

CO-GENERATION

What is co-generation?

Co-generation, an efficient method of generating energy, involves producing electricity at the same time as creating heat and steam for industrial purposes, such as drying timber in kilns or drying milk powder.

In large factories, wood waste, gas or coal is used to generate electricity for the factory. Surplus electricity can be exported to the National Grid. Co-generation can produce both electricity and hot steam for factory use.

What types of co-generation are there?

In New Zealand, the main types of co-generation are open-cycle gas turbines and steam turbines.

How is electricity generated through co-generation?



THE CARTER HOLT HARVEY PULP AND PAPER MILL IN KINLEITH IS A GOOD EXAMPLE OF A CO-GENERATION SCHEME.
SOURCE: GENESIS ENERGY

Co-generation at a paper mill (open-cycle gas turbine)

Co-generation uses the heat from an open-cycle gas turbine in a boiler, which produces steam. This steam is used in two ways:

- to dry freshly milled paper in the factory
- to turn a steam turbine

The steam turbine drives a generator. The generator then produces electricity. The paper mill uses the electricity to run its business and exports the rest to the National Grid for everyone to use.

Co-generation at a dairy factory (steam turbine)

Some of the heat produced by a dairy factory is used to turn water into steam. The steam turns a turbine, driving a generator. The generator then produces electricity. The dairy factory uses the electricity to run its business and exports the rest to the National Grid for everyone to use.

What are the advantages of co-generation?

Co-generation makes use of excess heat, which helps to improve overall efficiency of the generator. In comparison to other ways of generating energy, it's more efficient, as it uses the heat and energy generated by fossil fuels or wood waste. Co-generation can save businesses money as they're generating their



own electricity and steam supply.

What are the disadvantages of co-generation?

Even though co-generation uses electricity generated efficiently in the business, it can burn non-renewable sources which produce carbon dioxide emissions.

How is co-generation used in New Zealand?

Co-generation is a relatively new technology in New Zealand. It has the potential to be used throughout the country due to our primary industries, such as dairy, paper, and steel production.

A few co-generation schemes operate in New Zealand today. The Fonterra Plant in Te Awamutu and the Carter Holt Harvey Pulp and Paper Mill in Kinleith are two examples. Combined, these co-generation plants have a capacity of 67MW, enough capacity to power 60,000 homes.

ACTIVITY

Small group brainstorming activity.

- Think of at least one other business that could use co-generation. Look at the types of waste the business is creating and how the waste could be used to generate energy.
- Do you think co-generation is an environmentally-friendly type of energy generation? Explain.
- Discuss whether small or medium sized enterprises could pool their resources and use co-generation as a method of generating energy.

SUPPORTING RESOURCES

- Energy Efficiency and Conservation Authority: www.eeca.govt.nz
- Ministry of Economic Development: www.med.govt.nz
- Genesis Energy: genesisenergy.co.nz

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