

PATH TO ZERO: HOW NSW CAN KICK THE GAS HABIT

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The Climate Council acknowledges the Traditional Custodians of the lands on which we live, meet and work. We wish to pay our respects to Elders past and present and recognise the continuous connection of Aboriginal and Torres Strait Islander people to Country.



Cover image: Inside the Pilliga Forest, near Santos's planned Narrabri Gas Project. Image credit: Margaret Donald. Image license: CC BY 2.0

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Tim Baxter
Senior Researcher
(Climate Solutions)



Dr Madeline Taylor
Climate Councillor



Greg Bourne
Climate Councillor



Andrew Stock
Climate Councillor



Louis Brailsford
Campaigner



facebook.com/climatecouncil



info@climatecouncil.org.au



twitter.com/climatecouncil



climatecouncil.org.au

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Key findings

1

Gas demand within New South Wales could be 70% lower as soon as 2030, and eventually eliminated altogether, using readily-available, commercially-viable technologies.

- › NSW homes use 30% of the state's gas. This demand can be eliminated by the early 2030s with straightforward appliance upgrades and replacements.
- › Commercial buildings use 18% of NSW's gas. With capital work upgrades, which includes replacing gas boilers with electric heat pumps, three quarters of this demand would be gone.
- › Each small business is not a major gas user in NSW, but collectively they have a substantial impact. It is relatively straightforward to eliminate gas use through electrification in industries like the food and beverage sector, and such upgrades will also improve the long-term profitability of these businesses by reducing exposure to volatile and expensive gas prices.

2

Common-sense measures to reduce gas demand in New South Wales make the expensive and polluting Narrabri Gas Project unnecessary.

- › Work by energy consultancy Northmore Gordon (commissioned by the Climate Council) shows that measures to reduce gas demand in New South Wales could cut annual demand in the state over the next 10-15 years by around 70 petajoules per year, the same amount that the Narrabri Gas Project would produce.
- › With the right policy support, this report shows NSW gas consumption can be reduced by around one quarter between today and 2025; by more than two-thirds as soon as 2030; and entirely eliminated by 2050.
- › Much of New South Wales's gas (48%) is used to provide heat energy to spaces – such as living spaces – water and industrial processes. The solution is to combine energy efficiency with electrification, reducing energy use and using electricity.

3

There is no shortage of gas anywhere in Australia, with the growing demands of a swollen gas export industry driving domestic supply issues, higher energy bills and worsening climate change.

- › Australia is now the world's largest liquefied gas exporter with three times more gas sent overseas each year than is used in Australia. This growth in exports has come at a massive cost to Australian businesses and households, which are now dangerously exposed to the boom-bust cycles of the international liquefied gas market.
- › Western Australia's gas production is now triple what it was a decade ago. Over the same time Queensland's gas production has ballooned to five times what it was.
- › A global supply gas glut in the second half of 2019 – exacerbated by the impact of COVID-19 – resulted in a short-lived reprieve from steep gas prices in Australia. Analysis of data from the Australia Energy Regulator shows sky-high gas prices have returned across the eastern seaboard.

4

It is critically important for our economy, health and climate that every state and territory in Australia transitions away from fossil fuels like gas as quickly as possible.

- › The world's climate scientists have issued a "code red" in response to accelerating climate change. This is harming Australian lives, livelihoods and ecosystems via climate-fuelled extreme weather such as megafires, severe drought and deadly heatwaves.
- › While there are many substantial and effective emissions reduction policies in place at the state and territory level, these policies are still insufficient in scale, coverage and pace to avoid the worst consequences of climate change. A stronger, more complete and more bold response to the climate crisis is required by all levels of government.
- › The measures put in place so far in New South Wales on renewable energy and electric vehicles will go some way to cutting demand for coal and oil over the next decade. However, more work is needed to reduce demand for gas, the world's fastest growing source of greenhouse gas pollution.

Key Recommendations

The largest collective users of gas in New South Wales in 2021 are industry (52%), households (30%) and the commercial sector (18%).

In the residential and commercial sectors, gas demand can be mostly eliminated using commercially-available technologies. This also applies to the food and beverage sector (an industry which makes up 7% of NSW gas demand).

By focusing on these three areas alone the NSW government could dramatically reduce the state's gas use by the next decade. With further energy efficiency improvements in other industrial sectors, gas demand in the state could be reduced by 70% as soon as 2030. Further cuts to gas use could result in totally eliminating gas use by mid-century.

RECOMMENDATIONS FOR THE NEW SOUTH WALES GOVERNMENT

Clean Homes Fund

NSW homes use 30% of the state's gas. This demand can be eliminated as early as 2030 with straightforward appliance upgrades.

› **Recommendation 1:** Commit funding to support households to replace gas appliances with electric alternatives. This should include water heating, room heating and cooling and cooktops, which respectively account for 52%, 34% and 9% of NSW household gas demand. This program could be modelled on the Victorian Government's Home Heating and Cooling Upgrades Program, launched in 2020, which provides rebates of up to \$1000 to households to install reverse-cycle air conditioners. Eligibility is restricted to concession card holders and households with a combined income of under \$90,000. This should be accompanied by an advertising campaign to inform the community of the benefits of electric appliances.

› **Recommendation 2:** Remove all planning rules that require new residential developments to be connected to gas, and phase out gas connections in new residential and apartment developments by 2025. This includes removing rules that restrict local governments from banning gas connections in new residential developments.

Clean Commercial Building Fund

Commercial buildings use 18% of NSW's gas. Using existing technologies, commercial gas use can be reduced significantly by next decade.

- › **Recommendation 3:** Provide low-interest loans to assist commercial and local government buildings to undertake capital upgrades that reduce gas use in office and retail buildings, as well as hospitals, aquatic and recreational centres. This should include replacing gas boilers – that are used for heating and hot water – with electric heat pumps and reverse cycle chillers. This program should be targeted at building owners and small businesses.

Clean Air for Schools Program:

Inefficient, unflued gas heaters located in hundreds of NSW public schools are expensive to run and are worsening health problems for thousands of children across the state.

- › **Recommendation 4:** Replace all unflued gas heaters in NSW public schools by 2025 with reverse-cycle air conditioners. All new-build schools should be fully electric. This program could complement the Cooler Classrooms initiative, but prioritise the state's coldest schools, and ensure that it reaches every public school in the state.

Capital upgrades for industry:

By themselves, each small business is not a major gas user in NSW. However, collectively they have a substantial impact on gas demand in the state. For example, the food and beverage sector is responsible for 7% of NSW's gas use. For most businesses, especially the food and beverage sector, it is relatively straightforward to eliminate gas use through electrification with existing technologies. However, many small- and medium-sized businesses cannot afford to invest in capital improvements due to the upfront costs, even though these improvements will improve profitability in the long term by reducing exposure to volatile and expensive gas prices (Climate Council, 2020c).

- › **Recommendation 5:** Support industrial businesses to phase out gas by providing no – and low – interest loans to medium and small businesses to fund capital upgrades. This should include all industries that use gas, not just hard-to-abate sectors. Funding for this should occur through one of the streams of the state government's Net Zero Industry and Innovation Program.

Industry Research and Development:

Thirty percent of NSW's gas is currently used in sectors where there are no commercially viable alternatives to gas. This includes the ammonia and ammonium nitrate sector, the non-metallic minerals sector (including cement, brick and glass production) and iron and steel manufacturing and casting. By 2035, these three sectors could be responsible for 69% of NSW's gas use if new technologies, such as renewable hydrogen, are not commercialised.

- › **Recommendation 6:** Invest in research and development to identify and commercialise new technologies to enable emissions intensive industries to eliminate gas use. Funding for this work should be from one of the streams of the state government's Net Zero Industry and Innovation Program.

New South Wales Electrification Roadmap:

New South Wales needs a detailed electrification plan to reduce its reliance on gas to achieve significant emissions reductions.

- › **Recommendation 7:** Develop a comprehensive roadmap to identify how NSW can reduce gas use through electrification and other technologies, such as renewable hydrogen. This process should be informed by extensive consultation with energy and technology experts as well as businesses, while being underpinned by the clear imperative to replace fossil fuel gas use with zero emissions alternatives as fast as possible.

Summary of Major Climate Solutions

Table 1: Summary of major climate solutions identified in Northmore Gordon analysis.

Sector	Gas use in 2021	Gas reduction in early 2030s	Notes on the opportunity
Commercial and public buildings - Education	1.6 PJ	1.6 PJ (100% reduction)	These sectors are relatively simple to decarbonise with existing, commercial technologies – like heat pumps and other electrification – along with efficiency improvements. Government support required to accelerate the rollout of these solutions and co-ordinate solutions to common impediments such as distribution networks upgrades, where needed.
Commercial and public buildings - Retail	2.7 PJ	2.7 PJ (100% reduction)	
Commercial - Hotel	0.35 PJ	0.24 PJ (69% reduction)	
Residential – Other appliances	1.5 PJ	1.5 PJ (100% reduction)	
Residential - Cooking	2.8 PJ	2.8 PJ (100% reduction)	
Residential - Space heating	10.8 PJ	10.8 PJ (100% reduction)	
Residential - Water heating	16.5 PJ	16.5 PJ (100% reduction)	
Industrial - Food and Beverage	7.5 PJ	7.5 PJ (100% reduction)	These sectors broadly rely on the same set of solutions, but at a larger scale, meaning that the initial capital outlay will often be higher. This initial outlay will almost always be recouped in time, but policy mechanisms will need to recognise the distinction.
Commercial and public buildings - Others (inc Aquatic Centres)	1.6 PJ	1.6 PJ (100% reduction)	
Commercial - Other (including warehousing, hospitality, etc.)	8.6 PJ	5.37 PJ (62% reduction)	
Commercial - Offices	2.1 PJ	1.25 PJ (60% reduction)	
Commercial - Hospitals	2.3 PJ	1.15 PJ (50% reduction)	
Industrial - Textile, clothing, footwear, and leather	0.9 PJ	0.9 PJ (100% reduction)	These sectors rely on a greater array of solutions than basic combination of electrification and efficiency, and will frequently rely on analysis of each plant's needs on a more individualised basis. Many solutions are available already, but it is more difficult to approach them on a one size fits all basis.
Industrial - Iron and steel manufacturing/casting	6 PJ	4.84 PJ (81% reduction)	
Industrial - Pulp and paper	4 PJ	3 PJ (75% reduction)	
Industrial - Other/smaller facilities	8 PJ	5 PJ (63% reduction)	
Industrial - Non metallic mineral - cement, brick, glass	12 PJ	5.7 PJ (48% reduction)	
Industrial - Timber and Wood products	0.3 PJ	0.1 PJ (33% reduction)	
Industrial - Ammonia and Ammonium Nitrate	12.2 PJ	1.22 PJ (10% reduction)	
Industrial - Iron Smelting	3 PJ	0 PJ (0% reduction)	
Industrial - Mining	0.22 PJ	0 PJ (0% reduction)	

1. Introduction

This report provides one of the first pathways for eliminating gas demand in New South Wales (NSW) by 2050. Following this pathway would reduce gas demand substantially. In 10 to 15 years – possibly as soon as 2030 – demand for gas would decline by an amount that is equivalent to the output of Santos’s expensive and polluting Narrabri Gas Project in the state’s Northwest under this pathway.

Accelerating climate change is harming lives, livelihoods and the places we cherish. These impacts will continue to worsen while we continue to burn coal, oil and gas. Fortunately, there are viable solutions available that would dramatically decrease the use of fossil fuels right across the developed world (Madeddu et al. 2020).

Recent shifts in the economics of energy mean we can make deep inroads toward a zero emissions future with readily available technologies including renewable energy, energy efficiency, electrification and other zero emissions alternatives to fossil fuels. This will also require governments to become smarter about how energy is generated, distributed and used.

New South Wales can respond to the climate challenge by greatly reducing gas consumption over the next decade.

1.1 Australia's climate performance

On many measures, Australia is the most emissions intensive economy in the developed world – on a per person basis – with only a handful of other – mostly smaller – nations as reliant on coal, oil and gas for their energy needs (Climate Council 2020a). While many other nations are making significant progress on reducing their use of fossil fuels, Australia's coal, oil and gas consumption has remained stubbornly high (Department of Industry, Science, Energy and Resources 2020). While the country has every possible advantage when it comes to pursuing a zero-emissions energy system, the Federal Government has largely failed to harness this competitive advantage.

There is no meaningful plan at the federal level to reduce reliance on fossil fuels in Australia, whether through production or consumption. Indeed, the centrepiece of the government's economic policy – the so-called "gas-led recovery" – boils down to trying to increase fossil fuel production and consumption, despite overwhelming evidence of its harm. This includes granting tax-payer funds for unnecessary gas-fired power stations (Guardian 2021), re-writing the rules of Australia's clean

investment mechanisms to compel them to invest in fossil fuels (Reneweconomy 2020), directly sponsoring gas companies to build infrastructure required to develop and commercialise their plans with no expectation of repayment (ABC News 2021), and pressuring corporations that indicate they are moving away from investment in fossil fuels. There have been several instances of this last point – including the ongoing Parliamentary Inquiry into Prudential Regulation that is targeted at compelling banks and other financiers to explain why they are refusing to back fossil fuel projects (Sydney Morning Herald 2021) – and also more directly, including the undue pressure place on AGL over the closure of Liddell power station (Sydney Morning Herald 2018).

Fortunately, Australia's states and territories have made considerable progress. However, while there are many substantial and effective emissions reduction policies at the state and territory level – including each state and territory's net zero commitments – these policies are still insufficient to avoid the worst outcomes of climate change, for the simple reason that these are incomplete in their coverage. As well, so far these policies are not oriented toward reducing emissions with sufficient urgency to avoid the worst outcomes (Climate Council 2021a).



Figure 1: Policies from the NSW government to move off fossil fuels in the electricity sector will reduce reliance of old highly polluting power stations like Eraring, Australia's largest coal-fired power station.

1.2 New South Wales' climate performance

While the 2019/20 fire season and the severe drought that preceded it affected vast swaths of the country, New South Wales experienced an outsized impact from these climate driven disasters (Climate Council 2020b). Since then, the state has stepped up its climate response with ambitious plans to drive 12 GW of new renewable energy generation in the state across multiple renewable energy zones, as well as its new strategy to encourage the purchase of electric vehicles (NSW Government 2020a, 2021). However, even when paired with other elements of the state's Net Zero Plan (NSW Government 2020b), NSW will remain dependent on fossil fuels.

Given the state's population, it is unsurprising that NSW is responsible for more than a quarter of the country's greenhouse gas emissions each year (Department of Industry, Science, Energy and Resources 2021). Per person and per dollar of economic output, NSW emissions are near the national average. That said, Australia's emissions intensity is among the highest in the world by global standards. This should underscore how far the state still has to go, and why – in spite of recent state government announcements – fossil fuel use outside of the electricity and transport sectors has been trending upward over the course of the past decade, as shown in Figure 2.

A lot more is needed to put New South Wales fossil fuel consumption on track for a zero emissions future.

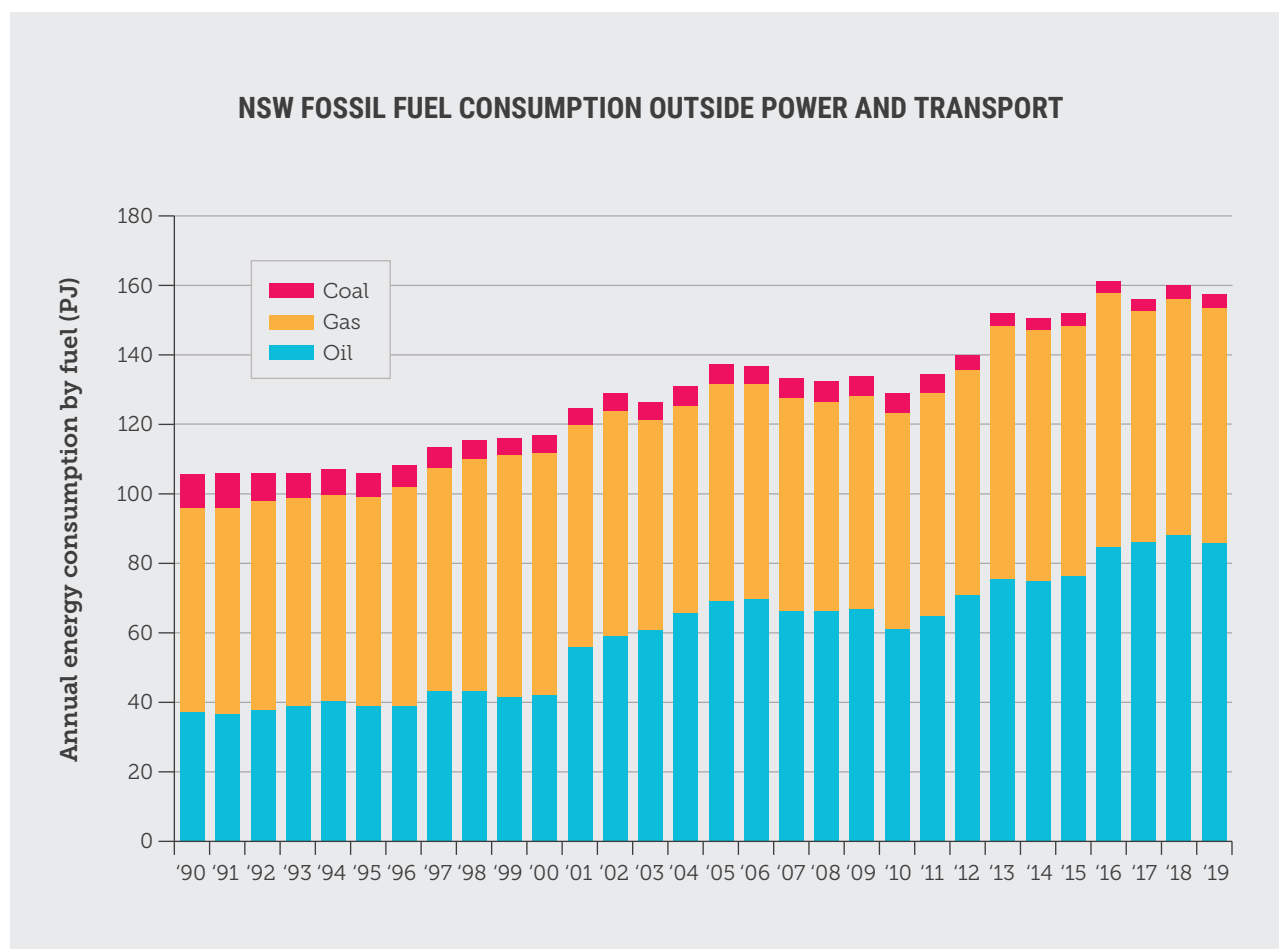


Figure 2: NSW fossil fuel consumption excluding the power and transport¹ sectors. Data source: Department of Industry, Science, Energy and Resources (2020), Table F.

Avoiding the worst impacts of climate change means that emissions intensive economies like NSW must seek out ways to make immediate, deep and sustained cuts to its use and production of fossil fuels.

The measures put in place so far in NSW will go some way to cutting demand for coal, and may begin to reduce demand for oil over the next decade as well, particularly petrol. However, they will do relatively little to reduce the demand for gas; the world's fastest growing source of greenhouse gas pollution (Jackson et al. 2020).

¹ This chart excludes the fossil fuel use of commercial transport – including trucking, public transport and aviation – and also excludes fuels that are used almost exclusively for transport – including aviation fuels and unleaded petrol. However, due to data limitations, it includes diesel used for other forms of transport. This includes, for instance, diesel used to run trucks and other vehicles on site in the mining or agricultural sectors and also diesel used by privately owned cars. Similarly, diesel used to produce electricity on site in sectors of the economy other than the grid-connected electricity sector – such as diesel used to provide electricity to remote mining operations – is also included.

1.3 Alternatives to the Narrabri Gas Project

Santos' proposed Narrabri Gas Project is unnecessary. Work by energy consultancy Northmore Gordon – commissioned by the Climate Council – shows that measures to reduce gas demand in NSW could cut annual demand in the state by the same amount that the project would produce over its decades long project life.

Northmore Gordon's full report is available on the Climate Council website.

There is no shortage of gas in Australia. In 2019, the country became the world's largest liquefied gas exporter (Office of the Chief Economist 2021) with three times more gas sent overseas each year than is used at home (Department of Industry, Science, Energy and Resources 2020). In fact – as shown in Figure 3 – the gas export industry burns more gas each year to process its export products than Australia's entire manufacturing sector uses. Any future supply issues in Australia have been created by the gas export industry and the pressure it has created due to long-term liquefied gas export contracts with overseas partners. This issue and its impact on domestic users has been raised, repeatedly, by the Australian Competition and Consumer Commission (Australian Competition and Consumer Commission 2021).

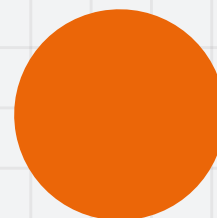
A lot more is needed to put New South Wales fossil fuel consumption on track for a zero emissions future.

NEARLY 80% OF AUSTRALIA'S GAS



IS DEVOTED TO EXPORTS

72%
EXPORTED GAS

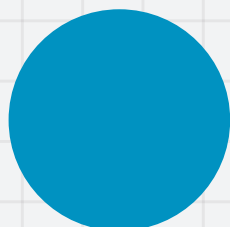


7.5%

**PROCESSING GAS
FOR EXPORT**



DOMESTIC USE



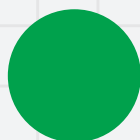
8.2%

**ELECTRICITY
GENERATION**



6.6%

MANUFACTURING



3.0%

RESIDENTIAL



1.2%

MINING



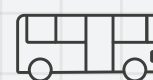
1.0%

**COMMERCIAL
& SERVICES**



0.6%

OTHER



Trying to meet the growing demands of Australia's swollen gas exporters has resulted in a gigantic increase in supply. Western Australia's gas production is now triple what it was a decade ago. Over the same time Queensland's gas production has ballooned to five times what it was (Department of Industry, Science, Energy and Resources 2020). Yet still Australia's gas exporters call for more gas basins to be opened for more gas to be shipped overseas under long-term contracts, thus adding to global greenhouse gas emissions. Setting aside the climate harm produced by the world's fastest growing fossil fuel for one moment (Jackson et al. 2020), if the solution to Australia's gas problem was more supply, then the easiest solution would be preferencing domestic usage over exports. Instead – especially on the east coast – the gas export industry has largely been able to grow without any need to consider the needs of Australian homes and businesses (Taylor 2020).

This growth in exports has come at a massive cost to Australian businesses and households. As noted in the Climate Council's 2020 report *Passing Gas: Why Renewables are the Future*, anyone relying on gas in Australia is now dangerously exposed to the vicissitudes of the international market for oil and gas, a market that has been defined by its boom-and-bust cycles for decades (Climate Council 2020c).

A supply glut in the second half of 2019 – exacerbated by the impact of COVID on global energy markets – resulted in the price of gas temporarily decreasing across eastern Australia. However, gas prices across the east coast have since returned to the same sky-high prices. This is shown in Figure 4.

The growth of the Australian gas export industry has come at a massive cost to Australian households and industries

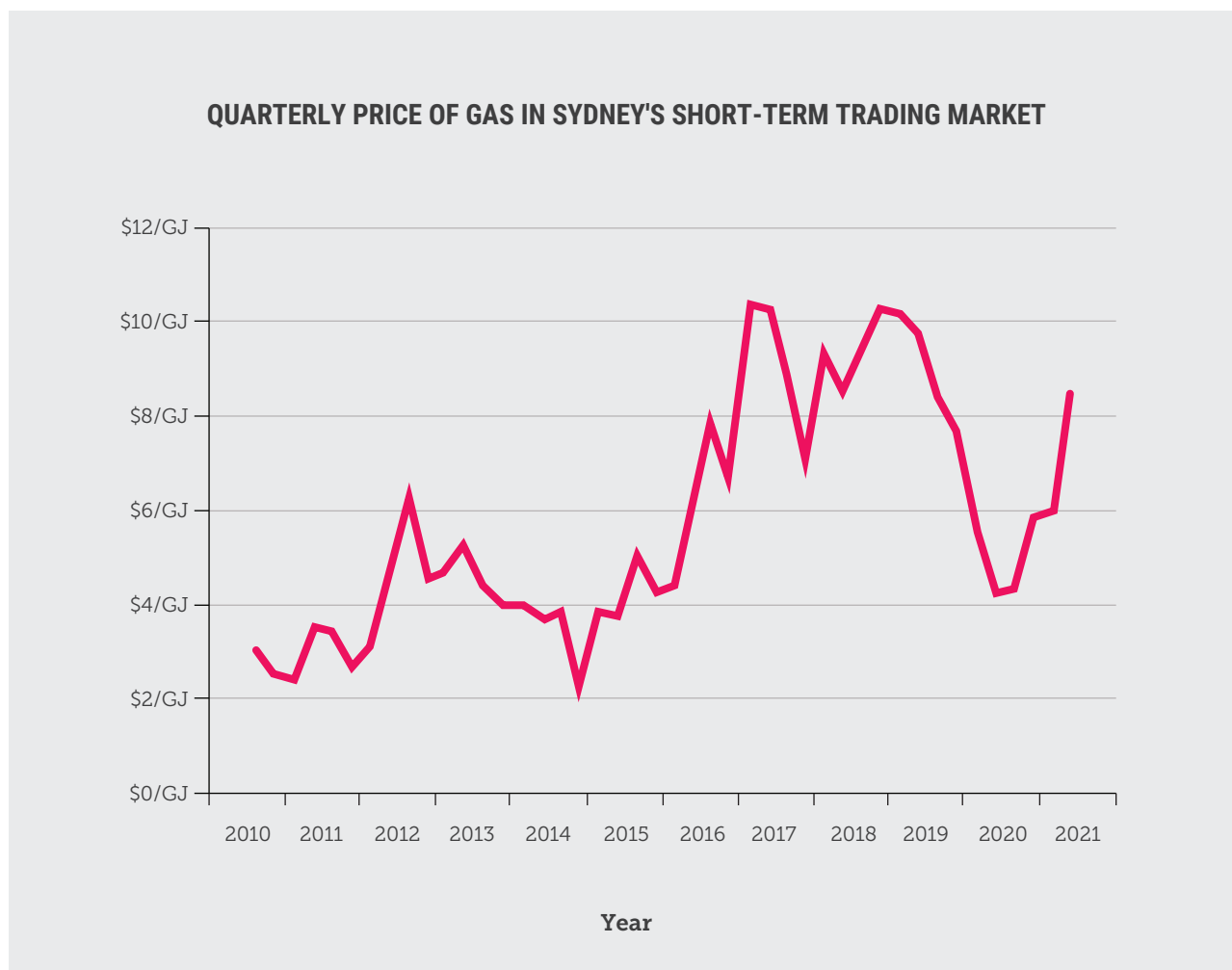


Figure 4: Quarterly price of gas in Sydney's short-term trading market. Data Source: Australian Energy Regulator (2021)

Ultimately, the only way for Australian households and businesses to reduce their exposure to this price volatility is to stop relying on gas. Luckily, Australia has a distinct advantage in being able to wean itself off fossil fuels like gas by being the sunniest continent on the planet and one of the windiest.

This will provide health benefits to all of us, as well as economic benefits. The Climate Council's report *Kicking the Gas Habit: How Gas is Harming Our Health* outlines how gas extraction exposes local communities to myriad catastrophic health risks (Climate Council 2021b). Gas extraction and processing involves many hazardous substances, including those that cause cancer, interfere with hormones, trigger asthma and contaminate the local environment through airborne pollution and wastewater. While further research is needed, evidence is emerging of these impacts being felt by communities in Australia today.



Figure 5: Gas consumption is not just harmful for our climate, but has many other health impacts as well.

Further, gas is not just harmful at the point of production, with the same report revealing the concerning effect gas is having in homes, especially on children and vulnerable communities. Few parents would be aware that 12% of the burden of childhood asthma is attributable to the use of gas cooktops in the home. In NSW public schools unflued gas heaters are still in use. These heaters release toxins directly into the classroom, leading to elevated asthma symptoms in pupils.

It is critically important – for our economy, our health and, of course, our climate – that every state and territory in Australia moves off gas as quickly as possible. To this end, the Climate Council commissioned energy consultants Northmore Gorgon to plot a pathway for NSW to reach a gas-free future using known technologies.

**The only solution
is to move off gas,
to zero emissions
alternatives**

2. A Gas-free Roadmap for New South Wales

Northmore Gordon's Roadmap for NSW predicts a steep reduction in the use of gas in the state across three different time horizons. Its research indicates that with policy support, gas consumption can be reduced by:

- › 24% between today and 2025;
- › 70% as soon as 2030; and
- › Entirely eliminated by 2050.

Following this pathway results in gas demand reduction as soon as 2030 equivalent to the size of the proposed Narrabri Gas Project output in the state's north west. This underscores why the Narrabri Gas Project – which will not begin to produce gas for several years – is unnecessary. This is shown below in Figure 6.

This pathway can be achieved using a combination of different technologies. While gas is used for other purposes, including as a chemical feedstock in several industrial processes – where gas is used as an ingredient in the process for its chemical properties, rather than as an energy source – the largest share of NSW's demand for gas is to provide heat energy to spaces – such as living spaces – water and industrial processes. The solution is to combine energy efficiency with electrification, so processes become energy intensive at the same time as their energy needs are met by renewable electricity.

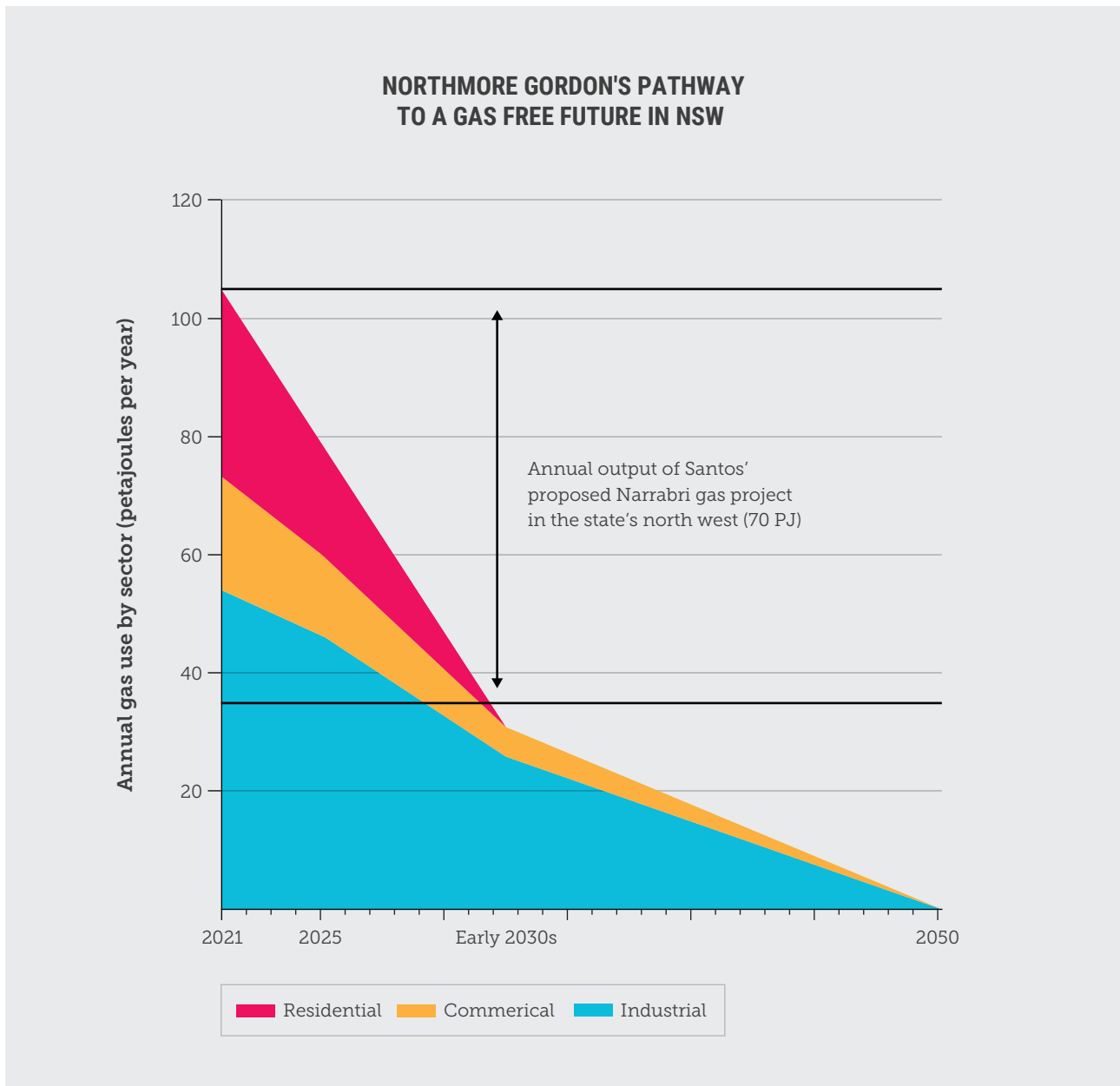


Figure 6: Pathway to a gas free future in NSW. In the early 2030s, the reduction in demand for the fossil fuel from 2021 levels is more than the proposed output of Santos's Narrabri Gas Project at 70 PJ.

The most important technology in the mix for providing heat to the state's homes, businesses and industries is the heat pump. This technology, which is core to the operation of refrigerators and reverse cycle air conditioners today, is capable of

efficiently providing a reliable source of heat by extracting heat from ambient air, water or the earth even where the temperature is at or below zero degrees Celsius. This process is explained in Box 1.

BOX 1: THE BASICS OF HEAT PUMPS

Heat pumps are an efficient means of providing heat for water, air or industrial purposes, though the reasons for this superior energy efficiency can be confusing at first. This is partly because the energy provided by heat pumps can seem to come from nowhere. Reverse cycle air conditioners and refrigerators use heat pumps, although they operate in reverse.

Heat pumps work differently from most other sources of heat. Rather than using energy to produce their own heat from burning a fuel or heating a coil, heat pumps source their heat from the local environment, using the air, ground, or ground-water nearby. By taking advantage

of the basic principles of physics, an air-source heat pump can heat a home to a comfortable temperature using heat from outside air even when the temperature is as low as -5°C .

The only energy used by a heat pump is the electricity needed to transfer the energy through the system, and to support other functions of the system. This includes, for example, the energy needed to power fans that blow heat from the pump into a room. Because heat energy is provided by the local environment rather than needing to be sourced separately, heat pumps can provide heat far more efficiently and cheaply than alternatives.

Figure 7: Existing technologies, like small-scale and industrial heat pumps have a big role to play in replacing NSW gas consumption with zero emissions alternatives.



While Australia's supply of electricity is dominated by fossil fuels, this is changing at a remarkable rate. In the first half of 2021, our largest electricity grid – the National Electricity Market, which supplies electricity to around 85% of the country's population – reached record levels of renewable energy generation with almost 30% of the grid's electricity coming from wind, water and solar (OpenNEM 2021). That is nearly double the amount of electricity that was derived from renewable sources five years ago.

This extraordinary growth in renewable electricity is far from being a one-off. Currently, renewable energy deployment is increasing faster than the most ambitious planning scenarios for Australia's largest grid (Australian Energy Market Operator 2020). If realised, AEMO's most ambitious scenario will mean that the share of renewable energy in the grid will double again within the next seven years.

It is worth noting that this scenario does not consider the impact of NSW' Electricity Infrastructure Roadmap, which was not announced until after the release of the market operator's most recent plan. That roadmap aims to drive 12 gigawatts of new wind and solar generation capacity in NSW alone (NSW Government 2020a). That is comparable to all the wind and solar being used today across the entire National Electricity Market.

When coupled with ambitious deployment of renewable energy, switching from gas to electricity will deliver precipitous reductions in greenhouse gas emissions from the consumption of fossil fuels over time.

By taking further steps outlined in the Northmore Gordon report – available on the Climate Council website – the NSW government could dramatically reduce the state's out-sized contribution to climate impacts, and save businesses and households money.

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