What is process heat?

In the dairy manufacturing sector, process heat is heat used to produce hot water or steam, typically generated onsite using a boiler or air heater. Some sites have cogeneration facilities that produce both steam and electricity (some of which may be exported).

What does the dairy manufacturing sector produce?

The dairy manufacturing sector makes products including milk, milk powders, cream, butter, cheese, ice-cream and associated protein products.¹

How is it used in the dairy manufacturing sector?

Specific processes requiring process heat include:

- Pasteurisation (or heat treatment) to ensure dairy products are safe to consume and to extend their shelf-life.
- Evaporation to increase the concentration of milk solids before further processing.
- Spray drying to produce shelf stable products (e.g. milk powder). This is the most energy-intensive dairy manufacturing process.

**FACT SHEET**

**What is the fuel demand for process heat in this sector?**

In 2016, the dairy manufacturing sector used 28.4 Petajoules (PJ) of fuel to generate process heat.

Of the 28.4 PJs used, coal accounted for 54% and natural gas for 38%. Other fuels, which includes liquid fuels (e.g. diesel) and geothermal, accounted for the remaining 7%.

How many households in New Zealand can be powered by 28.4 PJs in a year?

800,000 households, or 45% of all households in New Zealand.

**What are the greenhouse gas (GHG) emissions generated from process heat in this sector?**

The 28.4 PJs of fuel used produced 2.1 million tonnes of carbon dioxide equivalent (CO2-e).

Coal is one of the most emissions-intensive fuels used in process heat. Of the 2.1 million tonne emissions, coal contributed 67%, natural gas 28%, and other fuels 5%.

How many internal combustion engine cars would emit 2.1 million tonnes CO2-e?

900,000 internal combustion engine cars would produce 2.1 million tonnes CO2-e.

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**Figure 1: Fuel demand in the dairy manufacturing sector, 2016**

**Figure 2: GHG emissions in the dairy manufacturing sector, 2016**
There are 66 dairy manufacturing sites using process heat in the North Island and 33 in the South Island.

In the North Island, reticulated natural gas delivered 75% of the fuel demand. In the South Island, coal delivered 89% of fuel demand.

Reticulated natural gas is a lower emission fuel than coal but it is typically more expensive. However, the advantages of gas mean it is generally the preferred fuel where available. As natural gas is not available in the South Island, coal is the preferred fuel due to its availability and low cost. This means that dairy manufacturing in the South Island is more emissions-intensive than in the North Island.

### Sources


2. All data shown is for 2016 from the MBIE/EECA Heat plant database (2018). This data was aggregated to maintain commercial confidentiality. Fuel demand data includes estimates of the fuel required to generate steam supplied by cogeneration.


4. The fuels types included in the “Other” group are Diesel, LPG, Light Fuel Oil, and Geothermal.

5. Based on EECA modelling using Ministry of Transport 2015 light fleet data.

You can find out more about Process Heat in New Zealand (PHiNZ) on the Ministry of Business, Innovation & Employment (MBIE) website - [http://www.mbie.govt.nz/PHiNZ](http://www.mbie.govt.nz/PHiNZ)

For more information on PHiNZ please contact us at energymarkets@mbie.govt.nz