IEA DSM TASK X – PERFORMANCE CONTRACTING

Country Report: United States

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1 EXECUTIVE SUMMARY

This report provides an overview of the ESCO industry in the United States. The report includes an overview of the energy situation in the U.S., a description of the U.S. ESCO model and issues related to performance contracting, barriers to performance contracting, new opportunities emerging for the industry, and state and federal government policies to promote energy efficiency and performance contracting. The report also contains model documents, case studies of successful ESCO projects, and information on additional resources.

During the two decades that the ESCO industry has existed a number of key lessons have become apparent:

- There is an on-going need for customer education about ESCOs;

- Governments can send a strong message about the value of energy efficiency by retrofitting their own buildings;

- Governments may need to modify their procurement rules to enable them to enter into agreements with ESCOs;

- Economic incentives, most importantly energy prices, will motivate customers to implement energy efficiency retrofits;

- Energy efficiency retrofits can play an important role in meeting environmental compliance requirements.

2 INTRODUCTION

In October 2000, the International Energy Agency (IEA) Demand-Side Management Program established a Performance Contracting Task. The Task was set up as a mechanism for member countries to share information about their respective ESCO industries. Specifically, the Performance Contracting Task is designed to:

- Provide all participants with a better understanding of how performance contracting and other ESCO financial options and services can be used;

- Promote an understanding of the benefits of performance contracting and other ESCO financial options and services and the potential contribution of these financial options and services to promoting energy efficiency and mitigating global climate change;

- Promote an understanding of the necessary regulatory and legal context under which the performance contracting industry may function;
- Identify the market potential in countries for which no mature performance contracting industry currently exists;

- Identify and share information concerning potential barriers and problems associated with implementing performance contracting;
- Identify and share information concerning solutions to problems and success stories involving performance contracting;
- Contribute to increased awareness of the opportunities that the performance contracting model can offer, and as a result, establish larger market opportunities in more countries;
- Formulate definitions of different types of performance contracting;
- Identify how to involve energy agencies, consultants and other intermediates in the preparation process;
- Identify solutions and schemes for how to find suitable ESCOs and how to improve the tendering process.

These goals are being achieved through a series of experts' workshops and dissemination of country reports, which each member has been asked to produce. This report on the U.S. ESCO industry is the U.S. submission under this Task.

3 ADMINISTRATIVE INFORMATION

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4 METHODOLOGY

The information contained in this report is drawn from a variety of published materials and data on the U.S. ESCO industry collected over the past five years. It also draws upon interviews with industry representatives, case studies of successfully implemented ESCO projects, project manuals geared to specific market sectors, journal articles, and a database of over 1,400 individual energy efficiency projects. Together these materials make up a body of information that provides the history of how the ESCO industry developed in the U.S. as well as illustrates its current status and suggests its possible evolution.

5 GENERAL ENERGY CONTEXT

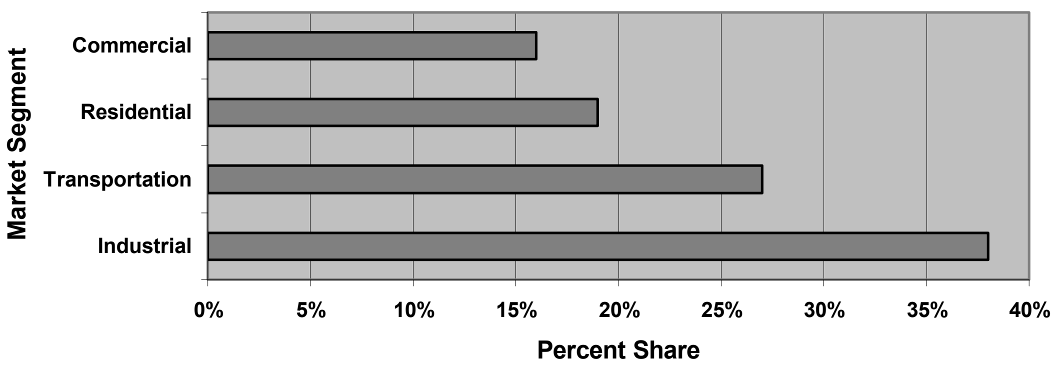
5.1 Energy Consumption and Key Sources1

The United States is the largest producer, consumer, and net importer of energy in the world. The estimated energy consumption of the U.S. for 2000 is 98.8 quadrillion Btu, which represents approximately 25 percent of total world energy consumption and results in approximately 25 percent of total world carbon emissions.

The sector share of energy consumption is divided as follows: industrial – 38 percent, transportation – 27 percent, residential – 19 percent, and commercial – 16 percent. The fossil fuel component of U.S. energy consumption includes oil (39 percent), natural gas (23 percent) and coal (22 percent).

Figure 1

ENERGY CONSUMPTION BY MARKET SEGMENT



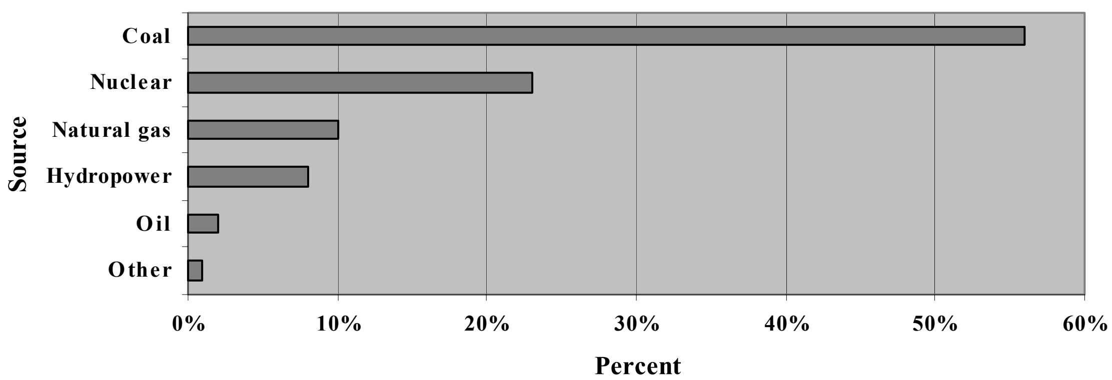
In 2000, the United States consumed 19.5 MMBD of oil. Petroleum product demand decreased in 2000, primarily due to a milder winter and a substantial increase in oil prices. U.S. oil demand is expected to continue increasing in coming years. Natural gas consumption in the U.S. increased by about 22 percent during the 1990s. Greater use of natural gas as an industrial and electricity generating fuel can be attributed, in part, to its relatively clean-burning qualities compared with other fossil fuels. Additionally, lower costs resulting from greater competition and deregulation in the gas industry and an expanding transmission and distribution network have helped expand its market penetration. Gas consumption in the United States is mainly in the industrial (41 percent), residential (22 percent), commercial (15 percent), and electric utility (13 percent) sectors. Demand for natural gas is expected to increase substantially through 2020.

Electric utilities account for the vast majority (90 percent) of U.S. coal consumption. It is expected that the demand for coal will continue to increase through 2020 due to coal's lower cost in comparison to oil and natural gas.

In 2000, the United States generated 3,807 billion kWh of electricity, including 3,009 billion kWh at electric utilities, plus an additional 798 billion kWh at non-utility producers. The price of electricity averaged 6.67 cents per kWh. For utilities, coal accounted for 56 percent of electric power generation, nuclear 23 percent, natural gas 10 percent, hydropower 8 percent, oil 2 percent, and "other" .1 percent. Recent high gas prices have increased interest in possible construction of new coal-fired power plants. In 2000, nuclear power generation reached about 20 percent of electricity generation; however, in the long-term, nuclear power capacity was expected to decline due to environmental and safety concerns on the part of the public. This expectation has been challenged by recent statements of administration representatives, including the vice president, which suggest that the construction of additional nuclear power plants may be an important element of the Administration's energy policy.

Figure 2

SOURCES OF ELECTRIC POWER GENERATION



In 2000, the U.S. used 7.1 quadrillion Btu of renewable energy, representing about 7 percent of total gross energy demand, primarily for electricity production. Of that amount, hydroelectric power represents about 44 percent. The other 56 percent is comprised of geothermal, solar, wind, and biofuels. Renewable energy still supplies only a tiny fraction of U.S. energy needs. In January 2000, the Department of Energy's National Renewable Energy Laboratory (NREL) released a report which said that photovoltaic cells could provide 15 percent of U.S. power by 2020. Wind and biomass energy sources also have significant potential in the U.S. In 2000, however, only 52 MW of wind power was installed, down from 730 MW installed in 1999.

5.2 Deregulation

The electric utility industry in the United States is in the process of changing from a regulated monopoly to a competitive industry. Power generation was dominated by vertically integrated investor-owned utilities that owned most of the generation capacity, transmission and distribution facilities. This structure has been shifting to a more competitive one for a number of years due to several reasons:

- A general re-evaluation of how competition in regulated industries might improve efficiencies;

- A wide disparity of electricity rates across the U.S.;

- Technological improvements that have changed the economics of power generation.[2]

Electric utilities are regulated both at the federal and state levels. The Federal Energy Regulatory Commission (FERC) regulates the U.S. interstate electricity and natural gas transmission systems. FERC has instituted reforms to promote the development of competitive wholesale power markets and open the electricity transmission system to all qualified users. FERC also mandated that electric utilities form regional transmission organizations, governed by independent management, that would operate, control, and possibly own the power transmission system. The benefits of RTOs include the elimination of potential discriminatory behavior in using the transmission system, improved operating efficiency, and increased reliability of the power system.[3]

Regulation of distribution service territories and retail rates for electricity are under state jurisdiction. As of May 2001, 23 states and the District of Columbia have passed legislation or regulatory orders to allow retail competition and encourage consumers to shop for power suppliers. California and Northeastern states, where electricity rates are relatively high, were the first states to enact these policies. Most of the remaining states that have not passed legislation are actively considering such a move. There are only five states where there been no activity at all.[4]

The restructuring process has slowed down considerably in the last year as a result of rising prices in California and the lack of choice options developing in states that have enacted restructuring legislation. Many states are now taking a slower approach and are delaying action until it becomes clearer how the competitive electricity market will develop in the states that already have passed legislation. A number of the states that have restructured their electric utility markets have used their restructuring plans to make improvements in and/or continue existing ratepayer-funded public benefit programs, which among other things, includes energy efficiency programs to help boost economic development and meet environmental goals.[5]

Several Federal bills have been introduced in the U.S. Congress over the past few years that are designed to provide a single framework for wholesale and retail competition in the U.S. The bills address a host of restructuring issues, including reliability, reform of Federal power marketing administrations (giant regional generation and transmission organizations such as the Tennessee Valley and Bonneville Power Authorities), creation of a public benefits charge, tax issues, and renewable energy portfolio standards. As of the finalization of this report (October 2001), no comprehensive federal restructuring legislation has been enacted.

6 THE U.S. ESCO INDUSTRY

6.1 Definition of ESCO and Performance Contracting

In the United States, an energy service company (ESCO) is defined as a company engaged in the development, installation, and financing of comprehensive, performance-based energy efficiency projects, typically 7-10 years in duration. These projects are centered on improving building energy efficiency and maintenance costs, and the cost savings achieved by the installed energy efficiency measures are used to pay for the project. Projects are implemented through an energy performance contract (EPC) and the energy cost savings achieved by the project are typically guaranteed. A project is considered performance-based when the ESCO's compensation is tied to the amount of energy saved and to the guarantee underlying the project.

ESCOs provide comprehensive technical services as a part of an EPC project, and seek to achieve energy and operating savings from the widest possible array of cost-effective measures in a given facility. In addition to analyzing facility energy consumption and designing comprehensive projects that will pay for themselves out of long-term savings, ESCOs provide ongoing equipment maintenance, project monitoring, and savings measurement and verification services to ensure persistent and reliable project performance. In essence, the ESCO becomes a partner with the customer to effectively improve, manage, and maintain the efficient use of facility systems that affect energy consumption.

ESCOs design projects to use state-of-the-art technologies, provide extensive training for facility operating personnel, and provide or arrange project financing which will be repaid over the contract term out of achieved energy and operating cost savings. In the event actual savings fall short of the guarantee, the ESCO is contractually liable to reimburse the customer for the difference. The comprehensive energy efficiency projects implemented by ESCOs enable the customer facility to optimize design opportunities that would be lost if the measures are implemented as separate projects over a number of years. It also permits the quick payback technologies, such as lighting, to subsidize the cost of longer payback measures, such as heating, ventilation, and air conditioning (HVAC) equipment. According to researchers at the Lawrence Berkeley Laboratory who have compiled a database of installed projects drawn from the information provided by NAESCO's ESCO members, "there is ample evidence that ESCOs do, in fact, convince customers to do comprehensive projects that address energy efficiency opportunities across multiple end uses, with an emphasis on major capital equipment replacements of HVAC systems."[6]

Standard services offered by ESCOs under an energy performance contract include the following:

- An investment grade technical energy audit to analyze current building conditions, establish base year energy consumption, and identify and define energy efficiency and cost reduction measures and their associated energy and cost savings;

- A sound technical project, including capital equipment and ongoing energy services, which is structured to be fully paid from energy savings;

- Complete project engineering and design services;

- Project financing;

- Construction bonding to comply with statutory and agency requirements;

- Equipment specifications and acquisition;

- Complete project installation and construction management services;

- Guaranteed savings for the life of the contract;

- Project systems and equipment commissioning;

- Energy and cost savings measurement and verification and project monitoring services;

- On-going equipment service and maintenance;

- Extensive training for building operators and facility personnel;

- Utility rate negotiation and technical assistance services.

The most typical ECMs installed by ESCOs include: lighting retrofits, high-efficiency heating and air conditioning, centralized energy management systems, boiler and chiller replacements, variable speed drives, high-efficiency motors, insulation and weather proofing, new water heaters, piping, steam traps, pumps and priming systems, motion sensors, cooling waters, and water conservation. In some instances, other innovative efficiency applications, such as cogeneration or renewable energy technologies, may be included in the project.

6.2 Origins of the ESCO Industry

ESCOs have existed in the United States for over 20 years. The industry began to emerge in the late 1970s and early 1980s due primarily to the dramatic rise in energy prices during that period. Some of the ESCOs that entered the marketplace at that time were start-up ventures established specifically to pursue energy performance contracting. Other ESCOs evolved out of several different types of businesses, including engineering firms, manufacturers of controls systems, and utilities that created demand side management (DSM) incentive rebate programs. Presently, due to on-going restructuring efforts and other changes in the utility industry, we estimate that about 50-60 percent of ESCOs are affiliated with utilities.

The ESCO industry has gone through several phases. Each company probably has its own perspective on what those phases have been, but perhaps the following scheme will provide a useful common framework.

6.2.1 Late 1970s to Mid-1980s: Pre-ESCO

The energy services industry as we know it began in the late 1970s, to provides services to utilities, which were mandated into the energy conservation business as part of the federal government's response (under President Carter) to the OPEC-induced oil price shocks. The initial utility programs were primarily aimed at residential customers and offered home energy audits, accompanied with the arrangement of contracting and financing services from lists of approved vendors. Other federal programs, funded through oil price rebates and direct grants, focused on delivering energy audits to institutional customers.

Understandably, many utilities were resistant to the mandate that it was their responsibility to help their customer use less of their product, which is energy. State regulators spent several years crafting rules that embodied both incentives and penalties to attempt to remedy this fundamental conundrum. The rationale for the utility at the federal and state levels was that the utilities had ready access to the customers, the credibility required to educate the customers, and the energy and administrative expertise required to implement large-scale programs. Unfortunately, in many cases this rationale proved inaccurate. Though the utilities had customer access, many lacked both the credibility and expertise required to fulfill the mandates.

Recognizing these gaps in utility capabilities, entrepreneurs started energy service companies (pre-ESCOs), which supplied manpower, audit systems, and management systems to utilities. In some utility territories, these pre-ESCOs worked in what would come to be known as "back office" capacities, supporting utility personnel who actually delivered services. More often, the pre-ESCOs supplied the front line personnel under subcontract to utilities, an early example of the now common trend of large companies outsourcing non-core functions. Most of the pre-ESCOs supplied only some of the full set of capabilities required to get customers all the way through the process of identifying, implementing, and financing energy efficiency improvements. They were experts in auditing, or program management, or early computerized audit systems, but rarely offered comprehensive services.

6.2.2 Mid-1980s to early 1990s: Emergence of the ESCOs

Despite the misgivings of many utilities, by the mid-1980s their mandated energy conservation programs had shown significant results. Every utility had completed its tests of attic insulation and determined that it really worked. Customers really could be persuaded to adopt energy conservation technologies, and got acceptable paybacks in both dollar savings and increased comfort. Early studies from industry indicated that the seemingly immutable ratio between growth in production and growth in energy use could be broken: American industry really could begin to approach the Japanese and European levels of efficiency.

State utility regulators digested these results at the same time that they were coming to grips with the utilities' very expensive implementation of nuclear and very-large-scale fossil fuel generating plants, and established a new paradigm called Integrated Resource Planning (IRP). Utilities were now required to present growth plans that evaluated both new generation (supply) and more conservation (demand) options. Furthermore, in some areas, utilities no longer had the sole right to provide these options, but had to procure new supply and/or demand resources through an open Request for Proposals (RFP) process.

Once again, entrepreneurs recognized an opportunity. They drew together the capabilities that had been developed in different pre-ESCOs into consortia or integrated companies that could deliver demand resources on a turnkey basis in response to utility RFPs. These were the first true ESCOs that offered comprehensive audit, design, implementation, maintenance, and financing capabilities all wrapped up in a single performance contract. Some were created from scratch in response to particularly lucrative utility procurements. Others gradually pieced together comprehensive service packages in response to requests from their institutional and industrial energy audit customers. By the late 1980s, the opportunities available to ESCOs were big enough to attract the attention of the major national controls companies, who already had business relationships with many of the target institutional and industrial companies, and established new ESCO business units to expand those relationships.

6.2.3 Mid to Late 1990s: Success and Consolidation

By the mid-1990s, the ESCO industry had achieved significant success – in both economic and public policy terms. A number of national ESCOs, led by the controls companies, had built profitable business with hundreds of millions of dollars in annual revenues. In a number of states, ESCOs had delivered the goods – significant demand reductions and significant dollars savings for their customers – in terms of public policy goals. In New Jersey, for example, ESCOs delivered more than 300 MW of peak savings, at an average cost of about $.047 per kWh, in one program – the Standard Offer.

The success of the ESCOs led the federal government to mandate sweeping energy efficiency improvements in its facilities worldwide, to be delivered through performance contracts. The potential market for ESCOs was huge, but so were the risks, because the federal contracting process can be cumbersome, time consuming, and may involve substantial risk investment (in uncompensated energy audits) by ESCOs.

The success of the ESCOs also attracted the attention of utilities, which had watched the ESCOs deliver energy efficiency and achieve profits from their DSM programs. The utilities were struggling to develop comprehensive service offerings, combining supply, energy efficiency and energy information services, in anticipation of electricity deregulation. They thought that ESCO capabilities were a critical component of these comprehensive offerings, and either bought existing ESCOs or started their own ESCOs in-house.

ESCO entrepreneurs found these utility acquisition offers attractive because they believed they needed significant capital investment to remain competitive. The lucrative utility DSM programs of the early 1990s were being scaled back in anticipation of the unregulated market players, rather than public policy, driving the energy efficiency market. ESCOs needed deep pockets to finance their federal program marketing efforts. They also felt they needed to be part of comprehensive service offerings to attract the biggest and best customers. By the late 1990s almost all of the independent ESCOs had been acquired by utilities or other energy companies.

6.2.4 1999 to Present: Beginning of the Competitive Electricity Markets

The first stages of the deregulation of the electricity market have been a mixed blessing for ESCOs. Theoretically, deregulation should give energy efficiency a real boost, because energy suppliers will compete to provide their customers with the most economical combination of energy supply and demand services. The conundrum of regulated utilities, whose revenues and profits are tied to kWh throughput, controlling the national energy efficiency effort, will fade away. Customers, able to choose their electricity suppliers for the first time, will elevate energy management from the facility to the enterprise level, applying more relentless cost/benefit analyses and insisting on lowest-cost options.

Unfortunately, the reality has not yet matched the theory. The electricity supply situation is so unclear that no state has yet developed a truly competitive retail electricity market. In states that are legally deregulated, most customers cannot get competitive supply offers. California, which pioneered retail competition, is on the verge of legislation that precludes retail choice for the foreseeable future. Without robust retail competition, the anticipated competitive market players and the anticipated boost for energy efficiency have not materialized. While many observers predict that a competitive retail market will eventually take shape, the current market offers few clear long-term trends.

6.3 Size of the ESCO Industry

Researchers from Lawrence Berkeley National Laboratory (LBNL) have spent several years assembling a database of U.S. ESCO projects. The database, which is estimated to represent 15 percent of total ESCO activity, represents $2 billion in previous investment by ESCOs in project development. LBNL estimates current market size of approximately $2 billion in annual investment.[7] For the period 1990-2000, total ESCO industry activity is estimated at $17 billion. The industry experienced rapid growth during this period, with revenues increasing by an average of 25 percent per year

6.4 Target Markets

Traditionally, ESCO projects in the United States have been concentrated in the ”institutional” market (comprised of schools, universities, hospitals, and government buildings). According to the NAESCO database of over 1,200 projects, institutions comprise approximately 74 percent of the market. Twenty seven percent of the projects are in the K-12 schools market, followed by 16 percent in the state/local government sector, 14 percent in the health and hospitals sector, and 10 percent in the universities and colleges market. The federal government makes up about 7 percent of the market, but this sector is growing at a rapid rate. Since 1995, the federal market, K-12 schools, and state/local government projects have accounted for an increasing share of activity.[8]

Table 1

MARKET SEGMENT	PERCENT SHARE
K-12 Schools	27%
State/local governments	16%
Health/hospital	14%
University/college	10%
Federal government	7%
Industrial	8%
Office-leased	5%
Retail-single site	3%
Office-owner occupied	4%
Other	3%
Residential	1%
Retail-multi-use	2%

6.5 Project Size

ESCOs typically develop projects in the $600,000 to $2 million cost range, although increasingly there are projects of between $5 million and 15 million. Some of the largest projects may be done in distinct phases. According to the database, the average project in the Federal government, K-12 schools, and university/college markets is about $2.6 - $2.7 million. The average project in state/local government market is about $1.7 million while health/hospital project costs average about $1 million. The average project in owner-occupied commercial office building is twice as large as leased commercial space ($1.4 vs. $0.7 million). The typical project tends to be larger in the public sector than in the private (commercial and industrial) sector.[9]

6.6 Energy Savings

On average, projects developed by ESCOs reduce electricity consumption by 17-36 percent. The results from the database indicate that on a site energy BTU basis, overall, ESCOs are significantly reducing electricity consumption in end uses with much less investment in thermal measures.[10]

6.7 Other Values of Energy Performance Contracting

In addition to reducing energy consumption and costs, ESCO projects provide a number of other important benefits:

6.7.1 Reduction of Outdoor Air Pollution

Energy efficiency projects reduce the demand for burning fossil fuels which conserves non-renewable resources of oil, coal, and natural gas and dramatically cuts air pollution. Significant air pollutants which are reduced include acid rain precursors (SO_2 and NO_2), greenhouse gases (CO_2 and CH_4), particulates and ozone, air toxins (mercury, cadmium, lead, VOCs), and carbon monoxide.

The sophisticated measurement and verification technologies available through ESCOs are now being used to translate reductions in energy consumption into measurable reductions in air pollutant emissions. For example, several states have developed or are in the process of developing programs that allow the banking of air emissions reductions resulting from reduced energy consumption.

6.7.2 Improvements in Indoor Air Quality (IAQ) and Comfort

Performance contracting has become an important tool in improving IAQ in buildings, an issue gaining prominence in the United States, particularly in offices and schools. Studies have shown that improving IAQ increases productivity, reduces absenteeism, and reduces liability costs for building owners and operators. In schools, improved IAQ has also been found to result in tangible health benefits, for example, a 30 percent reduction in acute respiratory infections and a 50 percent reduction in acute non-specific health symptoms.[11]

In the commercial sector, where 65 percent of the buildings were constructed before 1979,[12] energy efficiency upgrades improve the quality and comfort level of the indoor environment through improved lighting quality and climate control. Tenants enjoy lower operating costs while gaining a more comfortable work environment. Owners find that a more comfortable environment enables them to retain tenants and improve the marketability of their buildings. Businesses such as hotels must offer clientele a high quality of comfort in their indoor environment, including heating, cooling, lighting, water temperature, and air quality, along with contemporary amenities. Energy efficiency retrofits with state-of-the-art equipment and technologies can greatly improve the profitability of these properties by improving the indoor environment.

6.7.3 Enhanced Competitiveness and Economic Development

Energy costs are a substantial component of fixed operating costs in the commercial sector. ESCOs provide building owners and tenants the opportunity to reduce these costs by an average of 25 percent. These cost reductions translate directly into an improved profit picture for commercial establishments and can play a key role in keeping a business in its present location and keeping it competitive. Employees who depend on that business for their livelihood benefit from increased job security.

In the manufacturing sector, energy efficiency retrofits produce benefits both for cost reductions and product improvement. Manufacturers can take advantage of more efficient equipment and energy management systems to improve not only the cost of their production processes, but also the quality and uniformity of their products.

Benefits to economic development result from the use of local installation sub-contractors include the creation of jobs and contributions to local economic growth. It is estimated that a third of the costs of every project is spent on labor costs so the $2 billion in investments over the past five years by ESCOs estimated by LBL researchers translates into $675 million in labor wages.

6.7.4 Renovations of Public Buildings

Budgetary concerns are acutely felt in the public sector where financial constraints often result in the postponement of maintenance and renovation. In addition, the vast majority of government facilities were built before 1980, when modern standards for energy efficient construction became widespread. According to U.S. Census figures, almost 80 percent of local government buildings, or almost 295,000 buildings, are pre-1980 construction.[13] ESCO projects offer a way to combine energy efficiency retrofits with other building upgrades.

7 HOW ESCOS OPERATE

Once a basic project contract has been negotiated, ESCOs generally go through a specific process in developing projects. (Contracts are discussed under Section 8 – Main Issues in Performance Contracting).

7.1 Feasibility Study

ESCO projects often begin with a Preliminary audit or Feasibility Study, in which the ESCO, at its own expense, briefly surveys the customer facility and determines if there is a viable energy efficiency project. The ESCO presents its findings in the form of a preliminary report, along with a proposed project contract that usually specifies that if the Investment Grade Audit (IGA, see below) does not substantially confirm the results of the Feasibility Study, the customer can terminate the contract without obligation. The contract usually stipulates that if the IGA substantially confirms the results of the feasibility study, the customer must either implement the project with the ESCO or pay the ESCO its development costs.

7.2 Investment Grade Audit

A high-quality IGA is the technical and economic foundation of a successful energy performance contracting project. It establishes and defines representative consumption base years for each utility (e.g., gas, water, electric, etc.) in order to accurately analyze potential energy and cost savings. At a minimum, an IGA includes: 1) a summary table of the proposed ECMs which defines the cost per measure, annual maintenance cost, simple payback, and the life of the measure; 2) a full analysis and definition of the energy base year for each fuel and type of utility; and 3) a full description of the analysis methods, calculations, data inputs, and all technical and economic assumptions. It is important that a thorough and comprehensive technical and economic facility analysis like the IGA be conducted in order to define the basis for the design and performance of the ECMs. The time required to complete an IGA varies, depending upon the facility size, complexity, and data availability, ranging from two to six months or more in duration.

7.3 Project Design and Construction

ESCOs prepare technical specifications for the ECMs to be implemented. The design of energy efficiency projects and the ECMs and the specific equipment installed varies widely depending on the given facility and its use. How a group of ECMs is installed can dramatically affect the energy savings that the project produces, therefore, the ESCO must manage this phase of the project very carefully. Some or all of the following categories of equipment may be found in typical energy efficiency retrofits in the United States.

- High efficiency lighting – lighting systems can account for as much as 50 percent of total electricity consumption.

- High efficiency HVAC systems -- HVAC equipment manufactured today uses only about 60 percent of the energy required by equipment manufactured 30 years ago.

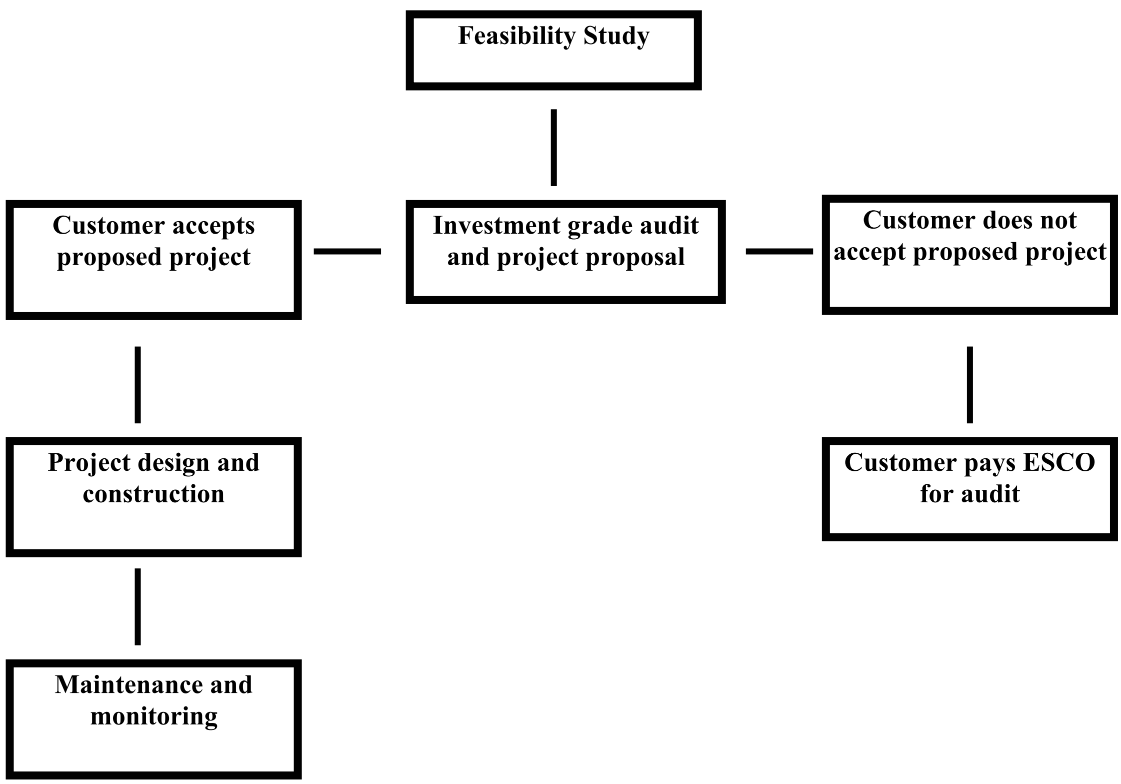
- Energy management systems (EMS) – an energy management system controls a facility’s energy consuming equipment from a central location.

- Improved manufacturing energy systems – this includes high efficiency motors, variable frequency or variable speed drives, building envelope enhancements, cogeneration, and gas fired engines or steam turbines. Energy efficient motors typically reduce energy losses by 25 –30 percent.

7.4 Maintenance and Monitoring

To ensure peak performance of equipment installed, maintenance is required throughout the contract term. Sometimes ESCOs perform this themselves; in other cases, the customer prefers to do its own maintenance and staff are trained to do so by the ESCO. Increasingly, the trend is for customers to want to do the maintenance themselves. All projects entail monitoring energy savings, which ESCOs typically perform on the ECMs they install in order to determine payment levels and to maintain the guaranteed level of savings over the life of the project.

Figure 3



8 MAIN ISSUES IN PERFORMANCE CONTRACTING

8.1 Contract Development and Management

The performance contract or project agreement serves as the blueprint of how the project is going to operate for the duration of the contract term. It covers the legal relationship between the ESCO and the customer. It clearly defines the role and responsibility of both the ESCO and the customer, and explicitly spells out how the project is expected to perform. The contract is flexible so that it can accommodate both the current and future needs of the customer and it protects the interest of both the ESCO and the customer.

The contract frames the basic legal provisions and protections to which each party will conform. It specifies all governing laws, contingent liabilities, conditions of default and remedies, any regulatory or policy requirements, and indemnification provisions. Most contracts include a number of attachments or schedules that address technical project details resulting from the investment grade audit.

Among the schedules is a *savings guarantee*, which describes all provisions and conditions of the guarantee negotiated by the ESCO and the customer. It generally defines the units of energy savings and method of determining the financial savings over the term of the contract. There is usually a reference to the annual reconciliation of actual versus guaranteed savings.

The *base year consumption* schedule is the standard against which future savings resulting from the project will be measured. The schedule includes the methodology and all supporting documentation that was used to calculate the base year, such as unit consumption and current utility rates. The schedule may also include other allowable related savings, such as costs associated with the elimination of outside maintenance contracts.

Another schedule contains *savings calculation formulas and methodology for adjusting the base year*. This includes a description of the savings measurement, monitoring, and calculation procedures used to verify and compute the savings performance of the installed equipment. It includes a method to compare the level of energy that would have been consumed with the amount of energy that was actually consumed during a specific time period. All methods of measuring savings, including engineered calculations, metering, equipment run times, pre- and post-installation measurements, etc., are described for all equipment installed. Periodically, the base year may be adjusted to account for changes in conditions that affect savings, for example, weather, billing days, occupancy, and new installation of equipment.

A schedule of *systems start- up and commissioning of equipment* as well as *operating parameters of installed equipment* specifies the performance testing procedures that will be used to start up and commission installed equipment and the total system.

A *standards of comfort* schedule describes the specific standards to be maintained for heating, cooling, lighting levels, hot water temperatures, humidity levels, and outdoor air ventilation rates, as well as any other special conditions to be maintained.

Energy performance contracts require cooperative efforts between the ESCO and the customer to achieve the goals of the project. If communications and/or performance of the projects is inadequate, the relationship between the customer and the ESCO can be harmed. The responsibilities of both parties need to be explicitly defined in the contract and clearly understood. Any adjustments made to the base year must be documented and explained. Adequate staff training and accurate documentation of equipment performance is critical to the success of the project. Consistent monitoring of the project and reviews of project performance provide important feedback to keep the project on track.

All agreements regarding changes to the project need to be put in writing. Problems need to be resolved quickly and a process should be in place for both sides to confirm that performance problems have been solved. Vague definitions of technical and economic data and methods of performance measurement invite misunderstanding. It is important that clear definitions be provided. Technically and economically feasible methods of measurement should be consistent with industry practices, well documented and mutually approved (see Measurement & Verification below). Open and timely communication between the ESCO and customer staff is crucial to project success. The voluntary resolution of performance problems is greatly facilitated when the parties are committed to seeking solutions based on good faith. Litigation and formal arbitration are usually very expensive and involve lengthy procedures where the judges or arbitrators often have inadequate expertise to understand complex technical issues. Alternative dispute resolution that requires the use of a well-qualified mediator is often a standard contract provision to minimize the potential high cost of formal dispute proceedings.

8.2 Financing ESCO Projects

The key feature common to performance-based retrofit projects is the requirement that the customer not make any cash payments except from realized savings. In order to meet this requirement, the ESCO assumes all performance risks associated with developing, financing, implementing, and operating the project. This means that the ESCO: 1) provides all the working capital to develop the project; 2) provides or arranges the construction financing; 3) provides or arranges long-term financing so that annual repayment obligation is less than the project's annual realized savings; and 4) absorbs any financial loss if the project's on-going debt service and operating costs exceed realized savings.

There are numerous financing sources available to finance energy performance contracts in the U.S. Many of these sources are business units of international banks and financing companies, which have offices or affiliates worldwide. The savings guarantee from the ESCO is often viewed as a benefit by the lender since the guarantee makes the ESCO financially liable for any shortfall that could occur in the project's performance and generation of savings needed to cover the debt service. If the guaranteed level of savings does not materialize, the ESCO is contractually bound to compensate the customer for the difference between the actual and guaranteed savings on an annual basis. Most ESCOs offer to assist in the arrangement of financing for the project. While the debt obligation resides with the customer, the ESCO provides a guarantee that there will be sufficient savings so that the annual debt obligation will be met for the entire contract term.

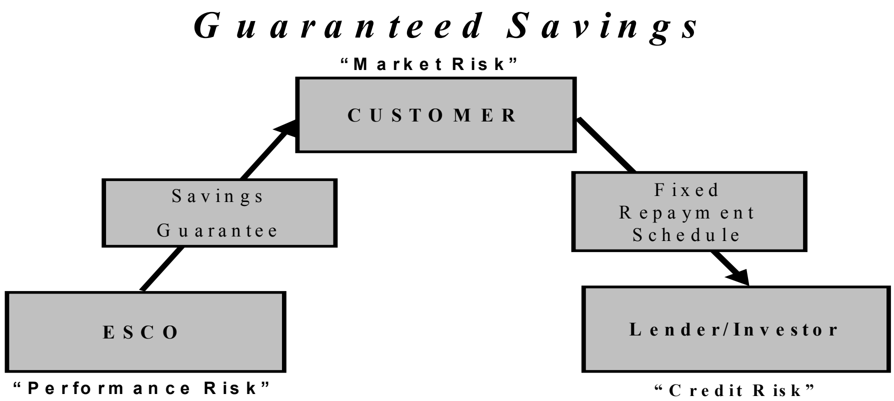
In the United States, a number of financing options are available for energy performance contract projects. These include:

- Bank financing
- Public financing (bonds)
- Direct customer financing
- ESCO or third party financing

No matter which option is used to finance the project, all projects are structured in one of two ways: *guaranteed savings* and *shared savings*.

Under a guaranteed savings structure, the customer finances the project in return for a guarantee from the ESCO that the project's energy savings will cover the customer's debt service. Thus, the customer assumes the obligation to repay the debt to a third-party financier (usually introduced by the ESCO), which is often a commercial bank or a leasing company. If the project savings fall short of the amount needed for debt service, the ESCO pays the difference. If the savings exceed the guarantee, the customer and the ESCO usually share the excess savings. The size of the share and the method of calculation vary widely, depending upon the degree of risk assumed and the extent of services provided by the ESCO.

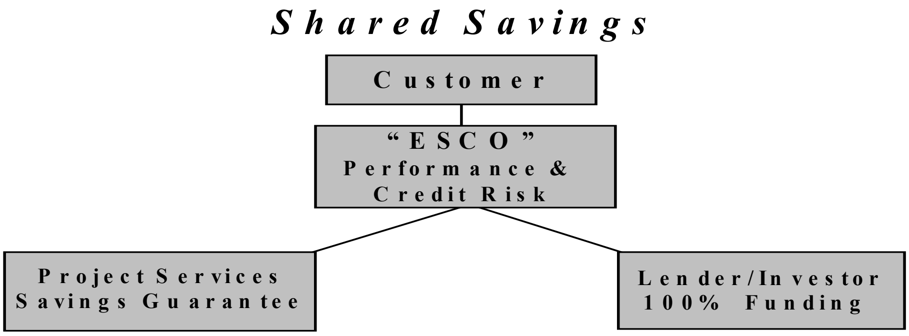
Figure 4



It is important to note that in the typical guaranteed savings project, the ESCO has no contractual relationship with the bank or leasing company. The ESCO's guarantee is to the customer, and is a guarantee of performance (that the project will result in enough cost savings to repay the loan assumed to finance it), not a guarantee of payment. As a consequence, the bank or leasing company confines its risk analysis to the customer's general credit standing. The financial institution may regard the performance guarantee as a form of credit enhancement.

Under a shared savings structure the ESCO finances the project, usually by borrowing money from one or more third parties. This structure is much less common than the guaranteed savings structure. It is used for projects done in U.S. federal facilities as the law restricts federal projects to this structure. In the case of shared savings, the ESCO assumes not only the performance risk, but the financial risk as well (including the underlying customer credit risk). The customer assumes no financial obligation other than to pay a percentage of the actual savings to the ESCO over a specified period of time. This obligation is not considered debt and does not appear on the customer's balance sheet. The portion of savings paid to the ESCO is always higher for shared savings than for guaranteed savings projects, reflecting the ESCO's significantly greater risk and expense for borrowing money.

Figure 5



ESCOs prefer the guaranteed savings structure for three general reasons. First, a third party financier more qualified in credit assessment than most ESCOs, bears the customer credit risk. Second, this structure keeps the ESCO's own balance sheet clear of project debt. Thus, it imposes the lowest debt service cost overall because the bank or leasing company provides the funds based on the creditworthiness of the customer. Third, by segregating credit risk from performance risk for the ESCO, the guaranteed savings structure serves as an incentive for the customer to resolve on-going project issues expeditiously since the customer bears on-going debt service obligations.

8.3 Finance Instruments

Under a guaranteed savings contract, the most common instrument for project financing is through debt, where the customer borrows directly from a bank or other lending institution. Debt financing has the advantage of lowering financing costs, since the average customer's cost of capital is lower than the average leasing company's or the ESCO's cost. A disadvantage is that the customer may be reluctant to take on debt.

Leases are a second type of instrument that can be used to finance energy performance contracting projects. Leases can be substituted for debt to create hybrid forms of project financing and can carry the same ESCO guarantee that debt financing would have. The most popular lease form of financing energy efficiency projects is through *capital leases*. Under this arrangement, the equipment is owned by the leasing company to whom the customer makes regular payments. While this type of lease means the customer must show a debt obligation on its balance sheet, it also permits the customer to take advantage of tax benefits from the equipment depreciation. The title of the equipment is transferred to the customer at the end of the lease based upon a previously agreed upon amount of money, which usually reflects the remaining unpaid principal of the leasing company's investment.

Another lease option is the *operating lease*. Under this structure, there is no debt obligation reflected on a customer's balance sheet and the leasing company receives the depreciation benefits. Transfer of equipment at the end of the lease is optional and is based on fair market, rather than a stipulated value or unpaid balance amount. The lessor risks having to reclaim and dispose of the equipment, which limits the kinds of equipment eligible for these leases and increases the cost to the customer. This structure requires that very stringent ratios and accounting criteria (stipulated by the U.S. Generally Accepted Accounting Principles) be met in order to not have the debt included on the customer's balance sheet.

Tax-exempt leases are the most common method of project financing for state and local entities, and are frequently used to finance projects in schools. This structure only applies to qualified tax-exempt entities (excluding the Federal government), and is used to take advantage of the interest rates, which are significantly lower than a taxable commercial lease. Typically tax exempt leases do not require public approval or constitute a long-term debt obligation for the state or local government entity.

Master leases are used in instances where the customer wishes to implement a number of projects at various times and locations. A master lease uses schedules to add multiple projects of varying values and terms over an extended period of time. *Certificates of Participation* (COPs) are similar in that they provide funding for groups of projects. Under this structure, "certificates" are sold to investors who share in the revenue generated from the lease payments made by the customer. While COPs have a higher cost of issuance than tax-exempt leases, their interest rates are generally lower.

Bonds are option available to state and local government entities for financing projects. While bonds offer the lowest interest rates, there are statutory debt restrictions that often limit their availability. Additionally, there are large issuance fees and underwriting expenses associated with issuing bonds and they must be approved by the voting public before being issued.

8.4 Measurement & Verification

The U.S. ESCO industry advocates the verification of energy savings based on generally accepted engineering practices of metering and monitoring. Measurement and verification of a project's energy savings is critical to the success of an ESCO project and is done for several reasons:

- To define how much a customer pays an ESCO;

- To maximize the persistence of cost savings over the contract term;
- To verify the savings guaranteed under the performance contract.

In most ESCO projects, savings are estimated in the Investment Grade Audit and then payments are tied to actual verified savings. A number of factors can affect the cost and appropriate level of M&V including: 1) value of projected savings, 2) complexity of efficiency equipment installed, 3) total amount of equipment installed, 4) number of interactive effects, 5) level of uncertainty of savings, 6) risk allocation for achieved savings between the customer and the ESCO, and 7) availability and capability of an energy management system. The M & V measures undertaken are scaled to the value of the project so that the value of information provided by M & V activity is appropriate to the project value. More complex ECMs may require more complex and expensive M & V methods to determine energy savings. ESCOs generally estimate the M & V costs to be between 3-5 percent of the installed project cost.

The M & V portion of an energy efficiency project typically involves the following procedures:

- Define a general M & V approach for inclusion in the energy services agreement.

- Define a site-specific M & V plan for the particular project being installed.

- Define the pre-installation baseline energy, including, equipment and systems, baseline consumption, and factors which influence baseline energy use.

- Define the post-installation system and use.

- Calculate energy savings for the first year or all of the remaining years of a contract.

- Calculate first year payments.

- Conduct periodic M & V activities to verify operation and calculation of energy savings.

- Calculate payments to the ESCO (shared savings contracts only).

The basic approach to determining energy savings involves comparing energy use associated with the facility both before and after the installation of an ECM. In general,

Savings = Baseline Energy Use – Post-Installation Energy Use

Since energy and operating savings are calculated by comparing consumption and costs before and after the installation of energy efficiency equipment, the key is to estimate what the building energy use would have been if no energy project had been installed. This estimate is defined as the base year utility consumption and cost for the building or a specific energy-using system. The base year provides the foundation for the technical and economic analysis of savings from the new energy equipment and is used to define, measure, calculate, and monitor the value of future savings.

The baseline is designed to represent the level of energy that would have been used by the old equipment had it not been replaced with the ECMs. If use patterns for the equipment of the facility change, then the customer and ESCO may need to recalculate the baseline to reflect new patterns. The baseline definition can be affected by a variety of factors, including:

- Changes in building equipment, schedule, occupancy, or controls.
- Changes in operations or maintenance procedures.
- Unusually mild or severe weather.
- Changes in utility costs.
- Existing service levels for lighting, ventilation, temperature, and humidity.
- Equipment sizes, loads, and operating condition.

Several M & V protocols or standardized guidelines have been developed to provide standardized procedures for the measurement and verification of energy usage factors used to calculate energy savings. The most prominent is the International Performance Measurement & Verification Protocol (IPMVP), developed by the U.S. Department of Energy with state energy officials, the energy services industry, and engineering groups. The U.S. Federal Energy Management Program has adapted the IPMVP to fit federal projects. In addition, the American Society of Refrigeration and Air Conditioning Engineers (ASHRAE) has developed guidelines for "Measurement of Energy and Demand Savings.

The IPMVP is intended to define technical guidelines in the field of M & V. It must be customized before it can be applied to a specific project. The IPMVP specifies four options for M & V:

- Option A is designed for projects where a one-time measurement of pre- and post-installation energy use or manufacturer's measurements are used to estimate savings. Periodic inspections may also be required to verify equipment conditions. This option verifies that the ECM has the potential to perform and generate savings, but does not measure actual savings. It is generally used for projects where there is greater certainty that the energy savings will be achieved and costs approximately 1 and 5 percent of the project construction costs. It provides an accuracy of +/- 20 percent.

- Option B verifies that the ECM has the potential to perform as well as verifies the actual performance by end use. This option involves continuous measurement of pre- and post-energy use for specific equipment or an energy end use equipment sample. Submetering is typical of this approach and the results may be more precise than those produced by Option A. Option B costs between 1 and 3 percent of construction cost and has an accuracy of +/- 10-20 percent.

- Option C uses the main building meter to measure savings from all project efficiency measures. It also involves continuous measurement of usage. This option is best suited to projects where there is a high degree of interaction between installed energy conservation systems and/or the measurement of individual component savings is difficult. This option costs between 1 and 3 percent of construction cost with an accuracy of +/- 20 percent.

- Option D uses calibrated computer simulation of post installation energy use to measure savings. This option costs between 3 and 10 percent of construction costs and provides an accuracy of +/- 5-10 percent.

In projects where operations and maintenance savings are considered to be a crucial component of total dollar savings, this aspect of the project must be verified and calculated separately and added to the energy cost savings.

9 BARRIERS AND OPPORTUNITIES

9.1 Barriers to Widespread Implementation of Energy Efficiency

There are already two decades of experience in implementing energy efficiency projects in the U.S. and substantial documentation of both its economic and environmental benefits. Yet, there remain a number of barriers to more widespread application of energy efficiency measures. These include:

- *Customer inertia* -- Many facility owners and managers realize that opportunities to save energy and lower costs may exist, but they never move forward with them. Others do not perceive the need, or feel a sense of urgency, to implement energy efficiency measures. It is a low priority compared with other mission objectives.

- *Lack of technical resources* – Managers often lack detailed energy consumption information about their facilities to help them understand their own energy and infrastructure needs as well as to identify and implement more beneficial energy savings choices. They also may lack the analytical tools to determine whether their facility is a good candidate for an energy efficiency retrofit and the technical expertise to implement a retrofit using existing staff.

- *Poor understanding of project synergies* – Most facility owners and managers are not aware that comprehensive energy efficiency projects can meet multiple objectives. Energy efficiency retrofits not only decreases energy use and costs, it also improves the facility infrastructure, lowers maintenance and operating costs, reduces environmental impacts, and improves indoor air quality and comfort levels. In many instances energy efficiency helps a facility owner to improve its competitiveness by lowering operating costs and enabling the facility to meet environmental requirements more cost efficiently.

- *Capital Constraints and Unattractive Hurdle Rates* – Often, facility owners are leery of taking on long-term debt. Because of this, they are unwilling to undertake energy efficiency projects even though the debt required to finance the projects would be paid out of the energy savings. Additionally, many facilities, particularly in the commercial and industrial sectors, expect a high rate of return on capital. While the rate of return on efficiency projects is quite good, it may not be as high as that of projects undertaken as part of the facility's core mission. In many cases this means an energy efficiency project will be rejected outright.

9.2 Emerging Business Opportunities for ESCOs

In addition to the major opportunities offered by federal and state government facilities (see below), several market niches appear to be very attractive to U.S. ESCOs. At the end of the day, many of these types of projects involve the same function elements – audits, design, engineering, construction, financing, and maintenance – but the approach to the customer is distinctive for each niche.

Facilities Modernization projects are driven by the customer's need to upgrade facilities starved for capital. Many government facilities – federal, state and local – suffer from deferred maintenance problems. These projects often require complex financing that combines elements of capital budgets, utility incentives, municipal lease financing, and state building incentives.

Utilities Outsourcing projects are driven by the customer's desire to stop operating boiler, chiller, compressed air, and other utility plants themselves. The customer sells its utility plant to the ESCO, often for a nominal price, and the ESCO upgrades and operates the plant. ESCOs competing for this business need substantial capital to acquire and upgrade customer facilities, as well as major plant operating expertise.

Distributed Generation projects are driven by the customer's desire for independence from the pricing vagaries of the power grid, or the need for more reliable or higher quality power than the grid can provide.

Information and Internet ESCOs appeal to customers who are most interested in using state-of-the-art computerized information systems to identify and manage energy costs.

Bundled Offerings which combine long-term supply procurement with energy efficiency improvements seem to appeal to some major national customers who want a comprehensive service. ESCOs in this business are generally business units of multinational energy companies, who have substantial capital resources and affiliates with world-class expertise in energy procurement, trading and risk management.

10 GOVERNMENT POLICIES

A brief description of the current programs and policies to promote energy efficiency and performance contracting at both the federal and state levels is below.

10.1 Federal Initiatives

The United States government is the largest energy user in the country, consuming approximately $3.5 billion in electricity per year. With a stock of 500,000 buildings and over 3 billion square feet of floor space, there are many opportunities to save energy and reduce costs. Beginning in 1988, Congress set an explicit energy efficiency goal for federal agencies to reduce their energy consumption by 10 percent by 1995, using 1985 as a baseline. Subsequently, both President Bush and President Clinton issued Executive Orders mandating higher levels of energy reductions. The two most recent Executive Orders were issued in 2001 mandating a reduction in energy consumption at federal facilities.

To help the various federal agencies meet the government energy goals, the Federal Energy Management Program (FEMP) was created within the Department of Energy. FEMP's mission is to "reduce the cost of government by helping agencies reduce energy and water use, manage utility costs, and promote renewable energy." FEMP works with government agencies in three areas: financing; technical guidance and assistance; and planning, reporting, and evaluation.

In the past, lack of appropriations for energy efficiency projects was an obstacle to federal agencies. FEMP can now assist agencies in choosing and implementing projects through their partnerships with the private sector. One of the mechanisms that FEMP promotes to help federal agencies implement energy efficiency projects is performance contracting, since this enables agencies to make improvements without having to pay the up-front cost of purchasing and installing new equipment. The U.S. government repays the ESCO over the life of the contract from the energy savings.

Initially, ESCOs had great difficulty penetrating the federal market due primarily to federal procurement rules. Changes to the rules now make it possible for government agencies to more easily enter into long-term contracts (up to 25 years) with third party providers like ESCOs and to pay for the project through the energy cost savings. Additionally, the creation of Super Energy Savings Performance Contracts (ESPC), which are regional or technology-specific contracts, allow agencies to negotiate site-specific performance contracts with an ESCO without having to start the contracting process from the very beginning, saving time as well as money.

It is estimated that the federal government requires $5 billion in energy efficiency improvements which would save approximately $20 billion in energy costs over the next 20 years.[14] Additionally, these projects would result in substantial avoidance of air emissions, including 3.3 million metric tons of carbon dioxide, 28,000 metric tons of nitrous oxides, and 49,000 tons of sulfur dioxide.[15] To date, all federal ESPCs have brought in $860.8 million in private sector investment. This investment will generate approximately $2.1 billion in energy cost savings over the lives of the projects. Of this, approximately $1.8 billion is returned to the private sector contractors as payment for their work. The remaining $310.5 million is the government's share of the savings.[16]

Programs similar to that of FEMP are run by the U.S. Department of Defense through the Army Corps of Engineers in Huntsville, Alabama.

Other federal programs designed to promote energy efficiency include:

- Energy Star is a voluntary labeling program introduced by the U.S. Environmental Protection Agency (EPA) in 1992. It is designed to identify and promote energy efficiency products in order to reduce carbon dioxide emissions.

- Rebuild America (RBA) is a program under the Department of Energy, which works with schools, universities, state and local government offices, and commercial enterprises to create local partnerships to plan and implement cost-saving building improvements using energy efficiency and renewable energy. Rebuild America provides tools and resources to these partnerships by teaming with national associations and private businesses.

- Energy Smart Schools is a campaign run by RBA designed to motivate and help schools to use energy wisely. The campaign provides training workshops, publications, recognition, and access to the RBA network of public and private sector partners. The campaign works with legislators and policymakers to develop incentives for energy improvements. It also creates and disseminates teaching materials so that students will become more informed about using energy wisely.

- The Export Council for Energy Efficiency (ECEE) was established by the Department of Energy to promote the export of energy efficient products, services, and technologies worldwide. It is a consortium of five leading energy efficiency groups, including the Alliance to Save Energy, International Institute for Energy Conservation, National Association of Energy Service Companies, National Association of State Energy Officials, and Solar Energy Research and Education Foundation.

- The International Performance Measurement and Verification Protocol (IPMVP) provides an overview of current best practice techniques available or verifying results of energy efficiency, water efficiency, and renewable energy projects in commercial and industrial facilities. It is maintained with the sponsorship of the U.S. Department of Energy by a broad international coalition of facility owners/operators, financiers, ESCOs, and other stakeholders.

10.2 State Programs

As states move from traditional regulation to retail competition in electric markets, many complex policy issues arise. One significant issue that is central to electric deregulation is the fate of demand side management (DSM) programs, previously undertaken by regulated utilities, in the areas of energy efficiency, research and development, and low-income services. In many states, for example, there is a past tradition of utility administration of DSM programs designed to reduce consumer electric demand by implementing energy efficiency measures.

As part of there restructuring efforts, many states have established a Systems Benefit Charge (SBC) or Public Goods Charge (PGC) in recognition of the interim need during a time of market restructuring to ensure that market pricing signals properly reflect the value of energy efficiency.

As states implement restructuring programs, they often use systems benefit charges to maintain or enhance already existing activities funded by utility ratepayers. Some states have used restructuring as an opportunity to develop new programs to support energy assistance and energy conservation programs. Most of the system benefit charge programs are designed to last three to five years and will end unless new legislation extends them. In California, for instance, the initial SBC was instituted for a period of four years; legislation passed in 2000 extends the SBC for 10 years.

In general, an SBC is a non-bypassable charge on all users of the electricity system which is used to raise the funds needed to allow competitive market forces to effectively to deliver energy efficiency. In the states where an SBC has been adopted, this charge has been levied on the transmission and distribution system. SBC programs may differ from state to state, as each state is developing and applying the charge to meet perceived public benefit needs in that state. Several examples of state public benefit programs are summarized below:[17]

- *California* – The annual funding levels for this program are $597 million, of which $218 million is used for energy efficiency programs. The programs have been extended through 2012.

- *Illinois* – The funding level for this program is approximately $93.9 million, with $3 million set aside for energy efficiency.

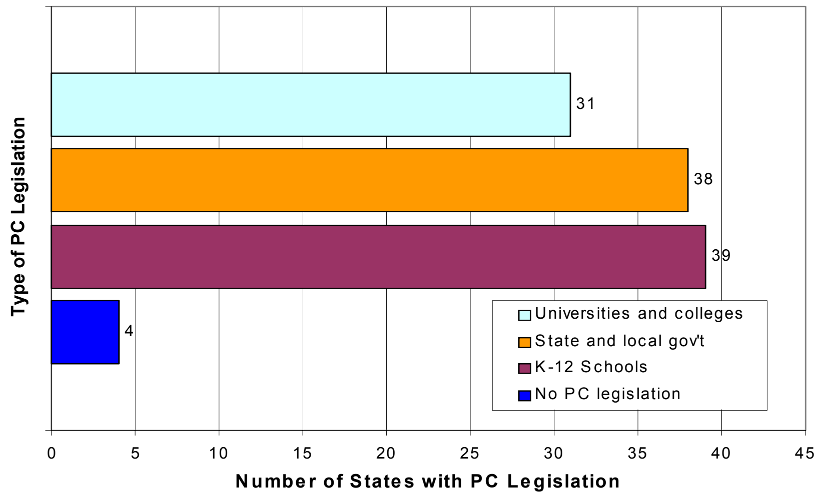
- *Massachusetts* – Annual system benefit funding is $246 million. $150 million will be used for energy efficiency programs, a significant increase over funding prior to restructuring.

- *New Jersey* – The annual system benefit funding is about $134 million. Of that $90 million will be used for energy efficiency projects.

- *New York* – The SBC program will increase from $78.1 million to $150 million annually and runs through June 2006. The annual funding for energy efficiency programs is $83 million.

A growing number of states have enacted legislation that makes it possible for state agencies to enter into performance contracts directly with ESCOs. This has enabled state and local government facilities, schools, public healthcare institutions, and public colleges and universities to implement energy efficiency retrofits. Currently, 46 states have legislation covering at least one of these markets.[18]

Figure 6. States with Performance Contracting Legislation[19]



Additionally, many states have instituted programs that provide technical assistance, training, and in some cases grants or other financing options, for those state facilities that wish to undertake energy efficiency retrofits themselves or through a third party like an ESCO.

Four states – New Jersey, New York, California, and Texas – have developed Standard Performance Contract (SPC) or Standard Offer programs. The purpose of an SPC program is to create a transparent mechanism by which to ensure widespread implementation of energy efficiency or demand reduction. The general goals of an SPC program are: 1) to facilitate interactions between customers and private sector energy efficiency companies, 2) to capture a larger share of cost-effective opportunities in large commercial markets, and 3) to contribute to the creation of a self-sustaining market for energy efficiency products and services.

In a typical SPC program, the program administrator develops a standard contract that includes delivery terms and conditions, with stipulated incentive payments for the acquisition of specified units of energy and/or demand savings. The contract and incentive payments are offered to all interested customers and ESCOs for an extended period of time on a first-come, first-served basis. Any customer or ESCO willing to sign the contract to deliver energy and/or demand savings under the standard terms and conditions for the stated incentive payments can sign a contract with the program administrator. Payment is made to the customer or ESCO upon delivery of the verified units of energy or demand savings, usually over time. Money for SPC program development and implementation, including incentive payments, to date has come from ratepayers. In the case of California and New York, the funding has come via the System Benefit Charge described above. The programs may be administered either by a government entity or utilities operating in that state.

As an example of how the financial aspects of an SPC program works, assume that a program administrator establishes an SPC program in which it seeks to acquire the equivalent of 100 megawatts of capacity, with payments for associated energy use reductions based on a projected avoided cost of $.045 per kilowatt-hour. The program administrator would publish its standard contract, terms and conditions, and incentive payment schedule. Customers and ESCOs would develop energy efficiency projects according to the published program terms, sign long-term contracts with the program administrator for delivery of specified energy use reductions, and submit verified savings measurements over a multi-year period, in exchange for the payment of $.045 for each kWh of savings.

California's program is funded for four years, with $22.5 million allocated for 2001. In New York, a total of $47 million was set aside for its SPC program, with approximately $15.77 million available annually. The program generates new incentive applications for about $2 million per month, which roughly translates into projects with a total value of about $10 million per month. In 2002, new energy efficiency programs will be initiated in Texas in an effort to reduce the demand for electricity in the service areas of Texas' investor-owned distribution utilities. These programs, which were approved by the Public Utility Commission of Texas, will provide an estimated $80 million annually in incentives. In New Jersey, which has the oldest program, results of the program have been quantified for in one utility service area for the period 1993-98. The results for that utility service area show that 860 energy efficiency projects were done, which produced 200 megawatts of reduction in summer peak.[20] The net benefit of these projects for New Jersey ratepayers is about $156 million.[21]

In a recent study NAESCO and the Lawrence Berkeley National Laboratory looked at the relationship between state programs that promote energy efficiency and performance contracting and the states that have attracted the most ESCO project investment. According to the data collected, 8 of the top 10 states with the highest ESCO project activity were also in the top 10 ranking for economic activity in the U.S. This confirms that ESCOs tend to operate in the states with the largest markets. The study also ranked the 10 states by their overall support for performance contracting, based on the level of activity of the state energy office and the type of enabling legislation that the state has enacted. This analysis shows that favorable performance contracting legislation has the most impact in states with small- and medium-size markets which might not otherwise attract ESCO investment.[22]

Figure 7. State ESCO Promotion and Activity Ranking[23]

State	ESCO Project Costs (SC, UC & GO)			Economic Activity (1999 GSP)*		State Energy Office Activity 1=low, 2=medium, 3=high**	Number of Sectors with Legislation	LBNL Overall Ranking† of State Support for Perf. Contracting
	Rank	($M)	N	Rank	($B)			
New York	1	287	76	2	755	2.3	3	7
California	2	147	81	1	1229	1.0	3	3
Texas	3	131	40	3	687	2.0	3	6
Indiana	4	112	23	15	182	1.0	3	3
New Jersey	5	84	95	8	332	2.0	3	6
Illinois	6	75	38	4	446	2.0	3	6
Ohio	7	68	45	7	362	2.0	1	2
Massachusetts	8	66	27	11	263	1.7	3	5
Florida	9	65	23	5	443	1.0	3	3
Pennsylvania	10	54	37	6	383	2.0	3	6

11 LESSONS LEARNED

The experience of the past 20 years in the United States has shown that ESCO projects have produced many economic and environmental benefits. There are a number of initiatives and activities that have been valuable in the development and support of the industry:

- Improving Customer Education – Customers often are not aware of ESCOs and performance contracting or do not fully understand how such energy efficiency retrofits might benefit them. Companies, trade associations, and government offices can all play important roles in helping to educate customers by developing case studies and sector-specific publications, and organizing workshops and seminars to introduce customers to the ESCO concept. In many instances greater emphasis should be placed on those benefits of energy efficiency retrofits that are in addition to energy and cost savings, for example, healthier indoor air quality and improved facility infrastructure.

- Retrofitting Government Buildings – Governments retrofits of their own building stock sends a strong message about the value of such projects as well as the credibility of the energy services industry. Additionally, the federal, state, and local government facilities can become lucrative markets for ESCOs.

- Providing Economic Incentives – There are a number of economic incentives that can motivate customers to move forward with energy efficiency retrofits. The most powerful incentive is high energy prices. This was probably the most important factor in the creation of the energy services industry in the United States. Other types of economic incentives can be set up through government policies, for example, tax credits for the purchase of energy efficient products or project buy-downs through utility DSM programs or from state-administered programs that offer per unit payment for energy efficiency or demand reduction.

- Modifying Government Procurement and Budget Rules – There is often a lack of fit between energy performance contracts and existing government procurement rules, which are typically bid/specification and predicated on lowest price, not total value. Thus governments may need to make some changes in these rules to enable their agencies to enter into agreements with ESCOs and other third party providers. In the U.S., federal and many state procurement rules have been modified to resolve many of the conflicts between contractual terms and procurement requirements. For example, federal and many state agencies have adjusted their methods for soliciting bids. Additionally, these agencies are now able to keep some part of the energy cost savings instead of returning it to the general treasury, which serves as an important economic incentive for individual agencies or military bases to implement energy retrofits at their facilities.

- Meeting Environmental Compliance Requirements – Energy efficiency retrofits are an effective way to reduce air emissions, including NO_x, SO_x, and greenhouse gases. Government regulations should specify the use of energy efficiency as one of the ways in which governments or individual companies can comply with federal and state environmental mandates. Implementing energy efficiency measures can be less expensive than using other means to comply environmental requirements and equally effective.

12. ENDNOTES

[1] U.S. Energy Information Administration, Country Analysis Brief – United States of America, April 2001, www.eia.doe.gov/cabs/usa.html.

[2] U.S. Energy Information Administration, *The Changing Structure of the Electric Power Industry 2000: An Update,* "Executive Summary," p. ix.

[3] Ibid.

[4] U.S. Energy Information Administration, "The Restructuring of the Electric Power Industry: A Capsule of Issues and Events," January 13, 2000, p. 28.

[5] Energy Programs Consortium, *Issue Brief*, "The Role of Systems Benefit Charges in Supporting Public Benefit Programs in Electric Utility Restructuring," May 2001, p. 1.

[6] C.A. Goldman, P. Juergens, M. Fowlie, J. Osborn, K. Kawamoto, and T. Singer, "Historical Performance of the U.S. ESCO Industry: Results from the NAESCO Project Database, August 2000, p. 7.

[7] Presentation by C. A. Goldman, Lawrence Berkeley National Laboratory, U.S. Department of Energy to NAESCO Board of Directors, May 22, 2001.

[8] Ibid., p. 4-5.

[9] Ibid., p. 8, 14.

[10] Ibid., p. 10-12.

[11] C. Bayer, S. Crow, J. Fischer, "Causes of Indoor Air Quality Problems in Schools: Summary of Scientific Research," January 1999, Oak Ridge National Laboratory.

[12] Daniel Sze, *Energy User News*, "Rebuild America: Partnerships for the Future," May, 2001, p. 32.

[13] Ibid.

[14] Federal Energy Management Program website, www.eren.doe.gov/femp/aboutfemp/benefits.html.

[15] Ibid.

[16] E-mail correspondence with Marta Gospodarczyk, Analyst, McNeil Technologies, Inc., May 31, 2001.

[17] Energy Programs Consortium, *Issue Brief*, "The Role of Systems Benefit Charges in Supporting Public Benefit Programs in Electric Utility Restructuring," May 2001, p. 8-21.

[18] J. Osborn, C. Goldman, N. Hopper, T. Singer, *Market Trends in the U.S. ESCO Industry: Results from the NAESCO Database Project*, Draft paper, March 2002, p. 20.

[19] Ibid.

[20] Wisconsin Energy Conservation Corporation, *Evaluation of Public Service Electric and Gas Company's Standard Offer Program, Final Report*; prepared for Public Service Electric and Gas Company, George R. Edgar, Martin Kushler, and Don Schultz, pp. ES-9, 3-3, and 3-14, October, 1998.

[21] Ibid., p. ES-21.

[22] J. Osborn, et. al., p. 21.

[23] Ibid.

APPENDIX A – CASE STUDIES

Syracuse University

Type of Facility	Private university
Number of Buildings *Square Feet*	 8 million sq. ft
Type of Contract	Guaranteed Energy Savings Performance Contract
ESCO	Alliant Energy Integrated Services Company
Installed Project Cost	Part 1: (Design/consult contract) $2.5 million Part 2: (Performance contract) $10-$12 million
Contract Term	5 years
Annual Energy Savings	62,995 mmBtu
Annual Cost Savings	$1,858,134 million
Source of Project Financing	Syracuse University
Energy Measures Installed	▪ Heating and ventilating units ▪ Lighting ▪ Electrical systems ▪ Energy management systems ▪ Boiler plant and related equipment ▪ High-efficiency motors
Environmental Benefits	Emissions Reduction: ▪ Carbon dioxide >12M lbs./yr ▪ Carbon monoxide > 1,800 lbs./yr ▪ Sulfur dioxide > 8,000 lbs./yr ▪ Nitrogen dioxide > 20,000 lbs./yr ▪ Particulate matter > 4,500 lbs./yr
M&V	All performance is based upon the stipulated calculations. Periodic confirmation of projected cost avoidance is performed through campus sub-metered utility information.

Houston Independent School District

Type of Facility	Public school district (K-12)
Number of Buildings *Square Feet*	22 buildings 2.9 million sq. ft
Type of Contract	Guaranteed Energy Savings Performance Contract
ESCO	Sempra Energy Solutions
Installed Project Cost	$12.7 million
Contract Term	10 years
Annual Energy Savings	7,955,295 kWh
Annual Cost Savings	$1,381,291 million
Source of Project Financing	Tax exempt municipal bonds and "Cool Storage Incentive" from Houston Lighting & Power
Energy Measures Installed	▪ Chillers and condensing units ▪ Thermal storage systems ▪ Lighting ▪ Energy management control system ▪ Variable speed drives and pumps ▪ Heat exchanges on ice storage systems ▪ Window film and solar screening ▪ Power factor capacitors ▪ 1,200 ton remote central chiller plant
M&V	Utility bill reconciliation

St. Barnabas Medical Center

Type of Facility	Private hospital
Number of Buildings *Square Feet*	2 buildings 780,000 sq. ft
Type of Contract	Guaranteed Energy Savings Performance Contract
ESCO	Custom Energy, L.L.C.
Installed Project Cost	$5,264,500
Contract Term	15 years
Annual Energy Savings	10,972,532 kWh
Annual Cost Savings	$691,178
Source of Project Financing	Tax exempt bond issue; initial cost paid by owner and financed through a private bond issue, through their financial institution.
Energy Measures Installed	▪ Energy management system ▪ Variable speed drives and efficient motors ▪ Lighting ▪ HVAC ▪ Steam absorption chillers ▪ Converted electric chillers to gas
Environmental Benefits	Emissions Reduction: ▪ Carbon dioxide: 6,975 tons ▪ Sulfur dioxide: 71.61 tons ▪ Nitric oxides: 25.575 tons
M&V	All energy conservation measure specific monitoring as specified by the PSE&G Standard Offer Rebate Program M&V Protocol, including end use measurement on the chiller plant, air handling unit VSDs, lights, and motors.

Allegheny County

Type of Facility	Local government
Number of Buildings *Square Feet*	Over 100 buildings 4.3 million square feet
Type of Contract	Guaranteed Energy Savings Performance Contract
ESCO	NORESCO, L.L.C.
Installed Project Cost	Pilot project: $980,000 Phase 1: $4.6 million Phase 2: $3.3 million Phase 3: under development
Contract Term	10 years
Annual Energy Savings	62,995 mmBtu
Annual Cost Savings	Pilot project: $150,000 Phase 1: $740,828 Phase 2: $487,308 Phase 3: under development
Source of Project Financing	Arranged by NORESCO
Energy Measures Installed	▪ Lighting ▪ Chiller replacement ▪ Cooling tower replacement ▪ Window replacement ▪ Energy management systems ▪ Sprinkler piping ▪ Kitchen and laundry equipment ▪ Toilets and showerheads ▪ Flow restrictors
M&V	M&V is accomplished with individual protocols developed specifically for each improvement. Typical verification methods employed include end-use metering, computer monitoring, data loggers, and engineering calculations.

Tobyhanna Army Depot

Type of Facility	Military base
Number of Buildings	Over 37 facilities
Type of Contract	Guaranteed Energy Savings Performance Contract
ESCO	Select Energy Services, Inc.
Installed Project Cost	$30 million
Contract Term	22 years
Annual Energy Savings	291,517 MMBtu
Annual Cost Savings	$4.9 million (energy and operational savings)
Source of Project Financing	Select Energy Services, Inc.
Energy Measures Installed	▪ Decentralized gas-fired boiler plants ▪ Gas fired rotation units ▪ Underground gas distribution system ▪ Lighting ▪ Energy management conservation system
Environmental Benefits	Overall emissions were reduced by 60 percent (calculated using actual stack emission for the old coal plant and U.S. EPA's AP-42 "Compilation of Air Pollutant Emission Factors," for the natural gas data).

APPENDIX B – SUMMARY OF STANDARD TERMS FOR AN ENERGY SERVICES AGREEMENT

The purpose of this summary is to set forth the standard terms used in an energy efficiency project agreement, also referred to as an *Energy Services Agreement ("ESA")*. In many cases, these contracts have been derived from standard engineering project agreements and will follow a format similar to the one found in that type of agreement. Whatever format a particular ESCO has adopted, the following terms should appear in the project agreement. As will be seen, certain terms will vary depending upon whether the agreement is for a *guaranteed savings* project or a *shared savings* project. Similarly, *hazardous waste disposal* may or may not be covered depending upon the facility and the scope of the project.

ENERGY SERVICES AGREEMENT
between
[ENERGY SERVICES COMPANY]
and
[CUSTOMER]
for
[NAME OF FACILITY]

Statement of Purpose ("Recitals"). Summarizes the elements of the agreement. ESCO will propose project design; install and maintain equipment specified; share any applicable utility subsidies; and guarantee equipment's performance. Customer promises to review and approve proposed project design; compensate ESCO for installation and maintenance; and share any applicable utility subsidies.

Structure and Term. Outlines the agreement's basic structure. Composed of main body (setting forth terms and conditions) and technical attachment (describing in detail equipment, efficiency measures, how energy savings will be measured, and other relevant technical details, such as hours of operation). States agreement term (5, 10 or 15 years, occasionally longer). Term commences when equipment and measures have been properly installed.

ESCO's Responsibilities.

<u>Energy audit</u>. The ESCO typically agrees to conduct an investment-grade energy audit of the customer's facility at no up-front cost to the customer, although given that the investment-grade audit represents a substantial investment, the ESCO is likely to require reimbursement for that cost if the customer elects not to proceed with the project after the audit is completed. ESCOs rarely will agree to go forward with a project except on the basis of a comprehensive energy audit prepared by the ESCO itself or by a third-party engineering firm under contract to the ESCO. Therefore, energy audits conducted by consulting firms or engineering firms not under contract to the ESCO hired for the project generally will not be utilized.

Project engineering design. The ESCO agrees to prepare the engineering proposal for the project based on the results of the comprehensive energy audit. This engineering proposal will constitute the project design and will be presented to the customer for comments and approval. Upon approval by the customer, the proposal is signed and becomes the Technical Attachment to the project agreement.

Financing. The ESCO agrees to finance or to arrange for the financing of the engineering, purchase and installation of energy-saving and measurement equipment, unless the project financing is arranged by the customer.

Installation. The ESCO agrees to design and install the energy efficient equipment and other efficiency measures according to the specifications set forth in the project's technical requirements, as reflected in the contract documents.

Operations and Maintenance. Agreements covering projects financed by the ESCO -- or for which the ESCO has arranged for financing -- typically offer the customer the option of having the ESCO maintain the installed equipment during the contract term, in exchange for a share of the maintenance savings realized. This enables the ESCO to ensure that the equipment performs at specified levels and thus delivers the projected energy savings during the life of the contract. While not all customers choose this option, for some the operations and maintenance component of the contract is the true motivation for entering into the energy efficiency project, since this type of project enables a facility to obtain "free" long term operations and maintenance services -- *i.e.*, all project-related operations and maintenance is paid for out of energy savings over the contract term. Thus, while these services can be used to supplement the work of existing operations and maintenance personnel, their cost is not added to the facility's budget. Operations and maintenance agreements can be extended after expiration of the principal contract.

Training. Project agreements often include provisions that require the ESCO to train the customer's maintenance or engineering personnel in the operation and maintenance of the energy efficient equipment and other efficiency measures. This enables the customer to ensure that the equipment continues to perform at specified levels and thus to deliver the projected energy savings following the expiration of the contract.

Deliver projected energy savings. The ESCO agrees to deliver to the customer the level of energy savings specified for the project, which typically covers the project costs incurred by the customer as a result of implementing the project.

Shared energy savings. If the project is based on a shared savings arrangement, the ESCO agrees that its fee for the project will be based on a percentage of the projected energy savings actually realized. For any period (specified in the ESA) in which the projected energy savings is not realized, the customer pays the ESCO only up to the level of actual energy savings. Thus, any shortfall in savings represents a loss to the projected return of the ESCO. Typically reconciliation of savings as between the ESCO and customer occurs monthly, with a "true-up" done on an annual basis.

Guaranteed energy savings. If the project is based on a guarantee of energy savings, the ESCO guarantees that a specified average level of energy savings will be realized by the customer -- normally equal to debt service payments for the project -- over a set period (typically equal to the term of project financing). The customer pays the ESCO on the basis of an agreed-upon payment schedule, while the ESCO agrees to reimburse the customer for any shortfall in energy savings at the end of the set period. The customer may be asked to agree to share with the ESCO any excess savings beyond that amount guaranteed.

Customer's Responsibilities

Review and approve engineering proposal. The customer agrees to review and approve the engineering proposal. If the proposal is not approved, the customer generally is required to pay the ESCO a set fee for the engineering services invested in preparing the proposal.

Operate host facility at agreed level. The customer agrees to operate the host facility as specified in the technical provisions of the ESA. The emphasis here is on maintaining the consistent use of the facility as compared to the baseline (pre-project installation level of use). Where it is not possible to maintain use at the agreed levels, the *material change* provisions, set forth below, will be invoked.

Compensate ESCO. The customer is required to compensate the ESCO in the manner appropriate to the type of financing used for the project. The ESCO's fee will include all project costs (including finance charges if financing is provided or arranged for by the ESCO) and the ESCO's profit on the project.

ESCO-financed shared energy savings. The customer agrees to pay the ESCO a periodic (typically monthly) fee calculated as a percentage of projected energy savings. Payments are reconciled with actual measured savings on a periodic basis.

ESCO-financed guaranteed energy savings. The customer agrees to pay the ESCO a set fee for the project on the basis of an agreed schedule. This fee is based on the ESCO's costs (including finance charges) plus profit for the project. For purposes of evaluating the project's performance against the ESCO's energy savings guarantee, measured savings will be averaged over an agreed-upon period (typically one year).

Customer-financed turnkey project. The customer agrees to pay a set fee for the ESCO's services in designing and installing the project. The agreement may provide for a performance period prior to final payment to ensure that projected savings levels are realized. The customer provides for maintenance of the equipment unless a follow-on maintenance contract is entered with the ESCO.

Other Customer Responsibilities. Pursuant to the Energy Services Agreement, the customer will be required to meet certain other obligations necessary for the project to be undertaken. These are likely to include, but may not be limited to:

- providing for access to the facility by the ESCO, its subcontractors, and possibly by the utility as well;

- providing the ESCO with data on energy use at the facility;

- inspecting and approving measures as they are installed;

- providing insurance coverage for the equipment once it is installed; and

- approving the ESCO's choice of vendors and subcontractors.

Contract Termination

Automatic Termination. The agreement expires automatically after a number of years specified in the ESA term provision. Normally the agreement term is equal to the term of repayment of the project financing.

Early Termination. In projects financed by the ESCO, if the customer decides to terminate the agreement prior to its automatic expiration for reasons other than a default by the ESCO, the customer will be required to pay liquidated damages to the ESCO according to an agreed-upon termination schedule. This schedule will be calculated on a declining basis to provide the ESCO with the present value of its projected income stream from the project for each year of the contract term. This *termination schedule* can be viewed as a liquidated damages provision. However, it also provides the customer the flexibility to buy-out an ESCO-financed project for its present value in any year prior to the expiration of the agreement, and thereby to retain all project savings for itself. Agreements for projects in which the customers have arranged financing impose no early termination penalties since the customer's principal financial obligation is to itself or to a bank or leasing company.

ESCO's Limited Right to Terminate. The ESCO generally will retain the right to abandon the project without penalty prior to project construction.

Ownership of Equipment.

ESCO-financed project. If the ESCO finances the project, it may retain ownership of the equipment throughout the term of the contract. If the ESCO has placed the project loan with a third-party lender, the lender will retain a security interest in the equipment for the same period. Ownership will transfer to the customer upon expiration of the agreement or early termination and buy-out of the project.

Customer-financed project. If the customer finances the project, the customer takes ownership of the equipment upon payment-in-full for the project.

Leasing arrangements. Where the project is financed through a lease, the leasing company retains ownership (in some cases only until the lease provides for transfer of title).

Conditions Affecting Equipment.

The customer must notify the ESCO of occurrences that may affect the operation of the equipment and the stream of energy savings. The customer cannot materially move or alter the equipment without the ESCO's permission. If the customer is negligent in either respect, the customer must reimburse the ESCO for any remedial maintenance made necessary and for any lost savings.

Material Change.

Material change is defined as any change in operation of the equipment from any cause that results in "materially" lower or higher energy savings. This provision is intended to provide a remedy to the ESCO if the customer significantly changes its use of the facility in a way that materially reduces energy usage (*e.g.*, partial closure or reduced operations, change in production units). The standard remedy is an alteration of the payment terms going forward in order to make the ESCO whole. If the project is based on guaranteed savings, the savings baseline to which the ESCO's performance guarantee applies must be readjusted. If the project is based on shared savings, then the ESCO's share of the savings must be recalculated according to an agreed-upon formula.

Casualty Insurance.

The customer may be required to maintain insurance to rebuild the project in the event of fires, floods or other natural sources of damage to the host facility during the contract term. If the project cannot be rebuilt within a reasonable period (*e.g.*, four months), the ESCO may declare the agreement terminated early and demand liquidated damages under the *termination schedule*.

Events of Default and Remedies.

Customer events of default. Acts for which the customer typically may be held in default of the agreement include: (1) nonpayment; (2) very significant alteration of its use of the host facility (*i.e.*, a "material change" affecting energy savings by more than 10% or 20%); (2) sale of, or termination of its lease on the host facility; (3) false or misleading representations or warranties (*see* below); (4) bankruptcy; or (5) material breach.

ESCO events of default. Acts for which the ESCO typically may be held in default of the agreement include: (1) false or misleading representations or warranties (*see* below); or (2) material breach.

Indemnification.

Mutual indemnification for injury or loss caused by negligence or misconduct.

Representations and Warranties.

Both parties. Both parties typically will provide standard warranties regarding the validity of the agreement, including statements of adequate corporate power, signatory authority, no conflict with existing agreements, and no legal barriers.

Customer warranty. The customer generally is required to warrant that it will continue to use the host facility as described in the Technical Attachment.

Equipment warranties. The ESCO should agree to assign to the customer the manufacturer's warranties on the equipment when the project is installed on a turnkey basis or where any outstanding manufacturer's warranties are in effect for installed equipment at early contract termination and buy-out.

Environmental Provisions.

If requested by the customer, the ESCO may provide information on proper disposal of hazardous waste related to the project. Some ESCOs will provide for transport and disposal of project-related hazardous waste. However, most ESCOs will require that the project agreement provide an acknowledgment that the ESCO bears no legal responsibility under federal, state or local environmental statutes for the removal, transport or disposal of hazardous material from the host facility. The customer also may be required to provide indemnification of the ESCO for environmental liability incurred during the project.

Assignment.

The ESCO may assign payment rights under the agreement in order to obtain financing. The customer may assign its rights under the agreement with the ESCO's consent, not to be unreasonably withheld.

APPENDIX C – SUPPLEMENTARY PUBLICATIONS

The following publications can be ordered online from the National Association of Energy Service Companies (NAESCO) at <u>*http://www.naesco.org*</u> or by calling NAESCO at 202/822-0950.

1. *Breathing Easy: Using Energy Performance Contracting to Improve Air Quality in Schools*

2. *The Energy Efficiency Project Manual: The Customer's Handbook to Energy Efficiency Retrofits: Upgrading Equipment While Reducing Energy Consumption and Facility Operations and Maintenance Costs*

3. *The Energy Services Industry: Revolutionizing Energy Use in the United States*

4. *Meeting the Challenge: How Energy Performance Contracting Can Help Schools Provide Comfortable, Healthy, and Productive Learning Environments*

5. *Modernizing Facilities and Maintaining Budgets: Energy Retrofits in Local Government Facilities*

6. *NAESCO State Guidebook Series: Implementing Energy Efficiency Retrofits (Illinois)*

7. *A Review of the Energy Service Company (ESCO) Industry in the United States*

8. *Reducing Operating Costs and Improving the Facility Infrastructure: Energy Efficient Capital Upgrades in Colleges and Universities*

9. *Reducing Operating Costs and Improving Patient Comfort: Energy Efficiency Upgrades in Hospitals and Medical Centers*

10. *Reducing Operating Costs and Improving the Student Learning Environment: Efficient Capital Upgrades in K-12 Schools*

11. *School Solutions: How to Save Money and Improve Indoor Air Quality Using Energy Performance Contracts*

APPENDIX D – ADDITIONAL RESOURCES

Alliance to Save Energy
1200 18th Street, NW, Suite 900
Washington DC 20036
Phone: 202/530-2215
www.ase.org

American Council for an Energy-Efficient Economy (ACEEE)
1001 Connecticut Avenue, NW, Suite 801
Washington, DC 20036
Phone: 202/429-8873
www.aceee.org

Energy Services Coalition
1526 Chandler Street
Madison, WI 53711
Phone: 608/280-0255
www.wrcperform.org

Export Council for Energy Efficiency (ECEE)
1717 K Street, NW, Suite 510
Washington, DC 20036
Phone: 202/271-2779
www.ecee.org

International Institute for Energy Conservation (IIEC)
2131 K Street, NW, Suite 700
Washington, DC 20037
Phone: 202/785/6420
www.cerf.org/iiec

National Association of State Energy Officials
1414 Prince Street, Suite 200
Alexandria, VA 22314
Phone: 703/299-8800
www.naseo.org

National Council of State Legislatures
1560 Broadway, Suite 700
Denver, CO 80202
Phone: 303/830-2200
www.ncsl.org

Solar Energy Research and Education Foundation (SEREF)
4733 Bethesda Avenue, Suite 608
Bethesda, MD 20814
www.seref.org

U.S. Department of Energy Rebuild America Program
Energy Efficiency and Renewable Energy Clearinghouse (EREC)
www.rebuild.org

U.S. Department of Energy
Federal Energy Management Program (FEMP)
www.eren.doe.gov/femp/

U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
www.epa.gov/iaq

U.S. Environmental Protection Agency
Energy Star Program
www.energystar.gov