13 November 2023

Future Gas Strategy Taskforce
Department of Industry, Science and Resources

Submitted electronically

To whom it may concern,

**Climateworks Centre submission on the Future Gas Strategy**

Climateworks Centre welcomes the opportunity to respond to the Future Gas Strategy (the Strategy) being developed by the Australian Government. Climateworks bridges the gap between research and climate action, operating as an independent not-for-profit within Monash University. Climateworks develops specialist knowledge to accelerate emissions reduction, in line with the global 1.5 degrees Celsius temperature goal, across Australia, Southeast Asia and the Pacific.

Climateworks supports the development of the Strategy with the end goal of phasing out gas\(^1\) in line with a fully decarbonised economy. Modelling conducted by the International Energy Agency notes that, to achieve their net zero emissions scenario, no new long-lead time upstream gas projects can be approved after 2023 (International Energy Agency 2023). Jurisdictions across Australia have acknowledged the need to prevent the expansion of gas use and long-lived gas infrastructure to achieve legislated emission reductions targets, such as through Victoria’s Gas Substitution Roadmap (Department of Energy, Environment and Climate Action 2023).

The development of the Strategy provides a crucial opportunity to plan for an economy-wide reduction in the use of gas, given the emissions associated with its extraction and use, as all sectors decarbonise to meet Australia’s emissions reduction obligations. This is especially urgent given the window to keep global warming within 1.5 degrees is still open, but narrowing. Climateworks has conducted additional modelling on gas use in Australia beyond that which is included in this submission. We would welcome the opportunity to share this data with the Department through a briefing.

**Submission recommendations**

Climateworks recommends that the Government:

- Ensures that the primary objective of the Strategy is to phase out Australian gas use and production in line with a least cost pathway to net zero emissions.

\(^{1}\) Unless otherwise specified, in this submission, ‘gas’ means fossil fuel gas – predominantly methane. Climateworks analysis also considers the production and use of hydrogen, and biomethane.
● Includes within the Future Gas Strategy an explicit decarbonisation objective of supporting transformative economic change in line with the Paris Agreement goals of limiting global warming to well-below 2°C and striving for 1.5°C.
● Develops a plan to support the orderly phase out of gas use in the electricity sector including through better use of demand-side energy management to support the provision of affordable and reliable energy services and ensure Australia can fully decarbonise its economy.
● Prioritises investment and policy options within the Strategy that favour electrification, particularly in buildings, over ‘green gas’ distribution, in order to reduce costs over the longer term.
● Implements programs via the Built Environment Sectoral Plan to upgrade building thermal efficiency to manage household energy demand and allow for efficient decarbonisation of the buildings sector.
● Works with industry and financial institutions to design holistic programs to support transitioning households away from gas, by prioritising vulnerable households, incorporating health and productivity considerations in cost-benefit analyses, and providing households with information through ‘one-stop shops’.
● Designs the Strategy so that it supports a transition in industry away from gas production and use - and supports this transition in industrial activity and energy use coherently with other government initiatives. These include the work of the Net Zero Economy Taskforce, the Safeguard Mechanism, the National Reconstruction Fund and the Sectoral Plans for Industry and Resources.
● Redesigns the gas market to ensure an orderly transition as gas use phases out of many parts of the economy and introduce new rules to ensure the equitable phase out of gas assets that currently underpin the domestic gas system, including revaluing these assets and addressing how to phase out their use as they become redundant.
● Ensures the Strategy is coherent with the emerging work of the Net Zero Economy Taskforce and recognises the major changes in the industrial and energy workforces and supply chains that will be needed if Australia is to become a Renewable Energy Superpower.

Context

As stated in the Strategy consultation paper, around 21 per cent of Australia’s national net greenhouse emissions are related to gas production and use. Climateworks analysis shows that many of the emissions from gas use can be reduced by energy efficiency and fuel shifting to electricity.

Our submission draws from a range of recent Climateworks modelling, including: Climateworks Centre scenarios (Climateworks Centre 2023a) which explores two alternative scenarios on how Australia can reach net zero emissions in line with the Paris Agreement; modelling conducted with CSIRO for AEMO (Reedman et al. 2022); modelling of emissions from the LNG supply chain conducted by Climateworks through the Australian Energy Transition Initiative (Climateworks Centre and Climate-KIC Australia 2023), and modelling of residential building decarbonisation (Climateworks Centre 2023b, 2023c). Climateworks’ modelling referred to in this submission is the Climateworks Centre scenarios 2023 (Climateworks Centre 2023a), unless indicated otherwise. We would welcome the opportunity to brief the Department on this modelling – and additional modelling on gas conducted by Climateworks which has not been included in this submission – in further detail.

Climateworks also note several key findings from the 2023 update of the International Energy Agency Net Zero Roadmap (International Energy Agency 2023). Of particular note is that no new long-lead time upstream oil and gas projects are needed in the IEA net zero emissions scenario, and the need to sequence the decline of fossil fuel supply investment and increase in clean energy investment to avoid shocks to energy security and affordability.

The Australian Government has made a commitment to reduce methane emissions as part of the Global Methane Pledge, a collective effort to reduce global methane emissions by 30 per cent from 2020 levels by 2030 (Climate & Clean Air Coalition 2023). Fugitive emissions from the production and
distribution of gas are a large contributor to Australia’s methane emissions, therefore a Future Gas Strategy that supports the declining role of gas in Australia, as the world transitions to a net zero economy, will also contribute to Australia’s commitments under the Global Methane Pledge.

Climateworks notes there is an uplift in our climate diplomacy from some quarters to act on the emissions impacts of our exports, which are around four times domestic emissions.

**Achieving rapid and comprehensive decarbonisation**

This section relates to question 12, *What do you see as the role of gas in Australia’s net-zero transformation?*

**Recommendation:** That the primary objective of the Strategy is to phase out Australian gas use and production in line with a least cost pathway to net zero emissions.

**Recommendation:** That the Strategy contains an explicit decarbonisation objective of supporting transformative economic change in line with the Paris Agreement goals of limiting global warming to well-below 2°C and striving for 1.5°C.

As the Australian economy decarbonises, the services provided by the use of gas – such as heating of space and water, in cooking, and as an energy source for industrial processes and feedstock – can largely be provided by alternative technologies. The remaining uses for gas can be made more efficient. Many technologies that allow fuel switching to electricity and power generation with zero emissions are already cost-effective.

Climateworks’ analysis of least-cost pathways to decarbonisation of the Australian economy in line with the Paris Agreement finds that domestic demand declines by 65 per cent by 2030, and almost 90 per cent by 2050, compared to 2020 levels in Climateworks’ 1.5°C aligned scenario (Climateworks Centre 2023a). There are lower cost and cleaner alternatives to carbon capture and storage (CCS), so these methods are taken up minimally in the model.

Modelling conducted by the International Energy Agency identified the rapid decline in gas use globally in their net zero emissions scenario, with unabated gas declining by over 80 per cent by 2040 in their global modelling (International Energy Agency 2023). With this decline in global gas use, the rapid and substantial phase out of gas use and production is key for Australia to decarbonise its own economy and prosper more broadly in a net zero global economy.

Based on these domestic and international shifts, the key objective of the Future Gas Strategy should be to support the orderly phase out of gas use in Australia, and the development of alternative exports to ensure that industry and communities benefit from the global transition to a net zero economy.

Climateworks supports the inclusion of a decarbonisation objective in the Strategy and recommends this objective specifically references Australia’s obligations under the Paris Agreement. The Strategy, and associated actions, should clearly support Australia’s emissions reductions targets and net zero emissions goal.

It is important for the future of Australia’s economy that the Strategy is coherent with emerging work on sectoral decarbonisation pathways and the Net Zero Plan and Sectoral Plans being developed to guide emissions reduction trajectories. A key criteria for investment and policies included in the Strategy should be whether these support action in line with the Net Zero Plan and advice by the Climate Change Authority on Australia’s next Nationally Determined Contribution towards the Paris Agreement.
Gas use as Australia and the world transitions to net zero emissions

Modelling the future for gas use in Australia

Modelling conducted by the International Energy Agency notes that, to achieve their net zero emissions scenario, no new long-lead time upstream gas projects can be approved after 2023 (International Energy Agency 2023). Climateworks’ modelling of least-cost pathways to net zero emissions shows declining domestic demand for gas. In Climateworks’ 1.5°C scenario, total domestic gas use declines by almost 90 per cent in 2050 (compared to gas use in 2020), with the bulk of this decline (65 per cent) occurring before 2030 (Figure 1). A significant decline in gas use is also seen in the well below 2°C scenario, with overall gas use in 2050 just one third of demand in 2020. Half of this decline occurs before 2030. This decline in use reflects that given the need to eliminate net emissions across the economy there are more cost-effective alternatives than to use gas as a fuel or feedstock. Climateworks highlights that using gas not only creates emissions during its use, but also during its extraction – due to fugitives and emissions during transport and processing.

Figure 1. Total gas use across the Australian economy declines rapidly under both Climateworks’ 1.5°C and well below 2°C scenarios.

Our sectoral analysis shows that gas use declines across all sectors in Australia, however at different rates (Figure 2). These changes are driven by sector-specific changes in energy efficiency and fuel switching (primarily electrification). This highlights the roles of gas as a fuel, heat source and feedstock across and within sectors, and the differing availability of technologies to replace these roles.
Figure 2. Gas use declines across all sectors of the Australian economy in both 1.5 (left) and well below 2°C (right) aligned scenarios.

Industry – including the processing of gas for export – is currently the largest user of gas in Australia, and our modelling suggests it will remain so to 2050 (Figure 2). Yet even in this relatively hard-to-abate sector, both Climateworks’ 1.5 and well below 2°C scenarios show a rapid transition away from gas. Industry demand in 2030 is expected to fall by close to 50 per cent of 2020 in the 1.5°C scenario and by more than 30 per cent in the 2°C scenario. Gas use reduces steeply in gas exploration, manufacturing and chemicals, driven by both domestic factors and assumptions of lower international demand (see Background: modelling domestic and international demand section for more information). Domestic reductions include electrification of industrial and mining processes, and uptake of hydrogen to displace gas in alumina refining and ammonia production (Figure 3). Gas use by industry further declines after 2030, with demand in 2050 less than 15 per cent of that of 2020 demand in 1.5°C scenarios. Even in the less ambitious 2°C scenario gas use in industry more than halves by 2050. See the Industrial gas use declines rapidly in most sub-sectors section for more details on industrial gas use.

Figure 3. Gas use declines rapidly in industry, especially in the 1.5°C (left) scenario. In the 1.5°C scenario, declines are much more rapid in gas mining and manufacturing.

Other sectors show even greater reductions on least-cost pathways with gas use declining to 2050 and especially prior to 2030 (Figure 2). See sections on The declining role of gas in the electricity sector and Rapid phase out of gas use in buildings for more details on these sectors.
As a result of changing sectoral demand for gas, our 1.5°C modelling shows that gas use will become increasingly concentrated in the industry sector as Australia’s economy decarbonises: industry accounts for more than 80 per cent of demand for gas across the Australian economy in 2050 in the 1.5°C scenario and more than 90 per cent of demand in 2050 in the 2°C scenario. Climateworks’ modelling demonstrates that the take-up of alternatives to gas, such as renewable hydrogen, are concentrated in the industry sector and heavy transport (Climateworks Centre 2023a) (Figure 4).

Figure 4. Climateworks’ modelling indicates an increased role for renewable hydrogen in industry and heavy transport over time, but no long-term role for hydrogen in buildings.

In contrast, deep energy efficiency and electrification are the least-cost emissions reduction solutions for buildings: Climateworks’ modelling has repeatedly shown no long-term role in a decarbonised economy for hydrogen or other alternate gases, such as biomethane in residential buildings (Reedman et al. 2022; Climateworks Centre 2023a, 2020). Declining gas use and its concentration for industrial use would mean that much of the gas networks would become increasingly less viable (especially in residential areas) (Gordon 2023). Climateworks’ existing modelling does not capture the effects of steep reductions in gas use on the economic viability of gas networks on a spatial basis. An important issue for the Strategy will be how it supports other policy objectives to ensure there is an orderly transition and appropriate consideration of equity issues. It will be crucial to plan an orderly transition to efficient, all-electric homes and buildings in an appropriate timeframe.

The rapid decline in gas use and changes in its sectoral use indicated in our scenarios clearly identifies a role for governments in this transformation. Climateworks recommends the Strategy ensures an orderly phase out of gas use in line with our Paris Agreement commitments.

Background: modelling domestic and international demand

This section relates to question 1, Do you use any international and/or domestic forecasts to inform your outlook of the gas market?

Climateworks draws on a range of domestic and international data sources when developing our least-cost decarbonisation scenarios. Scenarios in which temperature increase is limited in line with the Paris Agreement invariably see a substantial shift in energy mix.

Climateworks’ research relevant to this submission includes assumptions from a number of reputable sources. In Climateworks’ 1.5°C aligned scenario, LNG production model inputs have been aligned to the International Energy Agency’s (IEA’s) ‘Net zero by 2050’ (NZE) scenario (International Energy Agency 2021), as well as to Australian Government short-term projections (Department of Industry, Science, Energy and Resources 2021). Climateworks has not modelled emissions reductions associated with Australian exports, instead aligning demand to the IEA NZE scenario. This allows the scenario to align with changes in production and export demand expected as key trading partners reduce their emissions in line with the Paris Agreement. The IEA NZE scenario is consistent with limiting the global temperature rise to 1.5°C without a temperature overshoot, based on an analysis of IPCC scenarios. Guided by the IEA NZE scenario, Climateworks’ analysis assumes a 36 per cent
reduction in Australian LNG exports between 2020 and 2030 and a 73 per cent reduction between 2020 and 2050.

There is significant uncertainty around the relative changes in different fuel types such as gas due to a range of technological, social, economic and policy assumptions that inform these projections (Climateworks Centre and Climate-KIC Australia 2023). Australia is impacted by changes in demand in key export countries, making decarbonisation pathways in Asia very important for domestic outlooks.

Climateworks’ assumptions around gas and LNG demand are in broad alignment with 1.5°C-aligned assumptions in other modelling. The Intergovernmental Panel on Climate Change (IPCC) has used four 1.5°C compatible pathway archetypes to show the impact that differences in modelling have on the future energy mix. Their report notes that gas consumption varies significantly by scenario and that high-gas scenarios tend to rely on high levels of carbon capture and storage (CCS) (Rogelj et al. 2018). The global use of gas in 2050 is projected to decline with median values of 45 per cent on 2019 levels (or 70 per cent in pathways without CCS) in analysis of modelled pathways that limit warming to 1.5°C (with a greater than 50 per cent chance and no or limited overshoot) (IPCC 2022). The IPCC also finds that scenarios with higher energy demand see a more rapid scaling of hydrogen (Bruckner et al. 2014).

Climateworks modelling allows for up to 10% hydrogen blending and unrestricted biomethane blending, however these technology options do not appear in the modelling results, as electrification is a much more cost effective option.

The declining role of gas in the electricity sector

This section relates to question 2, What role do you see gas-fired generators playing in supporting Australia’s 82% renewable energy targets and beyond? and question 5, How feasible, and at what scale, are alternatives to natural gas for the electricity sector? You may wish to consider renewable gas alternatives for peaking generation, for example, biomethane and low-emissions hydrogen and other forms of grid-firming technologies like batteries and pumped hydroelectricity. What barriers exist to using these alternatives?

Recommendation: Develop a plan to support the orderly phase out of gas use in the electricity sector including through better use of demand-side energy management to support the provision of affordable and reliable energy services and ensure Australia can fully decarbonise its economy.

Climateworks’ scenarios show a diminishing role for gas in the electricity sector (Figure 5) - shifting to occasional use of peaking gas to provide electricity during times when demand exceeds the supply of electricity from variable renewable generation or storage. By 2050, gas-fired power stations contribute less than 1 per cent of total generation, and would be used for what is known as ‘firming’. This gas is not used day-to-day – it switches on infrequently, on the rare occasions that demand exceeds supply, to secure electricity supply to the grid.
Figure 5. The role of gas in Australia’s electricity generation declines rapidly under both 1.5°C (left) and well under 2°C (right) scenarios.

Climateworks’ analysis suggests a variety of technologies are important to provide a reliable electricity supply. And other research has also explored alternative firming methods beyond gas generation and suggested this can create a decarbonised economy at lower cost. Alternatives include a greater variety of storage technologies (Shine 2023) building over-capacity and flexibly ramping up demand (Australian Industry Energy Transitions Initiative 2021), and demand-side management (Murray-Leach 2023). A greater emphasis on demand-side energy management to reduce unnecessary energy use, and match variable electricity demand to supply, is becoming far more important as large numbers of distributed energy resources join the system (including rooftop solar, EVs, and home batteries). Demand side flexibility can shift the economics of firming. Our research conducted through the Australian Energy Transition Initiative indicates that an overbuild of renewable energy made economic by flexible demand from low carbon exports (e.g. variable hydrogen) could help fill supply in those times of occasional renewable energy droughts and make the use of gas generation to fill supply gaps even less likely (Australian Industry Energy Transitions Initiative 2021). There is a suite of clean firming storage under development, as well as existing technology such as flow batteries, renewable gas, and pumped hydro.

Rapid phase out of gas use in buildings

This section relates to question 11, How can governments, industry and households work together to manage impacts for homes?


Recommendation: The Strategy prioritises investment and policy options that favour electrification, particularly in buildings, over ‘green gas’ distribution, in order to reduce costs over the longer term.

Recommendation: Implement programs via the Built Environment Sectoral Plan to upgrade building thermal efficiency to manage household energy demand and allow for efficient decarbonisation of the buildings sector.
The role for household energy use

Climateworks’ modelling undertaken with CSIRO for AEMO in 2022 showed that electrification is one of the most cost-effective options to reduce emissions in line with the Paris Agreement (Redman et al. 2022). The modelling included a sensitivity analysis, labelled the “Exploring Alternatives scenario”, which investigated decarbonisation pathways in a future with constrained investment and uptake of electrification, and including greater investment in alternatives to gas. In particular, the sensitivity analysis assumed faster cost reductions in biomethane production compared with the other modelled scenarios, and the adoption of explicit biomethane targets for blending into gas networks.

Despite the assumed electrification constraints and investment in biomethane, the uptake of electrification in the Exploring Alternatives scenario, particularly in buildings and industry, remained high and reached the maximum levels allowable by the model for this sensitivity. Biomethane played a minor role in supporting decarbonisation in this sensitivity compared with electrification and renewable energy. This suggests that for Australia to follow a least-cost decarbonisation pathway, electrification should be favoured over investment in alternate ‘green’ gas distribution.

Transition in household energy use away from gas can also have additional benefits as this will increase the ability for demand-side energy management to assist in increasing reliability and reducing cost for the electricity system. Managing household energy demand, or ‘load shaping’, will be a key aspect of keeping infrastructure costs to a minimum and managing peak demand as residential buildings increasingly electrify. By reshaping load, peak demand can be shifted to times where renewable generation is higher. Climateworks’ current research through Renovation Pathways indicates that more efficient residential buildings can reduce peak demand significantly (Climateworks Centre 2023c).

An important factor in managing energy peaks in hot and cold weather is the thermal performance of residential buildings. Summer evenings and winters are typically the lowest times for generation from rooftop solar, but peak periods for home energy use. In a thermally efficient house, less heat builds up indoors in summer and less warmth is lost in winter, reducing the needs of occupants to use heating and cooling systems to stay comfortable. Improvements to insulation, draught-sealing, curtains, window shading, and windows can all help with reducing energy demand from homes. This is especially important for colder climate zones. Improving thermal efficiency will therefore help ensure energy security for homes in the transition away from gas.

The Australian Government has a role to play in coordinating the transition to ensuring residential buildings are upgraded at scale to be thermally efficient. The majority of the community transition will lie with states, though the Australian Government has the opportunity to lead on aligning the National Energy Performance Strategy, National Construction Code, Trajectory for Low Energy Buildings and Future Gas Strategy to transition towards efficient, all-electric buildings. These framework policies will provide a strong signal to states and territories, financiers, construction and training industries, and households to drive coordinated action towards replacing gas with all electric appliances in line with this trajectory.

Household electrification and demand management

This section relates to question 10, If your home or small business gas appliances (stove, heating, or hot water system) stop working, would you prefer to keep using gas or switch to an electric appliance? If you are unsure, what would help you decide? What factors influence your willingness to switch to electric appliances?

Recommendation: Work with industry and financial institutions to design holistic programs to support transitioning households away from gas, by prioritising vulnerable households, incorporating health and productivity considerations in cost-benefit analyses, and providing households with information through ‘one-stop shops’.
In developing a transition towards building electrification, cost benefit analyses of electrification take into account the effects on healthcare system costs, social cost of carbon, and productivity costs associated with gas appliances. Gas use has been associated with negative health impacts and can be a large contributor to household energy bills, particularly in colder climates where indoor gas combustion appliance use is more prevalent. Reducing energy use through improving building thermal efficiency, alongside moving residential buildings from gas to all-electric, will therefore directly improve health and economic outcomes for residents.

In particular, the government should prioritise electrification for low-income households, community and social housing occupants, renters and other vulnerable households through a range of targeted initiatives such as mandatory disclosure of home energy efficiency ratings and tightening standards for electric appliances, as outlined in more detail in our Renovation Pathways report (Climateworks Centre 2023b).

To most efficiently enable this transition, it is crucial to work alongside industry and financial institutions. We recommend the government commits to working with banks and financial institutions to normalise green financing products, to support owners in making their homes climate-ready and all-electric. Consultation with community housing providers, peak bodies and households will help to understand barriers to electrification and thermal shell upgrades, and allow for the design of incentives and regulations to overcome these. This may include providing a ‘one stop shop’ facility that allows households to easily access information on electrification and thermal shell upgrades, to support them in navigating related complexities.

**Industrial gas use declines rapidly in most sub-sectors**

This section relates to questions:

6. **How much longer will you continue using gas as a fuel source or feedstock for your business? Do you think your consumption of gas will decline over time, and if yes, at what rate?**

7. **Are there alternatives that your business can use instead of gas (for example electrification, hydrogen, biomethane or circular economy inputs)? What barriers exist to using these alternatives? How can the substitution of gas be accelerated?**

9. **What role might carbon capture, utilisation and storage (CCUS) and negative emissions technologies (NETs) (for example direct air capture and CO2 removal) play in decarbonising industrial processes that are hard to abate in your business or industry?**

**Recommendation:** The Strategy supports a transition in industry away from gas production and use - and supports this transition in industrial activity and energy use coherently with other government initiatives. These include the work of the Net Zero Economy Taskforce, the Safeguard Mechanism, the National Reconstruction Fund and the Sectoral Plans for Industry and Resources.

Scenario analysis from Climateworks and CSIRO for the Australian Industry Energy Transitions Initiative (Australian Industry ETI) focussed on five Australian heavy industry supply chains which are considered hard to abate: iron and steel, aluminium, other metals, chemicals (including ammonia, fertilisers and commercial explosives), and LNG (Climateworks Centre and Climate-KIC Australia 2023). The 1.5°C aligned ‘Coordinated action scenario’ in this analysis found that there is a substantial change in the energy mix with a widespread shift away from fossil fuels - including gas - in industrial energy consumption (Figure 6). The results show that increased electrification is critical to the decarbonisation of the industry sector. In that scenario, electricity use increased 140 per cent compared to 2020, with electricity making up 58 per cent of energy used by industry in 2050. Total energy use decreases because electrified processes are more efficient than direct combustion of fossil fuels.
The ‘Coordinated action scenario’ has a relatively low gas price, and this was contrasted with ‘medium’, ‘high’ and ‘maximum’ prices in the sensitivity study. The modelling found that differences in gas prices in the near and medium term may affect the speed at which abatement technologies are deployed in a least-cost pathway. The costs of gas-based hydrogen are highly sensitive to gas prices. In the ‘Coordinated action scenario’, in 2030, most hydrogen is produced with gas, before being replaced with renewable hydrogen as the cost declines (Figure 7). Some of this production is abated by Carbon Capture and Storage (CCS) (blue hydrogen). At higher gas prices, more renewable electrolysis-based hydrogen is produced in 2030. In the sensitivity in which gas prices remain constant at the maximum price ($32/PJ), 90 per cent of hydrogen production is electrolysis-based by 2030.

Figure 7: Quantities and types of hydrogen produced in 2030 under different gas prices in the Australian Industry ETI ‘Coordinated action scenario’
Some sectors saw rapid switching from gas despite the low gas price in ‘Coordinated action’. For example:

- Ammonia production: abatement of Australian emissions included the substitution of gas with hydrogen feedstock, with 97 per cent of the hydrogen being renewable (electrolysis-based) by 2050.
- LNG production: significant electrification with the deployment of electric drives by 2030 replacing gas turbines.

Some sectors saw increased medium-term use of gas-based technologies, some of which were partly abated by CCS. The tight carbon budget and assumed low gas prices drove uptake of these technologies. For example:

- Iron and steel supply chain: blast furnaces replaced by the direct reduction of iron and electrified steelmaking including a direct substitution of gas with hydrogen as a reductant when the price of hydrogen declines. When higher gas prices are assumed, there is slower or less uptake of gas technologies and a more rapid uptake of hydrogen and electrolytic steelmaking.
- Alumina production: significant uncertainty in the costs and practicalities of implementing abatement technologies for alumina production. These include costs and reservoir availability for CCS, the capital investment required for electric calcination and costs of hydrogen for use as fuel in calcination. Higher long-term gas prices resulted in electric calcination replacing gas powered calcination as early as 2030.

These findings suggest that gas-based transition abatement technologies are only part of a lowest-cost pathway with a consistently low gas price. With higher prices of gas similar to those seen in the 2022 energy crisis, electrification and renewable hydrogen could be lower cost in the long-term. Electrification and hydrogen technologies are also assumed to be capable of achieving deep emissions reduction long-term, rather than partial abatement.

Climateworks’ modelling also indicates that technology changes can drive the reduction of emissions intensity as part of a least-cost pathway. The ‘Coordinated action scenario’ conducted by Climateworks and CSIRO for the Australian Industry ETI found that the emissions intensity of industry reduces by roughly two-thirds (Climateworks Centre and Climate-KIC Australia 2023). Government policy such as the Safeguard Mechanism and the National Reconstruction Fund is expected to support investment in relevant technologies. The Strategy should set out the role for government to ensure industrial transition is occurring at an appropriate scale and pace to unlock Australia’s potential as a Renewable Energy Superpower.

Planning for the shift away from gas in the provision of energy services

**Recommendation:** Redesign the gas market to ensure an orderly transition as gas use phases out of many parts of the economy and introduce new rules to ensure the equitable phase out of gas assets that currently underpin the domestic gas system, including revaluing these assets and addressing how to phase out their use as they become redundant.

As discussed, Climateworks has found that the services provided by the use of gas can largely be provided by alternative technologies. This shift will allow for Australia’s economy to reach net zero in a least-cost way. The phase out of gas use will require a substantial rethink around the current design of the gas market. There are two fundamental areas where change is needed. The first is that the gas market is currently designed to ensure that gas demand is served, and assumes a continued expansion of the market and of reticulated gas distribution. Climateworks considers instead that the gas market be designed to ensure the phase out of gas use in an equitable and cost-effective manner. This leads to the second fundamental change. As gas use phases out, the pricing and returns for gas assets, especially the distribution networks that currently serve residential buildings, will have to be rethought. This includes such processes as the Regulated Asset Base test and regulated pricing.
Australia’s domestic gas supply

This section relates to question 39, What are the risks to Australia’s domestic gas security in the medium (to 2035) to long term (to 2050) for your industry and how can these be addressed?

Climateworks analysis has repeatedly shown that implementing energy efficiency measures and fuel shifting can substantially reduce gas use in the medium to long term. For example, Climateworks’ 2021 multi-sector energy modelling with CSIRO showed that energy efficiency and electrification of gas-based processes could reduce gas demand by 342 PJ across the country in 2030, 30% of gas use otherwise expected (Reedman et al. 2022). This reduction in demand alleviates pressure on gas supply and potential risks to domestic gas security. As discussed it is Climateworks’ view that fuel shifting from gas to zero emissions fuel is essential given that Australia and the world are fast using up the carbon budget that would stay within the temperature limits of the Paris Agreement. The ability for substantial reduction in domestic gas use would allow Australia to be in line with the IEA net zero emissions scenario that shows no investment in substantial new supplies of gas. With the right support for decarbonisation of buildings and industry, existing Australian production would be sufficient to meet declining domestic demand in line with least-cost decarbonisation scenarios.

Where a gas development is already committed, Climateworks encourages explicit and early engagement with First Nations communities. Soliciting First Nations engagement in the early phases of project development sets the stage for success, honouring the right to free, prior and informed consent and should be included in the Strategy.

Australia’s gas workforce

This section relates to question 38, What actions will assist workforce retention, upskilling and mobility in your community as the economy transitions to net zero emissions?

**Recommendation:** Ensure the Strategy is coherent with the emerging work of the Net Zero Economy Taskforce and recognises the major changes in the industrial and energy workforces and supply chains that will be needed if Australia is to become a Renewable Energy Superpower.

Climateworks highlights the importance of policy settings to enable the appropriate transformations of the energy system to support the rollout of Renewable Energy Industrial Precincts (REIPs) across the country in a national place-based industrial decarbonisation program delivered in partnership with state and territory governments. Place-based policies can provide long-term guidance and assurance to communities undergoing the transition to net zero emissions. Through a place-based approach, policymakers can leverage each region’s comparative advantages and unique characteristics. One example is rolling out REIPs in regional areas presently reliant on carbon intensive industries, including gas.

REIPs are clusters of industrial businesses with access to low-cost renewable energy. Precincts could be located nearby to renewable energy zones or connected to renewable energy generation through high-voltage transmission lines. Businesses within each precinct would ideally also access green hydrogen as a replacement low emissions fuel for industrial processes. With Australia’s trading partners shifting towards net zero emissions, REIPs can ensure Australia is well placed to thrive in a green economy while attracting new industries to regional areas most affected by the transition to net zero by providing access to secure jobs, opportunities to develop new skills, and supporting social infrastructure.

Incorporating REIPs through the Strategy will ensure the transition of regions occurs in a clustered, coordinated and collaborative way, prioritising those regions that have the biggest opportunity for transformation in the shift to a low-carbon global economy. We recommend the Australian Government scales up their impact to support the implementation of REIPs in 11 regional areas with
existing heavy industrial operations, in particular Gladstone and the Pilbara which currently have high gas production. With a commitment to undertake a national program to roll out REIPs in these locations, workers in existing gas-intensive industries could be retrained, allowing for them to remain in their current locations.

Thank you for taking the time to consider our submission. We would welcome an opportunity to brief your team if you would like to explore our responses in further detail.

Yours sincerely,

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2 These areas include: Gladstone, the Pilbara, Townsville, Hunter Valley, Illawarra, Latrobe Valley, Bell Bay, Whyalla – Upper Spencer Gulf, Kemerton - Collie - Bunbury, Kwinana, and Darwin.
References


Climate & Clean Air Coalition (2023) Global Methane Pledge.


—— (2023b) Renovation Pathways: the National Report [Forthcoming].


Climateworks Centre and Climate-KIC Australia (2023) Pathways to industrial decarbonisation: Positioning Australian industry to prosper in a net zero global economy.


