

Emission reduction technologies and potential use in the chicken meat industry



The release of greenhouse gases (GHG), such as carbon dioxide, into the atmosphere by human activities (e.g. industrialisation of industries and soil carbon loss from conversion of grassland to cropping) increases the ability of the atmosphere to hold heat, causing significant changes to the earth’s climate and weather patterns.

Reducing GHG emissions from human activities is a key priority for the government, community, and industry, with the aim of achieving overall carbon neutrality—where GHG emissions released into the atmosphere equals the amount of GHG emissions removed from the atmosphere.

The chicken meat industry is changing practices and investigating pathways to continue to reduce its GHG emissions (Figure 1). The key contributors to GHG emissions from meat chicken production in Australia relate to imported soybean meal for feed and the production of feed grains, and electricity use on farm (heating, shed ventilation etc) and during processing. Various technologies and strategies have been reviewed for their potential to contribute to the chicken meat industry’s efforts in reducing GHG emissions.

Diet and performance

The production of chicken feed contributes 58 – 61% of the carbon emissions from the chicken meat industry in Australia. When the impacts of land use are taken into consideration (for example, land use for feed grain production and soil carbon loss from conversion of grassland to cropping), feed accounts for 78% of industry GHG emissions. A key challenge for the Australian chicken meat industry is the reliance on imported soybean meal that has high levels of emissions from soil carbon loss. Mitigation of these impacts may be possible through improved feed conversion by the chickens (feed conversion ratio; FCR), reducing crude protein levels in the diet and sourcing lower-emission feed inputs, particularly soybean meal.

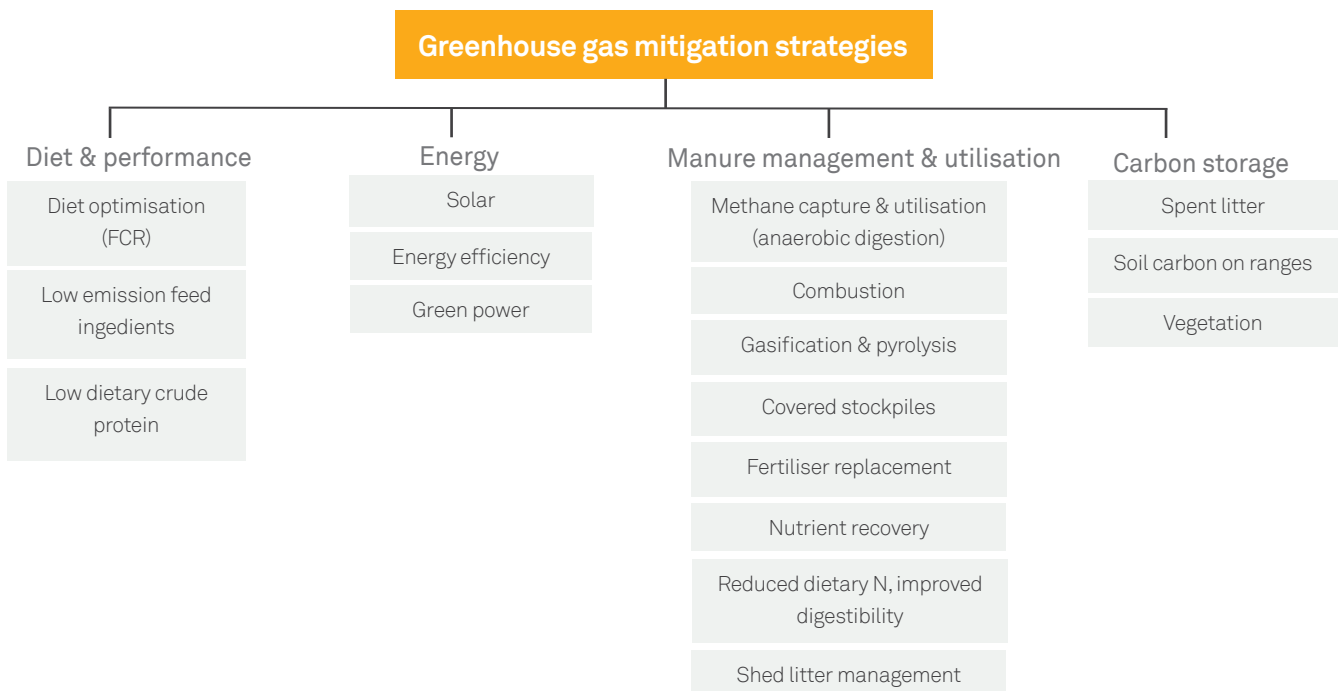


Figure 1. GHG mitigation strategies for the meat chicken industry.

This fact sheet was developed as part of the *Training and extension for the Australian chicken meat industry* project (PRJ-011920). This project supports the adoption of innovation and research and development outcomes for the Australian chicken meat industry.



Energy

The use of energy from fossil fuels throughout the chicken meat supply chain contributes approximately 20% of industry GHG emissions. A third of this is attributed to energy use in grain production for feed, while the majority is generated from farming and chicken meat processing.

Replacing 60% of grid electricity used on-farm with solar power would reduce total emissions (per kilogram of chicken meat) by 2% and replacing 30% of grid electricity with solar at the meat processing plant would reduce total emissions per kilogram of chicken meat by 2%. Between 68 and 88% of the energy on-farm is used for powering the fans used in tunnel-ventilation and environmentally controlled sheds. Utilising solar power and adopting more efficient ventilation fans represent the greatest opportunities for potential electrical energy savings. Ongoing efforts to reduce emissions from the electricity grid will also contribute to reductions in the emissions impact from the Australian chicken meat industry.

Manure management and utilisation

The production of manure by meat chickens contributes 5 – 8% of total industry GHG emissions. Broadly, there are three groups of options which can be considered for manure management and emission reduction:

1. waste-to-energy projects, which reduce emissions from fossil energy by utilising the manure to produce renewable energy on-farm
2. direct emission reduction from manure management on-farm
3. offsetting fertiliser emissions via better utilisation of manure as a synthetic fertiliser replacement in crop production.

Waste-to-energy is a key area of interest as the technology produces electricity and heat. The Australian pig industry has, in several instances, successfully adopted the technology.

It is important to note that between 2010 - 2020 the estimated average industry FCR improved by 12% and resulted in reduced emissions because the lower feed intake (to produce the same amount of meat i.e. FCR measure) means less manure.

Carbon storage

Carbon storage is the process of removing carbon from the atmosphere and depositing it in a reservoir, which in the case of the chicken meat industry is primarily in the form of used litter (bedding material), increasing farm vegetation (i.e. plants, grass and trees), and improved soil carbon storage (occurs when CO₂ from the atmosphere moves into the soil through manure and other organic matter).

At any given time, in excess of 20 times the amount of carbon in the atmosphere and four times the amount of carbon stored in plants, is stored in soil, which makes effective soil management extremely important for mitigating carbon emissions.

More information

Read the journal article

- Environmental impacts of the Australian poultry industry. 1. Chicken meat production DOI <https://doi.org/10.1071/AN22230>

Watch the webinar

- [Pathways to reduce carbon footprint in meat chicken farming](#)

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