

SUBMISSION

Submission to the Department of Industry, Science and Resources

Future Gas Strategy Consultation

13 November 2023

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.

Natural gas, which emits less carbon than most other fossil fuels, has a limited role as a transition fuel from coal to renewable energy sources. ATSE in its ['Becoming a Net Zero Nation'](#) position statement has called for Australia to commit to an ambitious target of net zero emissions by 2035, and for the immediate prioritisation and deployment of mature, low-carbon technologies that can make deep cuts to high-emitting sectors before 2030 (ATSE 2023a). Renewables, increased efficiency and a host of innovative technologies across a range of industries are needed. The Future Gas Strategy should outline a role for gas as a transition fuel and provide a pathway for substitution with clean energy sources. ATSE puts forward the following recommendations for the Future Gas Strategy:

Recommendation 1: Commit to nationally phasing out gas in new residential buildings.

Recommendation 2: Create a clear and ambitious pathway to reduce the role of gas in industry, by supporting smaller manufacturers to develop new technologies for electrification and fund transition to renewable electricity.

Recommendation 3: Support development and early-stage testing of carbon capture utilisation and storage technologies to reduce emissions from natural gas extraction and use.

Recommendation 4: Strengthen mechanisms to transition gas infrastructure to store and transport alternate fuels.

Recommendation 5: Develop a strategy to coordinate the repurposing of gas transportation and infrastructure for renewable energy infrastructure.

Recommendation 6: Improve data collection and availability on energy-related emissions to assist in planning emissions reduction measures and review progress.

Recommendation 7: Develop an incentive-based Gas Strategy that would encourage those emitters, that are under the Safeguard Mechanism threshold level, to reduce their emissions.

Recommendation 8: Develop a policy for encouraging and supporting gas exports to be progressively substituted by exports of clean energy fuels.

Recommendation 9: Prioritise inclusive stakeholder engagement at various stages of developing gas projects to identify and address adverse social impacts.

Recommendation 10: Support displaced gas industry workers to retrain to work in different industries like mining.

Phasing out residential gas

The cost-effectiveness of renewable energy like wind and solar has meant that natural gas has not played a significant role as a transition fuel source in Australia. Newer electric technologies such as heat pumps, battery storage and induction cooking are becoming more widely available and more efficient replacing domestic gas use. For example, heat pumps are in the order of 4 times more efficient than natural gas appliances and are increasingly cost-competitive (BCG 2023; Suckling 2023). The nature and extent of gas use will be determined by how rapidly Australia develops renewable energy sources and how quickly customers electrify their use of energy (AEMO 2022b).

Governments, both state and federal, should use policy mechanisms to encourage residential electrification. As recommended in ATSE's submissions to the [National Energy Performance Strategy](#) and [Residential Electrification](#) consultations, a combination of initiatives can support households' transition away from gas (ATSE 2023c, 2023d):

- Mandating energy efficiency as part of national building standards for new residential buildings, including full electrification, rooftop solar with battery storage, and better insulation
- Retrofitting public housing in line with the above national building standards
- Developing incentives for lower-income households to reduce upfront costs of installing energy-efficient upgrades
- Incentivising electrification and other energy-efficient upgrades for rental property owners

These recommendations have been partially addressed by the Government's Household Energy Upgrades Fund, which will provide low-cost loans for energy efficiency upgrades, commencing in the 2023-24 financial year. The Future Gas Strategy needs to ensure an orderly transition to electrification and avoid a 'gas death spiral' where low-income consumers bear the remaining costs of the gas.¹

Recommendation 1: Commit to nationally phasing out gas in new residential buildings.

Using natural gas for the net zero transition in industry

Australian Energy Market Operator's (AEMO) integrated system plan for the optimal future grid – suggests "peaking" gas plants, that can be turned on and off quickly, will be needed as a backup but forecasts that less will be burned than today (AEMO 2022a). During the transition phase to net zero, natural gas can support high-grade industrial heat, industrial feedstock, and peak power generation, making the transition more robust and mitigating unexpected delays.

The potential growth of electrification, and hydrogen or other renewable fuel sources for different use cases, is key to reducing the role of gas. ATSE in [submission to the National Hydrogen Strategy review](#) outlined the opportunity hydrogen production presents to diversify the export economy and reach new markets as demand for Australia's traditional fossil fuel commodity exports declines (ATSE 2023b).

ATSE recommends that the Australian Government supports developing and deploying low-emission renewable electricity alternatives that can replace natural gas in industrial use (when used as a heat source for example in heat generation in infrared heating units). The Future Gas Strategy can help smaller manufacturers overcome initial capital barriers through low-interest loans for renewable electricity-powered equipment. At the same time, the Strategy can invest and create incentives to support early adoption, commercialisation, and scale pilot renewable energy projects such as hydrogen projects to substitute the role of gas in industrial use.

Recommendation 2: Create a clear and ambitious pathway to reduce the role of gas in industry, by supporting smaller manufacturers to develop new technologies for electrification and fund transition to renewable electricity.

Driving the Future Gas Strategy with research and development

ATSE supports the key objectives of the Future Gas Strategy to support the decarbonisation of the Australian economy to achieve net zero and maintain energy security and affordability. Technological developments will be key to reducing emissions associated with extracting natural gas and decreasing emissions from industrial processes that use natural gas. The Future Gas Strategy needs to focus on research, development and deployment of technological solutions to tackle methane emissions, electrifying upstream facilities with low-emissions electricity, equipping gas production processes with carbon capture, utilisation and storage (including via reinjection and storage of CO₂ in depleted offshore and onshore oil and reservoirs in Australia²), and expanding the use of low-emissions hydrogen in refineries (IEA 2023).

Carbon capture, utilisation and storage (CCUS) development can be used to reduce emissions from the extraction of natural gas. CCUS development has gained significant momentum in recent years, in 2022, 61 new CCUS facilities were added to the project pipeline globally, bringing the global total of CCUS projects to 30 in operation, 11 under construction and 153 in development (LSE 2023). Yet the viability of CCUS remains unclear with high cost being cited as the main barrier. The technological performance of CCUS operations is also subject to risks and uncertainties – the majority of the 13 world's leading CCUS projects have captured far less CO₂ than anticipated (Adam Vaughan 2022). When compared to the cost of inaction however the costs and risks of CCUS and other technological solutions make such solutions worth investing in especially with expected cost reductions as the industry grows. The cost of CO₂ capture in the power

¹ As grid maintenance costs go up and the capital cost of renewable energy moves down, more customers will be encouraged to leave the grid. In turn, that pushes grid costs even higher for the remainder of customers. Meanwhile, energy networks are also stuck with a growing pile of stranded assets if the necessary transition has not been strategized (Tamatha Smith 2019).

² Current carbon capture and storage projects in Australia with carbon storage licences are Chevron's Gorgon venture, the onshore CO₂CRC research venture in Victoria and Santos' Moomba venture in central Australia, which is currently under construction. No projects intending to use offshore storage under the seabed have yet secured licences, with the practicalities of the overarching regulations yet to be proven (Angela Macdonald-Smith 2023).

generation sector was reduced by 35% from the first to the second large-scale CCUS facility deployment (IEA 2021). A robust research and development program is necessary to investigate the viability of CCUS, reduce the costs of carbon capture from natural gas power and industrial facilities and improve technological performance. Licenses to conduct pilot projects are ongoing. The Future Gas Strategy has a role in supporting technology development including the demonstration of natural gas-specific advanced carbon capture technologies at scale.

Recommendation 3: Support development and early-stage testing of carbon capture utilisation and storage technologies to reduce emissions from natural gas extraction and use.

Utilising and upgrading existing infrastructure

With minimal modifications, existing gas infrastructure (not only pipelines) could be used to demonstrate the physical and economic feasibility of alternative fuels such as green hydrogen and bio-methane. This could support the development of these fuels by blending them with natural gas into the distribution network. These alternative fuels could be developed progressively, initially supporting distribution-connected industrial customers with applications that are hard or expensive to electrify (BCG 2023).

Development of renewable energy infrastructure should be prioritised and be done in coordination and build on already existing infrastructure assets where possible. This would avoid doubling up of facilities and reduce the cost as identified in the Institute of Energy Economics and Financial Analysis study (IEEFA 2017). The Future Gas Strategy can play a role in identifying and funding strategic transport networks and storage sites. Economic incentives and policy certainty towards this broader objective will underpin greater investment in clean energy infrastructure and grid security. The Future Gas Strategy should target complimentary policies introduced capital grants, tax credits etc. that could help achieve this infrastructure build and technology deployment.

Recommendation 4: Strengthen mechanisms to transition gas infrastructure to store and transport alternate fuels.

Recommendation 5: Develop a strategy to coordinate the repurposing of gas transportation and infrastructure for renewable energy infrastructure.

Monitoring emissions from natural gas

Emissions from gas extraction, production and processing are a significant component of total emissions. ATSE in its [submission on 'Setting, tracking and achieving Australia's emissions reduction targets'](#) recommended creating and applying a regulatory framework for appropriate emissions monitoring and verification requirements (ATSE 2023e). The Future Gas Strategy should establish ambitious targets for Scope 1, Scope 2 (a company's internal operations) and Scope 3 emissions (which encompass the upstream and downstream value chain).

The Safeguard Mechanism applies to facilities that emit more than 100,000 tons of carbon dioxide equivalent of covered emissions in a financial year (the Safeguard threshold) (Australian Government 2023a). To further decrease national emissions the Strategy should develop an incentive-based strategy to encourage gas plants that fall under the emissions threshold level to also reduce their emissions. This can be accomplished with the use of open data, and sophisticated analytics tools, in tracking and assessing emissions reduction.

Access to natural gas pipeline services falls within the national energy market framework and is regulated through the National Gas Law and National Gas Rules which regulate the infrastructure and market (Infrastructure Victoria 2023). However, this framework is not designed to address the sectoral challenges caused by the rapid pace of technological change and societies shift towards a net-zero emissions future. This gap has been recognised and reforms are currently underway, which include extending the national gas regulatory framework to hydrogen blends and renewable gases, while the Australian Energy Market Commission (AEMC) has included a decarbonisation principle in its assessment of rule changes to support this (Australian Government 2023b). This is a welcome step; however further guidance should be given to market bodies to explicitly consider emissions reduction objectives and regulatory reform should explicitly

state that annual reports should include metrics on how each energy objective has been applied (ATSE 2023f).

Recommendation 6: Improve data collection and availability on energy-related emissions to assist in planning emissions reduction measures and review progress.

Recommendation 7: Develop an incentive-based Gas Strategy that would encourage those emitters, that are under the Safeguard Mechanism threshold level, to reduce their emissions.

Transitioning the gas export market

Australia is a substantial net exporter of natural gas. In 2019–20 about 74% of Australian-produced natural gas was exported as Liquefied Natural Gas (LNG) (Australian Government 2021). Nearly all of Australia's LNG exports were delivered to Asian markets in 2020–21, where they are critical to the electricity supply (Australian Government 2022). Australian LNG exports are projected to fall to around half of their current levels by mid-century under global net zero commitments, led by sharp declines in Japanese and South Korean demand (which account for almost 40 percentage points of the fall - Jonathan Kemp et al. 2021). This trade needs to be supplemented and progressively substituted by exports of green hydrogen, green ammonia and other renewable energy vectors – however, development of this is moving slowly. To prevent economic shocks to Australia resulting from a shrinking LNG market a Future Gas Strategy should account for the gradual and orderly replacement of gas exports with clean energy exports like hydrogen and biofuels.

Recommendation 8: Develop a policy for encouraging and supporting gas exports to be progressively substituted by exports of clean energy fuels.

Ensuring an equitable transition

Gaining a social licence is important for establishing the ongoing viability of projects in the extractive industries (Luke 2017; Zhang et al. 2018). Achieving social licence in the exploration and production phases of gas projects is also required to comply with the United Nations Declaration of the Rights of Indigenous Peoples (UN Declaration) (United Nations 2007). Developing a comprehensive understanding of what is most important to communities – environmentally, economically and socially – is vital. The Future Gas Strategy should outline a targeted communication program to assist communities in understanding the climate impacts of different energy sources including natural gas, the benefits of more efficient appliances, the benefits of energy-efficient buildings and available energy efficiency incentive programs. The Gas Strategy should also focus on extensive, transparent community engagement at multiple stages of setting up new clean energy projects and transitioning old infrastructure assets, especially with Aboriginal and Torres Strait Islander peoples. This engagement must clearly outline the potential (both good and negative) consequences of the decisions in order to achieve a social licence to operate. There should also be support from the Gas Strategy to mitigate concerns that communities might face in this transition face to renewable energy to ensure an equitable transition.

Australia's transition to a net zero economy will also require the workforce to construct and operate it. It is crucial for Australia to ensure it has the necessary skilled workforce in the appropriate locations to facilitate the construction and utilisation of this energy infrastructure, along with the adoption of new energy technologies. The skills of gas workers can be transferable to other energy sectors, and different labour training programs around the world provide valuable insights for the Future Gas Strategy (IEA 2022). The Future Gas Strategy should have pathways to transition its workforce to work in industries like mining, which is increasingly important to produce the minerals needed for the energy transition. Mining occurs in the same geographies, and the skill sets and pay scales are similar to current gas industry workers.

Recommendation 9: Prioritise inclusive stakeholder engagement at various stages of developing gas projects to identify and address adverse social impacts.

Recommendation 10: Support displaced gas industry workers to retrain to work in different industries like mining.

ATSE thanks the Department of Industry, Science and Resources for the opportunity to respond to the Future Gas Strategy Review Discussion Paper. For further information, please contact academypolicyteam@atse.org.au.

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