

Energy savings through ESCOs

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What is an ESCO

- ESCO stands for Energy Service Companies
- In developed countries ESCOs have provided services relating to provision of energy needs of large industrial and commercial facilities.
- ESCOs build, own and operate energy infrastructure such as standby generators, steam boilers, etc. at client premises and charge client for the supply of services.
- ESCOs install, operate and manage large energy infrastructures more efficiently and economically than the facility operators themselves.

Energy savings

- ESCOs dealing with energy savings have played a key role in addressing the barriers for energy efficiency through guaranteed savings from energy efficiency projects.
- Typically, ESCOs offer the following services:
 - develop, design, and finance energy efficiency projects;
 - install and maintain the energy efficient equipment involved;
 - measure, monitor, and verify project's energy savings; and
 - assume the risk that the project will save the amount of energy guaranteed.
- These services are bundled into project's cost and are repaid through monetary savings generated.
- What sets ESCOs apart from other firms that offer energy efficiency, like consulting firms and equipment contractors, is the concept of performance-based contracting.

Monitoring and verification

- The customer's payments are tied to the energy savings offered under the project so that the customer pays for the capital improvement with the money that comes out of the difference between pre-installation and post-installation energy use and other costs.
- For this reason, ESCOs have led the effort to verify, rather than estimate energy savings. One of the most accurate means of measurement is the relatively new practice of metering, which is direct tracking of energy savings according to sanctioned engineering protocols.

Maintenance, training

- Most performance-based energy efficiency projects include the maintenance of all or some portion of the new high energy equipment over the life of the contract. The cost of this ongoing maintenance is folded into the overall cost of the project. Therefore, during the life of the contract, the customer could receive the benefit of reduced maintenance costs, in addition to reduced energy costs.
- As an additional service in most contracts, the ESCO provides any specialized training needed so that the customer's maintenance staff can take over at the end of the contract period.

EEPAM model

EEPAM allows:

- Comprehensive analysis of ESCO and end user cash flows;
- Better transparency in terms of use by each of the parties – ESCO, end user and lender;
- Different loan structures for ESCO and end user;
- Enhanced profitability measurement tools (such as discounted cash flow, payback);
- Capability for preparing sensitivity analysis of different variables.

The model is a useful tool for members of the ESCO, banking, and customer communities to analyze basic project financial viability, and further to structure projects such that all parties are satisfied with the outcome and near-optimal project structure can be achieved.

ESCO guarantees

- ESCOs are turn-key service providers who are responsible for an unusually wide spectrum of tasks:
 - (a) identify, design and often finance projects,
 - (b) install and supervise the maintenance of most of the equipment involved in their projects, and
 - (c) measure and monitor the project's energy savings.

The most important aspect of ESCO projects is that the ESCO typically guarantees that its customer's energy and operating costs will be reduced in an amount sufficient to repay the investment cost. Should the savings be insufficient to repay the investment cost, **the ESCO will be responsible for the shortfall.**

Performance Measurement and Verification (M&V) Protocols

- Facility energy savings are determined by comparing the energy use before and after the installation of energy conservation measures. The “before” case is called the baseline;
- The “after” case is referred to as the post-installation or performance period.
- Proper determination of savings includes adjusting for changes that affect energy use but that are not caused by the conservation measures. Such adjustments may account for differences in weather, addition of loads, throughput, product-mix, raw material changes, number of shift operation changes and occupancy conditions between the baseline and performance periods.

ECM and loads

- **ECM reduces a constant load without changing its operating hours.**
- **ECM reduces operating hours while load is unchanged.**
- **ECM reduces both equipment load and operating hours.**
- **Finally, all this results in product output, which may change!**

Risk Assessment

A key factor in the selection of an appropriate M&V plan is proper Risk Assessment.

The major risks associated with an ESCO project can be classified as:

- Measurement, sampling Risk
- Performance Risk
- Usage Risk
- Financial Risk

Some issues

- Confidentiality of data
- Allow ESCO into company premises and operations
- Customer cooperation
- Certificate of completion
- Meets all legal obligations
- Insurance
- Force majeure