

Commercial Baseline Study

Energy Services Company
Market Assessment

Final Report

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SECTION 1

Introduction

1 Introduction

This report presents the findings from the Energy Services Company (ESCO) market assessment. The ESCO market assessment is one of four conducted by Opinion Dynamics (the “Market Evaluation Team”) as part of NYSERDA’s Commercial Statewide Baseline Study.

The goal of the ESCO market assessment was to develop a baseline of ESCO activity in New York State. To do so, the Market Evaluation Team worked with NYSERDA to develop five key research objectives and related metrics for this study.

Table 1 below shows the objectives for this market assessment, along with the overarching category for each.

For the purposes of this study, ESCOs are defined as firms that offer comprehensive energy efficiency or other related services, project management, and general contracting for retrofit and replacement of a range of building end uses. This study includes two types of firms:

TRADITIONAL ESCOS. Firms that provide a comprehensive turnkey set of services, and for whom performance contracting represents a core part of their business. These are firms traditionally thought of as “ESCOs”.

ENGINEERING/DESIGN-BUILD FIRMS. Firms that may act as general contractors or consultants. They provide recommendations to the building ownership and play a role as project manager subcontracting the implementation to end-use specific contractors. They have the ability to design turnkey projects for a variety of end-uses.

Table 1 | Key Research Objectives by Category

Category	Research Objectives
Size of the New York State Market	<ul style="list-style-type: none">Estimate the size of the New York State ESCO market
ESCO Operations	<ul style="list-style-type: none">Characterize ESCO operations in New York State
ESCO Competitive Landscape in New York State	<ul style="list-style-type: none">Characterize the ESCO competitive landscape in New York State
ESCO Regulatory Landscape in New York State	<ul style="list-style-type: none">Characterize the ESCO regulatory landscape in New York State
Drivers and Barriers to ESCO Project Implementation	<ul style="list-style-type: none">Assess the drivers and barriers to ESCO project implementation in New York State

The findings from this research are presented in Section 2. The Market Evaluation Team developed these results based on secondary research, five in-depth interviews with ESCO market experts, 19 in-depth interviews with firms active in the New York ESCO market, and a Delphi panel with eight ESCO market experts. In addition, the study leveraged results from a telephone/online survey conducted as part of the Commercial Baseline Study.



SECTION 2

Market Characterization
and Assessment Results

2 Market Characterization and Assessment Results

2.1 Size of the New York Market

The Market Evaluation Team estimated several characteristics related to the size of the New York market for traditional ESCO and engineering/design-build services. These characteristics include: the number of firms and projects, project square footage, annual revenues, energy savings, and trends over time. Based on the research, there is a far greater number of engineering/design-build firms operating in New York State than traditional ESCOs. As such, traditional ESCOs complete fewer projects annually. However, traditional ESCO projects tend to be much larger, both in terms of square footage and in revenues generated, compared with projects completed by engineering/design-build firms. Project size (both in terms of building square footage and revenues) is a key differentiator between the two firm types.

Through the Delphi panel, the Team developed estimates for various market size

indicators for both firm types, sometimes differentiating between the public and private sectors. It should be noted that the number and diversity of engineering/design-build firms in New York made it difficult for some respondents to isolate and estimate the characteristics of these firms as defined for this study. However, these firms are a large player in the non-residential market for energy efficiency improvements in New York State, particularly in the private sector. In contrast, traditional ESCOs are generally better understood as they have a specific business model (i.e., based on energy savings performance contracting) and a long and established history operating in the public sector.

The following sub-sections discuss these market size indicators in greater detail.



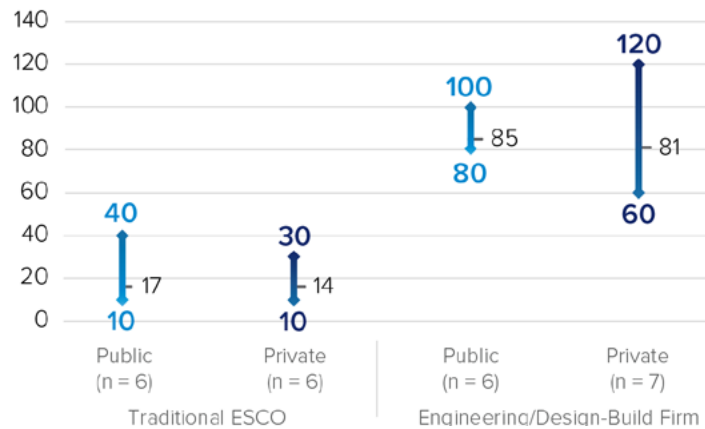
2.1.1 Number of Firms

Based on Delphi panelist estimates, the number of engineering/design-build firms operating in the New York market is five times the number of traditional ESCOs (see Figure 1). While traditional ESCOs complete a larger share of their work in the public sector, most, if not all, complete at least some work in the private sector as well. Similarly, while engineering/design-build firms tend to pursue more projects in the private sector, most are still active in the public sector.

Panelists provided a wide range of the number of firms active in New York. For traditional

ESCOs, the range was a function of different views about which ESCOs are active in the State. In contrast, for engineering/design-build firms, the range of estimates stemmed from uncertainty as to how many firms fit the definition presented in Section 1. Panelists agreed that engineering/design-build firms were more difficult to define as many small firms that have traditionally served one or two end uses (and thus would not fit the definition) could have the capability to design and build (through subcontracting) larger projects outside of their traditional areas of expertise (and thus would fit the definition).

Figure 1 | Number of Traditional ESCO and Engineering/Design-Build Firms Operating in New York



Source: ESCO Delphi Panel



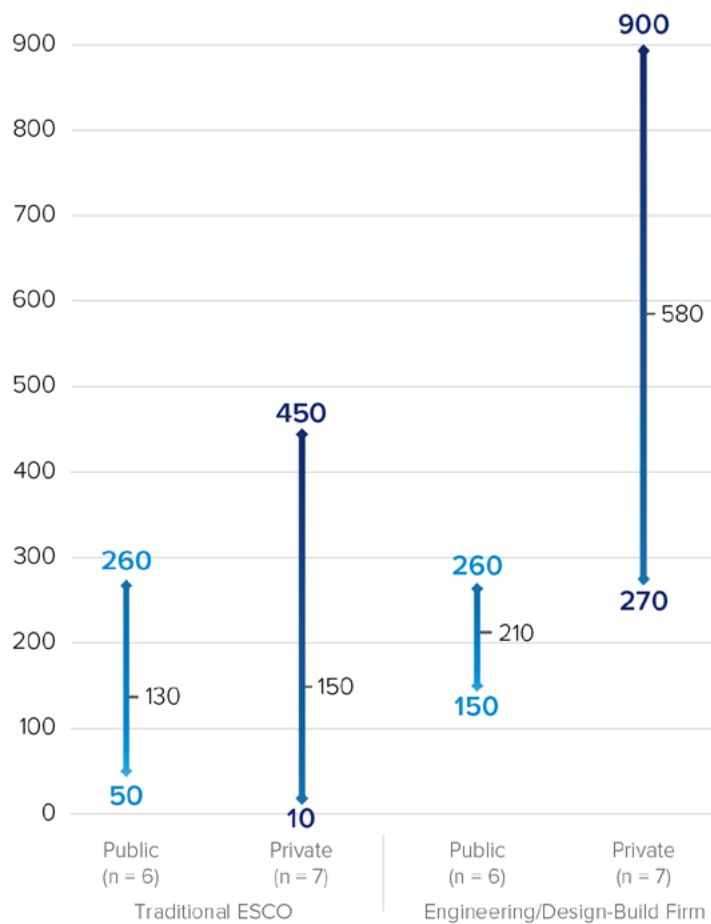
2.1.2 Number of Projects

Delphi panelists estimated that engineering/design-build firms complete over twice as many projects (790) annually compared with traditional ESCOs (280).

Both firm types complete a similar number of projects in the public sector, while

engineering/design-build firms complete approximately three times as many projects in the private sector (see Figure 2). The wide range of estimates for completed projects stemmed from panelists' different opinions about the number of firms operating in the State.

Figure 2 | Estimate of Number of Projects Completed Annually by Traditional ESCO and Engineering/Design-Build Firms in New York



Source: ESCO Delphi Panel

The mean represents the average of the Delphi panel responses with outliers removed, rounded to the nearest ten projects

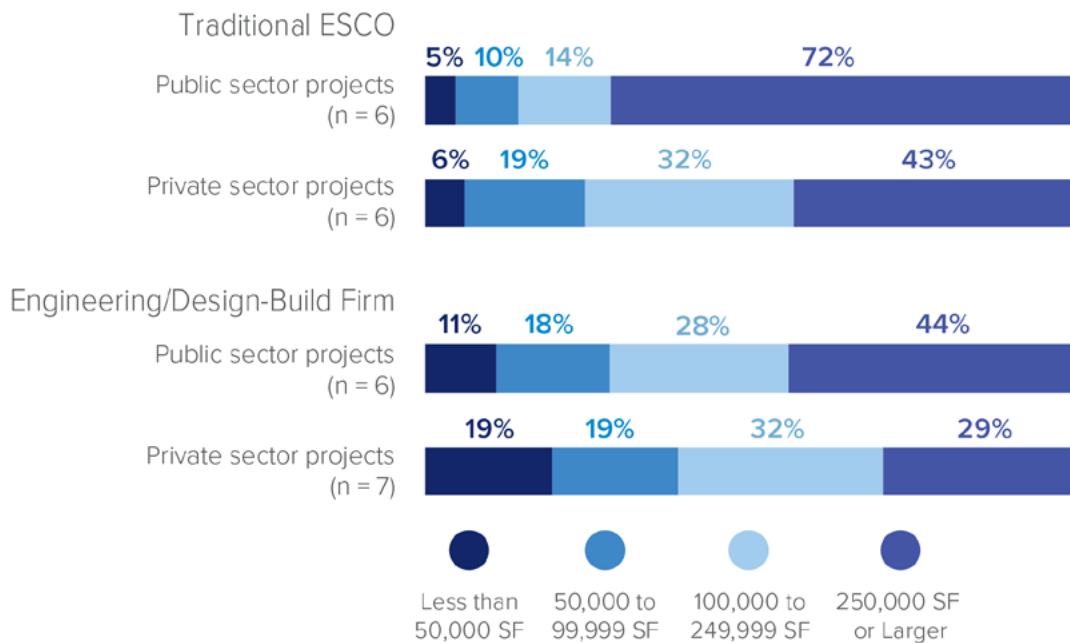
2.1.3 Project Size

Panelists also provided estimates of the size distribution of ESCO projects. Based on these estimates, public sector projects tend to be larger than private sector projects, and projects completed by traditional ESCOs tend to be larger than those completed by engineering/design-build firms (see Figure 3).

When discussing these estimates, panelists commented that traditional ESCOs typically seek projects in larger spaces because of the variety of systems present in larger facilities

that provide more opportunities for energy saving measures. Smaller spaces typically do not have the diversity of systems and therefore are not good candidates for energy savings performance contracts (ESPCs), a common contracting vehicle for traditional ESCOs (see also Section 2.2.5). While some engineering/design-build firms compete for projects in larger buildings, a greater share of their projects tends to be in smaller buildings, filling a gap in a part of the market not served by traditional ESCOs.

Figure 3 | Estimates of Project Sizes by Market Segment and Firm Type



Source: ESCO Delphi Panel

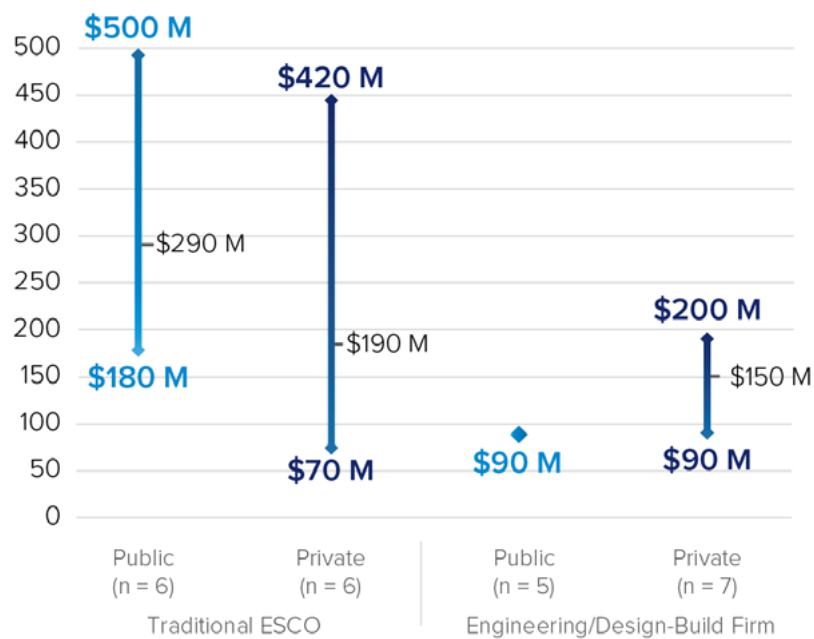
2.1.4 Project Revenues from ESCO Projects

Panelists estimated that traditional ESCOs generate approximately \$460 million in revenues per year through projects completed in New York State, while engineering/design-build firms generate revenues of \$240 million. Sixty percent of traditional ESCO revenues come from projects in the public sector, compared to only 23% of engineering/design-build firm revenues. Expert and market actors noted that traditional ESCOs have a long

history of competing for large public sector contracts and, as such, they generate a larger share of their revenues from these types of projects.

Of note in these results is the wide range of revenue estimates that panelists provided for most types of projects, which primarily reflects the range of estimates in the number of firms active and projects completed in the State.

Figure 4 | Estimates of Annual Revenues for Traditional ESCO and Engineering/Design-Build Firms from New York Projects (\$ Million)



Source: ESCO Delphi Panel

The mean represents the average of the Delphi panel responses with outliers removed, rounded to the nearest \$10 million.

Combining panel estimates of total revenues and the number of projects, the Team estimated that the average traditional ESCO project generates approximately \$1,790,000, compared with approximately \$300,000 per project for engineering/design-build firms¹

Figure 5 | Estimates of Per-Project Revenues for Traditional ESCO and Engineering/Design-Build Firms

Per Project Revenue by Firm Type	Estimate
Traditional ESCO	
Public Sector Projects	\$2,380,000
Private Sector Projects	\$1,310,000
All Projects	\$1,790,000
Engineering/Design-Build	
Public Sector Projects	\$430,000
Private Sector Projects	\$250,000
All Projects	\$300,000

Source: ESCO Delphi Panel



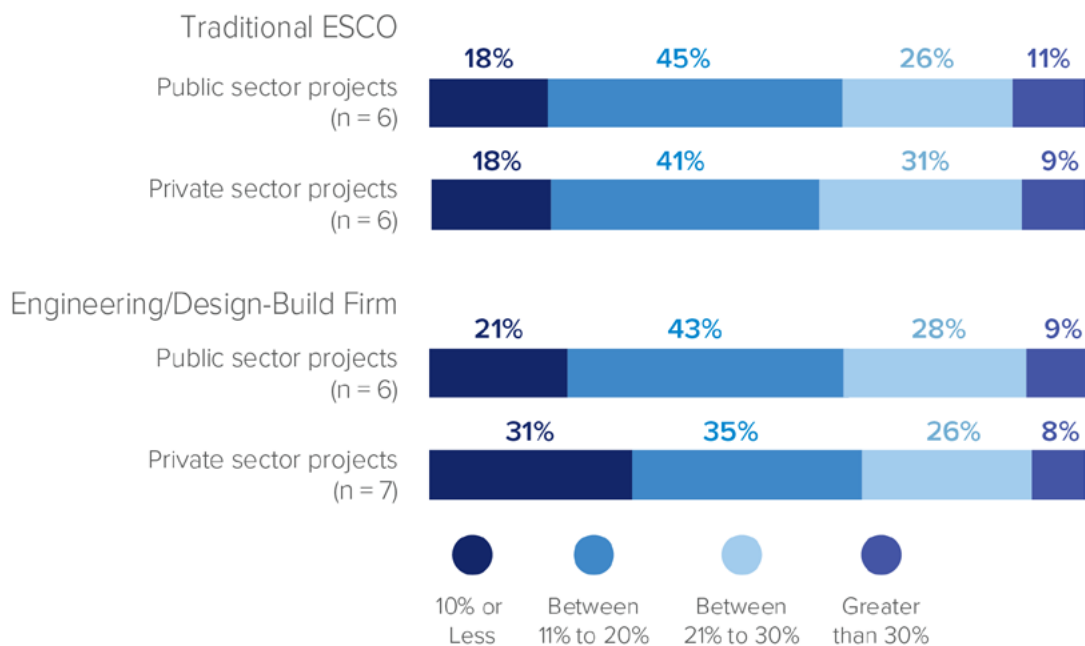
¹The Market Evaluation Team used un-rounded values for total revenues and projects for this calculation, rather than the rounded versions presented in the tables of this report

2.1.5 Energy Savings from ESCO Projects

Panelists reported that the majority of energy efficiency projects typically save between 11% and 30% of customers' baseline energy usage. In most cases, panelists reported a similar distribution of savings across public and private sector projects completed by both firm types. However, engineering/design-build firms tend to have a higher share of private sector projects with savings of 10% or less than

traditional ESCOs (31% compared to 18%). As noted, this is likely the result of differences in the types of buildings and projects that traditional ESCOs and engineering/design-build firms tend to bid on (i.e., traditional ESCOs tend to focus more on segments with opportunities for complex systems and comprehensive energy efficiency projects with deeper savings).

Figure 6 | Share of Projects by Annual kWh Usage Savings Category for Public and Private Firms of Both Types



Source: ESCO Delphi Panel

Feedback

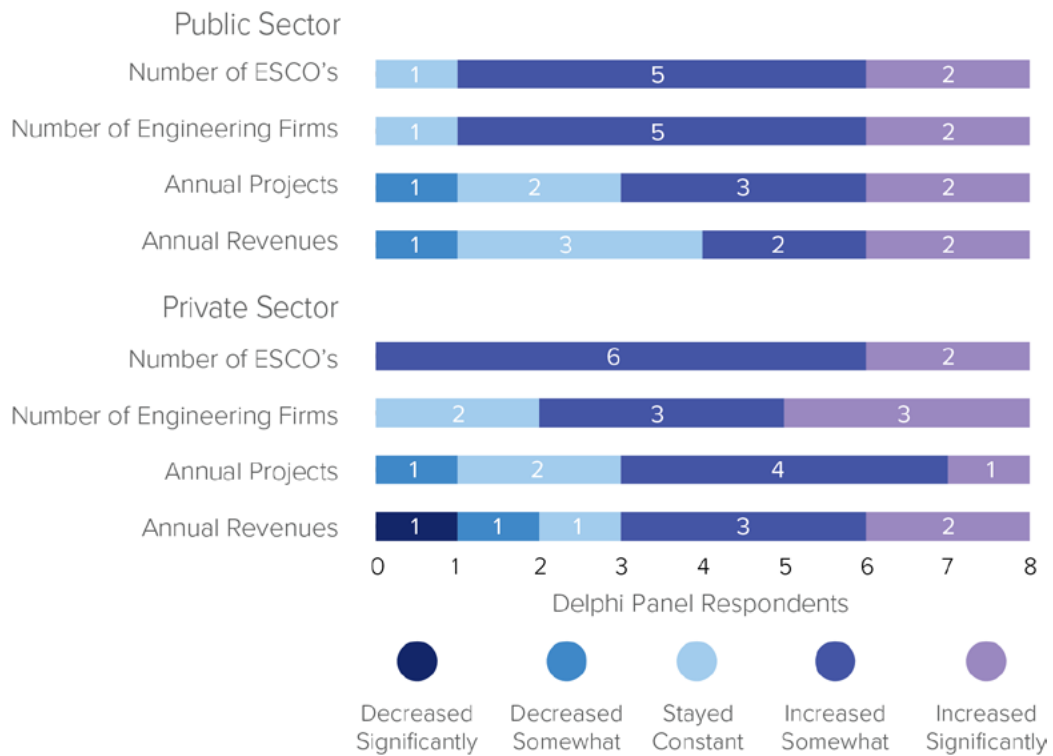
I find that [customers], they go to the [traditional] ESCOs when they want to do everything, and they want try to find all the things that might have 10% payback or 10% savings or less, they'll go to the [traditional] ESCOs for that because they want to bundle it with all the high yield [ECMs].

– Engineering/Design-Build Firm

2.1.6 Change in Market Characteristics Over Time

The Delphi panel also explored trends in certain market characteristics over the past five to ten years. Panelists generally agreed that the number of both firm types working in the public and private sectors has increased over time but were somewhat divided about trends in the number of projects and annual revenues.

Figure 7 | Trends in Public and Private Sector Market Characteristics



Source: ESCO Delphi Panel

2.2 ESCO Operations

2.2.1 Firm Structures and Operations

Traditional ESCO representatives reported that most firms of their type and size have historically been vertically aligned to market segments but that the structure and organization of their firms have changed over time to a more geographic alignment. Nevertheless, many traditional ESCOs have a long history of working in specific market segments (e.g., K-12 schools) and, as such, have built on prior work to establish expertise in certain types of buildings.

Engineering/design-build firms, on the other hand, tend to be less structured in their market segmentation and business development focus. Two interviewed experts suggested that engineering/design-build firms are more focused on specific end uses, rather than market segments, and they may

be closer-aligned to utility or other incentive programs as a driver of their business in the non-residential market. Further, interviewees suggested that single end-use contractors or manufacturers often partner with engineering/design-build firms. In some cases, the single end-user contractors will act as general contractor and subcontract all work falling outside their area of expertise to an engineering/design-build firm. In other cases, the engineering/design-build firm will subcontract a single end-user to another contractor or manufacturer. For example, it is common for an HVAC firm or manufacturer to partner or contract with another firm that offers lighting or other mechanical engineering services to complete a larger retrofit project.

2.2.2 Market Segments and Services Offered

Interviewed traditional ESCOs reported that they focus on public sector market segments while also working on a limited number of private-sector market segments. Engineering/design-build firms focus more on the private sector and have limited project work in the public sector.

Delphi panelists also provided insights into the distribution of public and private sector ESCO revenues by market segment.

Feedback

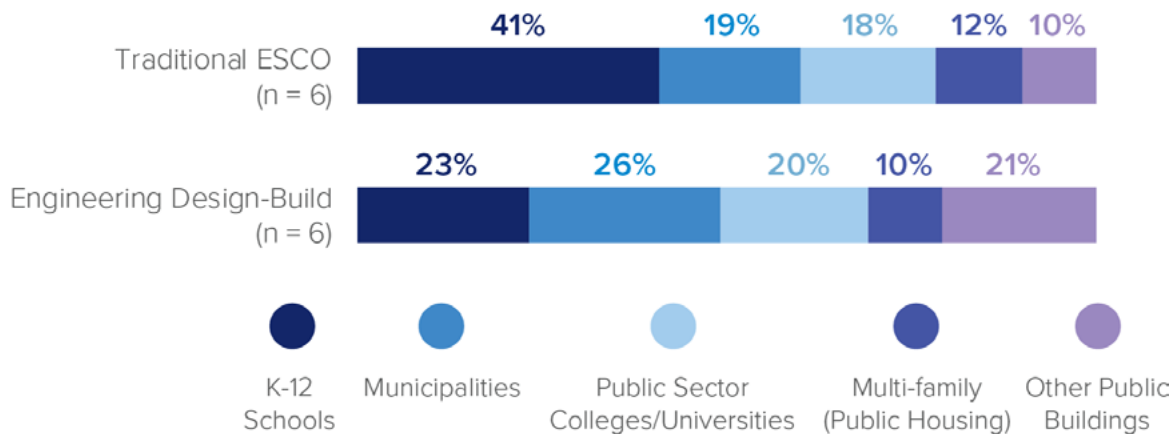
I think that there is a trend right now... that the majority of ESCOs are market-aligned by region, wanting individuals who have domicile, live, work, play, pay taxes, in the state they serve. I know the majority of our competitors are currently pursuing business along those lines, rather than having vertical market specialists parachute in and out from other states. It's more market alignment, regional-specific.

– Traditional ESCO Firm

2.2.2.1 Public Sector Market Segments

- Public sector revenues for traditional ESCO are concentrated in K-12 schools (41%), municipalities (19%), and public-sector colleges and universities (18%).
- Engineering/design-build firms focus their public sector work on segments similar to traditional ESCOs, including municipalities (26%), K-12 schools (23%), and public colleges and universities (20%). Panelists also estimated that engineering/design-build firms do work in other public sector buildings (21% of public sector revenues).
- Multifamily housing accounts for 12% and 10% of traditional ESCO and engineering/design-build firm public sector revenue, respectively.

Figure 8 | Estimates of Sources of Revenue from Public Sector Market Segments for Traditional ESCOs and Engineering/Design-Build Firms



Source: ESCO Delphi Panel

Feedback

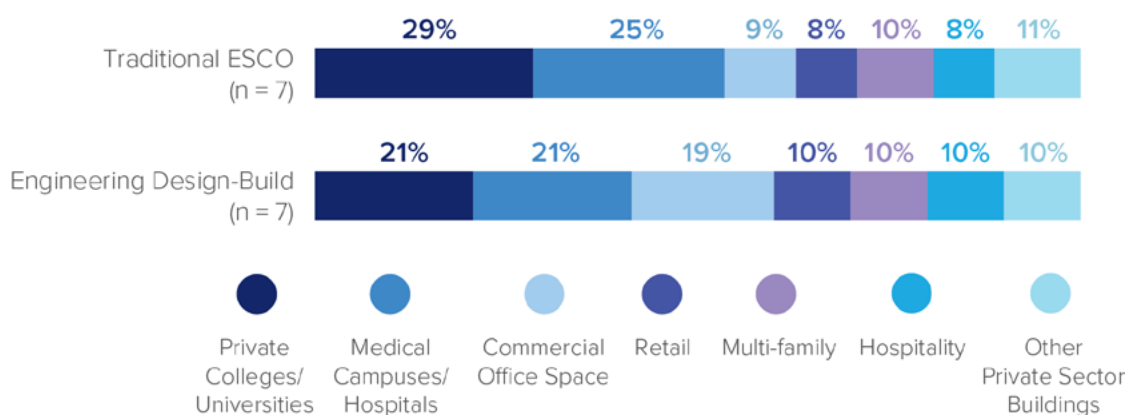
Now we do occasionally work in the commercial industry, but it's not the majority of our business. And it becomes challenging too largely because the cash flow models and ROIs that most private commercial customers are looking for are way shorter than what you'd see in a traditional state, local or higher health or healthcare opportunity.

– Traditional ESCO Firm

2.2.2.2 Private Sector Market Segments

- Panelists estimated that private sector revenues for traditional ESCOs are somewhat concentrated in private colleges/universities (29%) and medical campuses/hospitals (25%), with other segments, individually accounting for 10% or less of private sector revenues.
- Private colleges/universities and medical campuses/hospitals also account for the largest shares of private sector revenues (21% each) for engineering/design-build firms.
- According to panelists, engineering/design-build firms generate a higher share of their private sector revenues from commercial office space (19%) compared to traditional ESCOs (9%). Interviewees thought that this difference might be driven by the limited set of end uses and associated energy efficiency opportunities (typically lighting, HVAC, and plug load) and shorter payback period requirements in commercial office spaces. As such, commercial office buildings may be less attractive to traditional ESCOs that rely on more comprehensive longer-term projects. In addition, engineering/design-build firms may be more likely to propose single end-use projects with quicker payback periods that may be more attractive to commercial real estate decision-makers.
- Multifamily housing accounts for 10% of both traditional ESCO and engineering/design-build firm private sector revenue.

Figure 9 | Estimates of Sources of Revenue from Private Sector Market Segments for Traditional ESCOs and Engineering/Design-Build Firms



Source: ESCO Delphi Panel

Feedback

[Commercial office space and retail] are just not going to be interested in doing big renovations that... have 20 year paybacks or 18 year paybacks whereas a college or university, that's fine for them to do major renovations for that long. [Commercial office space and retail] are looking at five year paybacks or less and that really limits the scope and the ability to do major renovations.

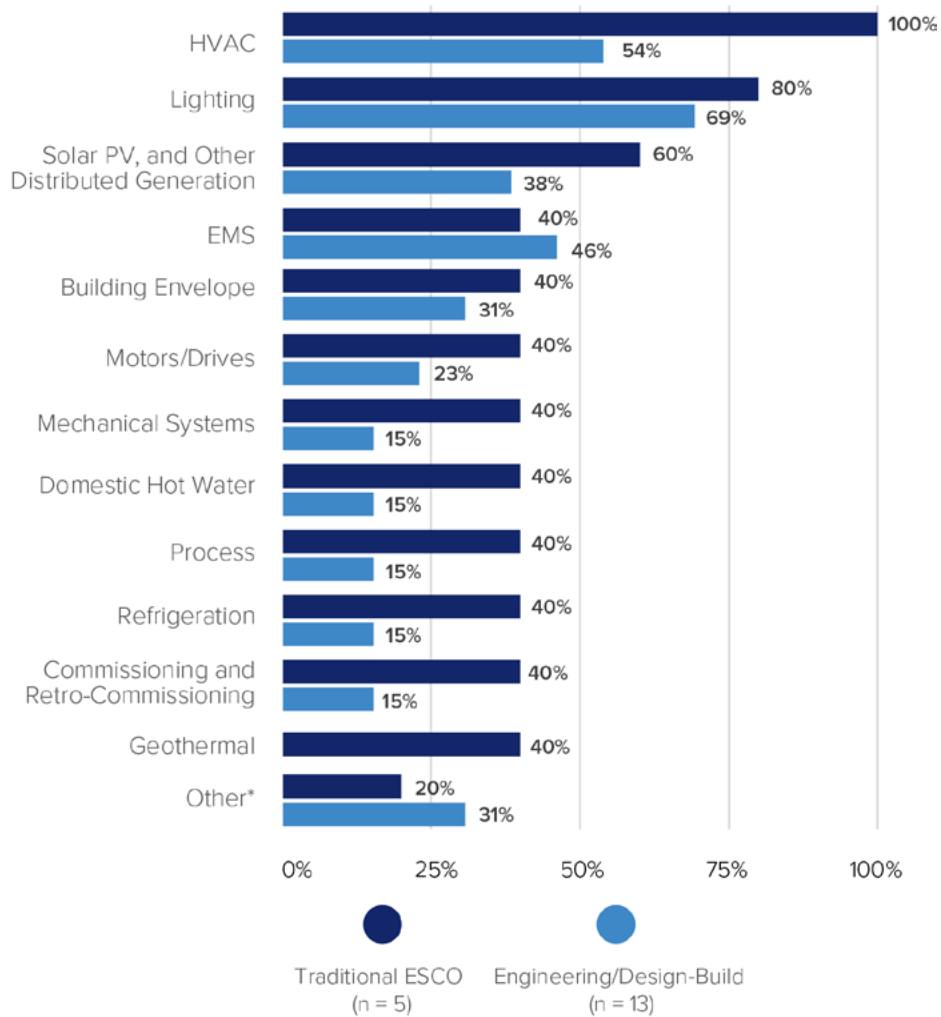
– Traditional ESCO Firm

2.2.2.3 End Uses and Services Offered

Both traditional ESCOs and engineering/design-build firms offer a range of engineering services related to different end uses, or energy conservation measures (ECMs). Figure 10 shows the share of each firm type interviewed that services the associated end-use. As some firms specialize in a core set of end uses, subcontracting

specific components of a larger project to other firms is common. Interviewees noted that the majority of projects in both sectors include a lighting component. Though lighting-only projects occur, interviewees reported that most of their work includes non-lighting ECMs as well (e.g., HVAC, EMS, etc.).

Figure 10 | End Uses Offered by Interviewed Firms



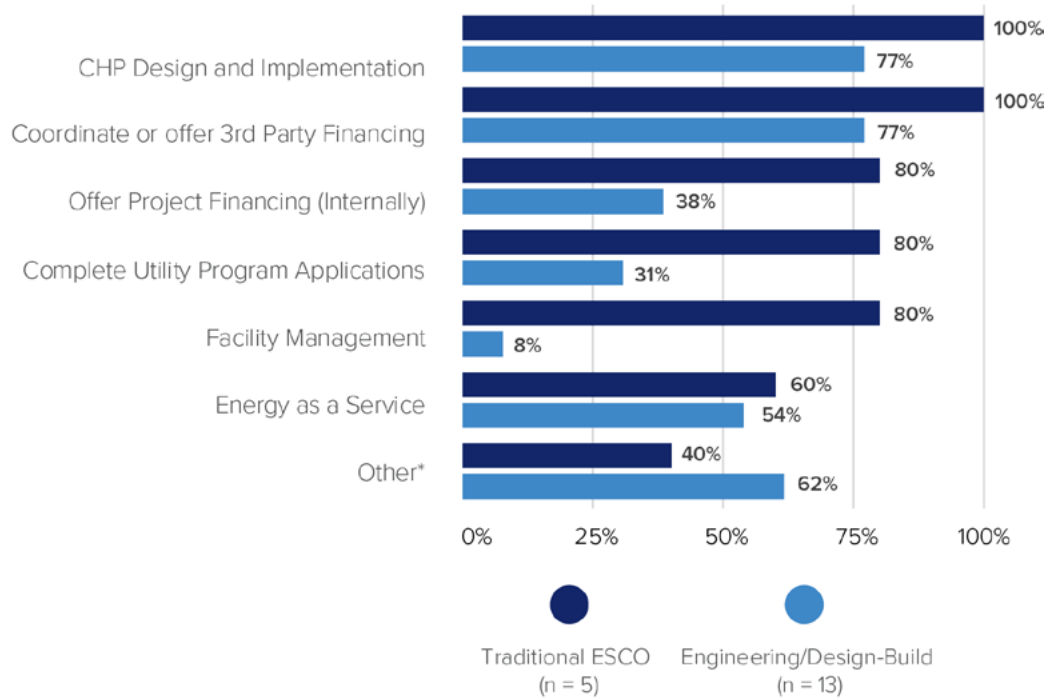
Source: ESCO In-Depth Interview

* Other end-uses include plug load, boilers, plumbing, economizers, and voltage optimization.

Figure 11 shows the share of the two firm types that offer different ancillary services, in addition to engineering services. Many firms reported offering services related to owning and managing their customers’ newly upgraded systems (e.g., “energy as a service” or EaaS, and “facility management”). These types of arrangements are gaining popularity in the market as, in some cases, they can offer an alternative means of financing a project and keeping it off the customer’s balance sheets (see 2.2.5 for more detail). Notably, a

larger share of traditional ESCOs offer facility management services, while EaaS is offered by over half of interviewed traditional ESCOs and engineering/design-build firms. While both of these services involve third-party management of their customers’ facilities, EaaS arrangements typically include some guarantee of energy savings while facility management arrangements often involve simply outsourcing the day-to-day operations of major building systems.

Figure 11 | End Uses Offered by Interviewed Firms



Source: ESCO In-Depth Interview

* Other services include energy master planning, air/ground source heat pumps, tax analysis, investment-grade audits, and carbon accounting.

2.2.3 Business Development Approach

Traditional ESCOs have moved towards structuring business development regionally rather than focused on specific market segments. However, panelists indicated that many of the largest traditional ESCOs still specialize in serving certain types of buildings. In some cases, this is due to a specific area of expertise, but more often due to long-standing relationships or a history of working in that segment. As such, traditional ESCOs reported that they prioritize business development based on market segment, facility square footage, and the potential for energy savings. Traditional ESCOs also reported that, in some segments, they can estimate which building systems are most likely to have deferred maintenance due to capital constraints. Business development teams identify priorities based on how ESPCs might alleviate these capital constraints.

While the criteria considered during the development process for engineering/design-build firms are similar to traditional ESCOs (i.e., segment, square footage, and

savings), there are some key differences. Engineering/design-build firms tend to focus more on private-sector opportunities that have much shorter payback requirements. Therefore, market actors reported that they identify opportunities based on the ability to meet their prospective customer's payback requirements by balancing project cost with anticipated energy savings. As such, engineering/design-build projects often include fewer end uses, most commonly efficient lighting and lighting controls, due to their high savings and quick payback. Similar to traditional ESCOs, engineering/design-build firms may also concentrate their business development efforts on certain market segments, either excluding or focusing on specific segments due to experience or specialized skill sets. For example, some firms may specialize in serving the hospitality segment, while others may stay away from projects in hospitals and labs due to their complexity.

Feedback

[Criteria for project selection include] size, potential payback period, potential scope of work, existing work that has already been done. The client's ability to finance the project... there has to be a minimum contract size just to make it economically viable. [A] much smaller firm that can go after smaller ECM's, but in our specific case, the potential savings has to be there, it has to be a minimum threshold before we can actually make it sustainable, so that is a big component of it.

– Traditional ESCO Firm

2.2.4 Business Development Time-lines

Both traditional ESCOs and engineering/design-build firms reported that their business development cycle is typically between one and two years from initial contact with a customer to have signed contracts in hand. However, respondents also reported that cycles could vary substantially by sector and business segment. For example, it may take firms well over a year to secure a contract for a public sector project (e.g., K-12 schools)

given more formal and lengthy procurement processes. Alternatively, some segments, such as commercial real estate, can make decisions more quickly and, therefore, may have a timeline of less than a year. Some engineering/design-build firms also reported business development cycles of less than a year for simpler projects that focus on a single end-use.

2.2.5 Contracting and Financing Models

Interviewed traditional ESCOs reported that the most common contracting model is the ESPC, a financing mechanism in which the ESCO implements and coordinates project financing and guarantees a certain level of energy savings over a defined term. The ESCO recoups the initial investment through the energy savings the project generates while the customer has no upfront expenditure to undertake the project. ESPCs thus create opportunities for capital-intensive energy upgrades that would be too costly for customers to finance themselves.

The ESPC model works well for the public sector due to a number of factors:

- **Long-term ownership.** Public entities tend to maintain ownership of their facilities for longer periods, making decision-makers more willing to consider a longer-term ESPC (e.g., paying for the cost of the project over ten or more years).
- **Diversity of systems.** K-12 schools, municipalities, and public sector universities tend to have a wide range of end uses and more complex equipment, both of which make a comprehensive energy efficiency project more viable (e.g., combining multiple ECMs).

- **Standard Scope of Work.** Some traditional ESCOs tend to specialize in certain public sector market segments (K-12 schools in particular) and have developed offerings and long-standing relationships that allow for work in similar buildings throughout the State.

Energy services agreements (ESA) are another model used by traditional ESCOs in both the public and private sectors, though more commonly for large institutional projects. In an ESA, a service provider owns and operates equipment, and the customer pays for the upgrade through a fee paid to the service provider at regular intervals based on realized energy savings. ESAs are similar to ESPCs in that the fee is usually based on energy savings, but the contracts are typically structured to be off customers' balance sheets. Though not as common, traditional ESCOs may also enter into a lease agreement with their customer, where the customer agrees to pay for the energy efficiency upgrade through regular payments for the term of the lease, or simply a general services agreement.

Engineering/design-build firms typically contract directly with customers through a general services agreement, either with financing or cash payments. While ESPCs are not common for engineering/design-build firms, they still leverage other contracting mechanisms employed by traditional ESCOs (e.g., ESA or lease agreements). These other mechanisms may be less common for engineering/design-build firms as their customers tend to prefer projects with shorter payback periods and avoid contracts with lengthy terms.

Both traditional ESCOs and engineering/design-build firms reported that the most common financing for their projects included customer self-financing through an operating

budget, third-party financing, and lease financing. Projects implemented through an engineering/design-build firm are generally smaller in scale and more likely to be funded through a capital budget. Market actors also noted that some of their public sector clients, especially K-12 school districts, leverage municipal bonds to finance projects. Property assessed clean energy (PACE) financing is less common.

While most market actors reported no significant changes in project financing models in recent years, some mentioned emerging models that are gaining popularity, including on-bill financing, shared savings agreements, EaaS, and equipment leasing.

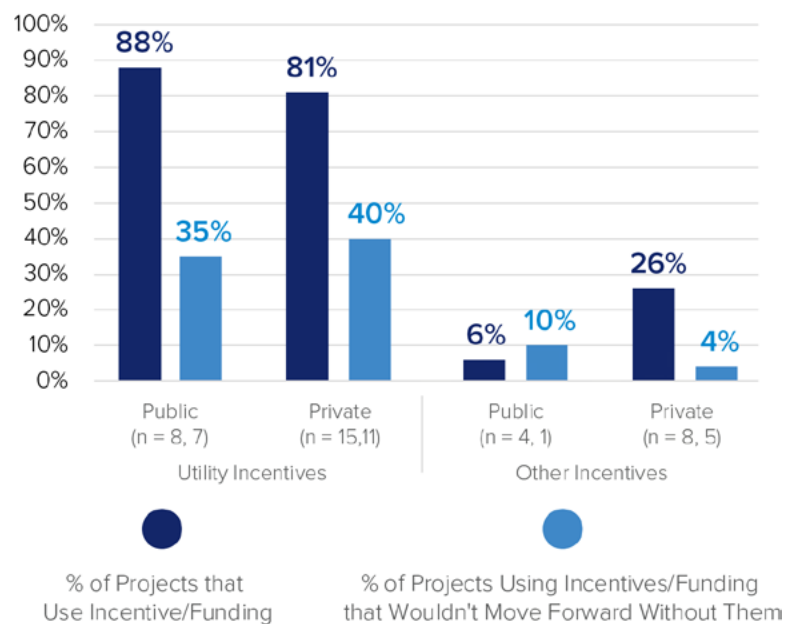


2.2.6 Utility Incentives

Market actors also estimated the share of projects in the public and private sectors that take advantage of utility incentives or other public funding sources, and the share of projects that would not have moved forward without these supplemental funding sources (see Figure 12). The majority of projects in both the public and private sectors take advantage of utility incentives (88% and 81%, respectively), and a substantial portion of those projects would not have moved

forward without those incentives (35% to 40%, respectively). Usage of and reliance on other outside funding, such as state or federal grants, is lower. Only 6% of public and 26% of private-sector projects use this type of funding, and of these, very few (between 4% and 10%) would not have moved forward without it. These results indicate that both market sectors are well aware of available utility incentives and taking advantage of them to move projects forward.

Figure 12 | Usage and Reliance on Utility Incentive and Other Funding Sources



Source: ESCO In-Depth Interviews

2.3 Competitive Landscape

2.3.1 Key Market Actors

Representatives from traditional ESCOs reported that they regularly bid against other firms – including engineering/design-build firms, New York State agencies such as NYPA, and single end-user contractors – for energy efficiency projects. Engineering/design-build firms similarly indicated that they compete against traditional ESCOs, single end-user contractors, unregulated arms of utilities, energy management arms of commercial real estate companies, and equipment manufacturers. Some traditional ESCOs also noted that firms with whom they had previously subcontracted to complete a portion of a larger project are now becoming competition on future projects.

Interviewees noted that the biggest market segments in New York are municipalities, state government, and K-12 schools. Interviewees feel that there is a substantial

opportunity in these segments as many buildings are older and have large amounts of deferred maintenance that traditional ESCOs or engineering/design-build firms could address. Experts felt that the K-12 and municipal markets are particularly attractive to traditional ESCOs because of the commonalities in the facilities' physical plant, age, and construction throughout the State. Within these segments, traditional ESCOs are well-positioned to develop scopes of work that produce deep energy savings that they can then replicate in similar buildings across the State. For engineering/design-build firms that focus more heavily on the private sector, interviewees felt that there are more opportunities in commercial office space in the downstate and New York City markets driven by higher electricity costs near the City and on Long Island.



2.3.2 Market Trends

Delphi panelists also provided comments on the recent trends in the New York public sector and private sector markets and expected changes in the next five to ten years.

Recent Trends:

- Increased demand for energy efficiency services in the public sector has contributed to a corresponding increase in competition.
- Along with the increased demand, there has been an increase in the availability and number of project finance sources.
- Utilities are continuing to develop offerings to try and incentivize deeper saving ECMs.
- On the private sector side, there has been a recent embrace of energy efficiency by commercial clients along with improvements in funding sources for traditional energy efficiency and renewables.

Expected Trends over the Next Five to Ten Years:

- Panelists expect New York PACE to continue to become a more widespread financing option.
- Experts also expect New York policymakers to continue encouraging the growth of renewables, sustainability, carbon footprint reduction commitments, and resiliency requirements.
- Panelists anticipate growth in the demand for energy efficiency to remain constant or slow in the near future because of falling energy prices and the relative maturity of the efficiency and renewables (solar PV) markets in New York.
- Private sector customers are expected to continue to focus on high-savings, quick-payback end-uses rather than deeper energy saving measures.

2.3.3 Emerging Business Models

Experts and market actors noted that non-residential customers are moving towards leasing certain systems in their building as a means of funding upgrades. Under this mode, for example, a traditional ESCO or engineering/design-build firm upgrades, owns, and maintains a building's HVAC system, while the customer will lease the system from the firm. This is an attractive

option for some owners of non-residential buildings who do not have the capacity or expertise to maintain an upgraded system but have a significant need for replacement equipment. Interviewees noted that they had seen this type of model successfully implemented in some market segments, such as public and private universities and K-12 school systems, throughout the State.

2.4 Market Drivers and Barriers

Through the in-depth interviews with market actors, the Delphi Panel, and the market baseline study, the Market Evaluation Team explored the drivers of and barriers to both traditional ESCOs and engineering/design-build firms completing more non-residential energy efficiency projects.

2.4.1 Drivers

Industry experts and market actors identified several key drivers of energy efficiency in New York’s non-residential buildings.

- **High Cost of Energy**—New York electric rates are generally higher than in other areas of the country, which encourages businesses and public sector entities to pay closer attention to their energy consumption and seek out ways of reducing energy-related costs.
- **Limited Capital Budget**—Many entities within the public sector do not have substantial capital improvement budgets, which makes the ESCO ESPC model a more attractive way to fund energy efficiency projects compared to alternative methods, such as issuing municipal bonds.
- **Managing Operations and Maintenance Costs**—Decision-makers in New York, as in other states, seek ways to reduce ongoing operations and maintenance costs in their facilities through energy efficiency upgrades.

New York State policy and regulation also drive energy efficiency projects in both the public and private sectors. The Department of Education, for example, provides matching funds for school construction, which may be one reason why K-12 schools represent a relatively large share of traditional ESCO public sector revenues (41%). Additionally, the City of New York has established mandatory benchmarking requirements for all buildings in the City, which may also drive greater investment in energy efficiency. The State has also been active in promoting energy efficiency and solar through incentives provided by government agencies and utilities.



2.4.1.1 Multifamily Drivers

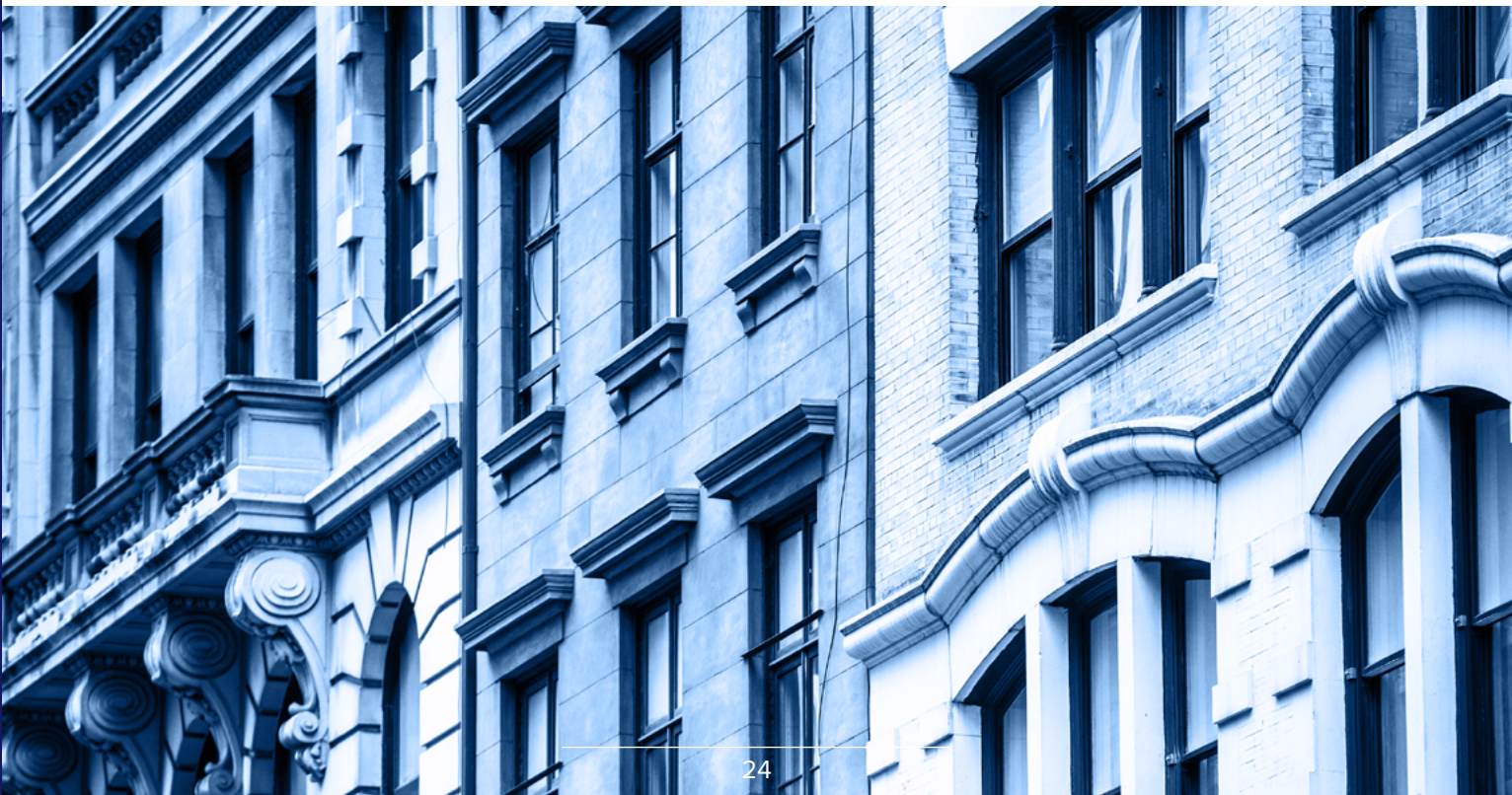
While multifamily buildings do not represent a particularly large share of ESCO projects, several interviewees indicated that their firms complete work in multifamily buildings. Three of the key drivers of multifamily projects are:

- **DECISION MAKING:** Having a single point of contact with clearly defined priorities, made the business development process much simpler for firms that work in multifamily. Interviewees cited difficulties related to group decision-making as an obstacle to completing more projects in multifamily buildings.
- **INCENTIVES:** Interviewees noted that covering the cost of energy efficiency upgrades is a challenge for many multifamily building owners. As such, incentive programs play a pivotal role in moving more multifamily projects forward.
- **EXPERIENCE LEVEL:** Multifamily buildings can be old and difficult to serve. Interviewees noted that the firms that tend to complete more multifamily projects are those that have experience working in those types of buildings.

Feedback

[...] in the past we've worked with condo and co-op boards and that's kind of a separate hurdle altogether. But then our client that I referenced in the city he owns and rents out his apartments so for him it's kind of the same mentality as with the commercial space. His #1 priority is always going to be occupant comfort.

– Engineering/Design-Build Firm



2.4.2 Barriers

2.4.2.1 Customer Level Barriers to Energy Efficiency

The commercial baseline survey included a series of questions about customers' primary barriers to completing energy efficiency projects with traditional ESCOs. These questions were asked of both public sector respondents and large private sector respondents.

Based on survey responses, 46% of public sector organizations have worked with a traditional ESCO in the past, compared with 28% of large private sector organizations. Additionally, public sector organizations are more familiar with traditional ESCOs than organizations representing large private sector buildings. On a scale of 1 to 7, where 1

is not familiar at all and 7 is very familiar, public sector respondents provided an average familiarity rating of 3.4, while large private sector respondents provided a rating of 3.0.

Table 2 summarizes the barriers most frequently cited by public and private sector survey respondents. The largest barriers for public sector representatives are lack of large enough projects (27%), internal procurement processes (25%), and lack of familiarity with traditional ESCOs (24%). For private sector representatives, lack of familiarity with traditional ESCOs is the single largest barrier (44%).

Table 2 | Barriers to Completing Projects with Traditional ESCOs for Public and Private Sector

Barrier to Completing Projects with Traditional ESCOs (multiple response)	Public (n = 61)	Private (n = 247)
Our projects are typically not large enough	27%	16%
Internal procurement processes	25%	8%
Not familiar with traditional ESCOs	24%	44%
The structure of many traditional ESCO contracts	15%	11%
No barriers	2%	6%
Other barriers	8%	15%

Source: Market Evaluation Team Analysis of Commercial Baseline Survey Results

In addition to these general barriers, interviewed market actors and the Delphi panel also provided information on the key barriers to achieving greater uptake of energy efficiency that they perceive among their customers:

- **Lack of awareness or understanding of energy savings.** Market actors felt that decision-makers did not know where to look for energy efficiency opportunities and how to evaluate them. Consequently, interviewees felt that decision-makers do not understand how a traditional ESCO or engineering/design-build firm may improve their building's energy performance and their organization's overall financial picture.
- **Financial barriers, such as access to capital and creditworthiness.** Representatives from traditional ESCOs and engineering/design-build firms reported that some of their customers have struggled with access to capital or creditworthiness, which can make some energy efficiency projects unattainable.
- **Uncertainty about the length of building ownership.** Market actors felt that building owners might be uncertain about how long they will own their facility, making longer-term energy-savings models (e.g., ESPC, PACE, etc.) less appealing. Market actors felt that this barrier may be compounded by skepticism of the savings that an energy efficiency project will generate.
- **Public sector procurement processes.** Within the public sector, procurement rules and procedures can be a barrier to completing more energy efficiency projects. While ESPCs may alleviate some need for public sector decision-makers to go through a very lengthy appropriations process, procurement may still be a lengthy process that takes substantial effort on the part of both the customer and traditional ESCO business development teams. As such, procurement rules can add to project timelines and costs.

Barriers to Deeper Savings Measures

Projects with deeper savings tend to bundle ECMs that have longer payback periods with those that typically achieve shorter paybacks, such as lighting measures. Market actors reported several barriers to deeper savings within the projects they complete:

- Interviewees noted that customer awareness of energy saving opportunities, deeper savings opportunities in particular, is a barrier to completing more comprehensive projects.
- In the private sector, customers' requirements for projects with short payback periods present obstacles for completing deep savings retrofits.
- Some smaller engineering/design-build firms with relatively narrow specializations spoke about not having the capabilities in-house to put together comprehensive projects with deeper savings.

2.4.2.2 ESCO-Level Barriers

Market actors reported barriers they face to completing more energy efficiency work in New York, although these barriers are not unique to the New York market. These barriers can be grouped by the different stages in a typical project cycle:

- **Business development, project scoping and contracting.** The contracting process can be time consuming and expensive. Traditional ESCOs reported that they often devote a substantial amount of time and resources to scope a project, conduct an investment-grade audit, and then go through the approval processes with their customer. In some instances, firms can also be at risk of their customers taking a part of a scoped project, such as a lighting upgrade, and completing it as a standalone project with a single end-use contractor or manufacturer. This may generate savings for the customer in the near term, but it also removes a key ECM from the package to be treated under a potential comprehensive project in the future. As a result, the future project may be less financially viable both for the ESCO and the customer. This cost of developing business may be a barrier to entry for some firms to compete in certain market segments. For example, the time and resources required to bid on and scope a public sector project may deter smaller engineering/design-build firms from competing with larger firms able to take on more risk.
- **Project implementation and commissioning.** At the project implementation phase, market actors

reported that maintaining efficient project timelines is often a challenge, which impacts the number of projects firms can complete each year. There is a range of variables that may impact a project timeline, some of which are outside of the firm's control. Generating positive cash flow as quickly as possible is often key, and any delays can put that at risk.

Market actors also commented that customer involvement in the implementation and commissioning steps is critical to ensuring that savings from certain ECMs persist. Having buy-in from facilities staff is often critical as long-term savings are reliant on how customers operate the building. Interviewees noted that training facility staff on appropriate operations can be necessary and burdensome for the implementer to ensure ongoing project success and, as such, further lengthens project timelines.

- **Measurement and verification (M&V).** Some traditional ESCOs have experienced some reluctance on the part of customers to move forward with an ESPC project due to additional M&V necessary after the project has been completed. If a project under an ESPC does not achieve projected energy savings, traditional ESCOs are typically responsible for determining the cause of savings shortfalls and taking corrective action. As such, M&V activities are a crucial part of the ESPC and help firms determine how to address savings shortfalls.



SECTION 3

Findings and
Recommendations

3 Findings and Recommendations

The following are the key findings from the ESCO market research.

3.1 Larger buildings are well suited for both firm types

Interviewed experts and market actors estimated that traditional ESCOs complete 86% and 75% of their public and private sector projects, respectively, in buildings that were 100,000 square feet or larger. Engineering/design-build firms also complete the bulk of their private sector projects (61%) in buildings that are 100,000 square feet or larger.

While both types of firms tend to complete work in larger buildings, there are key differences in the profile of projects for the two types of firms. Traditional ESCOs leverage the ESPC as their primary contracting model. As a result, facilities that have a need to address multiple ECMs and are interested

in paying for the cost of the project over a longer-term (10-20 years) tend to be a better fit. Experts and market actors estimated that over 80% of traditional ESCO revenues come from public sector or large institutional private sector projects (i.e., private colleges and universities, and medical campuses and hospitals). Engineering/design-build firms, on the other hand, tend to work with customers that require a much shorter payback period for capital projects (5 years or less). As such, these firms complete a larger share of projects that focus on upgrading fewer end uses but are also in buildings large enough to generate enough savings to meet their customers' payback requirements.

3.2 Smaller firms compete for portions of ESCO projects

Market actors noted that engineering/design-build firms, smaller engineering firms, and other single end-use contractors (e.g., HVAC or lighting manufacturers) compete with traditional ESCOs for projects. In some cases, traditional ESCOs work with prospective customers to develop a comprehensive scope of work, only to be outbid by smaller firms or single end-use contractors for a portion of that work. Generating positive cash flow as quickly as possible is key to most traditional ESCO projects completed

via ESPC. In many cases, including multiple end uses in the project helps to maintain this positive cash flow. If more prospective traditional ESCO customers choose to forego a major energy efficiency project that includes deeper savings measures in favor of a less expensive single-end use project (e.g., lighting only), this may cannibalize future ESPC projects that require relatively low-cost and high-saving ECMs like lighting to maintain positive cash flow.

3.3 Short Payback Periods Drive Energy Efficiency Investment in the Private Sector

According to market actors and experts, private sector customers require much shorter payback periods (5 years or less) than public sector customers. As such, projects typically must include ECMs that balance cost with high potential for energy savings (e.g., lighting

measures). While market actors indicated that typical projects include multiple measures, they also reported that the vast majority of their projects include lighting as a means of shortening the payback period.

3.4 Existing Relationships Play a Large Role in Business Development

Both traditional ESCOs and engineering/design-build firms reported that firms tend to develop areas of expertise over time or specialize in serving specific market segments. Some firms develop a set of offerings for a specific building-type that may decrease their business development costs (i.e., reducing the cost of developing custom proposals for different prospective customers). Similar to other industries, firms may also develop relationships with one customer that leads to future business. For example, one traditional ESCO may become

known for its work in K-12 schools and may thus be in a better position to bid on similar projects in the future. This is particularly true of firms that work in multifamily buildings. Market actors indicated that multifamily buildings, particularly those in the New York City area, tend to have specific attributes or older systems that make them complicated projects. Firms that have experience working in these types of buildings tend to seek out other opportunities given their expertise, while firms without this experience often do not.

3.5 Constraints on Capital Expenditures Present a Major Obstacle for All Market Segments

For some segments, particularly in the public sector, ESPCs alleviate financial challenges such as lack of funding for operations and capital improvements. For others, especially in the private sector, the burden of carrying long-term liability obligations from an ESPC on a balance sheet are unpalatable and limit the opportunity to pursue the traditional ESCO model for energy efficiency upgrades.

Emerging financing models represent opportunities for additional market developments for both the public and private

sector. Financing models, including energy services agreements (ESAs) or Energy as a Service (EaaS), represent new opportunities for market segments to take advantage of energy efficiency upgrades in ways that bypass the need for upfront capital or carrying long-term liability obligations on balance sheets. PACE financing also represents an opportunity for additional energy efficiency upgrades in areas of New York where local governments have adopted enabling legislation.

3.6 Limited Growth in Market

The market for comprehensive energy efficiency services has grown very slowly over the past five to ten years. Market actors reported that, while the number of traditional ESCOs and engineering/design-build firms have grown somewhat in the last five to ten years, the number of projects and the annual revenues from those projects have grown at a slower rate. Similarly, Delphi panelists

projected growth in the demand for energy efficiency to remain constant or slow in the near future because of falling energy prices and the relative maturity of the efficiency and renewables (solar PV) markets in New York. Despite these slow growth trends, market actors also indicated that there is still a lot of opportunity in the State.





SECTION 4

Methods

4 Methods

To explore the research topics of this market assessment, the Market Evaluation Team conducted the following research activities: (1) secondary research, (2) in-depth interviews with industry experts in the New York ESCO market, (3) in-depth interviews with ESCOs

and engineering/design-build firms active in the New York non-residential market, and (4) a Delphi panel with industry experts. In addition, the study leveraged results from a telephone/online survey conducted as part of the Commercial Baseline Study.

4.1 Secondary Research

In the early stages of this market assessment, the Market Evaluation Team conducted secondary research to develop an initial understanding of the market for non-residential energy efficiency improvements in New York. This task included research on traditional ESCOs and engineering/design-

build firms that operate in New York State, key market actors, firm operations, and the competitive and regulatory landscape. This research provided a foundation for the later tasks and helped inform development of the primary data collection instruments.

4.2 Expert Interviews

The Market Evaluation Team conducted five in-depth interviews with experts in the ESCO market, as identified through secondary research. Experts interviewed by the Market Evaluation Team represented the National Renewable Energy Laboratory, the National Associate of Energy Services Companies (NAESCO), the New York Power Authority, and two traditional ESCOs operating in New

York State. The Team used these interviews to better understand the landscape of companies that complete energy efficiency projects in New York's non-residential buildings, the size of the industry in the State, how both firm types operate, and market drivers and barriers in New York. In addition, the interviews helped define both types of firms explored in this market evaluation.

4.3 In-Depth Interviews with ESCOs and Engineering/Design-Build Firms

Following the expert interview, the Market Evaluation Team conducted interviews with representatives of traditional ESCOs and engineering/design-build firms operating in New York State. The Team developed a list of traditional ESCOs from publicly available sources and interviews with industry experts. To identify engineering/design-build firms, the Team started with a list of 1,291 architecture and engineering (A&E) firms provided by NYSERDA for the Commercial Real Estate (CRE) Tenant study. After cleaning the data to remove duplicate contacts and firms without contact information, the list contained 889 contacts representing 494 unique firms. In coordination with the CRE study, the Team identified 230 firms to target for in-depth interviews. The Team then supplemented both lists with secondary research to develop the final sample for the in-depth interviews, which included 41 unique traditional ESCOs and 450 engineering/design-build firms. The Team identified traditional ESCOs by referencing NAESCO membership and firms identified on the United States Department

of Energy qualified ESCO list. As noted in Section 2.1, engineering/design-build firms were more difficult to identify as firms varied widely in size and technical capabilities. After initially compiling the list of 450 engineering/design-build firms, the Team conducted additional screening through telephone and email outreach to ensure that interviewed firms fit the definitions presented in Section 1.

The Market Evaluation Team completed a total of 19 interviews with firms active in the New York non-residential market (6 with traditional ESCOs and 13 with engineering/design-build firms). Interviews covered topics including the size of the New York ESCO industry, firm operations, the competitive and regulatory landscape in New York, and drivers of and barriers to completing energy efficiency projects in the State. The Team analyzed the results of the in-depth interviews using NVIVO software, a qualitative data analysis tool, to code qualitative results, and Microsoft® Excel to tabulate quantitative results.



4.4 Delphi Panel

Following the in-depth interviews with representatives of both types of firm, the Market Evaluation Team convened a Delphi panel, consisting of representatives of traditional ESCOs and engineering/design-build firms that are active in New York. The team recruited Delphi Panel participants from the pool of participants in the preceding in-depth interview task and selected eight panelists that had substantial experience in New York.

The main goal of the Delphi panel was to develop quantitative estimates of the size of the New York ESCO market that were difficult to obtain in a firm-centric, or bottom-up manner. These metrics included the number of firms operating in the New York non-residential market, the number of projects completed annually, total project revenues and revenues by market segment, average project size, and typical project savings.

The Market Evaluation Team completed the Delphi panel in two rounds. The Team first analyzed the results of in-depth interviews to develop ranges of specific market characteristics. The Team then convened the panel to complete a short web survey, reacting to the initial estimates of market characteristics and providing their own estimates, including any comments and/or explanations. During this first round, the Team also asked panelists to provide qualitative feedback on market trends in the State. The Team then analyzed and compiled results from the first round of the panel and developed a discussion guide. During the second round of the panel, the Team conducted telephone interviews with all panelists, asking them to react to responses from the first round, if they wanted to change their estimates for specific market characteristics, and if they had any other related comments to share.

4.5 Baseline Study Phone Survey

The Market Evaluation Team used primary data collected through a telephone/online survey, conducted as part of the Commercial Baseline Study, to inform this market assessment. The baseline survey included several traditional ESCO-related questions, including familiarity with ESCOs, whether customers have worked with an ESCO, and customer drivers of and barriers

to implementing projects through ESCOs.² These questions were asked of a subset of respondents to the baseline telephone survey, including all respondents representing public sector buildings and a random sample of private sector facilities with usage of 75 MWh or greater annually. Overall, 545 respondents completed the battery of traditional ESCO-related questions.

² Note that these questions were about traditional ESCOs only. The survey did not include questions about respondents' experience with engineering/design-build firms.

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