

Wood Processing – Process Heat and Greenhouse Gas Emissions

FACT SHEET



What is process heat?

In the wood processing sector, process heat is the heat used to produce hot water, steam or hot oil to make wood-based products. It is typically generated onsite using boilers, furnaces, or thermal oil heaters.



What does the wood processing sector cover?

The wood processing sector covers:¹

- **Wood product manufacturing** including log sawmilling, timber dressing, veneer and plywood manufacturing.
- **Pulp, paper and paperboard manufacturing**, and converted paper product manufacturing (for example, paper bag and stationery manufacturing).

2016 data shows there are 131 wood processing sites that use process heat in New Zealand – 88 in the North Island and 43 in the South Island.²

In 2016, boilers provided about **80%** of the sector's energy requirements. About **90%** of the process heat was generated at temperatures between 100 and 300 degrees Celsius.³ This is a 'medium' temperature of process heat.

The sector's process heat usage varies depending on the product being made. For instance, process heat is used at different temperatures for the following:

- **Kiln drying sawn timber.** Timber drying kilns typically use pressurised hot water at temperatures between 120°C and 180°C to heat the kiln's air.
- **Particle board manufacturing.** Wood particles, sawdust or flakes are mixed with resin and formed into sheets which are then compressed under high pressure at temperatures of around 180°C.
- **Medium density fibreboard (MDF) manufacturing.** Hardwood or softwood residues are broken down into wood fibres and then combined with wax or resin binders to form sheets. Similarly to particle board, the sheets are then compressed under high pressure at temperatures of around 230°C.

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

The wood processing sector is New Zealand’s largest user of process heat. In 2016, it used 57.0 petajoules (PJ) of process heat (or **28.7%** of New Zealand’s total process heat demand).⁴ This is equivalent to the total amount of energy consumed by **90%** of New Zealand’s households annually.⁵

Of the 57.0 PJ used by the wood processing sector, wood product manufacturing used 36.2 PJ and pulp and paper manufacturing used 20.7 PJ.

Wood processing GHG emissions were relatively low when compared with other industrial sectors at around 0.51 million tonnes (MT) of carbon dioxide equivalent (CO₂-e) – or **6.1%** of all process heat related emissions in 2016.⁶

87.5% of the energy consumed was from renewable sources, namely wood, geothermal, and a small proportion of electricity.⁷ This produced **20.4%** of the sector’s process heat emissions. While **12.5%** of energy consumed was from non-renewable sources, it contributed to **79.6%** of the sector’s process heat emissions (see Figure 1).

Figure 1: Fuel demand and GHG emissions for the wood processing sector 2016 by energy source⁸

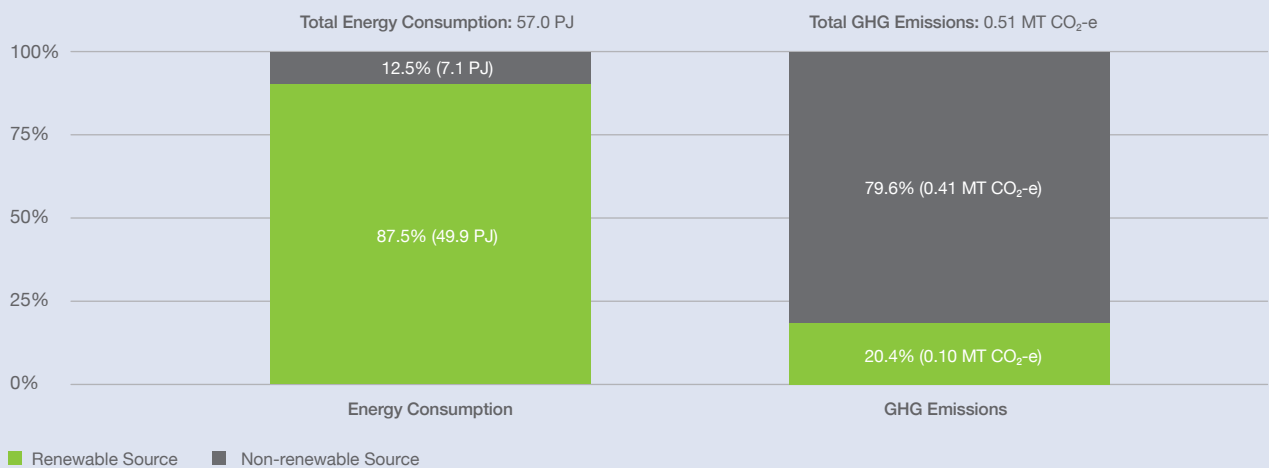
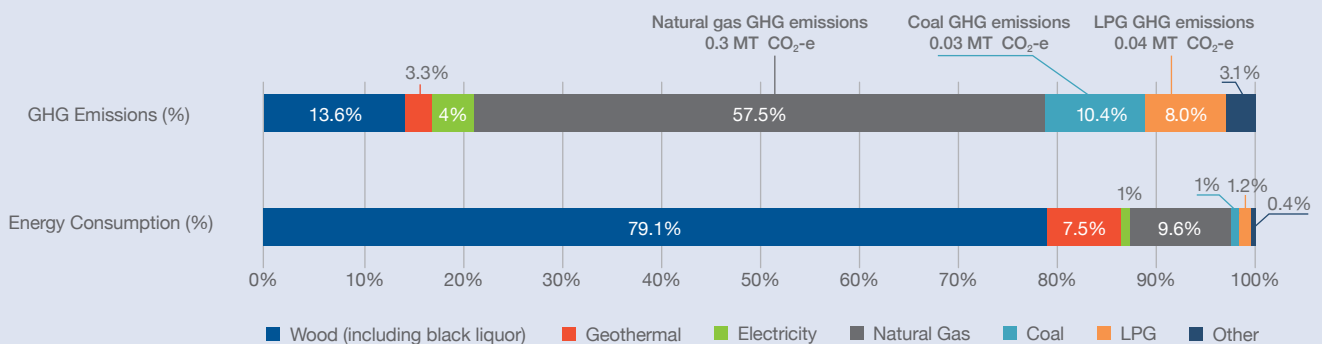


Figure 2: Fuel demand and GHG emissions for the wood processing sector 2016 – percentages by fuel type⁹



Note: The group 'Other' includes fossil fuels - fuel oil and diesel.

Figure 2 shows the sector’s percentages of fuel use and emissions by fuel type. **79.1%** of energy consumption was met using wood fuels. However, this only accounted for **13.6%** of GHG emissions. Most emissions were from using natural gas (**57.5%**), coal (**10.4%**), and LPG (**8%**).

Figure 3: Fuel demand and GHG emissions for the wood processing sector 2016 by fuel type¹⁰

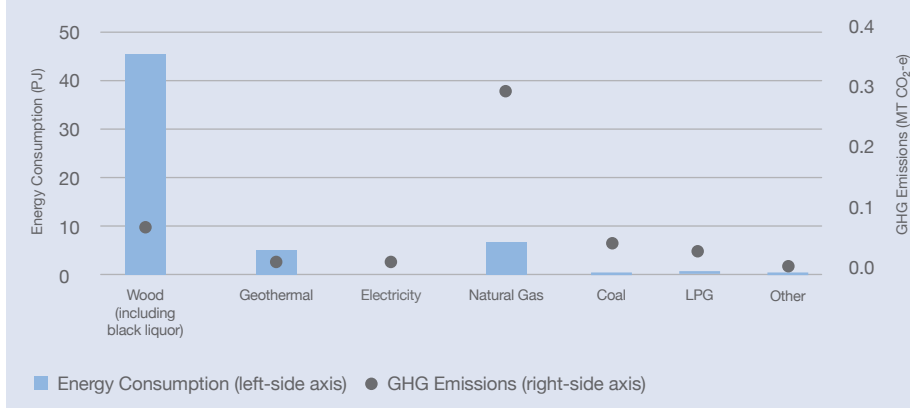


Figure 3 displays absolute levels of fuel demand and emissions by fuel type. The sector’s biggest emissions reduction opportunity is reducing natural gas consumption by increasing energy efficiency or switching to renewable fuels.

Sources

1. Refers to Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 Subdivisions C14 and C15.
2. 2016 Heat Plant Database, MBIE/EECA (2018). Note, the number of wood processing sites as at 2018 may be different from the 2016 data.
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. Based on Statistics New Zealand 2018 household estimates data and MBIE 2016 Residential energy demand data (published 2017).
6. 2016 EEUD, EECA (2018).
7. 85% electricity consumption is attributed to renewable sources – Source: Energy in New Zealand: 2016, MBIE (2017).
8. 2016 EEUD, EECA (2018).
9. 2016 EEUD, EECA (2018).
10. 2016 EEUD, EECA (2018).



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>

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