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.

There are over 90 meat processing plants in New Zealand, nearly 60% of which are located in the North Island. 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.

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.
- The making of speciality products such as small goods and cured products.
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). 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.

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).

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.

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

345 thousand tonnes of carbon dioxide equivalent (CO2-e)
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.

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. 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.
Sources

1. 2016 Heat Plant Database, MBIE/EECA (2018). Note, the number of plants as at 2019 may be different from 2016 data


