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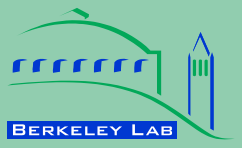

ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY

A Survey of the U.S. ESCO Industry: Market Growth and Development from 2000 to 2006

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Environmental Energy Technologies Division

May 2007

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Disclaimer

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We thank Ranjit Bharvirkar for assistance with the LBNL/NAESCO database. We also thank Larry Mansueti (DOE Office of Electricity Delivery and Energy Reliability), and Dan Beckley and Mark Bailey (DOE Energy Efficiency and Renewable Energy) for supporting this project, and Dan Beckley (DOE EERE), Steve Allenby (Allenby Associates), Brian Henderson (NYSERDA), Alfred Ornstein (ConEdison Solutions), Rich Sedano (RAP), Phil Coleman (LBNL), and Joseph Eto (LBNL) for providing comments on a draft of this report. Finally, this study would not have been possible without the support of the large number of ESCO representatives who took the time to participate in the survey.

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Acronyms and Abbreviations

EPCS	engineering, procurement and construction services contract
ESCO	energy service company
ESPC	Energy Savings Performance Contract
EUL	Enhanced Use Lease (contract)
HUD	(U.S. Department of) Housing and Urban Development
HVAC	heating, ventilation, and air conditioning
LBNL	Lawrence Berkeley National Laboratory
NAESCO	National Association of Energy Service Companies
O&M	operations and maintenance
UESC	Utility Energy Services Contract

Executive Summary

The U.S. energy services company (ESCO) industry has long been recognized for its role in delivering energy efficiency and related energy services to customers with large and medium-sized facilities. Recently, utilities, their customers, and state, local, and federal governments have developed renewed interest in energy efficiency to address concerns about rising fuel and electricity prices, climate change, increasing cost estimates of building new baseload generation, and challenges in siting new power plants and major transmission facilities. This is reflected in a consensus of regulators, utilities, industry representatives and customer groups established through the National Action Plan for Energy Efficiency (NAPEE 2006). Utilities, and state and federal regulators and policymakers are beginning to ramp up activities designed to encourage and support increased energy-efficiency investment. To be effective, they will need to consider models for procuring energy efficiency in various markets. This study, based on a survey of 46 ESCO companies, provides information to policymakers and industry participants on ESCO market development, growth and capabilities.

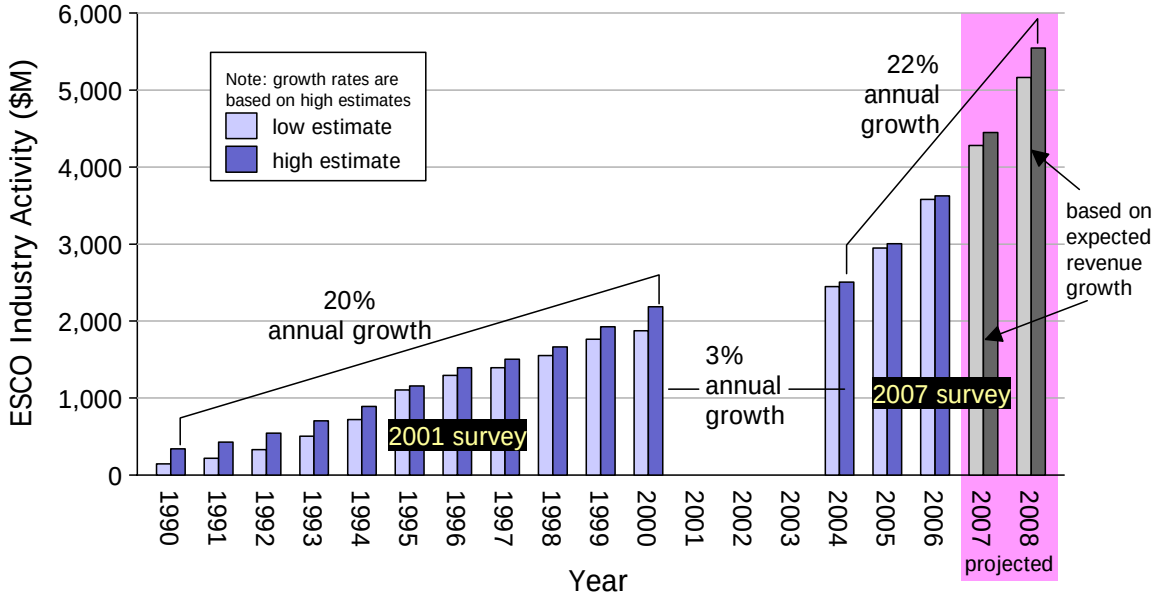

Figure ES-1. ESCO Industry Activity: 1990-2008

We identified and then surveyed 46 active ESCOs in order to develop a "top-down estimate of the size and characteristics of the ESCO industry. We estimate that ESCO industry revenues from energy services were about $3.6 billion in 2006 (see Figure ES-1). Energy efficiency accounted for almost three quarters of industry revenues, or about $2.5 billion. Customer-sited generation, including renewables, is a growth area for ESCOs (16% of revenues in 2006), with consulting/master planning and other services making up the balance of revenues (11%).

Average annual growth between 2000 and 2004 was only 3%, down from 20% in the 1990s. We attribute this to stalled retail competition, fallout from the Enron bankruptcy, a sunset in the legislation that enables performance contracting in the federal market, and industry consolidation. Survey results indicate a recovery in 2004–06, with growth again reaching 20% per year. Factors contributing to recent increases in ESCO activity include customer response to rising energy prices, renewed interest in energy efficiency and climate change, re-authorization of energy savings performance contracts (ESPC) in the federal market, the adoption of aggressive energy savings goals for federal agencies, and the ramping up of public-benefit- and ratepayer-funded energy efficiency and renewable energy programs. ESCOs project continued growth, at similar rates, for the next two years. The composition of the ESCO industry continues to evolve with significant industry consolidation since 2000; however, a significant number of small, independent ESCOs are still active in local and regional markets.

In 2006, over 80% of ESCO industry investment was among institutional customer facilities: 22% in the federal market, 58% in state/local government, universities, schools and hospitals markets, and 2% among public housing authorities (see Figure ES-2). Private sector investment is split between commercial (9%), industrial (6%) and residential (3%) facilities.

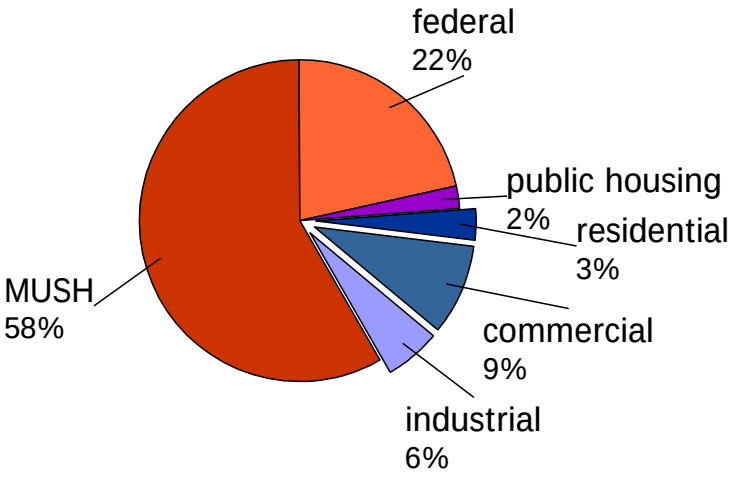

Figure ES-2. 2006 ESCO Industry Revenues by Market Segment

Based on the results of this study, we highlight the following implications for policymakers interested in encouraging private-sector investment in energy efficiency:

- **Private-sector investment in energy efficiency leveraged by ESCOs is about the same as authorized spending for utility and public benefit energy efficiency programs.**

Based on our survey, ESCOs report $2.5 billion in investments in energy efficiency equipment and services in 2006. By comparison, authorized budgets for ratepayer-funded electric and gas energy-efficiency programs (i.e., utility programs and public-benefits funded programs financed by charges on utility customers' bills) was ~$2.5

billion in 2006 (CEE 2007). These budgets include costs to administer energy efficiency programs, technical assistance, information and financial incentives that partially offset the cost of high-efficiency equipment.[1] Though ESCOS' primary offerings are defined as providing energy and dollar savings through the design and implementation of high efficiency technologies and ongoing operations and maintenance services, one of the bases for the success and growth of the ESCO industry has been its ability to arrange for and obtain market-rate, private sector financing for energy efficiency projects on a large scale.

- **ESCOs can be a crucial trade ally in selected market sectors for program administrators of ratepayer-funded energy efficiency programs.**

ESCOs can complement and support ratepayer-funded energy efficiency programs in the market sectors where they are active (*e.g.* developing comprehensive projects, arranging financing for customers who have difficulties obtaining funding for energy-related capital projects, managing performance risks as part of measuring and verifying savings). The core market in which the ESCO business model has been most successful is in energy-efficiency retrofits to large buildings, primarily owned by institutional clients. Policymakers need to recognize that ESCOs (and performance contracting) are not necessarily the optimal approach for delivering energy efficiency in all market sectors. This is particularly true for small projects where the prospective energy and dollar savings may not be large enough to offset the transaction costs of putting together a performance contract. Generally, small projects must be aggregated to be viable. Other types of energy service providers (*e.g.* lighting and HVAC contractors, engineering firms, architects, consultants) currently are more active in residential and small commercial markets as these providers tend to work on a design/build basis, are compensated directly through allocated funding, and assume no ongoing performance risk. In addition, ESCOS are not generally involved in new construction and have thus far ceded that market to other types of market providers.

- **ESCOs can be important partners in clean energy, sustainability, and climate change mitigation initiatives in urban areas.**

U.S. ESCOs have a proven track record of developing comprehensive projects that utilized energy efficiency, onsite generation and renewable energy technologies. There is increasing interest in energy efficiency and clean energy among cities that are pursuing either sustainable energy and/or climate change mitigation initiatives. Given their long-standing relationships and track record with many institutional customers, ESCOs are well-positioned to work with cities, their energy managers, and financial institutions to develop "clean energy" projects. Recent examples include participation of several large ESCOs in the global Energy Efficiency Building Retrofit program which involves 16

[1] Utility energy efficiency program spending include costs to administer energy efficiency programs, technical assistance, information and financial incentives that partially offset the cost of high-efficiency equipment We estimate that the total investment in 2006 in energy efficient products and equipment derived from utility and public-benefits energy efficiency programs is in the range of $2.3-2.8 billion.

cities (including New York, Chicago, and Houston in the U.S.) and five global banks.[2] Cambridge MA, Boston, and New York have also launched major clean energy initiatives to significantly reduce energy use in their cities that are likely to include partnerships with ESCOs and other energy efficiency service providers.[3]

[2] "President Clinton Announces Landmark Program to Reduce Energy Use in Buildings Worldwide, May 16, 2007" see http://www.clintonfoundation.org/051607-nr-cf-pr-cci-president-clinton-announces-landmark-program-to-reduce-energy-use-in-buildings-worldwide.htm

[3] "Cambridge Energy Alliance, March 29, 2007 http://www.cambridgeenergyalliance.org/

1. Introduction

The U.S. energy services company (ESCO) industry has long been recognized for its role in project development and implementation services and in obtaining private-sector financing for energy efficiency and "clean energy" investments and related energy services to customers with large and medium-sized facilities.

Recently, there has been a renewed interest in energy efficiency by more utilities, their customers, and state, local, and federal governments to address concerns about rising fuel and electricity prices, climate change, increasing cost estimates for new baseload power plants, and challenges in siting power plants and transmission facilities. Energy efficiency is increasingly regarded as a low-cost, clean alternative to building electricity (and gas) supply, transmission and distribution capacity. In addition, the growing deferred maintenance and replacement backlog of energy-using equipment in institutional buildings is an important driver for institutional customer interest in energy efficiency.[4]

A number of stakeholders, including regulators, utilities, industry representatives and customer groups, have established a consensus on moving energy efficiency forward as a high-priority resource through the National Action Plan for Energy Efficiency (NAPEE 2006). Utilities, and state and federal regulators and policymakers are beginning to ramp up activities designed to encourage and support increased energy-efficiency investment. As part of this effort, they will need to consider models for procuring energy efficiency resources in various markets. One potential approach is to establish policies and/or design programs to encourage private-sector investment by ESCOs in building efficiency and other clean energy options (such as renewable generation technologies and green buildings). Policymakers need to understand the role that ESCOs can play in securing energy efficiency investment capital: which functions, technologies and markets they can best reach, and which are best approached with alternative market intermediaries (*e.g.* contractors, vendors, retailers) and policy approaches (*e.g.* standards, codes); the level of current ESCO capability, how best to leverage it, and how to encourage ramping up. To facilitate dialogue on this issue, policymakers need information on the current state of the ESCO industry: its context in the broader market for energy services and energy efficiency, current activity, the markets in which ESCOs are active, the technologies they install, and their procurement models.

Additionally, there is a substantial international audience for information on the growth and development of the U.S. ESCO industry. While there are marked differences in the context in which U.S. ESCOs have evolved compared to that of other countries, understanding this context and the lessons learned can be useful for international policymakers seeking to encourage the development of private-sector energy services industries in their own jurisdictions.

This is part of a series of reports prepared by Lawrence Berkeley National Laboratory (LBNL) and the National Association of Energy Services Companies (NAESCO) with

[4] Many institutional customers see the cost savings created by the installation of energy-efficient technologies as a source of funding to pay needed building improvements.

the goal of making information on ESCO market growth and development accessible to policymakers, ESCOs and other industry participants, and the broader energy efficiency community. Previous reports include Goldman *et al.* (2002) and Hopper *et al.* (2005).[5]

To address the information needs described above, we conducted a survey of ESCOs in February/March 2007 to collect information on industry and market activity and trends. This report discusses and interprets the findings, and is organized as follows:

- Our approach and data sources are discussed in section 2;
- Section 3.1 describes the role of ESCOs in delivering energy efficiency and, increasingly, renewable and other onsite generation technologies, in the context of these broader markets;
- Section 3.2 updates aggregate ESCO industry size estimates for the first time since Goldman *et al.* (2002) was published;
- Section 3.3 examines industry structure, in terms of company ownership and ESCOs' geographic scope;
- Section 4 provides industry market penetration estimates by market segment, contracting type, and technology/project type; and
- We conclude with a brief discussion of policy implications in section 5.

[5] Previous LBNL/NAESCO reports and articles on the U.S. ESCO industry are available at: http://eetd.lbl.gov/ea/EMS/ee-pubs.html

2. Approach

This report is largely based on the results of a survey of ESCO companies conducted in February and March of 2007. The survey consisted of questions on company revenues from energy services in 2006, average annual growth in revenues for the periods 2004–06 and 2006–08 (expected), the percentage of revenues from various market segments, contract types and technology/project types, the number of employees and field offices maintained by the company, and a breakdown of employees per state.

Our goal was to develop "top-down" estimates of the size and characteristics of the ESCO industry by reaching as many companies as possible with the survey. The first step was to identify companies to target. We started by determining which of the 63 companies included in our previous industry survey (Goldman *et al.* 2002) were still in business as independent entities (i.e. those not acquired by larger ESCOs or that exited the ESCO business). We then supplemented this list with additional companies identified from the following sources:

- NAESCO member company list (http://www.naesco.org/organizations/default.aspx)
- ESCO contacts maintained by the Energy Services Coalition (http://www.energyservicescoalition.org/members/index.asp)
- Information on ESCOs active in the New York State Energy Research and Development Agency (NYSERDA)'s performance contracting programs (NYSERDA 2007), and
- Companies that we had otherwise encountered or of which we had heard.

Through this process, we identified 46 distinct, active ESCO companies (see Appendix A), and approached each of them with the survey. Where possible, we targeted high-level company executives (*e.g.*, NAESCO Board members) to assure that the individual answering the survey would have the necessary access and authority to release the requested information.

We received an excellent response rate. Thirty-three companies (72%) answered the survey, including all of the major national and regional ESCOs. The survey respondents account for fully 97% of our 2006 aggregate industry revenue estimate.

For the thirteen companies that did not respond, we used our professional judgment to develop high and low revenue estimates for each company. Because the non-respondents are small companies, this does not greatly impact the aggregate industry estimates in this report. We believe that our combined survey and Delphi technique provides information on essentially the full population of ESCOs.[6] Nonetheless, we acknowledge that there is some degree of *uncertainty* in the results. For example, our estimates of industry size rely on self-reported data from the majority of ESCO survey respondents, which may be inaccurate or the responses could be strategically motivated. Although we have no way of

[6] A Delphi technique is a process used in business forecasting of reaching a consensus by the anonymous solicitation and comparison of the views of experts.

statistically bounding this uncertainty, we did take the following quality-assurance measures:

- We reviewed each company's survey answers for reasonableness and consistency;
- For the federal market, we compared energy-efficiency investment data provided by federal agencies to the self-reported data; and
- We used historical financial information that was available for some of the companies to determine the reasonableness of their survey responses.

We then followed up with ESCOs to explain or clarify any revenue estimates that appeared to be out of range.

Finally, it is possible that there are a few active ESCO companies in the market of which we were not aware. However, our research team consists of experts actively involved in the ESCO industry (*e.g.* through NAESCO, a national trade organization, or as customer representatives) and it is highly unlikely that companies of significant size would have escaped our attention.[7] Thus, while we may have underestimated the *number* of active ESCO companies in the U.S. (particularly small, local players), we believe this is unlikely to have a significant impact on our estimate of aggregate industry revenues.

[7] None of the researchers involved in this study have any financial interest in any ESCO or related company (e.g., equipment manufacturer).

3. Industry Overview

Previous LBNL/NAESCO reports have discussed ESCO industry growth and trends from the early 1990s to 2000 (Goldman *et al.* 2002), the context for the ESCO business model among public and institutional customers (Hopper *et al.* 2005) and ESCO project characteristics, energy savings and economic performance based on a database of ESCO projects (Goldman *et al.* 2002, Hopper *et al*. 2005).

In the following sections of this report, we discuss the role of ESCOs in the context of the broader energy efficiency, renewables and onsite generation markets, present updated industry size and growth estimates as of 2006, and examine the structure of the industry in more detail.

3.1 ESCO Industry Context

Any discussion of the role of ESCOs in delivering energy efficiency and related energy services must begin by defining what an ESCO is. In this study, we adopt the same definition as in previous reports (Goldman *et al.* 2002, Hopper *et al.* 2005):

> *An ESCO is a company that provides energy-efficiency-related and other value-added services and for which performance contracting is a core part of its energy-efficiency services business.*

While ESCOs may offer other services beyond energy-efficiency offerings, we only consider them ESCOs if energy efficiency is a major product offering. Similarly, while companies may perform some projects on a design/build or fee-for-service basis, we only consider them to be ESCOs if they offer performance contracting—projects in which the ESCO assumes some performance risk during the project's economic lifetime —as a core business line.[8]

Conversely, this definition excludes companies such as engineering companies, contractors, equipment manufacturers, or construction firms that may offer energy-efficiency services but do not assume performance risk for their projects. It also excludes companies that only engage in other customer-side energy services—such as design and installation of onsite generation or renewable energy systems—without also deploying energy-efficiency measures. Both such types of companies play important roles in the broader markets for energy efficiency, clean energy and other customer-side energy services, but are distinct from ESCOs, and are therefore not included in this survey.

Policymakers considering the role of ESCOs in procuring energy efficiency need to be aware of the market segments in which ESCOs work. Among the three major energy-consuming sectors in the economy *(i.e.*, transportation, industry, and buildings), ESCOs have been the most active in the buildings sector. Building efficiency improvements can be targeted to existing buildings (retrofits and/or equipment replacement), or new construction.

[8] See Hopper et al. (2005) for a detailed discussion of different types of performance contracts.

Historically, ESCOs have primarily pursued energy-efficiency improvements in existing buildings. Within this market, nearly all ESCOs have targeted performance contracting offerings to larger customers. In part, this is because the transaction costs in developing and implementing performance contracts are relatively high.[9] As a result, very few ESCOs work in the residential market, with those that do targeting larger multi-family and public housing facilities. Among non-residential customers, ESCOs have had most success in public and institutional markets—federal, state and local government facilities, schools, universities/colleges and hospitals. ESCOs are also active in the commercial and industrial sectors, but have had more limited success in penetrating these markets.[10] Other types of service providers, including equipment and controls manufacturers, engineering and construction firms, various types of contractors (heating and air conditioning, controls, windows, lighting, and insulation), and energy consulting firms also provide efficiency services to residential and commercial/industrial customers.

For new construction, the adoption of strategies such as building efficiency codes and standards, design assistance, commissioning, targeted incentives offered by utility energy efficiency programs, energy consumption labeling programs, and training and certification programs for energy-efficient builders can be very effective at bringing about large and lasting energy savings. Owners/developers of new buildings have not been particularly receptive to performance contracting for a variety of reasons (*e.g.*, difficulties in establishing a "baseline" energy usage level against which to compare savings, length of contract term due to the short-term perspective of some real estate developers, misplaced or "split" incentives which separate responsibilities for making capital investments and paying operating costs). Recently, some of the larger ESCOs have begun responding to owners' interest in green buildings (*i.e.*, LEED certification) and are offering various energy-related services that support green building certification processes.

3.2 Industry Size and Growth Trends

In our company survey, we asked ESCOs to provide their revenues from energy services[11] in 2006, as well as average annual growth rates experienced for the period from 2004–06 and projected for 2006–08.[12] We combine the results with data from our last industry survey, conducted in 2001, (Goldman *et al.* 2002) in Figure 3-1.

We estimate that industry revenues in 2006 were about $3.6 billion (our low and high estimates are $3.58 and $3.63 billion). By comparison, Goldman *et al.* (2002) estimated

[9] See Hopper *et al.* (2005) for a discussion of the context, motivations for, and barriers to performance contracting in public and institutional markets.
[10] The proportional ESCO industry activity in various market segments is provided in section 4.1.
[11] We defined energy services to include projects such as performance contracts, design/build projects, engineering, procurement & construction services (EPCS) projects, and consulting that involved energy efficiency or other energy-related services, including onsite generation projects for end users. We specifically asked companies **not** to include revenues from retail commodity sales or projects built to supply power to wholesale markets.
[12] For companies that did not respond to the survey, we developed high and low revenue estimates through a Delphi survey (see section 2).

industry revenues of about $2 billion in 2000. Based on ESCOs' reported growth expectations, we project annual revenues of $5.2–5.5 billion in 2008.

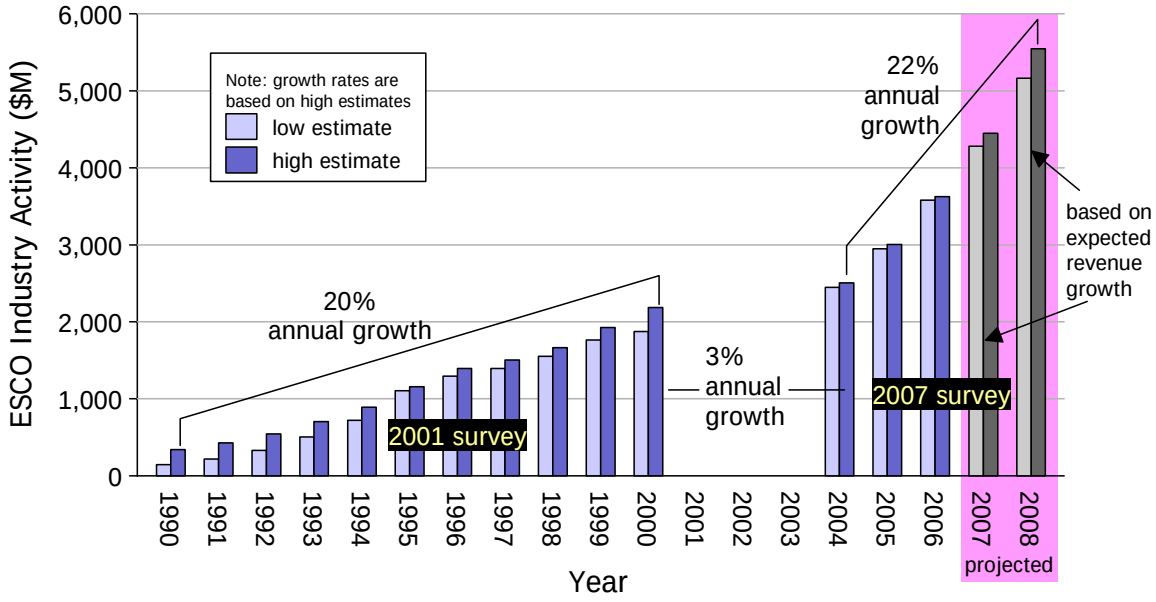

Figure 3-1. ESCO Industry Activity: 1990-2008

Although no data are available for the period from 2001 to 2003[13], the estimates for 2000 (from Goldman *et al*. 2002) and 2004 (from this survey) imply drastically reduced growth—down to 3% per year from 20% in the 1990s (see Figure 3-1). This slowdown can be attributed to a number of factors:

- **Stalled retail competition**—The ESCO industry and many observers expected the advent of electric restructuring to provide a significant boost to ESCOs. In states that allowed retail competition, retail electric suppliers were expected to offer their customers optimized "bundles" of commodity and value-added services (including energy efficiency). However, repercussions from the California electricity crisis of 2000–01 led a number of states to reconsider the implementation of electric industry restructuring in general, and their retail market designs in particular. For example, some states suspended or delayed retail access for some customer groups that had already been approved by state legislation (*i.e.*, California, Nevada, New Mexico, Arizona, Oklahoma and Montana), while other states decided not to move forward with retail competition at all. As retail competition stalled, a number of utilities that had acquired or started in-house ESCOs as part of their broader national and, in some cases, international corporate positioning began to reconsider whether to continue this line of business, which typically involved retail operations outside of their local service territories.[14]

[13] It would have been impossible to reconstruct industry revenues in the early 2000's from surveys because many of the companies that were operating at that time are no longer in business.

[14] When interest in retail competition by policymakers looked to be a national phenomenon in the mid to late 1990s, some utilities had viewed ESCOs as a strategy to prepare for retail competition and to establish a presence in geographic regions and markets outside their local service territories.

- **The "Enron effect"**—The Enron scandal and bankruptcy of Enron Energy Services had direct and indirect short-term effects on the overall ESCO industry. Enron Energy Services was a relatively large ESCO. Thus, its demise had a direct impact on aggregate ESCO industry size for several years afterwards. The indirect effects on other ESCOs may have been even more significant. Fallout from the Enron scandal undermined accepted accounting methods for energy-related projects. Specifically, concerns about off-balance-sheet financing raised questions about the classification of debt in performance contracts. There were also marketing implications. The Enron scandal made some large customers more wary of contracting with ESCOs, particularly in arrangements that involved bundling of commodity and other value-added services (including energy efficiency) in which Enron Energy Services had specialized and subsequently abandoned.
- **Sunset of Federal Energy Savings Performance Contract (ESPC) legislation** — The legislation that authorized federal agencies to enter into long-term performance contracts with ESCOs expired in 2003 and was not re-instated for a full year. Because the federal government had been a significant source of new market growth for ESCOs, the lack of project activity had a significant impact on those ESCOs that were active in the federal market.
- **Industry consolidation**—A series of buyouts and mergers resulted in significant consolidation in the ESCO industry, driven in part by the market and industry events highlighted in this section. In our last survey in 2000, we identified 63 ESCOs that were active. In 2006, we identified 46 ESCOs.

Based on our survey results, the industry showed significant recovery in recent years, with growth again reaching 20% per year for 2004–06. This can be attributed to several factors: rising energy prices; renewed interest by customers, utilities and policymakers in energy efficiency and climate change; the reauthorization of federal ESPCs and the adoption of aggressive energy savings goals for federal agencies by the U.S. Congress in 2005 (EPACT 2005); and the ramping up of public-benefit- and ratepayer-funded energy efficiency and renewable energy programs. ESCOs are projecting continued growth, at similar rates, for the next two years.

3.3 Industry Structure and Ownership

The trend toward industry consolidation mentioned above is supported by our survey results. As of 2000, Goldman *et al*. (2002) reported that thirteen companies with revenues over $30 million/year accounted for ~75% of industry revenues. In 2006, eight companies had revenues over $100 million in 2006; together, they account for 79% of industry activity. In addition, the thirteen largest companies now account for over 90% of industry revenues (based on our high revenue estimate).

Yet these results belie the fact that the ESCO industry is characterized by a diversity of companies, large and small. In the following sections, we dissect the industry to examine trends in ESCO ownership and geographic scope.

3.3.1 Company Ownership

To examine trends in ESCO composition and ownership, we classified companies according to the following four categories:

- **Independent ESCOs**—ESCOs that are "independent" in the sense that they are not owned by electric or gas utility, an equipment/controls manufacturer, or energy supply company; many "independent" ESCOs concentrate on a few geographic markets and/or target specific customer market segments;
- **Building equipment manufacturers**—ESCOs owned by building equipment or controls manufacturers; many of these ESCOs have an extensive network of branch offices that provides a national (and international) footprint, with sales forces and specialized national staffs providing packages of energy efficiency, renewables and distributed generation "solutions" to customer market segments;
- **Utility companies**—ESCOs owned by regulated U.S. electric or gas utilities; many utility-owned ESCOs currently concentrate on regional markets or focus on the service territories of their parent utilities; and
- **Other energy/engineering companies**—ESCOs owned by international oil/gas companies, non-regulated energy suppliers, or large engineering firms.

These different types of ownership structure may have some bearing on companies' types of service offerings and/or their business and marketing approaches. For example, in marketing and developing projects, "independent" ESCOs that are not affiliated with equipment manufacturers or utilities often tout the fact that they do not promote specific technologies or products. However, because of brand loyalty to the equipment part of the business and overall customer brand recognition, ESCOs affiliated with controls or building equipment manufacturers may have certain marketing advantages. In addition, many ESCOs owned by controls or equipment manufacturers are large and tend to have the financial resources to compete in markets where transaction costs are high. Similarly, ESCOs owned by utilities often initially go after business opportunities that are geographically close to their local service territory where they have name recognition and/or customer contacts. Finally, ESCOs affiliated with large engineering companies often have large in-house engineering staff compared to other types of ESCOs, which they may tout as a competitive advantage.

Figure 3-2 compares U.S. ESCO industry ownership, in terms of number of companies and revenues, in 2000 and 2006.[15]

Independent ESCOs are quite numerous but, with some exceptions, most are relatively small (*e.g.*, 61% of companies comprise only 21% of revenues in 2006). The industry share of independents increased both in terms of numbers and revenues between 2000 and 2006.

[15] The revenue breakdown is based on the high estimates for 2000 and 2006.

The market share of ESCOs that are subsidiaries of building equipment and controls manufacturers has remained fairly constant in terms of number of companies (13–15%), but their share of industry revenues has increased substantially, from 27% in 2000 to 59% in 2006. These companies have aggressively built their businesses in the last several years, through multiple acquisitions and also by taking advantage of synergies with other business lines within their parent companies (*e.g.*, bundling energy efficiency services with facility management, or outsourcing of facility operations and maintenance).

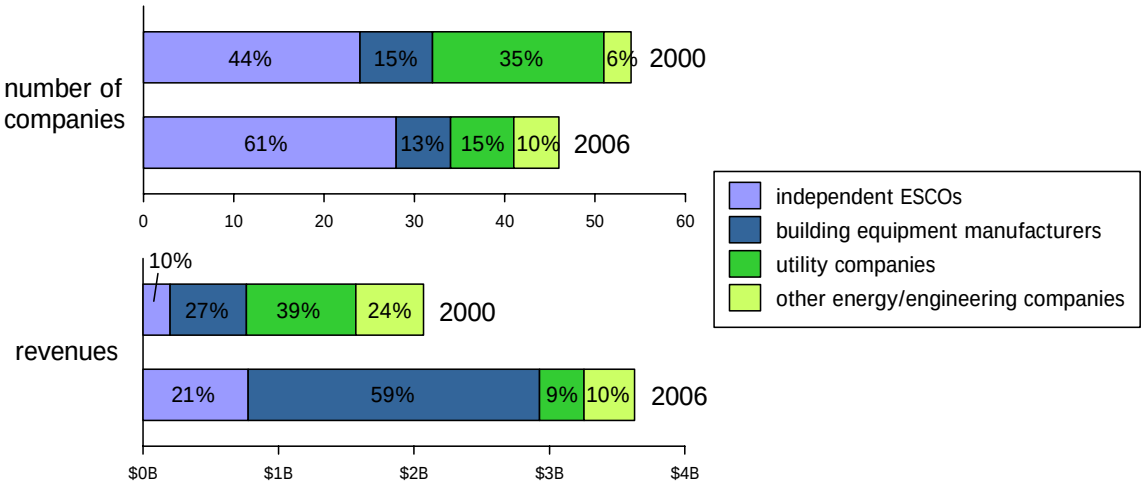

Figure 3-2. Trends in Industry Shares by Company Ownership

The number of utility-owned ESCOs has declined considerably, from 35% in 2000 to only 15% in 2006. In the 1990s, a number of utilities acquired ESCOs as a strategy for competing in retail electricity markets and establishing a presence in geographic regions and markets outside their local service territory. Since 2000, however, a number of utilities have made strategic decisions to focus on their core regulated businesses or developing power generation, rather than retail energy services or power marketing, and thus decided to sell or close their ESCO businesses. In addition, some utilities felt that their ESCO subsidiaries were not producing revenues in line with their rate-based businesses and thus were not, on the whole, compatible with their corporate financial objectives. Some utilities also discovered that long ESCO project sales cycles and tough market competition resulted in uncertain returns on investments of their ESCO subsidiaries. Based on our survey results, it appears that those utility-owned ESCOs who stayed in business were mostly smaller players—the revenue share of utility-owned ESCOs has dropped more dramatically than the number of companies, from 39% in 2000 to only 9% in 2006. Those utility-owned ESCOs who remain tend to be local or regional, rather than national, in their market focus.

The share of companies owned by oil and gas companies, unregulated electric or gas suppliers, or large engineering companies has increased from 6% in 2000 to 9% in 2006. At the same time, their revenue share has decreased substantially, from 24% to 10%. In part, this is attributable to the Enron bankruptcy—Enron Energy Services comprised a sizeable portion of the revenues for this category in our 2000 survey. But this category is also changing structurally. The entry of large engineering firms into the ESCO market is

a new development since our 2000 survey. If successful, these new players may open the door to a new trend in ESCO ownership and help grow the overall market.

3.3.2 Geographic Scope

We also distinguished ESCOs as local, regional, or national players (see Figure 3-3). We define these categories as follows:

- **Local**—ESCOs that restrict their activities to one or more local markets, and do not aspire to cover an entire region or the whole country;
- **Regional**—companies that restrict their activities to one or more regions, either covering the region(s) with offices or responding to program opportunities within the region(s); and
- **National**—ESCOs that either have an established national presence or are willing and have the capability to establish branch offices anywhere they see significant business opportunities.

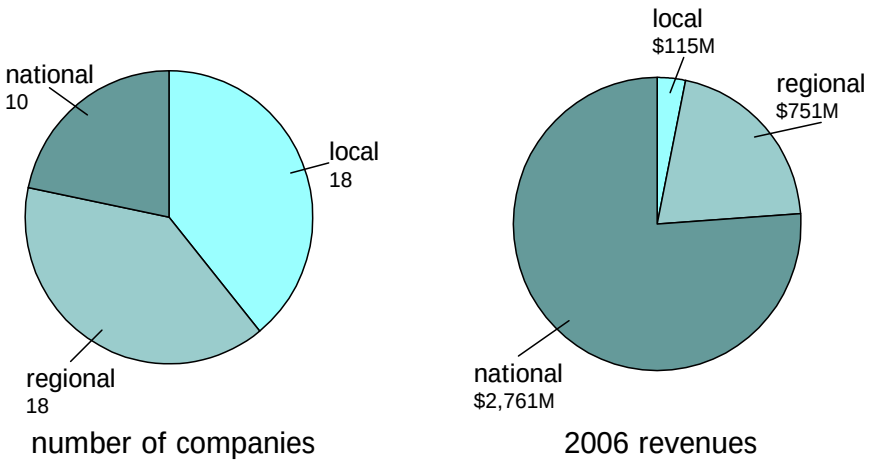

Figure 3-3. Industry Shares of Local, Regional and National ESCOs

As might be expected, local companies tend to be small and relatively numerous—they account for 39% of companies in our survey, but only 3% of revenues. However, we emphasize that we probably did not identify all the local ESCOs. As a result, their numbers are likely higher than our results suggest. Regional companies comprise 21% of revenues and 39% of companies. The national companies make up about 22% of companies in our survey, but contribute over three quarters of industry revenues.

4. Market and Project Trends

In our survey, we asked ESCOs to provide a breakdown of their 2006 revenues among various market segments, contract types and technology/project types. Thirty-two companies, with combined 2006 revenues of $3.515 billion (97% of our high 2006 estimate) provided this information. We report the results in the following sections, comparing results to previously collected information where possible.

4.1 Market Segments

ESCO industry revenues for various customer market segments as of 2006 are represented in Figure 4-1.

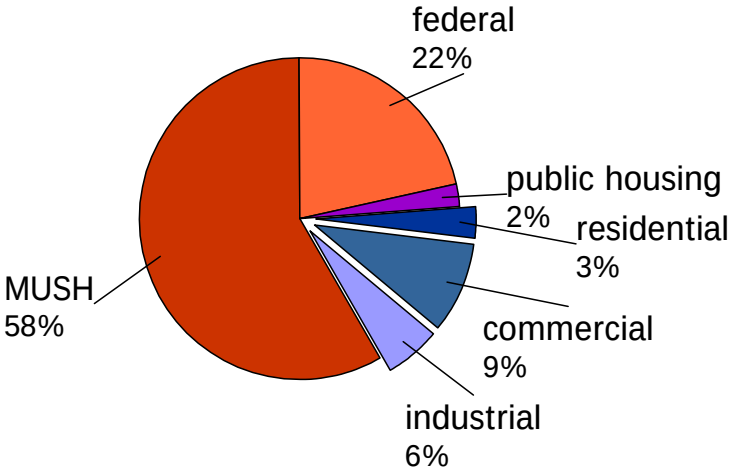

Figure 4-1. 2006 ESCO Industry Revenues by Market Segment

In the U.S., the "MUSH" markets—municipal and state governments, universities and colleges, K-12 schools, and hospitals—have historically hosted the largest share of ESCO industry activity. The survey results for 2006 indicate that this is still the case; MUSH markets comprise 58% of industry revenues, worth over $2 billion.

The importance of the federal market has increased dramatically in the last decade.[16] According to survey results, it now represents 22% of industry revenues ($760 million), despite the hiatus in the ESPC enabling legislation in 2003–04. It is important to note that ESCOs provide energy services to federal agencies through a variety of financing mechanisms. Some of this work consists of performance contracting (*i.e.*, ESPC projects), but ESCOs may also provide energy services to federal facilities on a design/build basis or act as contractors implementing Utility Energy Services contracts (UESC). To calibrate our federal sector estimates, we gathered investment information from the federal government under the following financing mechanisms:

- **Energy Savings Performance Contracts (ESPC)**—In FY2006, the total investment in Energy Savings Performance Contracts by various federal agencies (including the

[16] See Hopper et al. (2005) for a discussion of procurement mechanisms that have enabled the growth of the federal market.

DOE Super-ESPC program, Army, Navy, and Air Force) was $321 million (Vallina 2007; FEMP 2007).

- **Utility Energy Services Contracts (UESC)**—Federal agencies may also invest in energy-efficiency improvements through the UESC financing mechanism, in which a local utility develops and manages the installation of energy-efficiency projects at federal facilities; ESCOs are sometimes selected to implement these projects. UESC activity in FY2006 was about $70 million, which is somewhat lower than in previous years (Vallina 2007).
- **Direct Congressional appropriations**—Another $276 million in federal project investment is accounted for by design/build or EPCS (Engineering, Procurement, and Construction Services) projects that are paid out of agencies' appropriated budgets.
- **Enhanced Use Leasing (EUL)**—A number of energy projects are being financed at federal facilities through enhanced used leasing (EUL), although we were unable to find an estimate of EUL activity in 2006.

Based on recent data compiled by the Office of Management and Budget (OMB), energy-efficiency investment at federal facilities in 2006 is estimated to total about $668 million (Vallina 2007). Our estimate of ESCO activity in the federal sector is $760 million in 2006, exceeds the activity reported by the federal government accounting by about 14%. Some of this discrepancy may be explained by the fact that some large ESCOs have begun including energy-efficiency services as an add-on to existing operations, maintenance and/or facility management contracts at federal sites. This activity may be included in the ESCO's estimates of their federal market activity, yet not be included in the federal government's accounting because it does not fall under the financing mechanisms typically associated with federal sector energy efficiency.

According to our survey, only 18% of ESCO industry revenues in 2006 were attributable to private sector market segments (*i.e.*, industrial, commercial and residential). This is in contrast to ESCO market activity in several other countries (*e.g.* most Asian and some European countries), which are dominated by industrial and commercial customers (Vine 2005). The industrial market (6% of industry revenues) has been challenging for U.S. ESCOs to penetrate for a number of reasons: high customer investment hurdle rates, low priority for energy projects compared to investments with a more direct impact on sales, limited non-process related energy demand, limited ability of some ESCOs to work on core industrial processes and customer hesitancy to allow outsiders to alter industrial processes, and limited replicability of project designs (Elliot 2002).

Commercial market activity is slightly higher than the industrial market, but at 9% of revenues it remains a relatively small market segment. Barriers to ESCO activity in the commercial sector include misplaced or "split" incentives which separate responsibilities for making capital investments and paying operating costs that limit interest in long-term performance contracts (*e.g.*, building owner/tenant relationships), the relatively short terms of tenant leases (*e.g.*, one to five years), high investment hurdle rates for non-owner occupied commercial space and the unwillingness of some owners to take on long-term debt, which might interfere with their ability to "flip" their properties. However,

increasing interest in green building improvements may drive the level of energy services investment in this sector going forward.

Residential and public housing markets together only account for 5% of industry revenues, and are only targeted by a handful of ESCOs. Because of the difficulties working in these markets—high transaction costs, institutional barriers—they remain a niche market for ESCOs. In the case of public housing authorities, significant project delays have also arisen from inconsistencies between the Department of Housing and Urban Development (HUD) and its field offices in interpreting statutes and regulations affecting housing authority project implementation details. Nonetheless, ESCOs have achieved significant penetration in the public housing market. Revised legislation, extended allowable contract terms (from 12 to 20 years), rising energy and water costs, and aggressive marketing by ESCOs have contributed to significant expansion of the public housing market in the last few years.

4.2 Project/Technology Types

The "conventional wisdom" in the ESCO industry is that there has been a trend in recent years toward larger projects involving onsite generation, large central plant facilities, and renewable energy technologies. In the survey, we asked ESCOs to allocate their 2006 revenues among various project and technology strategies.

Our survey results indicate that energy efficiency still makes up a major share of industry activity (see Figure 4-2). At almost three quarters of industry revenues, ESCO-deployed energy efficiency amounts to a ~$2.5 billion per year market.

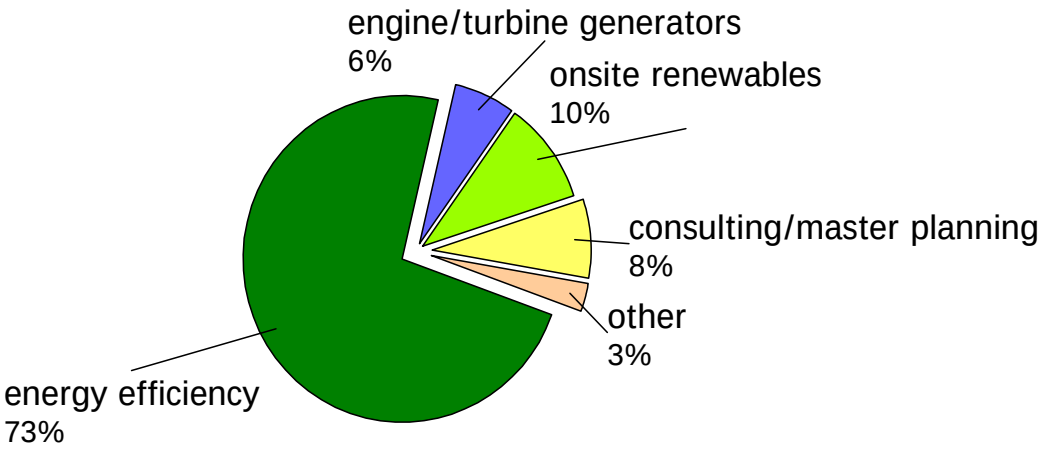

Figure 4-2. 2006 ESCO Industry Revenues by Technology/Project Type

Engine/turbine generators installed to serve customer supply needs comprise 6% of industry revenues ($218 million).[17] A larger share was reported for renewables (10%)

[17] Some ESCOs have constructed large power generating facilities to sell power into wholesale markets. We specifically asked companies **not** to include revenues from such projects in their survey responses.

although when probed some large companies told us they had included activity in the green buildings market, which is primarily new construction, in this category.[18] Thus, the actual investment by ESCOs in renewable generating technologies such as photovoltaics, wind power and geothermal heat pumps is somewhat lower than the results in Figure 4-2 may suggest. In many cases, ESCOs are leveraging incentives offered by public benefit funds in some states for emerging renewable technologies as well as federal and state tax credits and bundling renewables with energy efficiency improvements in order to enhance the overall economic attractiveness of these projects.

Consulting and master planning (in which the ESCO provides a host of energy management services, including billing, commodity procurement or consulting, recommending efficiency improvements, etc.) and other services (typically operations and maintenance (O&M), water conservation, or non-energy improvements reported separately by the ESCOs) make up just over 10% of industry revenues.

4.3 Contractual Arrangements

We also asked ESCOs to break down their 2006 revenues into several types of contracting vehicles. Goldman *et al.* (2002) estimated that performance contracting—projects in which the ESCO assumes some portion of the project performance risk—accounted for 60% of ESCO industry activity in 1996-2000. This was down from the same study's estimate of 74% for 1990-95.

Based on our 2007 survey, performance-based contracts accounted for 69% of industry activity in 2006 (see Figure 4-3). This represents 16% average annual growth in revenues from performance-based agreements since 2000. We believe this increase is explained by two phenomena:

- **State and federal performance contracting requirements**—

All states (with the exception of Wyoming) allow performance contracting projects in various institutional markets (*e.g.* K-12 schools, state and local governments, universities/colleges). A number of these states have ramped up their energy-efficiency project activity in public buildings in recent years in conjunction with relatively rigorous guarantee requirements (*e.g.*, Pennsylvania, Kansas, North Carolina, Kentucky, and Texas). This phenomenon, plus the growth in performance contracting in the federal market, has probably led to an overall increase in energy efficiency performance contracting since 2000.

- **Increased use of Power purchase agreements**—

In a power purchase agreement, the ESCO maintains ownership of the generating assets and sells commodity (*e.g.*, electricity, steam, hot water) to the customer.[19] The contract specifies a guaranteed price and/or amenity output level that must be met by the ESCO,

[18] Some ESCOs have indicated that they believe that the 'greening" of buildings is emerging as a major industry driver, and are experimenting with project approaches that "use energy efficiency to pay for Green."

[19] These contracts are also referred to as "build/own/operate" agreements.

so it can be considered performance-based. These projects often target on-site generation and/or central plant opportunities. Because they tend to be very large projects, they may contribute substantially to the observed growth in performance-based agreements among ESCOs since our 2002 report.[20]

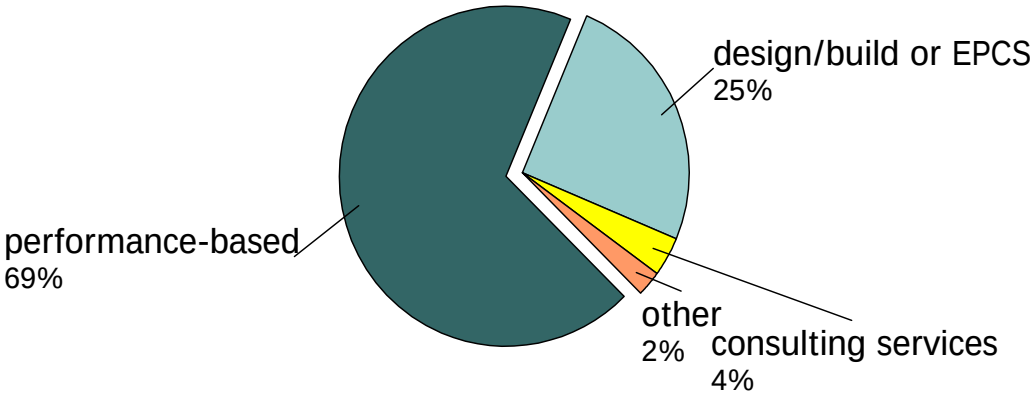

Figure 4-3. 2006 ESCO Industry Revenues by Contract Type

Non-performance-based agreements, such as design/build and "engineering, procurement and construction services" (EPCS) projects, account for about 25% of reported 2006 industry revenues (see Figure 4-3).[21]

Finally, a small additional share of industry revenues is attributable to consulting services and other energy services (typically O&M contracts) reported as distinct revenue streams by ESCOs.

[20] In this study, we broadened our definition of "performance-based agreements" to include power purchase and build/own/operate agreements as well as guaranteed and shared savings (see Hopper et al. (2005) for descriptions of these types of performance agreements). Because power purchase agreements were not that prevalent in 2000, including this type of performance agreement in our definition in Goldman et al. (2002) would not have changed the 2000 results significantly.

[21] Neither design/build nor EPCS projects entail ESCO assumption of project performance risk (e.g., energy savings) once the project has been completed. Under a design/build contract, a single entity (i.e. the ESCO) designs and builds the project under a single agreement, which typically involves a guaranteed maximum price. EPCS contracts are entirely fee-based; different entities may be responsible for different phases of the project (e.g., design, construction), and the contractor does not assume project price risk.

5. Discussion

Based on the results of this study, we highlight the following implications for policymakers interested in encouraging private-sector investment in energy efficiency:

- **Private-sector investment in energy efficiency leveraged by ESCOs is about the same as authorized spending for all utility and public benefit energy efficiency programs.**

Based on our survey, ESCOs report $2.5 billion in investments in energy efficiency equipment and services in 2006. By comparison, authorized budgets for ratepayer-funded electric and gas energy-efficiency programs (*i.e.*, utility energy efficiency programs and public-benefits funded programs) was ~$2.5 billion in 2006 (CEE 2007). These program budgets include costs to administer energy efficiency programs, technical assistance, information and financial incentives that partially offset the cost of high-efficiency equipment. We estimate that the total investment in 2006 in energy efficient products and equipment derived from utility and public-benefits energy efficiency programs is in the range of $2.3-2.8 billion.[22] One of the major accomplishments of the ESCO industry in expanding the size and breadth of the energy efficiency market has been its ability to arrange for and obtain market-rate, private sector financing used by their customers for ESCOS to design, implement, and maintain energy efficiency projects on a large scale.

- **ESCOs can be a crucial trade ally in selected market sectors for program administrators of ratepayer-funded energy efficiency programs.**

ESCOs can complement and support ratepayer-funded energy efficiency programs in the market sectors where they are active (*e.g.* developing comprehensive projects, arranging financing for customers who have difficulties obtaining funding for energy-related capital projects, managing performance risks as part of measuring and verifying savings). The core market in which the ESCO business model has been most successful is in energy-efficiency retrofits to large buildings, primarily owned by institutional clients although ESCOS can and do work in all building sectors. Policymakers should recognize that performance contracting is not necessarily the optimal approach for delivering energy efficiency, especially in market sectors where the energy cost savings are not significant enough to offset the transaction costs inherent in implementing performance-based contracts. Other types of energy service providers (*e.g.* lighting and HVAC contractors, engineering firms, architects, consultants) are currently more active in the residential and small commercial markets as well as in new construction where typically most ESCOs do not focus their attention.

- **The institutional market continues to provide significant opportunities for cost-effective energy efficiency.**

[22] We derived this estimate of overall investment in energy efficiency products and services by customers in 2006 by netting out utility administrative and other indirect costs and developing low/high estimates of the fraction of total measure costs paid out in incentives/rebates to residential, commercial/industrial and low-income customers.

This study reconfirms the dominant role of the institutional market in the U.S. ESCO industry. A decade ago, many industry observers predicted that the schools and state/local government markets were near saturation in terms of ESCO market opportunities, yet these markets continue to show strong growth. Furthermore, the federal government has developed into a large and growing market for ESCOs, in large part due to the implementation of enabling legislation and procurement mechanisms. Going forward, we note that there is still a large backlog in facility upgrades that will continue to be strong drivers for energy efficiency investments in the institutional sector, along with new policy drivers (see next bullet).

- **ESCOs can be important partners in clean energy, sustainability, and climate change mitigation initiatives in urban areas.**

U.S. ESCOs have a proven track record of developing comprehensive energy retrofit projects that employ a range of energy efficiency, onsite generation and renewable energy technologies. There is increasing interest in energy efficiency and clean energy among municipal governments that are pursuing sustainable energy and/or climate change mitigation initiatives. ESCOs are well-positioned to work with cities, their energy managers, and financial institutions to develop "clean energy" projects. Recent examples include participation of several large ESCOs in the global Energy Efficiency Building Retrofit program which involves 16 cities (including New York, Chicago, and Houston in the U.S.) and five global banks.[23] Cambridge MA, Boston, and New York have also launched major clean energy initiatives to significantly reduce energy use in their cities that are likely to include partnerships with ESCOs and other energy efficiency service providers.[24] These initiatives could prove to be a major growth driver for ESCOs as well as other energy efficiency service providers.

[23] "President Clinton Announces Landmark Program to Reduce Energy Use in Buildings Worldwide, May 16, 2007" see http://www.clintonfoundation.org/051607-nr-cf-pr-cci-president-clinton-announces-landmark-program-to-reduce-energy-use-in-buildings-worldwide.htm

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Appendix A: ESCO Companies Included in Survey

Ameresco
APS Energy Services Company, Inc.
Atlantic Energy Solutions, Inc.
Bottom Line Utility Solutions, Inc.
Building Controls & Services
Burns & McDonnell
Chevron Energy Solutions
CLT
Co-Energy Group
ConEdison Solutions
Constellation Energy Projects & Services Group
CTS
Custom Energy Services, LLC
Dalkia Facilities Services, LLC
Direct Energy
DMJM Harris
Earthwell Energy Management, Inc.
Energy Control Inc.
Energy Services Group, LLC
Energy Systems Group
Ennovate Corporation
EnSave Energy Performance, Inc.
FPL Energy Services
Honeywell International, Inc.
Johnson Controls Inc.
Kapadia Energy Services
McKinstry Company
NES Energy, Inc.
NORESCO
Onsite Energy Corporation
Pepco Energy Services, Inc.
Power Management Company
PPL Energy Services
Quantum Energy Services and Technologies (QUEST)
Quantum Engineering and Development
Siemens Building Technologies
SLI Lighting
SmartWatt Energy
Synergy Companies
TAC/Tour Andover Controls Energy Solutions
The EnergySolve Companies
Trane
Ucons, LLC
Unitrac Energy Management
URS
Water & Energy Savings Corporation