

SUBMISSION

Submission to the House Standing Committee on Industry, Science and Resources

# Submission to the Inquiry into Food and Beverage Manufacturing in Australia

1 May 2024

**The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.**

The Australian food and beverage manufacturing industry is on the brink of transformation, with emerging technologies like artificial intelligence (AI) and automation offering opportunities to drive innovation, enhance productivity, and promote sustainability. These technologies can streamline processes, reduce waste, provide valuable insights into consumer preferences, and improve availability and affordability of healthy foods. To make the most of them, Australia will need to address challenges such as environmental sustainability, research and infrastructure investment, and workforce training. Collaboration between industry, government, and research institutions is crucial to navigating these challenges and seizing opportunities. Government support, initiatives promoting a circular economy, and strengthened collaboration are key drivers for the industry's resilience and sustainability.

ATSE makes the following recommendations:

**Recommendation 1:** Engage and support the food and beverage manufacturing sector in establishing a comprehensive decarbonisation strategy.

**Recommendation 2:** Support uptake of AI-driven and automation technologies to drive innovation and productivity in the Australian food and beverage manufacturing industry.

**Recommendation 3:** Implement policies and incentives that encourage the food and beverage manufacturing industry to accelerate adoption of circular economy practices across the supply chain.

**Recommendation 4:** Uplift research and development investment to 3% of GDP.

**Recommendation 5:** Encourage the establishment of joint research and development centres between industry stakeholders and research institutions.

**Recommendation 6:** Promote government-backed training and industry-academia partnerships to align vocational programs with technological advancements.

### **Opportunities for decarbonisation in the food & beverage manufacturing sector**

The food and beverage manufacturing sector in Australia presents several opportunities for decarbonisation, primarily through the adoption of renewable energy sources and improvements in energy efficiency. Integrating renewable energy technologies such as solar, wind, and biomass can significantly reduce reliance on fossil fuels, which are a major source of carbon emissions in the industry. For instance, solar thermal systems and biomass boilers can be used for heating processes, while photovoltaic panels can supply electricity for operations.

Enhancing energy efficiency within manufacturing processes is another critical avenue. This can be achieved through the optimisation of production lines and the implementation of energy recovery systems, such as using waste heat recovery units to capture and reuse energy from manufacturing processes. The adoption of advanced digital technologies like smart sensors and Internet of Things devices can lead to more efficient management of resources and lower energy consumption.

In partnership with Government, the sector can explore the potential of carbon capture and storage technologies to mitigate emissions directly associated with production processes. Implementing these technologies can help in capturing CO<sub>2</sub> emissions at the source and storing them underground or using them in other applications.

Decarbonisation of the food and beverage manufacturing sector can interface with efforts to decarbonise agriculture as a related industry. This can be considered alongside implementation of the Government's Agriculture and Land Sectoral Plan, currently being developed. [ATSE's submission](#) to that consultation recommended a whole-of-landscape emissions accounting system, along with supporting the development and implementation of low-methane feedstock and nitrogen fertiliser coatings to reduce nitrous oxide release. A decarbonisation strategy for the food and beverage industry can build off the momentum of the Sectoral Plan, aiming to cut greenhouse gas emissions across the agrifood supply chain.

**Recommendation 1:** Engage and support the food and beverage manufacturing sector in establishing a comprehensive decarbonisation strategy.

## Leveraging emerging technologies to drive innovation and productivity

The Australian food and beverage manufacturing industry stands to benefit significantly from emerging technologies like artificial intelligence (AI), automation, and digitalisation, as they offer opportunities to drive innovation and enhance productivity. Integrating AI-driven analytics into supply chain management can optimise processes, reduce waste, and improve efficiency. Predictive maintenance using AI can minimise downtime and increase productivity while automating repetitive tasks can further boost efficiency and reduce operational costs (Csiba & Ferenc, 2022).

Smart manufacturing platforms utilising AI can help the industry adapt quickly to changing market demands and consumer preferences, enabling the development of new products tailored to evolving consumer needs (Shukla, 2024). AI is also valuable for quality assessment in the food sector, ensuring consistent product quality and reducing waste. For beverage manufacturers, digital technologies in fermentation processes can improve product quality and consistency (Gonzalez Viejo & Fuentes, 2022). Innovations like personalised nutrition, intelligent packaging, and advanced quality control systems can result from the integration of AI and automation, helping meet the demand for healthy, safe, and sustainable food products that contribute to both emissions reduction and population health.

Additionally, these technologies contribute to sustainability goals by reducing waste, optimising resource use, and improving energy efficiency. However, there are challenges associated with the uptake of these technologies, such as infrastructure investment and workforce training, along with concerns related to data privacy, security, and employment impact (Misra et al., 2020). Effective data management and integration are essential, requiring robust infrastructure and governance. To support adoption of these technologies, the Australian Government could provide funding for research and training programs specific to the sector, along with expanding and promoting grants or tax incentives (such as the R&D Tax Incentive) for the implementation of AI and automation.

**Recommendation 2:** Support uptake of AI-driven and automation technologies to drive innovation and productivity in the Australian food and beverage manufacturing industry.

## Promoting circular economy within the food and beverage manufacturing industry

There are already initiatives aimed at promoting a circular economy in the food and beverage manufacturing industry, to reduce packaging waste and minimise food waste across the supply chain. To further promote a circular economy, the government should continue and expand existing initiatives aimed at reducing packaging waste and minimising food waste across the supply chain. The "A Circular Economy for Packaging in Australia" initiative from the DCCEEW should be sustained, and further avenues for packaging improvement should be explored. This could include implementing soft plastics recycling programs, especially considering the collapse of RedCycle. The Australian food and beverage manufacturing industry is actively involved in designing recyclable or biodegradable packaging, implementing take-back or refill programmes, and using food by-products for new products (Poças & do Céu Selbourne, 2023). Extending product shelf life and partnering with waste management companies for proper recycling and composting are also proving to be effective (Trade Council of Denmark in Australia, 2024).

Precision farming, optimised logistics, smart packaging technologies, and consumer awareness all contribute significantly to a circular economy (Shapiro, 2024). Sector-specific circular economy practices and redesigned food supply chains enhance value addition and safety while reducing waste. Education and awareness campaigns are essential for encouraging consumers to participate in circular economy practices. Strategies for promoting a circular economy within the sector focus on recycling, reusing waste for energy, and engaging consumers in waste reduction efforts. Implementing policies that encourage the use of recyclable or compostable packaging materials and developing infrastructure for recycling could significantly reduce waste. Initiatives such as improved supply chain logistics, food waste recycling programs, and incentives for food donation can also help minimise waste.

ATSE's report, [Towards a Waste Future](#), recommended the development of national standards for the quality and use of recycled content following actions from the National Waste Action Plan (ATSE, 2020). These standards would help develop guidelines to avoid waste, facilitate the use of materials throughout lifecycle of products, increase life cycle potential and promote the use of recycled content. Since the publication of ATSE's report, the Australian Government has taken the initial step of developing the voluntary National Framework for Recycled Content Traceability. Having these common standards builds trust in the provenance of recycled materials. There is more to be done on adopting circular economy

practices tailored specifically for the food and beverage manufacturing industry, conceptualising and applying common circularity practices, redesigning the agri-food chain, and implementing circular food supply chains, value addition and safety can be enhanced while reducing waste through innovative approaches in production and supply chain management.

**Recommendation 3:** Implement policies and incentives that encourage the food and beverage manufacturing industry to accelerate adoption of circular economy practices across the supply chain.

### **Strengthening collaboration between research and industry**

Collaborative efforts between the research sector and industry stakeholders in the Australian food and beverage manufacturing industry are constructive for fostering innovation and addressing sector challenges. Platforms for networking and sharing best practices align research activities with industry needs (The University of Queensland, 2023). Enhancing cooperation through the adoption of facilitating practices, leveraging research funding programs, and promoting cross-sector collaboration could further fortify collaborative efforts. There is also an opportunity to align common goals by leveraging the food and beverage sector for improved public health outcomes by advancing towards healthier food products (Garnweidner-Holme et al., 2021).

Government funding directed towards collaborative projects could significantly bolster these partnerships. Large research programs like Cooperative Research Centres (CRCs) have a proven track record of shaping industries. CRCs have boosted the food and beverage sector, with initiatives such as the One Basin CRC, Marine Bioproducts CRC, and others working in sustainability. However, CRC Program funding has stalled, hindering new projects. Australia's low research spending – just 1.6% of GDP – threatens innovation. Uplifting research and development funding to internationally comparable levels of 3% of GDP will lift progress across a number of sectors, including food and beverage manufacturing, bolstering Australia's competitiveness.

**Recommendation 4:** Uplift research and development investment to 3% of GDP.

**Recommendation 5:** Encourage the establishment of joint research and development centres between industry stakeholders and research institutions.

### **Future challenges for the Australian food & beverage manufacturing workforce**

The Australian food and beverage manufacturing industry confronts workforce challenges in adapting to new technologies, filling skill gaps, and sustaining a diverse talent pool (AIB International, 2023).

Key challenges include adapting to technological advancements, reskilling for the digital economy, and addressing labour shortages (Department of Education, Skills and Employment, 2020). To mitigate these challenges, the Australian Government can implement policies supporting training and upskilling, incentivising businesses to invest in employee development, and attracting talent (including from historically underrepresented groups) to the industry. ATSE's report *Our STEM Skilled Future* recommended that the agriculture sector can attract talent by linking the sector to purpose, highlighting how the sector contributes to sustainability and societal well-being outcomes (ATSE, 2023). This approach could be mirrored by the food and beverage manufacturing sector, alongside modernising training programs in partnership with industry. Ongoing training is essential as technology evolves, requiring vocational programs and industry partnerships for workforce adaptability. Addressing skill shortages may also involve immigration policies for skilled workers and initiatives promoting STEM careers within the sector (Chelliah & Lee, 2020). By fostering diverse talent and supporting development, the industry can foster sustainability and resilience.

**Recommendation 6:** Promote government-backed training and industry-academia partnerships to align vocational programs with technological advancements.

*ATSE thanks the House Standing Committee on Industry, Science and Resources for the opportunity to respond to the Inquiry into Food and Beverage Manufacturing in Australia. For further information, please contact [academypolicyteam@atse.org.au](mailto:academypolicyteam@atse.org.au).*

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