Meat and Meat Product Manufacturing

Process Heat in New Zealand

FACT SHEET

What is process heat?

Most of the heat used in the meat and meat product manufacturing industry is generated in boilers to provide steam and hot water for meat processing. Steam is also used to manufacture meat products and render animal by-products. Smaller quantities of heat are used for other purposes such as space heating.

What does the meat manufacturing sector produce?

There are over 90 meat processing plants in New Zealand, nearly **60**% of which are located in the North Island.[1] These produce:

- Cattle, sheep, goat and pig meat, oils and fats, tallow and protein meals. About **85**% of the meat processing plants produce animal products and consume a similar proportion of the total energy used in the sector.
- Poultry meat products, which consume less than **10**% of total of the sector's energy.
- Fish and other seafood preparation, through canning and processing.
- Cured meat and small goods manufacture including bacon, ham, pate and corned meat.

How is the heat used?

New Zealand meat processing plants use relatively small, medium-temperature boilers to produce steam or hot water for:

- Cleaning and sterilisation of equipment used in slaughtering, boning and meat preparation.
- Rendering of animal by-products to produce tallow, lard and protein meals. Rendering typically doubles the process heat requirement of a meat processing plant.[2]
- The making of speciality products such as small goods and cured products.

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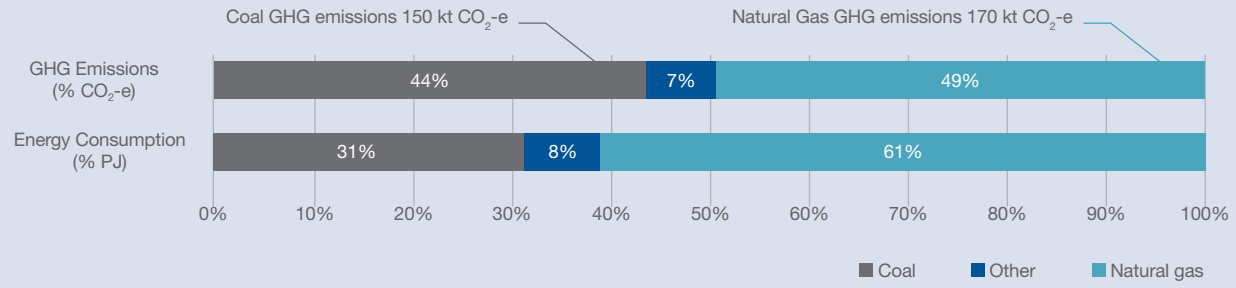
What is the fuel demand and greenhouse gas (GHG) emission volume from process heat in this sector?

In 2016, the meat and meat product manufacturing industry consumed 5.2 petajoules (PJ) of fuel to generate process heat (**2.6**% of New Zealand's total process heat demand).[3] A mix of fuel types was used to fire the steam boilers:

- Coal accounted for **31**% or 1.6 PJs of total energy consumption in this sector. Over **80**% of the coal was consumed in South Island plants, about half of which was lignite, a low cost, low quality type of coal.
- Gas contributed **61**% or 3.2 PJs of total energy consumption. This was limited to North Island plants as natural gas is not available in the South Island. Although gas is generally more expensive than coal it is often the preferred option due its superior combustion characteristics and the lower cost of gas boiler plant.
- The remaining **8**% of energy requirements was made up of a variety of fuels including LPG, fuel oil and wood.

Figure 1: Fuel Consumption and GHG Emissions for the meat processing sector 2016



Total GHG emissions from meat and meat manufacturing in 2016 were 345,000 tonnes of CO2-e. (**4.2**% of New Zealand's process heat-related GHG emissions).[4]

Because coal generally emits more carbon dioxide than other fuels for each tonne of steam produced in the boilers, it was the source of **44**% of emissions despite representing only **31**% of energy consumed. Conversely, gas provides **61**% of energy but only **49**% of GHG emissions.

Virtually all energy consumed for process heat is produced from non-renewable fossil fuels. This is reflected in the relative profiles of fuel mix and sources of greenhouse gas emissions (See Figure 1).

NB: Heat recovery from electrical processes such as refrigeration plant is a growing source of energy within the industry.

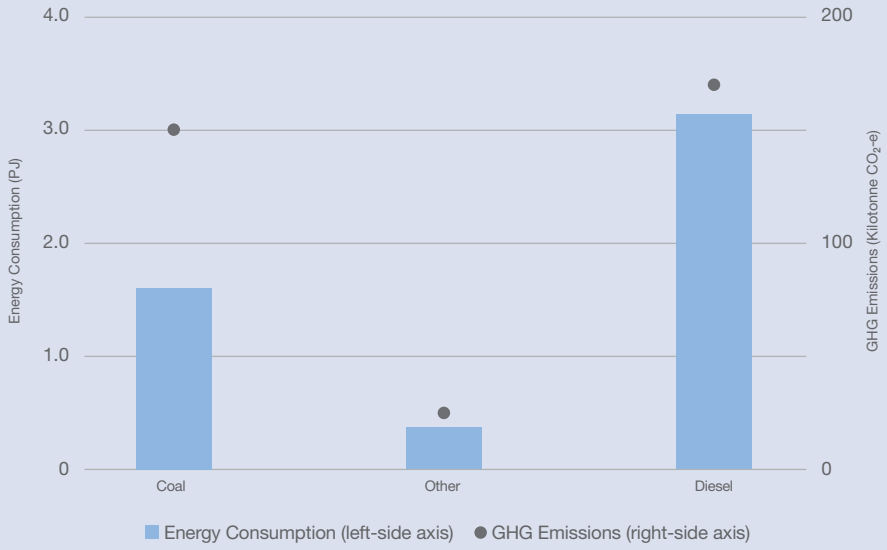
345
thousand tonnes
of carbon dioxide equivalent (CO_2-e)

The approximate volume of the meat and meat manufacturing sector's GHG emissions in 2016.

What is the fuel demand and greenhouse gas (GHG) emission volume from process heat in this sector?

Figure 2 displays absolute levels of fuel demand and emissions by fuel type. It shows that coal is more emissions-intensive per PJ of energy consumed, than any other fuel source used.

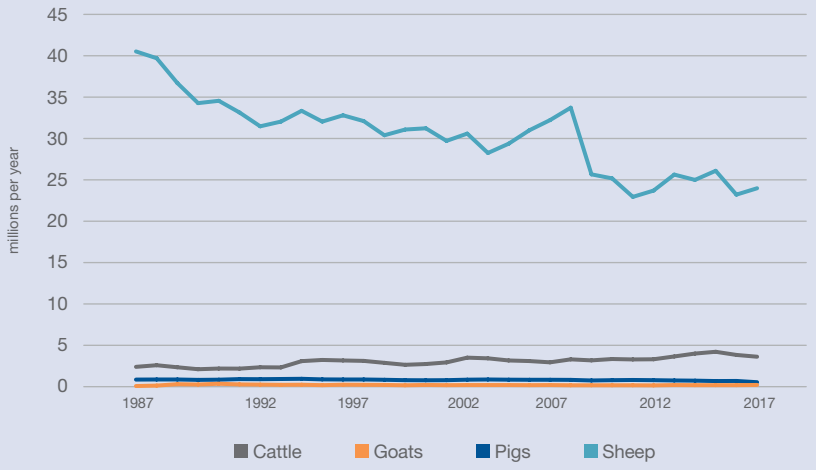
Figure 2: Fuel Consumption and GHG Emissions for the meat processing sector 2016—actuals by fuel type.



Sector insight: Animal slaughter data

Nearly 30 million cattle, sheep, goats and pigs were slaughtered in 2017, a figure which has remained fairly stable over the last ten years, but is substantially lower than the highs of the 1980s. In addition, over 100 million chickens were killed and processed.[5] Energy consumption roughly corresponds to the total weight of meat being processed; cattle and pigs require greater quantities of energy per head to process than lambs and chickens.

Figure 3: Animals Slaughtered[6]



Sources

1. 2016 Heat Plant Database, MBIE/EECA (2018). Note, the number of plants as at 2019 may be different from 2016 data
2. Energy consumption for small to medium red meat processing facilities, Energetics Pty Ltd 2013 https://www.ampc.com.au/2013/10/Energy-Consumption-Guide-for-Small-to-Medium-Red-Meat-Processing-Facilities
3. 2016 Energy end Use Database (EEUD), EECA (2018). https://www.eeca.govt.nz/resources-and-tools/tools/energy-end-use-database
4. 2016 EEUD, EECA (2018)
5. https://pianz.org.nz/industry-facts/ Poultry Industry Association of New Zealand
6. Statistics New Zealand (from Ministry of Primary Industries), animal kill data. Note, no time series data was available on chickens killed. https://www.stats.govt.nz/information-releases/livestock-slaughtering-statistics-august-2018-infoshare-tables

Process Heat in New Zealand

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

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