

AMPC Decarbonisation pathways update 2022

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Project Description

This research report was commissioned by the Australian Meat Processor Corporation (AMPC) to update the 2019 report “Emission reduction pathways and opportunities for the Australian red meat processing (RMP) sector” (AMPC report 2019-1059). This update includes a review of the 2022 Environment Performance Report (EPR) results, the status of decarbonisation in the international red meat processing industry, decarbonisation technologies, Australian government policies, and the outputs from updated domestic decarbonisation pathway analysis.

Project Content

This research:

1. Updates previous emissions reduction pathway analysis conducted in 2020.
2. Updates the previous research with new decarbonisation technologies, changes in Australian government policy and recalculate the decarbonisation pathway based on the updated situation.
3. Provides an overview of international RMP industry carbon emissions intensity and the types of decarbonisation technologies for comparison with the Australian RMP.
4. Assesses the impact of retailer carbon emissions goals on RMP.
5. Conducts a brief assessment of fugitive emissions.
6. Reviews the use of Power Purchase Agreements (PPAs) for RMP.
7. Reviews the status of carbon offsets.
8. Updates the status and forecast of the electricity grid decarbonisation.

Project Outcome

As discussed in the previous report, Australia is already taking steps towards market leadership in red meat decarbonisation. In 2017, the Australian red meat and livestock industry set a target to be carbon neutral by 2030 (CN30). The AMPC has a similar ambition to achieve CN30. The results from the EPR project over the last 13 years (see Table 1) indicate that Australian red meat processors (RMP) have achieved about 15% to 20% energy intensity and greenhouse gas emissions reduction. The recent increases in both energy intensity and carbon intensity can be attributed to lower production levels in 2022, which resulted from limited animal supply, China’s imports ban, and staff shortages due to COVID-19 at several meat processing plants. Lower production output has reduced estimated annual total RMP industry emissions from 1,300,000 tCO₂e/year in 2018 to 1,139,850 tCO₂e/year in 2022¹.

Table 1 Australian red meat processing 2022 EPR results

Resource	2008/9	2013/14	2019/20	2021/22
Energy intensity (MJ/tHSCW)	4108	3005	3316	3435
Carbon emissions intensity* (kgCO ₂ e/tHSCW)	554	432	397	447

*Includes an estimate of carbon emissions from wastewater treatment

Major international RMP companies are also making efforts to reduce carbon emissions. They have set energy and carbon emissions targets, with differences in ambition (e.g., 10% versus 30% reduction by 2030), scope (energy use emissions only, versus emissions scopes 1, 2, and 3), and timeframes (net zero by 2030 to 2050). The decarbonisation strategies for Australian companies owned or in partnership with international groups follow the

¹ Data provided by AMPC

targets set by their international owners or partners. These targets are not as ambitious as the CN30 target set by AMPC and MLA.

A review of the carbon intensity for international companies shows the key differentiating factor for emissions intensity per tonne of meat processed in each country is the emissions intensity of the grid electricity in that country or region. A summary of the estimated emissions intensities for each country shows that most of our key competing countries have lower emissions intensity per tonne of meat processed, specifically Brazil, UK, and New Zealand (see Table 2). These countries have an average grid electricity carbon intensity of 0.10 to 0.15 tCO₂-e/MWh, which is lower than the most ambitious forecast for Australian electricity decarbonisation, which projects grid intensity of 0.20 tCO₂-e/MWh by 2030.

Table 2 Country electricity grid carbon emissions intensity and estimated RMP production carbon emissions intensity

Country	Average grid electricity carbon emissions intensity tCO ₂ -e/MWh	Estimated RMP carbon emissions intensity kgCO ₂ -e/tHSCW
Australia	0.68 (0.85 in Victoria and 0.17 in Tasmania)	447 (100 to over 600)
Brazil	0.12	220
New Zealand	0.15	240
United States	0.40	330
United Kingdom	0.10	>200
India	0.82	500
Mexico	0.43	350

The key technologies for decarbonisation have not changed significantly since the 2019 report, but heat pumps have become more available and competitive for hot water generation (75°C to 90°C). The rapid decarbonisation of Australia’s electricity grid, high and volatile natural gas prices, and rapid progress in heat pump technology development have led to increased interest in heat pumps for the electrification of natural gas and other fossil fuel-reliant processes. This is demonstrated by the recent implementation of a heat pump, solar PV, and battery project for the Hardwick Meats plant in Gippsland with funding support from the Australian Renewable Energy Authority (ARENA)².

There has been rapid growth in the implementation of on-site solar PV systems. In the last two years, AMPC has funded projects which have helped to increase the RMP solar PV adoption pipeline by 150%, commenced a hydrogen pilot project and assisted in the development of industry heat pump assessment tools with Australian Alliance for Energy Productivity (A2EP). All these projects are important steps for the development of the RMP decarbonisation pathway.

Two key factors which have changed since the 2019 emissions pathway report are:

- ◆ The change in government in 2022 has produced a significant change in Australian climate change policy. The Labour government has set new national targets for emissions reduction of 43% below a 2005 baseline by 2030 and net zero by 2050. (In 2020, under the Coalition, the national target was 26-28% reduction from

² Hardwick Meatworks Heat Pump Installation and Power Upgrade Demonstration - Australian Renewable Energy Agency (ARENA)

2005 levels, which, by counting Kyoto Protocol carryover credits toward the target, resulted in an effective target of 16%).

- ◆ Based on recent electricity grid decarbonisation forecasts³, RMP facility's emissions from grid electricity use could fall by 40% to nearly 90% by 2030 solely through grid decarbonisation. By 2050 all states converge on zero-emissions grid electricity.

It is important to note that the decarbonisation pathway for each RMP plant may differ considerably due to location-based factors such as grid electricity carbon intensity variations and the source of fuel for thermal systems.

If grid electricity does not decarbonise at the projected rate, this may also require RMP plants to move more quickly on replacement of fossil fuels with renewable energy sources to achieve the Australian government target of 43% by 2030 and entail larger efforts to achieve the Paris target of 63% by 2030.

To reach CN30, the RMP will need to decarbonise all scope 1 and 2 emissions. This would require the use of renewable energy for all electrical equipment including heat pumps, renewable fuels such as biomass and biogas boilers, and most likely the purchase of carbon offsets to address wastewater carbon emissions and Greenpower or renewable energy certificates to abate any residual emissions in electricity supply.

Further pressure for decarbonisation in the RMP industry is growing. In recent times, Australian food retailer Woolworths has a commitment of a 19% reduction in value chain emissions by 2030⁴ and Walmart, one of the world's largest international retailers, has committed to a goal to reduce or avoid one billion metric tonnes of Scope 3 CO₂e in the global value chain by 2030 (Project Gigaton)⁵.

Benefit for Industry

- The Australian RMP industry supported by AMPC has a strong history in decarbonisation demonstrated by the improvements in energy intensity and water intensity over the last 10 to 15 years. AMPC members can use this history to respond to the food retailers looking for scope 3 decarbonisation in the food supply chain.
- This report provides examples of decarbonisation pathways for Australian RMP plants. Each RMP plant can develop a site carbon footprint using the state-based grid electricity carbon intensity and appropriate carbon multipliers for other fuels and emissions using this report.
- This report includes a brief overview of decarbonisation opportunities required to achieve the carbon reduction targets. More details of decarbonisation technologies can be found in project 2023-1008.
- This report provides a list of AMPC decarbonisation research and pilot projects including those opportunities critical for future decarbonisation including heat pumps, biomass boiler and other renewable energy supplies.

Useful resources

See footnotes.

³ <https://www.dceew.gov.au/sites/default/files/documents/australias-emissions-projections-2022.pdf>

⁴ [Net positive carbon emissions by 2050 \(woolworthsgroup.com.au\)](https://www.woolworthsgroup.com.au)

⁵ [Climate Change \(walmart.com\)](https://www.walmart.com)