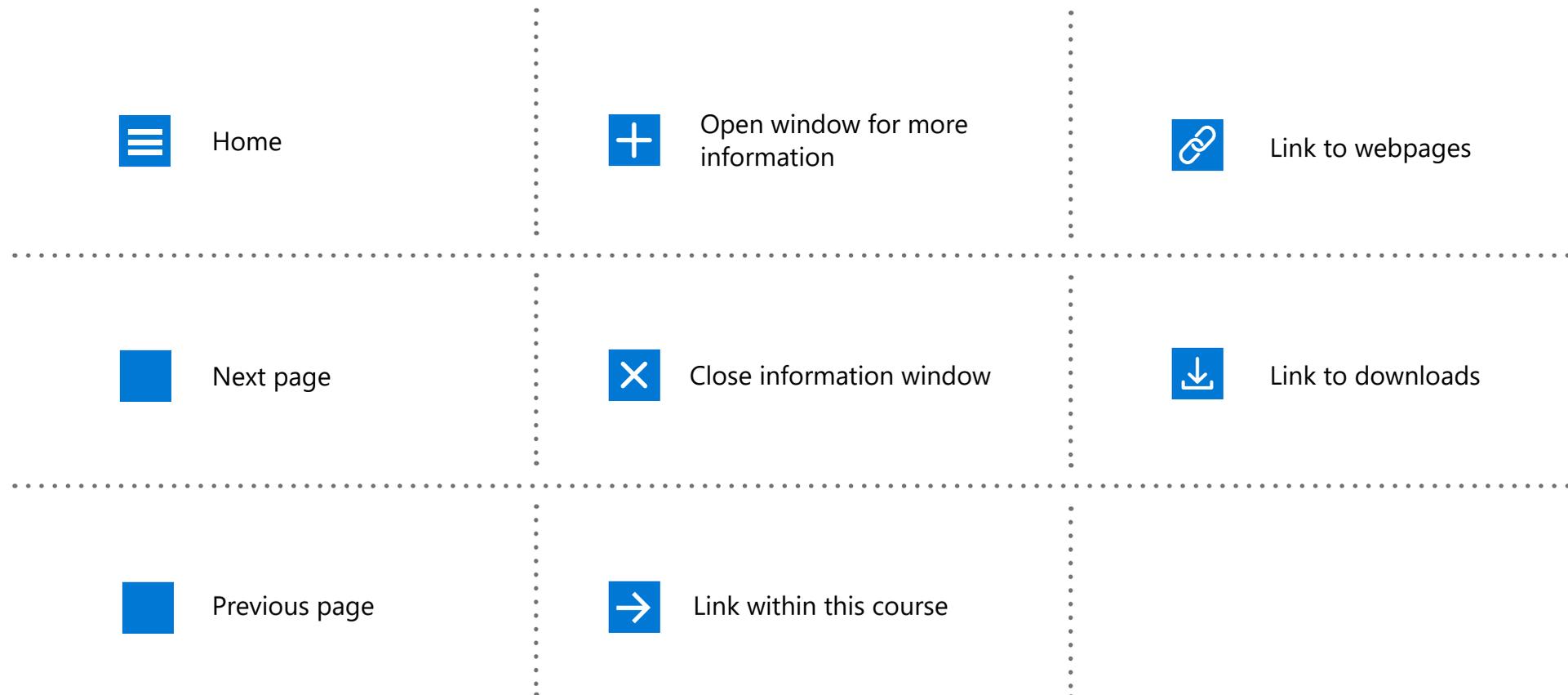


Module 5

Business case development

Before we start our training, please find the keys below to our interactive PDF:



Learning objectives

After completing an implementation roadmap, developing a business case summarizes the benefits and potential costs for new energy efficiency measures. A well-developed business case helps provide clarity to upper management on the importance of energy strategy, and can help secure approval and funding for the initiatives.

At the end of this module, you should have a high-level overview of the following best practices:

- Frame a business case.
- Conduct a life cycle cost analysis (LCCA).
- Understand the key difference between capital and operational costs.
- Distinguish the different types of investment metrics (TCO, ROI, savings determination, depreciation).
- Acknowledge both monetary and non-monetary benefits.

Once you complete this module, you'll have the following modules left:

Module 1 Getting started with energy management	Module 2 Stakeholder engagement	Module 3 Opportunity identification	Module 4 Roadmap development	Module 5 Business case development	Module 6 Energy efficiency in action
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Terms to know

Life Cycle Cost Analysis (LCCA): Life-cycle cost analysis (LCCA) is a method for assessing the total cost of facility ownership. It takes into account all costs of acquiring, owning, and disposing of a building or building system.

Whole building model guidelines (WBMG): The whole building model assesses the total cost of facility ownership that includes acquiring, owning, operating and disposing a building system.

Return on investment (ROI): This is a performance measure used to evaluate the efficiency or profitability of an investment.

Internal rate of return (IRR): Annual rate of growth a project is expected to generate.

Modified internal rate of return (MIRR): This is a modified version of IRR that takes into account financing and reinvestment rates.

Capital costs: All costs incurred before a project is operational.

Operational costs: Costs incurred in day-to-day operations of buildings and equipment.

Depreciation: The reduction in value of a capital asset with the passage of time.



Framing the business case—concepts

Energy efficiency business cases are driven by layered benefits, nuanced financial considerations, and a clear understanding of the company-level decision-making process.

A well-presented business case can improve decision making by:

- **Articulating all benefits** related to the energy efficiency measure.
- **Stating the monetization benefits** that will occur after implementation (such as savings increased, costs reduced).
- **Using relevant metrics** to present to decision makers (such as risk factors, cost factors, resilience factors).
- **Being transparent in your calculations** by stating your assumptions and methodologies. This will help reduce confusion and limit questions from relevant stakeholders.
- **Ensuring stakeholders** identified in [Module 2: Stakeholder engagement](#) have the appropriate level of information.

Information to collect when presenting a business case

- Cost data
- Utility data
- operations and maintenance data
- Capital cost data
- Interest rate/discount rate
- Depreciation tables
- Potential benefits
- Potential savings
- Rate of return
- Forecast data
- Scenario analysis



Framing the business case—example

First cost only case

Installing a building control system will cost \$100,000 and help us achieve our energy goals by reducing energy use.

Energy savings only case

Installing a building control system will cost \$100,000 up front, with expected energy savings of \$25,000 per year for a simple payback of 4 years. The project will reduce energy consumption by an estimated 250,000 kWh, contributing to energy reduction targets.

Information to collect when presenting a business case

Installing a building control system will cost \$90,000 up front after \$10,000 of utility rebates. The project has expected annual savings of \$30,875, including \$25,000 in energy costs, \$5,000 in labor savings, and \$875 in depreciation tax savings, resulting in a simple payback of 2.9 years and an internal rate of revenue (IRR) of 35 percent. The controls will extend the life span of controlled HVAC equipment by reducing run times and will reduce hot and cold calls, improving tenant satisfaction. The project will reduce energy consumption by an estimated 250,000 kWh, contributing to energy reduction targets.

Life Cycle Cost Analysis (LCCA)

A life cycle cost analysis is a financial analysis that takes into account both the short and long-term costs associated with a project. This includes the costs associated with purchasing, installing, operating, maintaining, repairing, decommissioning, and disposing of equipment. The purpose of an LCCA is to help you estimate the cost of a proposed project and compare it with that of alternative measures. By taking both short and long term costs into account, you will be able to make an informed decision about project costs that is consistent with the organization's long-term strategy.

Different types of LCCA:

- **Whole building model guidelines**—The whole building model assesses the total cost of facility ownership including acquiring, owning, operating, and disposing a building system.
- **Simple payback**—This model accounts for the acquisition/implementation of an equipment/measure and calculates the IRR and present value at the end of the project's timeline.

Different metrics of LCCA:

- **Return on investment (ROI)**—The total return over the total investment.
- **Total cost of ownership (TCO)**—Total value of acquisition costs and expenses related to operating the asset.
- **Internal rate of revenue (IRR)**—Annual rate of growth a project is expected to generate.

Costs: capital vs. operational

Understanding capital and operational costs and the differences between them is vital when evaluating energy efficiency measures.

Capital costs (CC) are all costs incurred before a project is operational:

- Fixed costs
 - Equipment acquisition
 - Installation costs
- One-time expenses
 - Performance contractors
 - Service fees in purchase agreements

Operational costs (OC) are incurred in day-to-day operations of buildings and equipment:

- O&M costs
 - Labor costs
 - Third-party costs
- Maintenance costs
- Fuel costs
- Replacement and repair costs

A drill purchased for \$850,000 will be used for 15 years. The drill operator will be paid \$20 per hour for 8 hours. Every two weeks, there will be cleaning costs of \$1,000. Every four months, blades will be replaced for \$12,000. What are the CC and OC?

CC: Acquisition fee of \$850,000.

OC: Labor costs of \$160 per day. Monthly cleaning costs of \$2,000. Annual replacement costs of \$36,000.

Savings determination

Savings can help boost ROI, create a budget for future projects, and build trust with stakeholders in the decision-making process.

Types of savings to consider:

Energy savings—absolute savings, peak reduction.

Different methods available—engineering estimates, energy modeling.

Labor savings—apply labor rates to expected reductions in hours (such as, lightbulb replacements).

Other savings— such as fuel, replacement parts.

Cost savings—apply a monetary value to all identified savings.

Energy savings

Category	Savings	Rate	Annual savings
kWh savings (Annual)	200,000.00	\$0.10	\$ 20,000.00
Peak kW reduction (Monthly)	10	\$15.00	\$1,800.00
Total			\$21,800.00

Labor savings

Annual labor hours saved	208	Assumes 2 hours per week of savings
Labor rate (\$/hr)	\$35.00	
Annual labor cost savings	\$7,280.00	

Total cost of ownership evaluation

This evaluation will help assess all lifetime costs associated with the project. Understanding the total cost of ownership will help plan budgets for the future, anticipate costs, and evaluate different options.

Total cost of ownership (TCO) involves three main costs:

- **Acquisition costs**
 - Initial cost (usually less than 10%)
- **Operating costs**
 - Cost of operation (training, install cost, cost of energy)
 - Cost of maintenance (repairs, inspections)
 - Cost of downtime (indirect labor, lost production)
 - Cost of production
- **End of life costs**
 - Cost of disposal
 - Cost of de-installing
 - Remaining value

TCO formula

Initial cost

+ Operation cost

+ Maintenance cost

+ Production cost

– Remaining value

Acquisition cost	\$2,000,000
Operation cost	\$500,000
Maintenance cost	\$150,000
Production cost	\$180,000
Remaining value (subtract)	\$50,000
Total Cost of Ownership	\$2,780,000

Return on investment metrics

When evaluating which projects to invest in, choose the best metric to optimize decision making and align with leadership performance metrics.

Return on Investment (ROI) looks at the total return over the total investment.

Internal rate of Revenue (IRR) is the annual rate of growth a project is expected to generate.

Modified Internal rate of Revenue (MIRR) helps determine the financial attractiveness of a potential investment by assuming that positive cash flows are reinvested at the firm's cost of capital. MIRR is generally more accurate at determining the cost and profitability of a project.

Formulas

Return on investment metrics (continued)

The difference between MIRR and IRR is important to distinguish when presenting a business case.

IRR tends to overstate project profitability. MIRR improves on IRR by providing control over financing and reinvestment rates in the calculation.

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Depreciation and tax incentives

Depreciation is the physical degradation of a capital asset. Reporting depreciation can reduce your tax bill. It is important to **incorporate depreciation and tax incentives** into your business case in order to **offset costs on energy assets**.

There are three elements needed to report depreciation:

- Approach (Type of method)
- Timeframe (lifetime of the asset or number of years of operation)
- Rates (rate of depreciation, lifetime of equipment)

There are five methods to calculating depreciation:

1. **Straight line depreciation** = (Fixed asset cost – residual value)/useful life)
2. **Units of production** = (Number of units produced/estimated units produced over useful life) * (cost – residual value)
3. **Sum of the year's digits** = (Remaining life of asset/sum of years' digits) * (fixed asset cost – residual value)
4. **Declining balance** = Net book value * depreciation rate
5. **Double-declining balance** = Net book value * depreciation rate
(the rate in this case is double rate used in the straight line depreciation)

Straight line depreciation calculation example

Year	Asset cost	Residual value	Depreciation expense
1	50,000	5,000	9,000
2	50,000	5,000	9,000
3	50,000	5,000	9,000
4	50,000	5,000	9,000
5	50,000	5,000	9,000

Other incentives

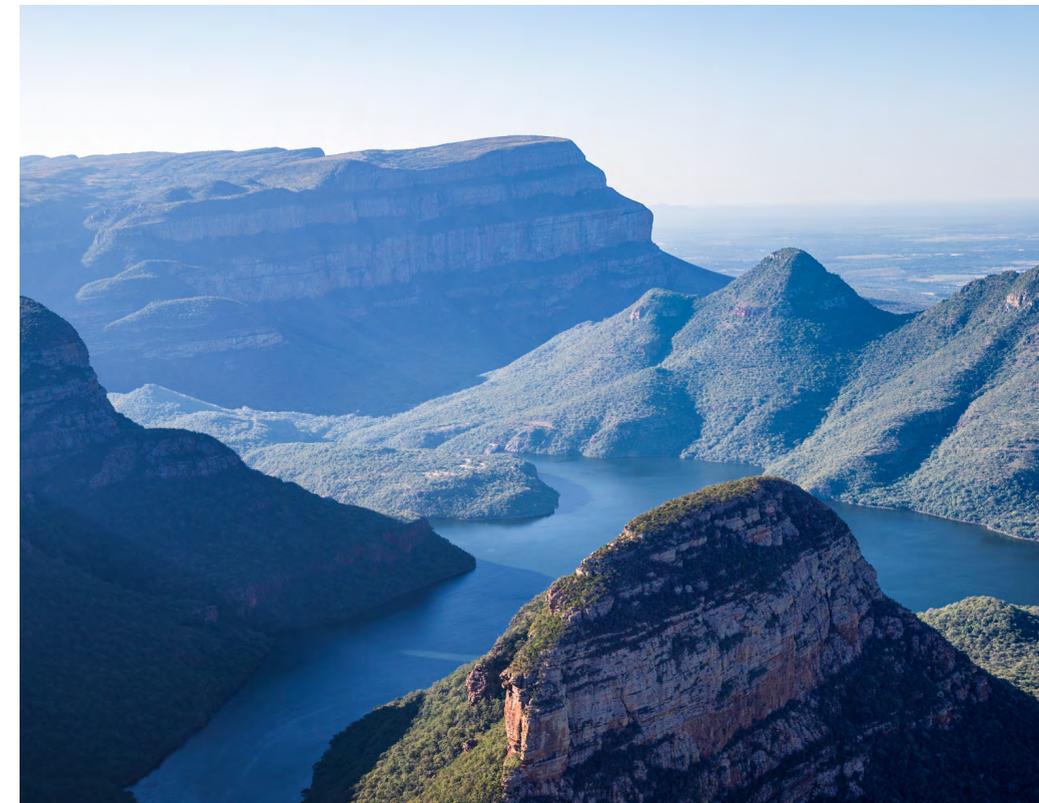
There are other incentives to look at which can be taken into account when framing a business case. These incentives can provide subsidies or offset costs.

Research local utility incentive or rebate programs.

Research municipal, state, and federal programs.

Recommend direct outreach to program leads.

Provide resources for identifying available incentives.



Visit www.dsireusa.org for a comprehensive source of information on incentives supporting energy efficiency in the United States.

Additional and indirect benefits

Well-framed business cases showcase both monetized and non-monetized benefits. Great investments have benefits that go beyond savings only.

Here are some examples of such benefits:

Safety

Employee morale

Skill building

Customer satisfaction

Labor productivity

Enhanced public image

**More energy
consumption awareness**



Congratulations! You've completed Module 5: Business case development

This module provided best practices on how to develop a well-framed business case. Key takeaways:

- Frame a business case by articulating all the benefits, stating the monetization benefits, using relevant metrics, and staying transparent in your calculations.
- Develop an LCCA model to estimate the cost of the project's alternatives. Make sure to select the correct type of LCCA depending on your energy efficiency measure.
- Understand the different types of savings.
- Know how to incorporate total cost of ownership, ROI, and depreciation in your business case.
- Distinguish which investment metric is relevant in presenting your business case.
- Identify incentives to offset costs.
- Articulate additional benefits such as productivity, employee satisfaction, and safety.

The following module will provide an overview of how to ensure energy conservation measures are implemented correctly and tracked.

Module 1 Getting started with energy management	Module 2 Stakeholder engagement	Module 3 Opportunity identification	Module 4 Roadmap development	Module 5 Business case development	Module 6 Energy efficiency in action
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