher level of abstraction, aggregating in order to tell the program's "performance story" in just one page.

The logic model suggests project outcomes that are expected achievements of the program over different time periods. These are described in more detail in the tables in this section, Table 6-1 through Table 6-3 detail the ETAC program's expected achievements (outcomes), as well as observable indicators that would signify the presence of these achievements. In addition, the tables show the data sources and potential collection approaches that an evaluation effort might undertake to determine the achievement of the expected outcomes.

Figure 6-1. ETAC Initiative Logic Diagram



**Table 6-1. Outcomes, Indicators, and Potential Data Sources**

Outcomes	Indicators	Data Sources and Potential Collection Approaches
<b>1. Short-Term Outcomes from Outputs from Engage Stakeholders</b>		
Stakeholders' continuing engagement in projects	Number involved in a project Number involved in outreach activity	Potential program database Notes from meetings Interviews with program participants and contractors Interviews with program staff
Resources leveraged	Stakeholder funds leveraged Funds tracked by technology, strategy, and outreach activity	Potential program database Interviews with program staff
<b>2. Short-Term Outcomes from Select Underutilized Technologies to Support</b>		
Potential energy/demand savings achieved by the portfolio of projects documented	Potential energy and demand savings from projects deployed in demonstration projects Overall balance of risk and expected reward (i.e., energy or demand savings) across the portfolio of ETAC-funded projects	Potential program project database Documentation of due diligence about risk-reward tradeoff completed on each project considered
Results fed to program planning staff at NYSERDA	Instances of feedback to R&D, to ETAC plans or PONs	Interviews with program staff from ETAC, Technology Development, R&D, etc.
<b>3. Short-Term Outcomes from Fund Demonstrations</b>		
Participants' perception of technology performance changed	Participant reporting reduced concerns Percent of participants reporting increase in favorability	Interviews or surveys with participating end users & service providers at beginning and end of project
Related new services added by participating service providers	Number of unique services offered by participating service providers (by year of service) Number of unique firms entering the market to support adoption of technologies & strategies	Interviews or surveys with participating and non-participating service providers Interviews or surveys with participating and non-participating market actors
Additional obstacles to adoption identified	Description of additional obstacles identified during the demonstration	Potential program database Documentation of problems/issues referred back to R&D Interviews with program staff from ETAC, Technology Development, R&D, etc.
Energy savings, load reduction achieved by demonstrations and replications	kWh saved and quantified load reduction	Potential program database

Outcomes	Indicators	Data Sources and Potential Collection Approaches
Performance of demonstrated technology improved	Change in technology performance or cost (in some cases)	Demonstration report
Demonstrations replicated	Evidence of non-program sponsored demonstration projects (or funded by other NYSERDA programs) of similar technologies & strategies	Interviews with non-participating market actors
<b>4. Short-Term Outcomes from Perform M&amp;V</b>		
Data used in outreach	Number of M&V reports disseminated (1) by NYSERDA, (2) by others Number of outreach materials created about the M&V (1) by NYSERDA, (2) by others	Potential program database Interviews with program staff Interviews or surveys with participating and non-participating market actors
Positive and negative results fed back to R&D and forwarded to deployment programs and regulators	Number of instances of data fed back to R&D Number of instances of data passed to deployment programs List of technologies screened out or determined not to be viable and published results from projects	Potential program project database Interviews with program staff Notes from internal planning meeting
Knowledge base about selected underutilized technologies and strategies grows	Number of lessons learned from each demonstration Total number of lessons learned from each demonstration	Potential program database Final reports for the demonstration and M&V projects Interviews with program staff (e.g., sector managers)
<b>5. Short-Term Outcomes from Outreach and Technology Transfer</b>		
Increased promotion activity	Number and description of the promotion activities Number of trade allies or industry organizations participating in promotion activities Number of service providers participating in promotion activities	Interviews or surveys with participating & non-participating technical contractors Interviews or surveys with industry organizations/trade allies Interviews or surveys with participating and non-participating end users
Technology transfer addresses obstacles identified	Reports of diminished barriers by end users and market actors Assessment of obstacles to adoption that M&V originally intended to address	Interviews or surveys with participating and non-participating end users Market research

<b>Outcomes</b>	<b>Indicators</b>	<b>Data Sources and Potential Collection Approaches</b>
<p>Awareness of consumers, suppliers, other stakeholders increases</p>	<p>Qualitative evidence of consumers awareness of new technologies &amp; strategies</p> <p>Percent of consumers or market actors seeking more information about the technology</p> <p>Improved perception of the value of the benefit-cost tradeoff of the technology</p> <p>Evidence of stronger trade ally networks supporting ETAC-participating technologies &amp; strategies</p>	<p>Interviews with market actors</p> <p>Market research</p> <p>Potential program project database</p> <p>Interviews with participants</p>

**Table 6-2. Intermediate Outcomes, Indicators, and Potential Data Sources**

Outcomes	Indicators	Data Sources and Potential Collection Approaches
<b>Intermediate Outcomes</b>		
Obstacles to utilization reduced (increased knowledge base, reduced variation in installation, etc.)	Key decision-makers prioritize energy efficiency in business strategies and capital budgets	Interviews with key decision-makers
Market sees improved value proposition and makes utilization a higher priority	Increased market demand for new technologies & strategies	Market research
Government organizations (state standards, NYSERDA and utility programs) provide support to increase utilization (e.g., incentives or information)	Standards are adopted to encourage the adoption of new technologies and strategies Presence of incentive programs, information campaigns, etc.	Regulatory and legislative documents Interviews with market actors Market research
Adoption with incentives, repeat usage, information shared with others	Increased sales of ETAC-participating technologies & strategies with and without incentives Increased number of customers who have made repeat purchases with and without incentives Number and percent of users that have shared the information with others Number of new service providers or existing contractors providing new services in the market Documentation of changing market trends	Interviews or surveys with participating and non-participating service providers Interviews or surveys with participating and non-participating end users Market research

**Table 6-3. Long-term Outcomes, Indicators, and Potential Data Sources**

Outcomes	Indicators	Data Sources and Potential Collection Approaches
<b>Long-term Outcomes</b>		
Increased market penetration of demonstrated technologies without incentives	Percentage of potential consumers that have adopted the technology Count of installed technologies and deployed strategies	Interviews with market actors Market research
Electric energy savings achieved from improved building stock performance	MWh saved and quantified load reduction	Potential program database Impact assessment
Electric demand savings achieved from improved building stock performance	kW peak saved and quantified load reduction	Potential program database Impact assessment
Gas energy savings achieved from improved building stock performance	MMBTU saved and quantified load reduction	Potential program database Impact assessment
Energy savings from deep retrofits	Percentage energy savings from existing buildings that use ETAC-supported technologies Percentage energy savings from new buildings that use ETAC-supported technologies	Potential program database Impact assessment



## **ASSUMPTIONS ABOUT STRATEGIES**

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This section describes the testable hypotheses or testable assumptions about the program to be explored in the evaluations. These are key evaluation questions about how program activities and outputs under this initiative will lead to desired near, intermediate, and longer-term outcomes.

1. Did the activities and outputs of such activities occur as planned and reach the target audiences?
2. Did target audiences react to the outputs as anticipated? That is, have expected short- and intermediate-term outcomes occurred?
  - a. Have key industry stakeholders been involved in project implementation and outreach? Have they added their own resources to the effort?
  - b. Have demonstrations changed participants' perceptions of the value of the technology or strategy?
  - c. Have demonstrations improved the performance of some technologies?
  - d. Have M&V projects resulted in credible reports that have been utilized by the ETAC program and others?
  - e. Has the ETAC program used lessons learned in its planning and its advice to R&D and deployment and regulatory programs?
  - f. Have outreach and technology transfer activities resulted in increased promotion activities and increased awareness and adoption with incentives?
  - g. Has the broader market been engaged to participate in promotional activities?
  - h. Have demonstrations been replicated, with or without incentives?
3. Have the changes above reduced obstacles and increased incentives and contributed to increased adoption of supported technologies?
  - a. Have obstacles to utilization of the technologies supported been reduced?
  - b. Do market actors and consumers see improved value propositions for technologies and strategies supported?
  - c. Have government deployment programs, utility programs, or standards been put in place to support some of these promising underused technologies?
  - d. Have there been increased sales of supported technologies and strategies, without incentives?
  - e. Have energy savings and peak load reduction occurred as a result of the ETAC activities?
4. What important spillover mechanisms should be investigated during research to quantify participant spillover and nonparticipant impacts?
  - a. Have participants repeated an action without further NYSERDA funds/assistance (e.g., replicated a demonstration, repeated a purchase of a technology)? Or have participants pursued other underused buildings technologies without NYSERDA funds/assistance due to program influence?

Causal Mechanism: Gained skills, resources, connections, and determination that the action was worthwhile based on the experience funded by NYSERDA; continue to see opportunities.

- b. Have *nonparticipants* become aware and begun taking similar actions?
  - Causal Mechanisms: Learned personally about the technology/strategy and its benefits from interaction with a participant (customer or market actor), or from NYSERDA staff, publications, or other source, and were persuaded to take the necessary steps and actions; took action, and continue to see opportunities.
- c. Have program direct effects changed behavioral norms which then cause changes/have an impact on former/current *participants and nonparticipants*? These would happen when end users who try it confirm that there are enough benefits and achieve consensus to make it a standard operating procedure for every part of an organization, or it might happen if a major supplier starts stocking it and promoting it over competing technologies.
  - Causal Mechanism: The benefits are noticed and incentives strong enough to incentivize changes in the way business is done, and these incentives are self-sustaining.
- d. Have program direct effects changed general economic equilibrium, which then causes changes/has an impact on former/current *participants and nonparticipants*?
  - Causal Mechanism: This would happen only in the unlikely scenario that one or more of supported technologies had very large benefits in terms of cost savings, business profit and jobs.

Section 8:

## **NON-PROGRAM INFLUENCE ON OUTCOMES**

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This section describes the influences that are external to the program that may affect the outcomes. These external influences include the economy and other influences over which NYSERDA programs have no direct influence.

### **8.1 GENERAL ECONOMIC CONDITIONS & HEALTH OF THE ECONOMY**

The health of the economy influences income and spending priorities for customers in all building sectors. Depending on the conditions, the health of the economy can either foster interest in energy efficiency investments or thwart it. Historically, energy efficiency investments have suffered in economic downturns. In the most recent downturn, the construction industry was significantly impacted, and the negative impacts have lingered much longer than anticipated. The supply side of the market is also impacted by the health of the economy, affecting the availability of new technologies and strategies and technology innovation.

### **8.2 STATE AND FEDERAL GOVERNMENT REGULATIONS AND POLICIES**

State and federal government regulations can shape the market's focus on different energy-related issues, technologies, and strategies through their priorities, messaging, and adoption of codes and standards. As a result, the perceptions of the value (benefits relative to costs) of energy efficiency and other buildings-related investments can be altered by policy changes at the state and federal level. Such policy changes may include regulation, taxes and subsidies, codes and standards, and other market interventions. The political timelines for changing policies and regulations do not necessarily overlap with market timelines or budget cycles, creating challenges for market development and technology adoption.

### **8.3 COMPETING PRIORITIES FOR DECISION-MAKERS**

Key decision-makers must wrestle with the macro- and micro-economic forces that impact the health of their business. This ecosystem of influences may result in assigning priority to other business decisions over matters relating to energy or energy efficiency. Often, key decision-makers are focused on the decisions that will keep their business competitive, which may cause their attentions to be on their competitive landscape, product or service innovation, or branding. This leaves limited ability to prioritize issues related to energy from a business strategy or budgetary perspective. These competing priorities can fluctuate based on the health of the economy or other external factors as well, despite the efforts of program interventions.

### **8.4 COMPETING OR COMPLEMENTARY TECHNOLOGIES**

Despite the program's best efforts to select underused technologies with the most promise, competitive market forces may bring to market a new technology that better suits customer needs. This alternate technology could be in direct competition with the technologies participating in ETAC. It is also possible that new technologies may come to market that complement the products and strategies participating in ETAC, thus stimulating the adoption of both.

**8.5 SUCCESS OF RELATED PROGRAMS**

The success of the ETAC program depends, in part, on the success of related programs administered by both NYSERDA and others. If budget cuts or changing priorities at the federal or state levels lower spending on programs (e.g., the energy technology deployment programs of the U.S. Department of Energy), that would make ETAC's ultimate success more difficult. Collaboration with related programs, such as NYSERDA's R&D and deployment programs, makes long-term success of technologies selected for ETAC funding more likely. The design and funding levels of these related programs impacts their success.

For example, the activities of other buildings-related programs in the state of New York may be complementary to or at odds with the efforts of the ETAC program. Municipalities, end users (e.g. private universities), or other utilities may be offering informational or financial programs that encourage the adoption of the same underused technologies and strategies. These competing programs may also impact ETAC participation levels.

Section 9:

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- NYSERDA TMD Operating Plan, February 2013, Section 9.2.1-Program Goals (9.33-9.34)
- NYSERDA TMD Operating Plan, February 2013, Section 9.2.1-Targeted Problem (9.32)
- NYSERDA. TMD Program Semi-Annual Report, March 1, 2013
- Sources for the C/I-specific activities include the PIPR for PON 2689, interview with ETAC C/I Program staff (January 2013), and C/I ETAC Advisory Group meeting presentation (October 1, 2012).

