

4C-107: Potential Pathways to Carbon Neutrality

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Aims & Objectives

Reducing greenhouse gas (GHG) emissions is a key priority for the CRC for High Integrity Australian Pork, which has set targets to substantially reduce greenhouse gas emissions from pork production, to a target level of 1 kg CO₂-e/kg pork. This project builds on previous research using life cycle assessment (LCA) to quantify the GHG emissions from pork production to the farm gate. The project aimed also to show the process that a pig farmer would follow to lower their GHG emissions per kilogram of pork.

Methodology

The study conducted a detailed LCA analysis of pork production for a case study farm in Victoria. Emissions were modelled from the production of feed inputs, energy inputs, staff transport and manure management on the farm. Manure emissions were modelled using mass balance principles and emission factors from the Australian GHG Inventory and literature values. A series of GHG mitigation strategies reviewed from the literature and were screened for applicability to the Australian industry by a farmer advisory group established for the purposes of the study. Suitable mitigation strategies were modelled to show the emission rates that could be achieved.

Key Findings

The carbon footprint of the case study piggery was 4.86 kg CO₂-e/kg LW. Mitigations were modelled using a combination of strategies as follows:

1. CAP-CHP with standard production
2. CAP-CHP with optimised effluent storage and utilisation
3. CAP-CHP with optimised diet (low GHG feed ingredients)
4. CAP-CHP with optimised diet, effluent storage and utilisation, soil carbon sequestration and tree planting.

The final emissions from the four scenarios ranged from 0.6 - 2 kg CO₂-e/kg LW.

Reductions to meet the Pork CRC target (1 kg CO₂-e/kg pork) required application of several approaches together. We found that emissions could be reduced by 59% by installing CAP-CHP units and this was both the most likely and the most effective mitigation option.

The qualitative cost-benefit analysis suggests that covering ponds may be cost effective for a reasonable proportion of the industry. Changes to effluent management may also be cost effective, though these may have fairly long payback times. Other options such as modification of ration components or reduction of dietary CP are likely to increase costs making this less attractive.

Application to Industry

Providing a pathway to reducing GHG emissions in the industry. Researchers in the pork industry, and potentially in the food supply chain, may use the results to guide more detailed investigation into mitigation opportunities.

Pig farmers can use the report to identify strategies they can follow to reduce GHG from their farms.

At the discretion of Pork CRC, this information may be valuable for members of the general public who are concerned about the environmental impacts of pork and the potential to reduce impacts.