

CEP1005: Efficiency First Module Outline

“Self-directed” Online Training

Prerequisites

None

Recommended prior learning/experience

A general knowledge of buildings and/or manufacturing systems, equipment and operations would be helpful for understanding the context of this training.

Description

This is our introductory module that outlines why efficiency is important and looks at organising energy and decarbonisation projects in a specific way to optimise the overall impact and minimise overall costs.

Position and pathway

This module has an associated assessment which takes the form of an online examination. Success in the associated assessment is an element of CEP’s Certified Professional in Energy and Certified Professional in Carbon professional qualifications.

Delivery mode

The training module consists of eleven (11) videos, eleven (11) progression quizzes and one completion quiz (in 2 parts). The progression quizzes serve as gatekeeper steps, requiring successful completion before participants advance to the next lesson.

Additional reading: Energy Efficiency First, The Electricity Story (EECA, July 2019)
<https://www.eeca.govt.nz/assets/EECA-Resources/Research-papers-guides/EECA-Energy-Efficiency-First-Technical-Report.pdf>

Hours

This module is split into eleven (11) lessons and totals approximately 45 minutes of viewing time. Students will be required to undertake eleven (11) progression quizzes, which should take around five (5) minutes each.

Learning outcomes

By the end of the module, students should:

1. Understand energy efficiency in the global context.
2. Understand energy efficiency in the local context.
3. Understand why efficiency projects should generally be implemented first.
4. Solidify why efficiency comes first and marginal abatement cost introduction.
5. Understand efficiency and demand reduction and be aware of some common examples of each.
6. Understand loads and equipment sizing.
7. Be able to employ the 'start at the end' strategy to reduce demands and have a high level understand of systems level thinking and optimisation.
8. Understand the upstream impacts of reducing demands and equipment sizes specific to electricity infrastructure.
9. Understand what a hybrid system is and common hybrid setups.
10. Be aware of the risk of efficiency or investments locking-in a technology or sub-optimal solution.
11. Have a memorable case study at your disposal.

Module Structure and Progression

Lesson Outlines	
Lesson 1	Energy efficiency, a global perspective
	Video duration: 5 minutes approximately. Content relates to learning outcomes 1: <ul style="list-style-type: none"> • Global perspectives • The role of energy efficiency, globally
Progression Quiz 1	
Lesson 2	Energy efficiency and decarbonisation in New Zealand
	Video duration: 5 minutes approximately. Content relates to learning outcomes 2: <ul style="list-style-type: none"> • Local perspectives on efficiency • The benefits of efficiency first for New Zealand
Progression Quiz 2	
Lesson 3	When efficiency comes last
	Video duration: 3 minutes approximately.

	<p>Content relates to learning outcomes 3:</p> <ul style="list-style-type: none"> • Understand what can happen if efficiency does not come first • Understand how it could have gone differently
Progression Quiz 3	
Lesson 4	Why Efficiency First and Marginal Abatement Cost
	<p>Video duration: 3 minutes approximately.</p> <p>Content relates to learning outcomes 4:</p> <ul style="list-style-type: none"> • Understand why efficiency usually comes first • Understand the concept of Marginal Abatement Cost (MAC)
Progression Quiz 4	
Lesson 5	Efficiency and demand reduction
	<p>Video duration: 6 minutes approximately.</p> <p>Content relates to learning outcomes 5:</p> <ul style="list-style-type: none"> • Understand the concepts of efficiency and effectiveness • Identify examples of efficiency, such as accomplishing the same tasks with less energy • Summarise the key points from the efficiency lesson • Recognise general savings opportunities in various categories, like lighting • Explain part-load efficiency and its benefits • Understand demand reduction strategies • Identify examples of demand reduction such as decreasing overall energy needs
Progression Quiz 5	
Lesson 6	Understanding loads and equipment sizing
	<p>Video duration: 4 minutes approximately.</p> <p>Content relates to learning outcomes 6:</p> <ul style="list-style-type: none"> • Identify and interpret typical load profiles • Understand and analyse load duration curves • Define and assess peak load • Evaluate part-load efficiency • Determine the appropriate sizing of equipment based on peak load, including its impact on efficiency
Progression Quiz 6	

Lesson 7	Start at the end and systems thinking introduction
	<p>Video duration: 9 minutes approximately.</p> <p>Content relates to learning outcomes 7:</p> <ul style="list-style-type: none"> • Differentiate between efficiency and effectiveness • Identify examples of efficiency, such as achieving the same results with less energy • Summarise key concepts from the efficiency module • Recognise general energy-saving opportunities across various categories (e.g. lighting) • Understand and assess part-load efficiency • Explore strategies for demand reduction • Provide examples of demand reduction, including methods to reduce overall energy consumption
Progression Quiz 7	
Lesson 8	Upstream effects and costs - electrification
	<p>Video duration: 4 minutes approximately</p> <p>Content relates to learning outcome 8:</p> <ul style="list-style-type: none"> • Analyse the use of an electric steam boiler in a hospital setting • Provide an overview of basic electrical infrastructure • Identify the lowest-cost approach for electrical system implementation
Progression Quiz 8	
Lesson 9	Hybrid solutions
	<p>Video duration: 2 minutes approximately</p> <p>Content relates to learning outcome 9:</p> <ul style="list-style-type: none"> • Understand and apply the 80/20 rule • Identify and describe common hybrid systems
Progression Quiz 9	
Lesson 10	The risk of locking-in technologies
	<p>Video duration: 3 minutes approximately</p> <p>Content relates to learning outcome 10:</p> <ul style="list-style-type: none"> • Analyse a heat recovery example • Differentiate between efficiency and decarbonisation • Understand the importance of strategic planning when capital is limited

Progression Quiz 10	
Lesson 11	Putting it all together
	<p>Video duration: 3 minutes approximately</p> <p>Content relates to learning outcome 11:</p> <ul style="list-style-type: none"> • Recognise the importance of accurate data • Implement strategies for reducing demand • Understand and apply principles of energy efficiency • Develop optimised solutions for energy management
Progression Quiz 11	
Completion Quiz (in two parts)	

Assessment

This training module does not have a formal assessment. CEP runs a credential, assessed by examination for CEP1005: Efficiency First, which operates independently of this training module. Completion of this module is not a pre-requisite for the formal assessment.

Completion

The module will be considered completed and a digital “Completion” certificate will be available when the student has achieved a score of 75% or above in each part of the Completion Quiz (which has no limit on number of attempts).