Module 13: Project Development Cycle

Learning Objectives

After completing this module, you will be able to describe a strategy to:

- Design and document a project
- Develop the necessary documentation for project approval
- Develop the necessary documentation for securing financing
- Select contract types and contractors
- Monitor project implementation

This module is based on material from the Climate Change Project Development Handbook prepared by Hagler Bailley Ltd. and funded by USAID.

In any comprehensive energy management program, there will opportunities identified in the audit to undertake projects which combine several energy efficiency measures, and which can be financed and implemented as a major investment opportunity.

The previous modules in this course have addressed in detail the elements of energy management projects that pertain directly to the audit—including the technical assessment and opportunities identification, and the financial justification. This Module presents an overview of the project development cycle (PDC). It provides an outline of the steps that contribute to successful project development.

The steps in the PDC are:

1. Project Definition and Scope
2. Technical Design
3. Financing
4. Contracting
5. Implementation and Monitoring

13.1 Step 1: Project Definition and Scope

The first step in the PDC is to identify the components of the project. Projects may be identified both internally and externally:

- Internal identification takes place when the facility manager identifies a package of energy-savings opportunities during the day to day energy management activities, or from facility audits.

- External identification of energy savings can occur through systematic energy audits undertaken by a reputable energy management consultant or energy service company.

In screening projects, the following criteria should be used to rank-order project opportunities:

1. Cost-effectiveness of energy savings of complete package of measures (Internal rate of return, net present value, cash flow, average payback).
2. Sustainability of the savings over the life of the equipment.
3. Ease of quantifying, monitoring, and verifying electricity and fuel savings.
4. Availability of technology, and ease of adaptability of the technology to South African conditions
5. Other environmental and social costs and benefits (such as employment, or reduction in local pollutants like SOx, particulates, etc.).

13.2 Step 2: Technical Design

Once a project makes it past the screening process, the hard work of developing technical specifications begins. For a project to be considered a viable investment, its proponent must present a robust technical feasibility study that identifies the following elements in some detail:

- The proposed new technologies, process modifications, equipment replacements and other measures included in the project.
- Product/technology/material supply chain (e.g., locally available, imported, reliability of supply)
- Commercial viability of the complete package of measures (Internal rate of return, net present value, cash flow, average payback).
- Any special technical complexities (installation, maintenance, repair), associated skills required.
- Preliminary designs, including schematics, for all major equipment needed, along with design requirements, manufacturer's name and contact details, and capital cost estimate.
- Organizational and management plan for implementation, including timetable, personnel requirements, staff training, project engineering, and other logistical issues.

13.3 Step 3: Financing

If outside financing is required for an energy management project, it may be obtained from a private bank, from any targeted financing programs available, or from loans offered by specialized agencies that are focused on energy efficiency. In addition to the usual information on company assets and lines of credit, financial agencies will require an assessment of the financial feasibility of the proposed project. This should include a fully-specified *pro forma* financial worksheet that presents project cash flows, net present value, and internal rate of return. In addition, the financial proposal should contain:

- Amount of financing already secured (e.g., equity, current sources of capital)
- Project cost structure, including investment required at each stage, proposed investment structure (debt-equity), risk mechanisms (insurance, currency exposure, guarantees, etc.)
- Detailed discussion of use of proceeds from the loan.
- Certification that the project will be carried out with due diligence and efficiency in accordance to sound technical, financial and managerial standards

Loan agreements will also be required to include:

- Conditions regarding goods and services procurement
- Inspection provisions
- Conditions regarding insurance
- Information requirements
- Termination provisions

13.3.1 Project Financing

There are two essential decisions that your organization needs to make about its involvement in energy management:

- Is it to be conducted by in-house staff or brought in from outside?
- Is it intended to be a time-limited project or a permanent function?

The answers to these questions may vary over time. For example, an organization might start with energy management being staffed solely in-house and then, in the longer term, move to employing an external energy management contractor to carry out specific tasks. Or, it may begin by employing external consultants and then use in-house staff to run and maintain it.

Where energy management is brought in from external consultants or energy management contractors, then it can be paid for, as and when required, like any other service - whether on a fee basis or through allocating a percentage of the savings made.

You need to understand your own organization's intentions here, for the choices it makes may be critical to the way in which energy management activities can be financed in your particular case. For example if your organization intends to employ outside consultants for all its energy management, there may less need for it to be established on a secure, sustainable basis. However, if it is intended to establish energy management as a permanent in-house function, there can be clear advantages to making it self-financing and self-sustainable.

13.3.2 Financing options for in-house implementation

There are four options for financing in-house energy management:

1. from a central budget;
2. from a specific departmental or section budget, such as building sources or engineering;
3. through payment for services by individual budget holders;
4. by retaining a proportion of the savings achieved.

All of these methods for financing energy management are workable, at least in the short term. Or an organization could use a combination of options, for example, part central financing and part payment for services rendered. But routes 1 to 3 are likely to constrain, if not immediately, then certainly in the longer term, the type and level of energy management activities which can be undertaken. These are likely to be restricted to those that yield direct and attributable short-term savings.

13.3.2.1 Self-financing energy management

One way to make energy management self-financing is to split savings to provide identifiable returns to each interested party. This has the following benefits.

- Assigning a proportion of energy savings to your energy management budget means you have a direct financial incentive to identify and quantify savings arising from your own activities.

- Separately identified returns will help the constituent parts of your organization understand whether they are each getting good value for money through their support for energy management.

- If operated successfully, splitting the savings will improve motivation and commitment to energy management throughout the organization since staff at all levels will see a financial return for their effort or support.

- But the main benefit is on the independence and longevity of the energy management function that will become increasingly apparent as your program of energy management moves into the long-term maintenance phase.

13.3.2.2 How much financing?

Whatever your organization sees as the primary purpose of energy management and however it chooses to fund such activities, the total sum allocated will depend on the level of investment required to:

- improve the energy efficiency of your facilities, plant and equipment - raise staff energy awareness;

- meet staff energy-related training needs;
- upgrade the energy information system;
- and the number and expertise of the staff needed to carry out these activities.

13.3.3 Energy performance contracts and ESCOs

If the project is to be implemented externally, one of the attractive options for many organizations is the use of energy performance contracts delivered by energy service companies, or ESCOs.

ESCOs are usually companies that provide a complete energy project service, from assessment to design to construction or installation, along with engineering and project management services, and financing. In one way or another, the contract involves the capitalization of all of the services and goods purchased, and repayment out of the energy savings that result from the project.

In some contracts, the ESCO provides a guarantee for the savings that will be realized, and absorbs the cost if real savings fall short of this level. Typically, there will be a risk management cost involved in the contract in these situations. Insurance is sometimes attached, at a cost, to protect the ESCO in the event of a savings shortfall.

In other contracts, the ESCO may also undertake the provision of operating services such as plant maintenance, control of HVAC and lighting systems, or even complete physical plant operation. This is more common in commercial buildings than in industrial facilities.

The core of performance contracting is an agreement involving a comprehensive package of services provided by an ESCO, including:

- An energy efficiency opportunity analysis
- Project development
- Engineering
- Financing
- Construction/implementation
- Training
- Measurement and verification

The last component, measurement and verification, is key to the successful involvement of an ESCO in performance contracting where energy cost savings are being guaranteed.

ESCOs are not "bankers" in the narrow sense. Their strength is in putting together a package of services that can provide guaranteed and measurable energy savings that serve as the basis for guaranteed cost savings. However, the energy savings must be measurable.

13.3.4 Benefits of Third-Party Financing

In a capital-tight operating environment, third party, off balance sheet financing can be an attractive alternative to corporate self financing against internal thresholds and competing internal priorities.

Performance contracting can provide the following benefits, in addition to energy efficiency improvements:

- Reduced or eliminated need for corporate capital - helping capital short companies implement energy efficiency initiatives that they could not otherwise finance directly
- Helping capital available companies accelerate existing energy efficiency programs to enhance their cash flow, for use on other investments
- Helping manage debt through off balance sheet financing
- Decreased operating costs
- Turn-key installation
- Participation of local energy utilities
- Enhanced staff training
- Savings fund repayments, based on performance against quantifiable results
- Accelerated equipment upgrading, retrofits, and/or modernization
- Transferred risk to a third party (ESCO)

Typical ESCO contract options are:

- **First Out** - ESCO retains savings until an agreed-upon financial goal is achieved; client company then receives future savings.
- **Shared Savings** - ESCO and client company share savings as they are achieved.
- **Guaranteed Savings** - ESCO guarantees project costs (exclusive of client add-ons); debt service is covered by the income stream.
- **Discounted Energy Savings** (Chauffage) - Client company pays ESCO a fee equal to the base year energy bill minus an agreed upon discount; ESCO pays actual energy bill.

Each of the above options have their own distinctive financial and tax implications.

For example, the Discounted Energy Savings approach can possibly be treated by the client organization as 100% deductible as a service or operating cost. In this case the organization foregoes any depreciation on equipment.

In the First Out or Shared Savings options costs can be structured either as an ESCO service contract or a capital cost to the client.

Sources of financing can include third party financing arranged by the ESCO as well as more traditional bank loans, asset financing companies (both direct or through the ESCO), the ESCO's own shareholders, or the equipment's manufacturer.

Here are several rules of thumb for performance contracting:

- ESCOs will take on energy efficiency investment projects in the R500,000 to R15,000,000 range. Some ESCOs will consider projects as small as R200,000, involving small to medium-sized companies.
- Banks, directly or through ESCOs, typically invest in 1 to 5-year opportunities; asset financing companies will undertake sales financing programs for equipment manufacturers in the 5 to 10 plus year, R10 million plus range (but will not themselves provide performance contracts or guarantees).

13.3.5 Managing the Risks

As with any contractual agreement, performance contracting brings with it its own risks.

Perhaps the most frequent cause of misunderstandings relates to the establishment of the Base Year and provisions for adjustments. The Base Year is the base line benchmark from which all energy savings are measured for the term of a performance contract.

Among the things that can affect the Base Year and related measurements of energy efficiency improvements are:

- Changed operating hours
- Changed equipment
- Rescheduled equipment operation
- Unplanned changes in building use
- Additional "plus-in" technology

13.4 Step 4: Contracting

If the project is to be implemented by an outside contractor, several types of contract may be used to undertake the installation and commissioning:

- **Traditional Contract**. All project specifications are provided to a contractor who procures and installs equipment at cost plus a mark-up or fixed price.

- **Extended Technical Guarantee/Service**. The contractor offers extended guarantees on the performance of selected equipment, and/or offers service/maintenance agreements.

- **Extended Financing Terms**. The contractor provides the option of an extended lease or other financing vehicle in which the payment schedule can be based on the expected savings.

- **Guaranteed Savings Performance Contract**. All or part of savings are guaranteed by the contractor, and all or part of the costs of equipment and/or services are paid down out of savings as they are achieved.

- **Shared Savings Performance Contract**. The contractor provides the financing and is paid an agreed fraction of actual savings as they are achieved. This payment is used to pay down the debt costs of equipment and/or services.

The mark-up charged by contractors will increase as they take on more and more of the risk of achieving the savings. The following table summarizes the differences among the different types.

Table 13.1: Contract Types

	Traditional Contract	Extended Technical Guarantee/ Service	Extended Financing Terms	Guaranteed Savings Performance Contract	Shared Savings Performance Contract
Contractor's Role	Energy audit, design, installation, and commissioning	Plus extended equipment guarantee and maintenance	Plus leasing or payment based on expected savings	Plus guarantee that savings will cover project debt	Plus financing of measures and payment from a share of savings
Skills of Contractor	Mostly engineering	Plus after sales service	Plus leasing and financial services	Plus computer modeling and legal skills	Plus computer modeling and legal skills
Finance Risk	Customer only	Customer only	Customer and Contractor	Customer and Contractor	Contractor only
Typical Equipment	All	Motors, pumps, Air conditioning,	Capacitors, transformers etc.	Complete packages of measures	Complete packages of measures
Relative Complexity	Low	Medium	Medium	High	Very High

13.5 Step 5: Implementation and Performance Monitoring

Once financing has been secured, and the contracting types selected, the project must be approved by company management. Project implementation can then begin. Some guidelines based on general project experience include:

- **Limit Long Lead Times**. Delays due to government procedures cause severe cost increases — some energy efficiency projects must obtain government clearances that will always take longer than planned for. Plan for these over-runs in the pro forma financial model. Also, if non-standard equipment is specified, extend the period of delivery and acceptance.

- **Manage Out-of-Pocket Development Costs by Focusing Efforts**. Because project implementation takes time and money, ensure that the development budget includes costs for travel, specialized consultants (e.g., building control consultants, geo-technical engineers), permits and fees.

- **Manage Construction Carefully**. Construction management may pose a number of special challenges. On energy efficiency projects, the main issues are technology selection risk, the overall risk sharing criteria in the installation contract, structure and relationship with subcontractors, and enforcing penalties among parties.

Once construction is complete and the project operational, the energy savings projected during the feasibility analysis should be monitored. Several operations issues may affect the monitoring process, including facility usage and equipment changes, and whether the facility undergoes construction. To address such problems, monitoring efforts should be designed to balance the accuracy and rigor of monitoring versus its cost, as well as to develop the baseline in a fashion to allow for re-adjustment if significant changes occur.

Depending on the nature of the project, savings are determined using engineering calculations, or via metering and monitoring, utility meter billing analysis, or computer simulations. This subject is addressed in more detail in Module 14.