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The Northern Territory Is Pinning Its Hopes On a Declining Industry

The Gas-Fired Recovery is Being Overtaken By Battery Technology and Changing Export Markets

Executive Summary

Similar to the terminal decline of coal globally, we are now seeing the rapid decline of gas as a major source of fuel in the international and domestic energy system, being replaced by renewable energy and newer more sustainable technologies. The very rationale for embarking on a gas-fired recovery plan post COVID-19 has been removed.

At the moment, the Australian gas industry is reliant on exports with approximately 70% of gas being exported from the east coast of Australia. That is likely to change in the near term with Australia's core export markets, Japan, China and South Korea, having all given firm net zero emission commitments: by 2050 for Japan and South Korea, and 2060 for China. Net zero emissions by 2050 effectively means that liquefied natural gas (LNG) demand will fall. This is echoed by the International Energy Agency (IEA) which finds primary energy demand falls 17% by 2030 under such net zero emission commitments.[1] Australia's key export markets will increasingly get more energy from renewables and batteries, and through demand reduction via efficiency gains, electrification and behavioural changes.

Domestically, gas use in industry has fallen 12% since 2014. High domestic prices for gas have left the industry uncompetitive. Opening up further supplies of high cost gas under the Australian government's gas-fired recovery plan will increase the cost of gas to Australian consumers and industry, further depressing industrial gas usage. Gas is an expensive fuel to use for domestic applications and domestic usage will fall as consumers move away from gas.

High domestic prices for gas have left the industry uncompetitive.

Gas usage in gas-fired power plants has declined by 58%[2] since 2014, whilst renewables have increased to produce 25% of the energy in the National Electricity Market (NEM). The rapid rise of grid scale batteries will assure the continued

[1] International Energy Agency. World Energy Outlook 2020. October 2020.
[2] AEMO. Natural Electricity & Gas Forecasting.

decline of gas-powered generation.

The Australian Energy Market Operator (AEMO), the only agency to model a future electricity grid for Australia, has shown that by 2040 the role of gas in a renewables rich grid is smaller than today. With the rapid uptake of grid scale batteries, the AEMO's Integrated Systems Plan (ISP) has over-estimated even the limited role of gas it foresees.

By developing a National Gas Infrastructure Plan (NGIP), the Australian government is failing to acknowledge the evidence contained in the Australian Consumer and Competition Commission's (ACCC) 1,226 pages of gas inquiries from 2015 onwards that all clearly and unequivocally continues to demonstrate a lack of competition in the Australian gas market and the monopolised nature of the gas transmission sector. This lack of acknowledgement will lead to the failure of any NGIP.

The first rule of business is to listen to your customer. By focusing on a gas-fired recovery via the development of infrastructure and new gas resources in the Northern Territory, the Kimberley in Western Australia, and in Queensland, Australia is ignoring the behaviour change occurring with its customers, both domestic and international. This failure to acknowledge the current global energy transition away from fossil fuels and into sustainable, clean renewable energies is leading Australia's economic recovery policy to a 'dead end'. With its core customers moving to import less coal and LNG, and domestic usage dropping, Australia must acknowledge these bald facts and adjust its policies accordingly.

Gas is no longer serving a role as a transition fuel.

Gas is no longer serving a role as a transition fuel either domestically or internationally. The clear established global trend is towards more renewable power in electricity systems with grid scale batteries, and less gas. Grid scale batteries are now cost competitive with gas, eating into gas' market share for peaking power.

In supporting a gas-fired recovery, Australia is subsidising a losing industry that is experiencing export and domestic market declines.[3]

Any commercial gas production out of the Beetaloo Basin in the Northern Territory would most likely start in the second half of the decade subject to highly speculative drilling success. This will not provide the necessary economic stimulus coming out of the COVID-19 recession.

[3] IEEFA. Flogging a dead horse. October 2020.

The offshore development of gas hinges on a final investment decision for Santos' Barossa project located 300kms North of Darwin in the Northern Territory. This project however is carbon intensive, an unsuitable source of gas in a carbon constrained world. It faces significant financial risks from both carbon taxes and carbon tariffs.

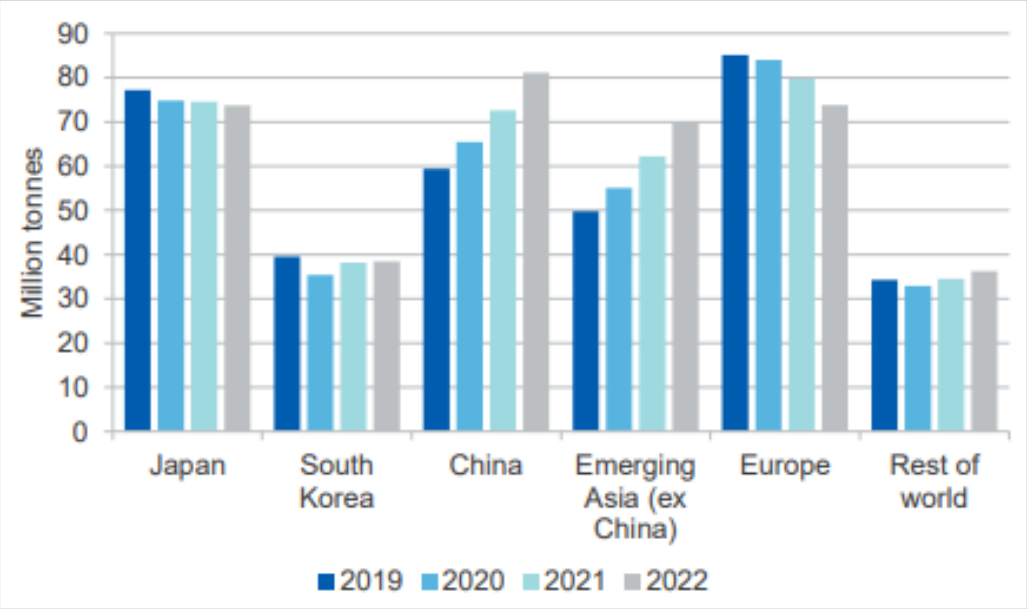
Contents

Gas Is Heating Up the Climate Faster Than Coal

Gas is predominantly methane, a powerful greenhouse gas. Methane emissions from unconventional gas fields are high, and when burned in peaking plants and used for export, are no better for the climate than coal. LNG is a higher emitting fuel than piped gas as it takes large amounts of energy to liquefy and then ship the gas.[4]

In September 2020, President Xi Jinping announced that China is aiming to hit peak emissions before 2030, and to be carbon neutral before 2060. It is likely that any new plans will increase China's reliance on domestic production and piped gas, rather than the higher emitting LNG. South Korea and Japan have also announced net zero emission targets to 2050, and more recently, the U.S. And in Australia, every State and Territory has a 'net zero' emissions target by 2050. Producing and consuming more gas is fundamentally opposed to each State/Territory government's policies on emissions.

Figure 1: World LNG Import Forecasts



Source: Resources and Energy Quarterly.[5]
Note: Emerging Asia includes India.

Even if Australia refuses to implement greenhouse gas targets, it looks as if China, Japan Korea, Europe, and the U.S., will force its' hand. Recent forecasts from Australia's Office of the Chief Economist (Figure 1) expect that China (17% of exports) and other Asian countries will take up the slack from declining European and Japanese markets. With new climate pledges by global leaders such as China, Japan, Korea and the U.S., it is unlikely that this will be the case. With the democrats winning the U.S. presidential election and control of the Senate, the U.S. has

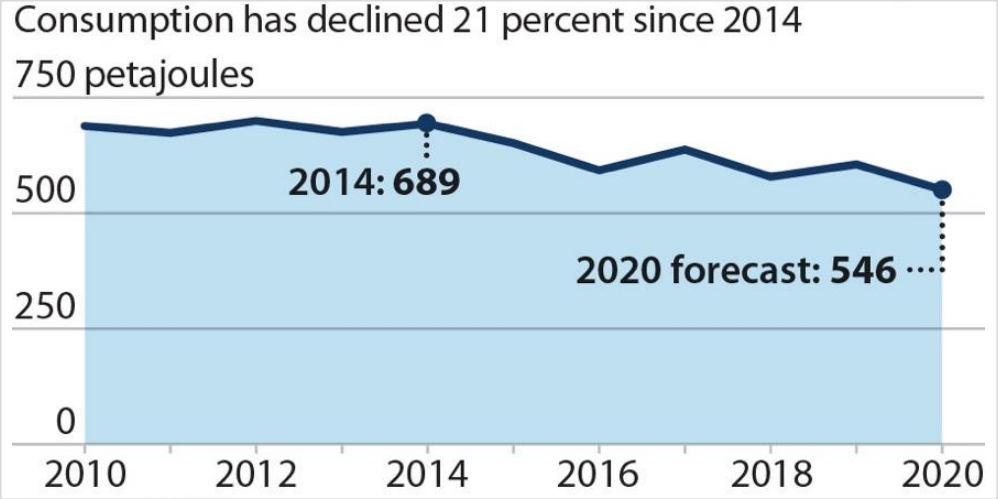
[4] IEEFA. Is the Gas industry facing its Volkswagen Moment? March 2020.
[5] Department of Industry, Science, Energy and Resources. Resources and Energy Quarterly. September 2020. Page 69.

embarked on ambitious climate goals, the implications of which are reverberating around the globe.

The Shrinking Australian Gas Market

Eastern Australian domestic gas use has been falling since 2014. Consumption has declined by 21% since 2014.

Figure 2: Eastern Australia Domestic Gas Use Is Falling



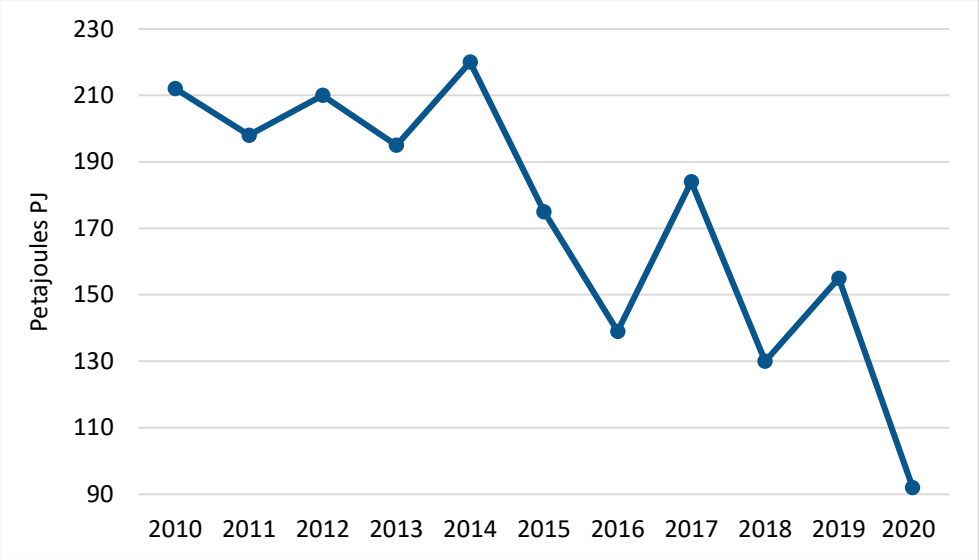
Source: AEMO.

Globally, uncompetitive gas prices have ensured that gas is not a competitive fuel source in each major sector of the gas market in Australia. Falls in consumption are likely to accelerate into the future.

Gas Is No Longer a Transition Fuel

In Australia, gas usage in gas-fired power plants has declined by 58%[6] since 2014 whilst renewables have increased to produce 25% of the energy in the NEM.[7]

Figure 3: Gas Usage by Gas Powered Generation in the National Electricity Market (NEM) 2010-2020

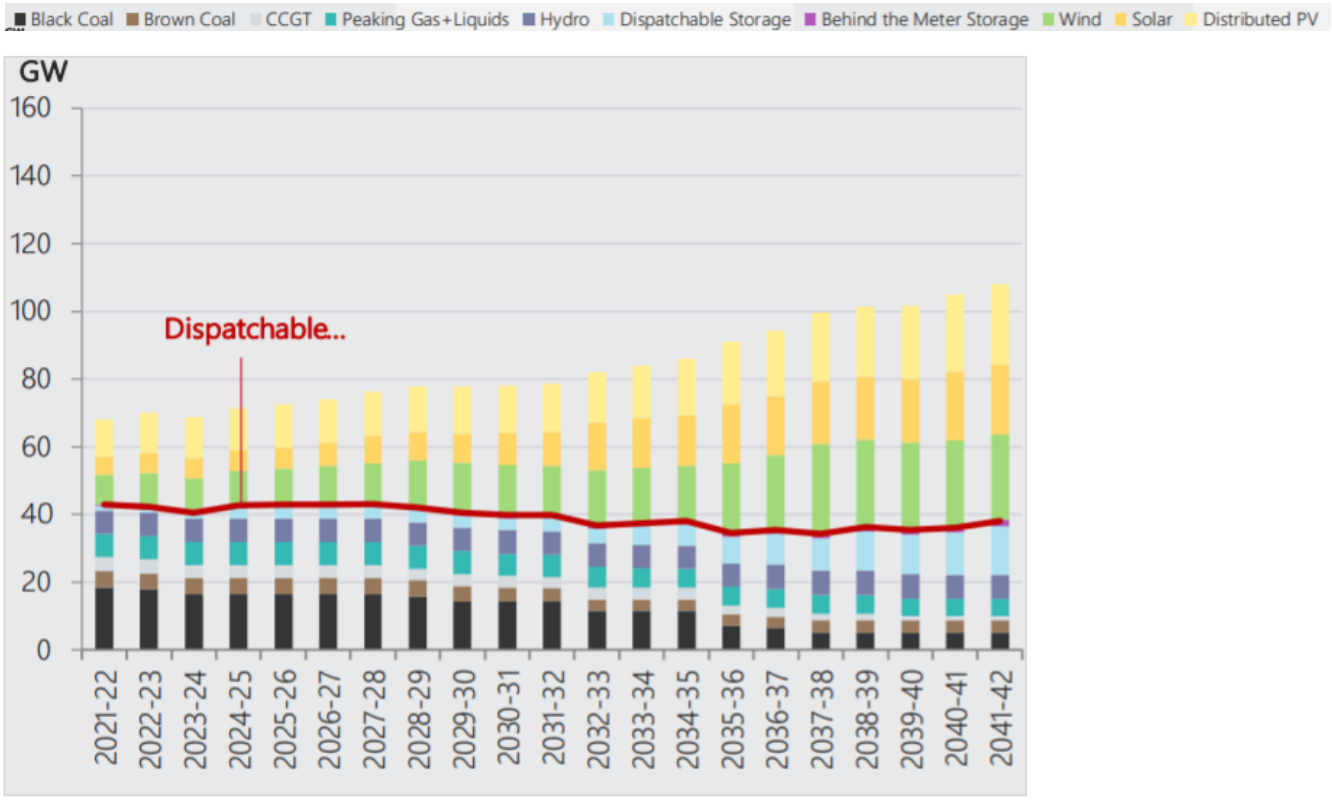


Source: Australian Electricity Market Operator (AEMO), IEEFA.

The Australian Energy Market Operator (AEMO), the only agency to model a future electricity grid in its Integrated Systems Plan,[8] has shown that in a renewables rich grid, by 2040 the role of gas is smaller than it is today. (Figure 4)

[6] AEMO. Gas Annual Consumption Total.
[7] OpenNEM. NEM.
[8] AEMO. 2020 Integrated Systems Plan. July 2020.

Figure 4: AEMO Integrated Systems Plan – Least Cost Development – Central Scenario



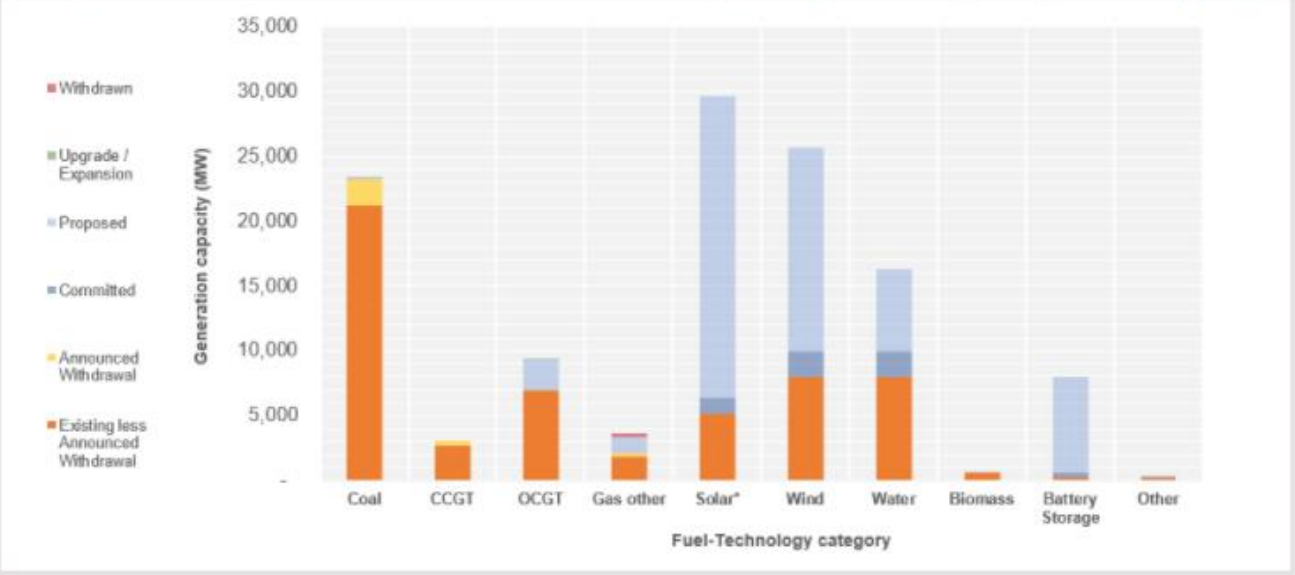
Source: Australian Electricity Market Operator (AEMO) Integrated Systems Plan. Page 40.
Note: Gas is the combination of CCGT (Combined Cycle Gas Turbines or gas baseload plants) and Peaking gas plus liquids (Open Cycle Gas Turbines or gas peaking plants).

AEMO considers investment into new gas-powered generation (GPG) unlikely in its Integrated System Plan (ISP):

> *"GPG can provide the synchronous generation needed to balance variable renewable supply, and so is a potential complement to storage. The ultimate mix will depend upon the relative cost and availability of different storage technologies compared to future gas prices. This favours existing GPG plants, but further investment in GPG is less likely based on the assumptions used in this ISP, particularly in scenarios that have carbon budgets to meet."*[9]

[9] AEMO. 2020 Integrated Systems Plan. July 2020. Page 53.

Figure 5: Australian Electricity Market Operator - Existing and New Developments by Fuel Technology January 2021



Summary Table: NEM Scheduled, Semi-scheduled & Non-scheduled Generation (MW) - Existing and New Developments by Fuel-Technology Category

		Fuel - Technology Category										
	Summary Status	Coal	CCGT	OCGT	Gas other	Solar*	Wind	Water	Biomass	Battery Storage	Other	Total
	Existing	23,201	3,041	7,002	2,114	5,125	7,965	7,982	607	261	201	57,499
	Announced Withdrawal	2,000	388	34	240	-	-	-	-	-	-	2,662
	Existing less Announced Withdrawal	21,201	2,653	6,968	1,874	5,125	7,965	7,982	607	261	201	54,837
	Upgrade / Expansion	90	-	15	-	-	-	-	-	-	-	105
	Committed	-	-	-	-	1,296	1,997	2,040	-	333	24	5,689
	Proposed	151	-	2,297	1,260	23,278	15,746	6,254	41	7,410	84	56,520
	Withdrawn	-	-	-	240	-	-	-	-	-	-	240

Notes:

"Existing" summary status includes "Announced Withdrawal".

"Committed" summary status includes "Committed*".

"Solar*" Fuel-Technology category excludes Rooftop PV installations.

Projects with "TBA" Dispatch Type are not included in the Summary Table.

Projects with "Confidential" FuelBucketSummary are not included in the Summary Table.

Source: AEMO.

Gas peaking plants, also known as open cycle gas turbines (OCGT), only contributed 0.9%[10] of the NEM's generation in the year to January 2021 whilst accounting for 12.2%[11] of capacity. Put simply, capacity in gas peaking plants is needed but they are not operated for long. Not much gas is needed to power them.

All new investment in Australia is flooding into solar, wind, batteries and hydro. The most recent example of this occurring was the New South Wales government's call

[10] OpenNEM. NEM.
[11] AEMO. Generation Information.

for tenders for 3 gigawatts (GW) of renewable power projects for its new Central West Renewable Energy Zone (REZ). The government received responses for 27GW with the tender nine times over-subscribed.[12]

The East Coast Gas Industry

Australia's east coast gas industry was irrevocably altered by the opening of three large export terminals in Gladstone in 2014-15. (For a more in-depth look at the transformation of the east coast gas market please see IEEFA's report, Gladstone: The Risks Mount.[13])

Following the development of Gladstone, the east coast market went from 'domestic only gas' to exporting over 70% of its gas.[14] The subsequent price rises in the market saw domestic gas consumption decline by 21% in the period 2014–2020.

Table 1: Transformation of the East Coast Gas Market – Gas Consumption in PJ

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020f
Gas Powered Generation (GPG)	212	198	210	195	220	175	139	184	130	155	92
Industrial	291	293	301	302	297	280	264	257	254	255	262
Residential and Commercial	181	178	184	174	172	192	185	192	190	190	192
Total Domestic Consumption	**684**	**669**	**695**	**671**	**689**	**647**	**588**	**633**	**574**	**600**	**546**
LNG exports	0	0	0	0	5	325	1060	1219	1237	1325	1415
Total Production	**684**	**669**	**695**	**671**	**694**	**972**	**1648**	**1852**	**1811**	**1925**	**1961**

Source: AEMO.

Residential and Commercial Demand for Gas

As can be seen in Table 1 above, residential and commercial consumption of gas has been very flat for the last 5 years. Domestic usage of gas is about to fall for two primary reasons:

1. It is cheaper to heat your home with a heat pump (electric air conditioner) and more efficient to heat hot water with a heat pump system. Cooking can efficiently be done with an induction cooktop.[15]

2. Domestic and commercial consumption of gas was 64% of all gas consumed in Victoria in 2019.[16] The Victorian government is investing $797 million to make homes more energy efficient and reduce greenhouse gas emissions. The package includes $335m to deliver new high efficiency heating and cooling systems for low income earners and $112m for energy upgrades of social housing properties, both of which will lower gas demand.

[12] ABC. NSW Government's renewable energy plan attracts more than 100 potential investors. 23 June 2020.
[13] IEEFA. Australia's Export LNG Plants at Gladstone: The Risks Mount. June 2017.
[14] AEMO. Gas Annual Consumption Total.
[15] Renew. Household Fuel Choice in the NEM 2018. July 2018. Page 32.
[16] Northmore Gordon. Victorian Gas Market – Demand Side Measures to Avoid Forecast Supply Shortfall. 23 March 2020. Page 15.

East Coast Gas Is Controlled by a Handful of Producers

The east coast gas industry is controlled by only a handful of players that have consistently price gouged the Australian domestic consumer and our governments have allowed them to. The cartel, consisting of Santos, Origin Energy, BHP, Exxon and Shell, have a stranglehold on reserves of gas on the east coast.

The ACCC has produced two gas inquiries since 2015 and has handed down 11 reports consisting of 1226 pages, all essentially saying the same thing: east coast gas consumers pay more than they should for gas and there is an anti-competitive market environment. The next report due in 6 months will no doubt reiterate what the previous 11 reports have said and will yet again be met with inaction.

While examples of the exercise of market power are littered throughout the 1226 pages of the various ACCC gas reports, one recent stark example is highlighted in an August 2020 ACCC press release:

> *"Queensland LNG producers sold 18 LNG spot cargoes into international markets in late 2019 and early 2020, equivalent to more than 10 per cent of annual domestic east coast demand. This gas was sold at prices substantially below domestic gas price offers, showing the importance of our continuing work to understand the drivers behind the price levels we are seeing across the domestic market…*
>
> *It is also clear that recent Australian contract gas prices do not reflect overseas forward prices. I am yet to hear a compelling reason from LNG producers as to why domestic users are paying substantially higher prices than buyers in international markets."*[17]

The sale of 18 LNG spot cargoes at prices below domestic price offers is in direct contravention of a 'heads of agreement' signed between the LNG exporters and the Australian Government on 30 September 2018. That agreement stated:

> *"Under the agreement, LNG exporters have agreed to offer uncontracted gas to the domestic market on reasonable terms in the event of a shortfall. This uncontracted gas will not be offered to the international market unless equivalent volumes of gas have first been offered to the Australian domestic gas market on competitive market terms."*[18]

The LNG exporters flouted the heads of agreement and the Australian government did nothing about it.

The concentration of the market is stark, as outlined by the ACCC:

> *"A substantial proportion of gas resources in Queensland (over 80% of 2P reserves and over 50% of 2c resources) are controlled by the three LNG*

[17] ACCC. Domestic gas users paying too much. 17 August 2020.
[18] Department of Industry. New Heads of Agreement to secure gas supply. 30 September 2018.

> *producers, raising potential concerns about the level of concentration in the market."*[19]

Queensland is the most important state for the east coast gas market. Reserves in the Bass Strait are running down, and the Moomba field in South Australia is at its peak. Queensland coal seam gas (CSG) reserves are the future for the bulk of the supply to the LNG export facilities in Gladstone, and more broadly, the supply of gas on the east coast.

The NGIP, with the attempt to establish an Australian Gas Hub at Wallumbilla, is bound for failure. It aims to increase competition by "*increasing the number and diversity of participants in the hub*".[20] This is simply not achievable when the reserves in Queensland are controlled by just 3 consortiums.

Essentially the NGIP is attempting to create a market where 1226 pages of evidence from the ACCC clearly show there is no market. It is bound for failure.

Transport Monopolies

The ACCC has also commented extensively on the monopoly pricing that occurs in the gas pipeline sector, as far back as its original 2015 East Coast Gas Inquiry. The Australian gas pipeline industry is dominated by just a few companies with APA group being by far the largest. Regulation of the industry is weak and the returns earned by gas pipeline companies in Australia far exceed any reasonable rates of return.[21] They have exercised their market power to the detriment of consumers.[22]

The east coast has an inefficient, monopolised, price gouging pipeline sector. It is not efficient or transparent.

Gas Is Struggling in the Northern Territory

The Northern Territory Will Struggle to Compete With Qatar

Qatar, the world's biggest LNG exporter until last year, has advised it is pushing ahead with a huge expansion of capacity[23], taking it from 77 million tonnes a year to 110 million tonnes a year by 2025, then potentially to 126 million tonnes two years later. It is looking to develop its North Field, a field shared with Iran who has already pushed ahead with development. Qatar has cut prices by around 22% to secure new customers. A recent deal was struck with Sinopec at a "slope" or index against crude oil of just over 10%.

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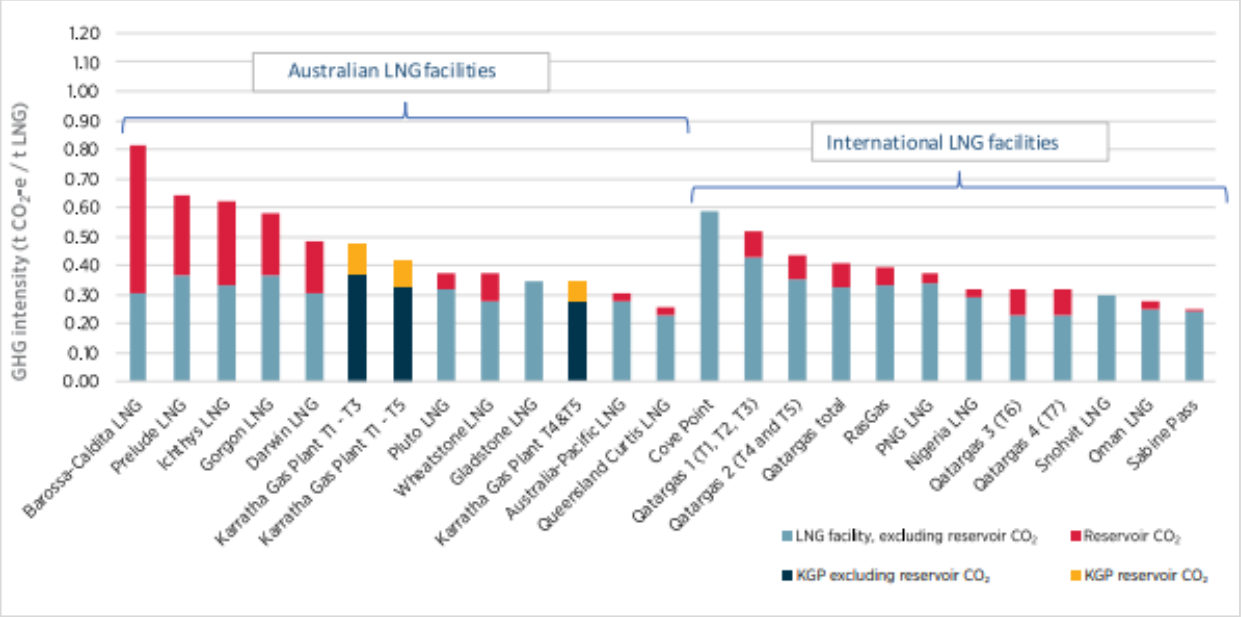
[19] ACCC. Gas inquiry 2017-25 Interim report January 2021.
[20] Department of Industry, Science, Energy and Resources. Gas Fired Recovery Plan Consultation Note.
[21] Michael West Media. It's a gas! Australian gas is a bargain…if you're Japanese. 15 July 2016.
[22] ACCC. Gas inquiry 2017-25 Interim report January 2021. Page 8.
[23] AFR. Qatar pushing ahead with LNG expansion despite demand slump. 25 May 2020.

Qatar is a very low cost producer, arguably the lowest cost producer in the world. Australian projects will struggle to compete with this new cheap supply.

The Offshore Barossa Field Is Just Too Carbon Intensive

The offshore Northern Territory Barossa field owned by Santos and SK E&S follows in the trend of new gas fields being far higher in greenhouse gases than those that they replace.

Figure 7: Greenhouse Gas Intensity of Various Australian and International Projects



Source: NWS project extension – Environmental Review Document Page 115.

In a recent report,[24] John Robert, a guest contributor with IEEFA estimated that:

> *"Between 2014 and 2019, the emissions intensity of Australia's gas production had increased by around 30 per cent as newer projects released higher rates of greenhouse gas emissions."*

Barossa is particularly problematic with the highest greenhouse gas intensity of any project in Australia. With carbon prices and carbon tariffs being introduced globally this project faces significant financial risks.

[24] IEEFA. The Growth of Australia's LNG Industry and the Decline in Greenhouse Gas Emission Standards. April 2020.

The Beetaloo Basin Will Not Provide Economic Stimulus to the Northern Territory

In a recent Australian Financial Review article, Australian Petroleum Production & Exploration Association (APPEA) executive Keld Knudsen said that the industry hadn't sought government subsidies to carry out speculative drilling in the onshore Beetaloo Basin.[25] Despite this, the industry received $50 million in government assistance anyway.[26]

The U.S. hedge funds backed by American billionaires are the prime beneficiaries of the Australian governments' $50 million in drilling subsidies. Tamboran Resources, which owns three permits in the Basin, is backed by two large U.S. hedge funds and is heading for a sharemarket listing of up to $195 million.

Knudsen further played down any expectation of early production in the Beetaloo, stating:

> *"The Beetaloo sub-basin still requires billions of dollars of investment in high-risk exploration and the construction of production wells, gas processing and pipeline infrastructure to get the gas to market – and this will take a number of years."*[27]

If the Beetaloo really was the "hottest play on the planet" as claimed by both the Resources Minister Keith Pitt[28] and Tamboran Resources,[29] all the gas companies would be lining up to drill wells without the need for taxpayers' hard earned dollars. Curiously, despite all the hype about the Beetaloo Basin, Origin Energy is farming down its interest in its Beetaloo permits.[30]

Any commercial production out of the Beetaloo would most likely start in the second half of the decade subject to highly speculative drilling success. This will not provide stimulus coming out of the COVID-19 recession.

This will not provide stimulus coming out of the COVID-19 recession.

[25] Michael West Media. Fracking Madness Beetaloo Basin Gas subsidies. 3 January 2021.
[26] AFR. Explorers line up for $50m Beetaloo drilling funds. 17 December 2020.
[27] Michael West Media. Fracking Madness Beetaloo Basin Gas subsidies. 3 January 2021.
[28] Hon Keith J Pitt. Beetaloo strategic plan will unlock gas, jobs and development. 17 December 2020.
[29] AFR. 'Hottest play on the planet': Beetaloo explorer aims high. 27 October 2020.
[30] Origin Energy. Investor Presentation 2020.

More Battery Storage Equals Less Gas

Batteries are usurping the role of gas in the power system. Grid scale battery usage is increasing rapidly, and battery cost deflation is faster than wind or solar. Gas is struggling to compete with batteries, with gas prices globally being at historic lows. When gas prices recover, gas will not be able to compete. The cost deflation will ensure batteries pay a larger role in the power system at the expense of gas in the very short term.

Energy companies are finally starting to see this transition, and to act.

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AGL Energy

AGL Energy, a company whose very name is synonymous with the gas industry and who produced the iconic "Living Flame" advertising campaign in 1979, announced on 13 August 2020 that the falling cost of battery storage makes a case for big batteries usurping the role of gas in a renewables rich grid.[31]

On 17 August 2020, AGL Energy's newly appointed chief operating officer Markus Brokhof said: "There is a clear business case for big batteries." He added that batteries were starting to compete with gas peakers on commercial terms to firm up supplies of wind and solar.[32]

AGL's Climate Statement commitments 2020[33] are geared towards decarbonisation and investment in renewable sources of electricity supply and integration. The company now has big plans for installing several new batteries to complement its power generating operations.[34]

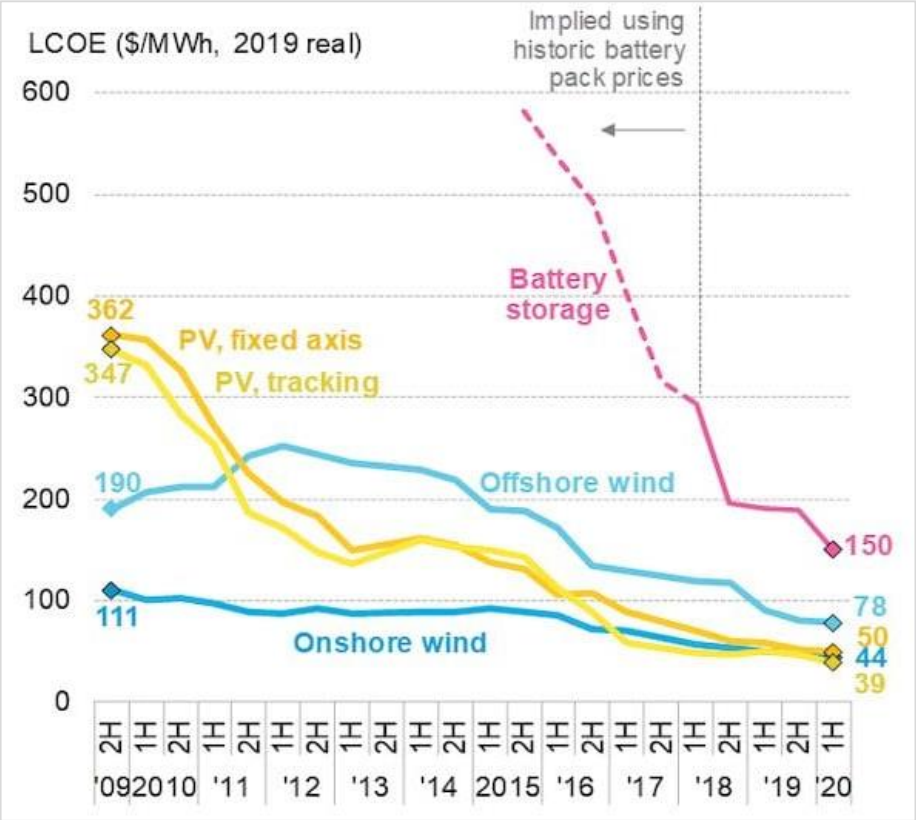
AGL has set a goal of installing 1,200 megawatts (MW) of new battery storage and demand response capacity by 2024,[35] and is tying executive and senior management bonuses to reaching growth targets for the company's clean energy and storage portfolio. It has also lodged initial development plans for a new big battery of up to 500MW at its Liddell coal-fired power station site in the Hunter Valley, New South Wales.[36] It plans to construct a 150MW battery in the first instance following the

[31] Renew Economy. AGL says batteries at tipping point, but renewables "choked" by connection woes. 13 February 2020.
[32] Renew Economy. AGL says batteries starting to compete with gas generators for peaking services. 17 August 2020.
[33] AGL. Climate Statement and Commitments 2020.
[34] Renew Economy. AGL targets 1.2GW of new battery storage by 2024, plans tender. 13 August 2020.
[35] Renew Economy. AGL targets 1.2GW of new battery storage by 2024, plans tender. 13 August 2020.
[36] Renew Economy. AGL seeks approval for 500MW big battery at site of Liddell coal generator. 14 August 2020.

station's closure in 2023. Further, at its Torrens Island gas-fired power station in South Australia, AGL is installing a 100-150MW battery in its initial stage.

Increasingly, wind and solar projects are being co-located with batteries. AGL is progressing plans to add a 100MW/150MWh battery next to the proposed Wandoan solar farm in Queensland, and up to 200MW/400MWh of battery capacity spread across four sites in partnership with the Maoneng Group, including a 50MW/100MWh battery next to the Sunraysia solar farm in New South Wales.

Figure 6: Battery Cost Deflation Even Steeper Than Wind and Solar



Source: Bloomberg NEF.

Further Battery Developments by Private Industry

At present, the largest battery in the world is the Hornsdale Big Battery in South Australia. It boasts a size of 150MW/193MWh. On 20 August 2020, French owned renewable company Neoen filed plans for a $3bn wind and solar farm with a battery 10 times bigger than the Hornsdale big battery.[37] The Goyder South project in South Australia proposes 1200MW of wind energy, 600MW of solar PV, and a

[37] Renew Economy. Neoen files plans for $3bn wind and solar farm with battery 10 times bigger than Hornsdale. 20 August 2020.

900MW/1800MWh battery dwarfing the size of the Hornsdale big battery. These types of hybrid projects, that totally exclude gas, are the future of the power system.

Since the beginning of November 2020 a new big grid scale battery has been announced on average every 2- 3 weeks. The total size of these proposed projects is over 3GW. These projects have, in most cases, secured land and connection points to the grid making them more likely to proceed.

Grid scale batteries are now a feature of the energy market in Australia, with gas usage for gas-powered generation declining by 58% since 2014, and gas demand from all sectors declining by 21% since 2014. Further battery penetration will come at the expense of gas.

Big grid scale batteries will not replace gas in the short term. They will however take the cream out of the market and crimp gas' profitability and usage. The continued decline of gas as a fuel source for power generation globally looks assured.

Conclusion

The gas industry is in structural decline in Australia and the LNG industry faces increasing pressure from climate conscious investors, insurers, bankers and customers. Net zero emissions commitments from Australia's major trading partners will see gas and LNG use decline. It is likely that global carbon pricing and carbon tariffs will erode gas' competitive position.

As a stimulus to industry the gas-fired recovery will backfire as the companies involved continue to utilise their market power to price gouge the domestic consumer. High priced gas will not stimulate a recovery from COVID-19.

The rapid adoption of grid scale battery technology will reduce demand for gas in the power sector and in the domestic sector gas is winding its way out of household use as houses electrify.

For the Northern Territory, the offshore Barossa field is looking like it simply has too large a carbon footprint and onshore gas will struggle in export markets against a rapidly expanding low cost Qatar.

The future for gas and LNG is bleak and the Northern Territory should not pin its hopes on a declining industry.

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