



Flogging a Dead Horse

Why the Gas Industry Can't Stimulate the Economy

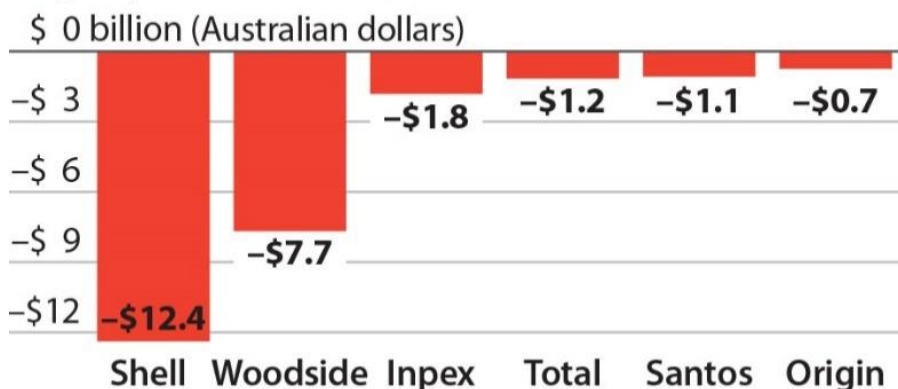
Executive Summary

Australia is subsidising a losing industry that is experiencing export market declines.

The gas industry in Australia suffered \$25 billion in write-offs in the first six months of 2020. Australian gas companies have lost between 58% and 69% of value since January 2011.

Australian Gas Write-Offs Total \$25 Billion

Largest pre-tax write-offs, June 2020



Source: IEEFA, based on company financial reports

Since January 2011 the Australian Stock Market (as represented by the All Ordinaries index) has risen by 26% whilst oil and gas stocks have fallen heavily. The oil and gas industry has proven to be a wealth destructive sector on the stock market.

Australia's core export markets, Japan, China and Korea have given firm net zero emissions commitments by 2050 for Japan and Korea and 2060 for China. Net Zero emissions by 2050 effectively means that LNG demand will fall. Primary energy demand falls by 17% by 2030 under net zero emissions commitments according to the International Energy Agency. They will get more energy from renewables, nuclear, batteries and through demand reduction via efficiency gains, electrification and behavioural changes.

The first rule of business is to listen to your customer. Australia is flatly ignoring its customers and failure to acknowledge the future is leading our economic policy up a

dead end. Australia's thoughts on climate policies or science are irrelevant. Our core customers are moving to import less coal and LNG and we must acknowledge these bald facts and adjust our policies accordingly.

Gas is no longer serving a role as a transition fuel either domestically or internationally. Grid scale batteries are now cost competitive with gas, eating into gas' market share for peaking power.

The clear established global trend is towards more renewable power in electricity systems with grid scale batteries, and less gas.

For the Next Ten Years, the World Has Too Much Gas

There is a global supply glut of gas that will continue until late this decade. The factors that led to this were in place prior to 2020. Overbuilding of LNG plants and over-production of uneconomic shale and coal seam gas (CSG) has occurred for years. The COVID-19 demand depression has merely accelerated the process.

Australian Gas Drillers Lose Shareholder Value



Source: ASX

Globally the LNG industry is in a deep depression. The U.S. shale fracking industry has imploded with multiple bankruptcies and a severe depression in activity. Cargo ships carrying LNG are circling oceans searching for a buyer.

Despite this, Qatar is expanding LNG production by 64% by 2027. Expanding production into a weak market will extend the length of the global gas glut and pose significant competition to gas exporting countries like Australia, as Qatar is a low-cost producer.

Globally, gas prices are very depressed. There is no place for high cost gas in this market.

In Australia, Gas Usage Has Shrunk; It Simply Costs Too Much

Domestically, gas usage overall has shrunk by 21% since 2014, primarily because gas is too expensive as an energy source.

Gas use in industry has fallen 12% since 2014. High domestic prices for gas have left industry uncompetitive. Opening up further supplies of gas under the government's gas-fired recovery will *increase* the cost of gas to Australian consumers and industry, further depressing industrial gas usage.

Gas usage in gas-fired power plants has declined by 58%¹ since 2014, whilst renewables have increased to produce 25% of the energy in the National Electricity Market.

The Australian Energy Market Operator, the only agency to model a future electricity grid for Australia, has shown that by 2040 the role of gas in a renewable rich grid is smaller than today.

Gladstone, A Financial Failure

The coal seam gas to liquefied natural gas projects at Gladstone, Queensland are a financial failure.

The three lead companies in the consortium that own the three export CSG to LNG plants at Gladstone have written off \$24bn since 2014 on their failed investments. Santos' CSG to LNG Gladstone experiment has nearly written off \$7 billion. Its latest \$1.1 billion write-off was announced in July 2020.

Opening Up New Supply at Narrabri Will Increase the Price of Gas

East coast gas consumers already pay too much for gas. The Australian Competition and Consumer Commission's gas price enquiry (2017-2025) repeatedly shows that the Australian domestic consumer pays too much for gas, and has been doing so since the Gladstone export plants opened in 2014.

The Narrabri coal seam gas project will *not* bring down the cost of gas, but rather, it will place upward pressure on prices.

Unconventional gas (coal seam gas and shale gas) is high cost gas, which means it is very expensive to extract from the ground. Producing high cost gas in a low-cost gas world is not economic.

The Narrabri gas project will embed high cost coal seam gas into the domestic system. Meanwhile, cheaper sources of gas will be exported. Selling high cost coal

¹ AEMO. [Natural Electricity & Gas Forecasting](#).

seam gas to the domestic consumer will force up the price of gas.

Opening Narrabri, expected sometime between 2024 and 2027, will *not* stimulate the Australian economy. The only benefits to this new supply will be in lining gas companies' pockets.

The only measure that will bring down the high cost of Narrabri gas is the massive subsidies being proposed by the federal government for the gas companies, not the consumers.

Australia's 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. This 'cartel' has socialised its losses on the export markets at the expense of the Australian energy consumer.

The Western Australian gas market operates differently. In Western Australia, the state government has put in place a gas reservation policy, which reserves the necessary quantities of gas for cheap domestic consumption. Consumers in Western Australia pay a lot less for gas than their east coast neighbours.

The east coast of Australia needs a domestic gas reservation policy. A domestic gas reservation on existing and prospective fields at \$4/gigajoule is the only way to ensure low prices and assured supply for Australian east coast domestic consumers.

If Not Gas, Then What?

Gas use in residential and commercial applications can largely be substituted with cheaper electrical heating in the form of air conditioners, induction cooking and heat pumps for hot water.

Switching from gas would unfetter up to 190 petajoules per annum, and dwarf the suggested contribution of, at best, 70 petajoules from Narrabri.

Gas Is Heating Up the Climate Faster Than Coal

Gas is predominantly methane, a greenhouse gas which displaces oxygen and warms up the atmosphere.

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.

In September, 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 reliance on domestic production and piped gas rather than LNG.

Every State and Territory in Australia has a 'net zero' emissions target by 2050. Producing and consuming more gas is fundamentally opposed to each government's policies on emissions.

Even if Australia refuses to implement greenhouse gas targets, it looks as if China, Europe, and even possibly the U.S. will force its hand.

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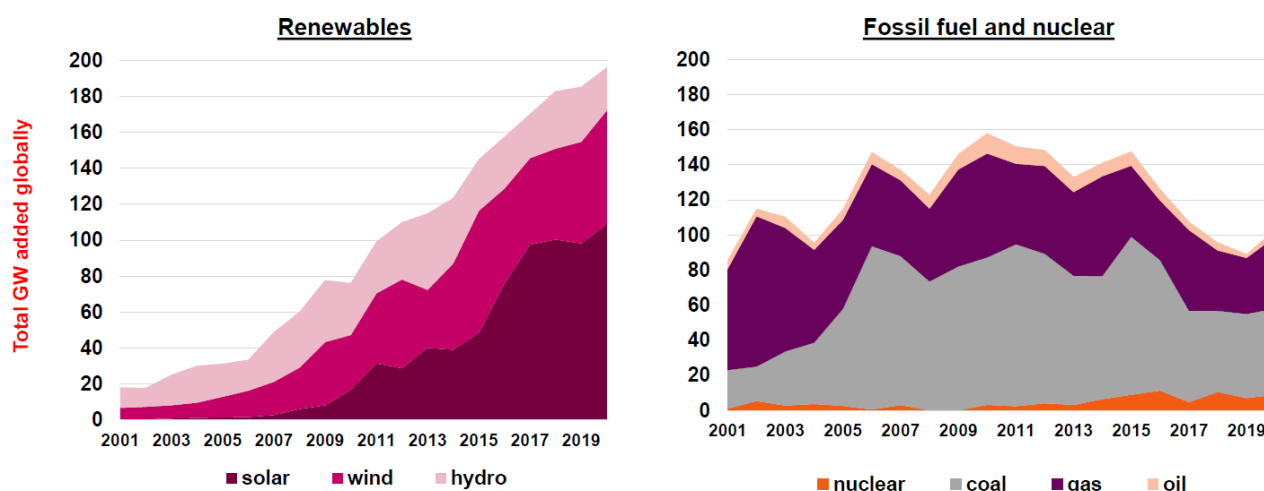
The Global Context

Renewables Overtake Fossil Fuels and Nuclear

Globally, renewables are overwhelming new fossil fuel and nuclear power station builds. Since 2010, new renewable plants have grown by approximately 148% whilst new nuclear² plus fossil fuel plants have declined by 38%. (Figure 1) In 2019, 200 gigawatts (GW) of renewable power plants were built while only 100GW of fossil fuel and nuclear were constructed.

Significantly, less gas power plants were built in 2020 than in 2001. Gas is no longer serving a role as a transition fuel globally.

Figure 1: Global New Power Station Builds



Source: IRENA, S&P Global Platts Analytics, Market Intelligence World Electric Power Plant database. 2019 is a preliminary estimate, 2020 is forecast.

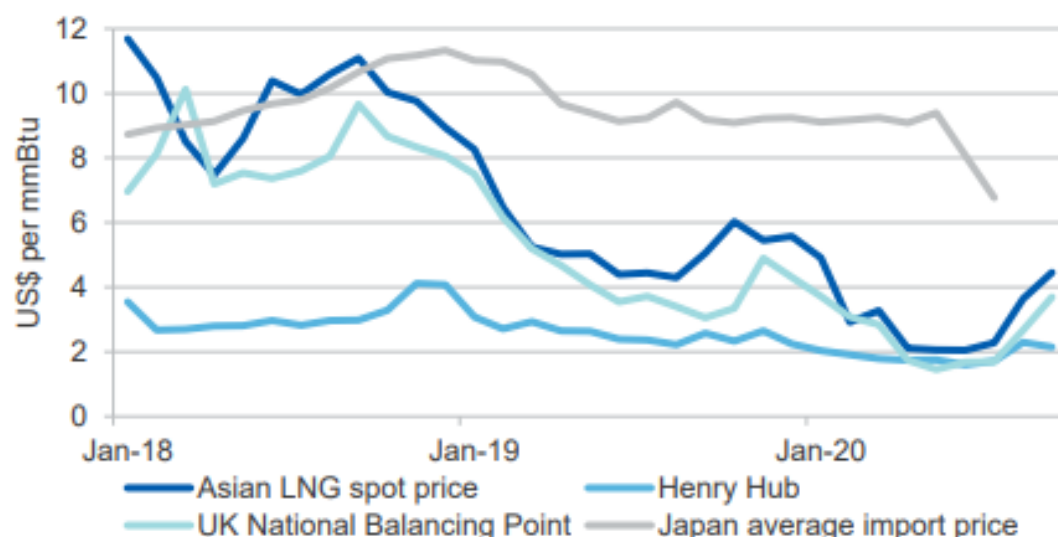
The Great Global Gas Depression Has Hit Everyone Hard, Particularly the U.S.

We are *not* seeing a slowdown in demand or even a recession in the global gas industry; what we are witnessing is a depression in the global gas industry. Globally, gas/LNG prices have collapsed.³ (See Figure 2.)

² Globally, nuclear has not been a significant source of new power station builds.

³ OCE. *Resources and Energy Quarterly*. September 2020. Page 67.

Figure 2: Gas and LNG Prices Fall to Historic Lows



Notes: ANEA is the Argus Northeast Asia spot price. LNG prices are DES (Delivered Ex Ship), which include shipping and insurance.

Source: Argus (2020); Bloomberg (2020); Department of Industry, Science, Energy and Resources (2020)

Note: This graph, published by the Australian government's Office of the Chief Economist, quotes oil prices. Export LNG gas contracts are priced as a percentage of the oil price, hence the relevance of oil prices.

The U.S. fracking industry, which extracts shale gas from rocks underground, has imploded. In addition to a 70% fall in the number of operating drill rigs over the last 12 months (Figure 3), there have been 36 oil and gas bankruptcies to date this year, restructuring \$51bn in debt.

Figure 3: Number of Operating Drill Rigs in the U.S. Drops by 70%

Area	Last Count	Count	Change from Prior Count	Date of Prior Count	Change from Last Year	Date of Last Year's Count
U.S.	25 Sept 2020	261	+6	18 Sept 2020	-599	27 Sept 2019
Canada	25 Sept 2020	71	+7	18 Sept 2020	-56	27 Sept 2019
International	Aug 2020	747	+4	July 2020	-391	Aug 2019

Source: Baker Hughes Rig Count.

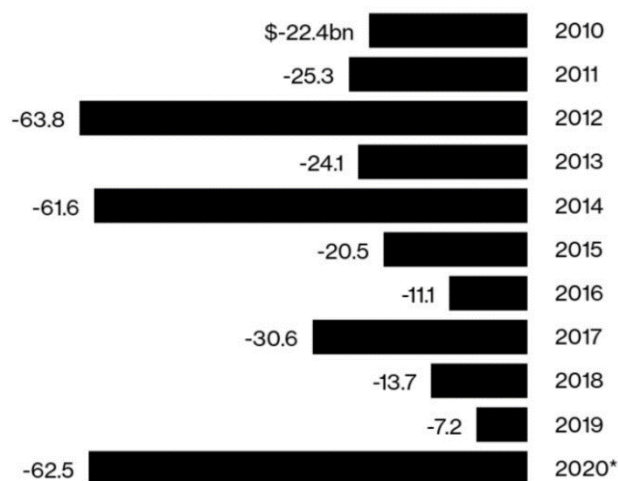
The U.S. shale industry has been cash flow negative every year in the last decade. (Figure 4) Deloitte estimated in June that almost one third of U.S. shale producers are technically insolvent at current oil prices.⁴

Figure 4: Deloitte – US Shale Oil and Gas Producers Free Cash Flow

Burn Baby, Burn

U.S. shale oil and gas producers have burned through
\$342 billion since 2010

■ Free cash flow



Source: Deloitte
*2020 is estimated

Bloomberg

Further, U.S. LNG exports have declined by more than half to date in 2020. (Figure 5) Capacity utilisation of U.S. LNG plants was just 31% in July 2020. LNG ships from all nations are circling in the ocean whilst trying to find a buyer for their unwanted cargoes.⁵⁶

In short, there is a massive global glut in gas supply that will extend out to late in this decade. The global gas glut was *not* caused by COVID-19. The pandemic has merely accelerated the process.

⁴ Bloomberg. [Third of U.S. Shale Near Technical Insolvency, Deloitte Says](#). 22 June 2020.

⁵ SMH. [Sailing around in circles: LNG tankers idle at sea as buyers delay cargoes](#). 16 July 2020.

⁶ SMH. [Australia is sponsoring a failing gas industry](#). 23 July 2020.

Figure 5: U.S. LNG Industry Volumes Halve

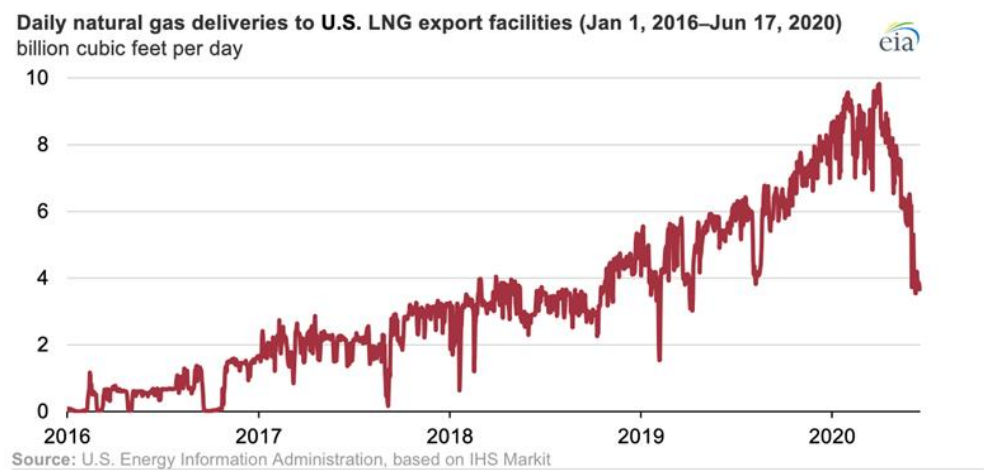
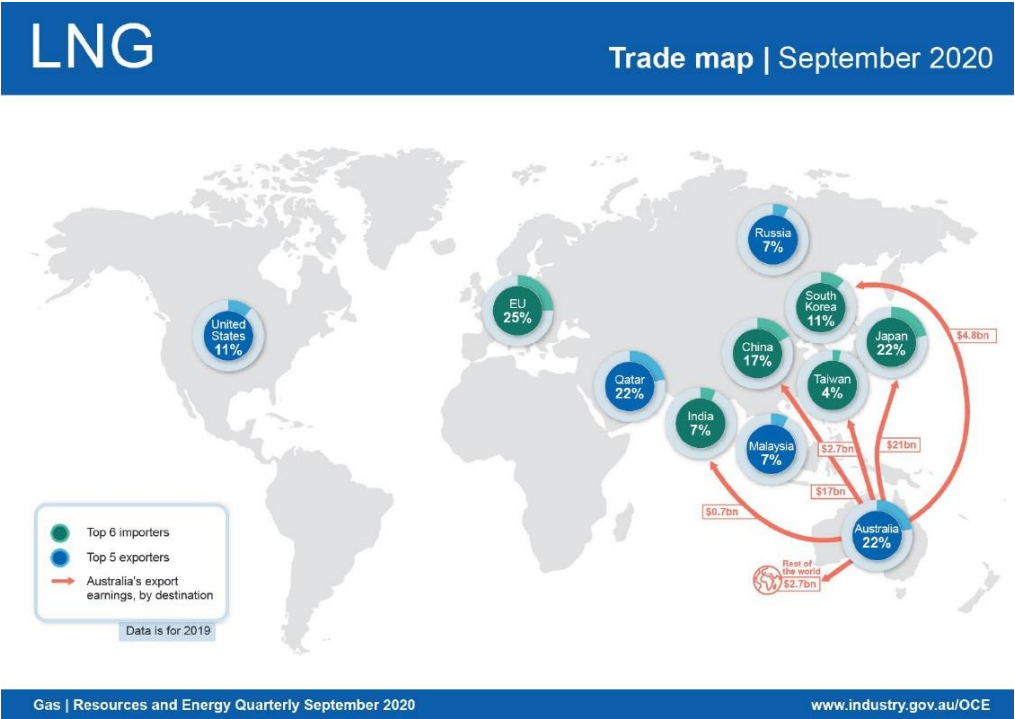


Figure 6: LNG Trade Map



Qatar, the World's Second Largest LNG Producer, Is Planning Massive Expansion in a Very Weak Market

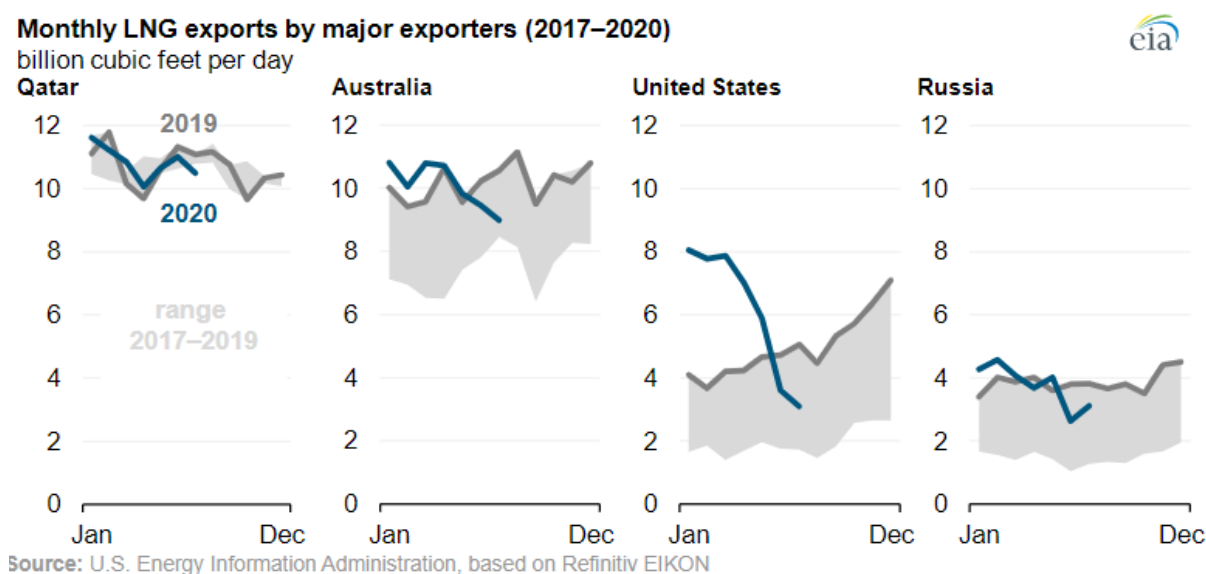
Despite the massive slump in LNG exports (Figure 7), Qatar, the world's biggest LNG exporter until last year, has advised⁷ it is going ahead with a huge expansion of capacity, taking it from 77 to 110 million tonnes per year by 2025, then potentially to 126 million tonnes per year two years later. It is looking to expand production by 64%.

To do this, Qatar is developing its North Field, a field shared with Iran who has already pushed ahead with development⁸, effectively forcing Qatar to proceed.

More production into an already faltering market ensures that the global gas glut will be prolonged.

Qatar recently cut prices by around 22% to secure new customers. A deal was struck with Sinopec at a "slope" or index against crude oil of just 10.19%.⁹ Even with this drop, Qatar is a low-cost producer and can afford to cut prices as it will still be profitable.

Figure 7: LNG Exports Slump



⁷ AFR. [Qatar pushing ahead with LNG expansion despite demand slump](#). 25 May 2020.

⁸ Sputnik News. [France's Total signs deal with China, Iran to develop South Pars Gas Field](#). 3 July 2017.

⁹ AFR. [Qatar flex muscles with cut to gas prices](#). 21 September 2020.

Gas Demand Is Weakening Globally

Europe and Japan

The largest importer of LNG globally is Europe, followed by Japan.

Both markets are shrinking and have been for a number of years as these markets look increasingly to energy efficiency measures and renewables. In common with the most advanced economies, the energy intensity of a given unit of GDP has been declining in Europe and Japan.

While the European market is not significant for Australia as shipping costs make Australia uncompetitive, Japan is Australia's largest export customer accounting for 47% of export LNG earnings in 2018-19.¹⁰

Japan's new commitments to net zero emissions will mean that pressure will rise to re-open Japan's fleet of mothballed nuclear plants and increase investments into offshore wind. Solar will be encouraged however Japan is constrained in this technology by lack of land.

According to the IEA, primary energy demand under net zero emission targets falls by 17% between 2019 and 2030. Note that the figure is 2030, ie. in the medium term:

*"Primary energy demand in the NZE2050 falls by 17% between 2019 and 2030, to a level similar to 2006, even though the global economy is twice as large. Electrification, efficiency gains and behaviour changes are central to achieving this. Coal demand falls by almost 60% over this period to a level last seen in the 1970s."*¹¹

Surprisingly, the IEA fails to provide its modelling for the net zero emissions scenario in its World Energy Outlook even though this is the most vital scenario for Australia as all of our customers are adopting a similar policy.

The falls in demand for coal in the next ten years are dramatic, a fact beyond the scope of this paper but well worth noting.

China

China is Australia's second largest market accounting for 31% of export LNG earnings. China has been expanding imports of LNG in recent years whilst the third largest market, Korea, has been stagnating. Many forecasters have been relying on growth out of China and emerging Asia (ex China) as the markets that will soak up lower volumes in Europe and Japan and ensure continued growth. This is a mistake.

Growth in the Chinese market is far from assured following recent statements from President Xi Jinping that China will aim to hit peak emissions before 2030 and for

¹⁰ Department of Industry. [Resources and Energy Quarterly](#). September 2020. Page 55.

¹¹ IEA. [World Energy Outlook 2020](#). Page 123.

carbon neutrality before 2060.¹² This statement was made six months prior to the next 5-year plan, clearly signalling the direction that plan will take.

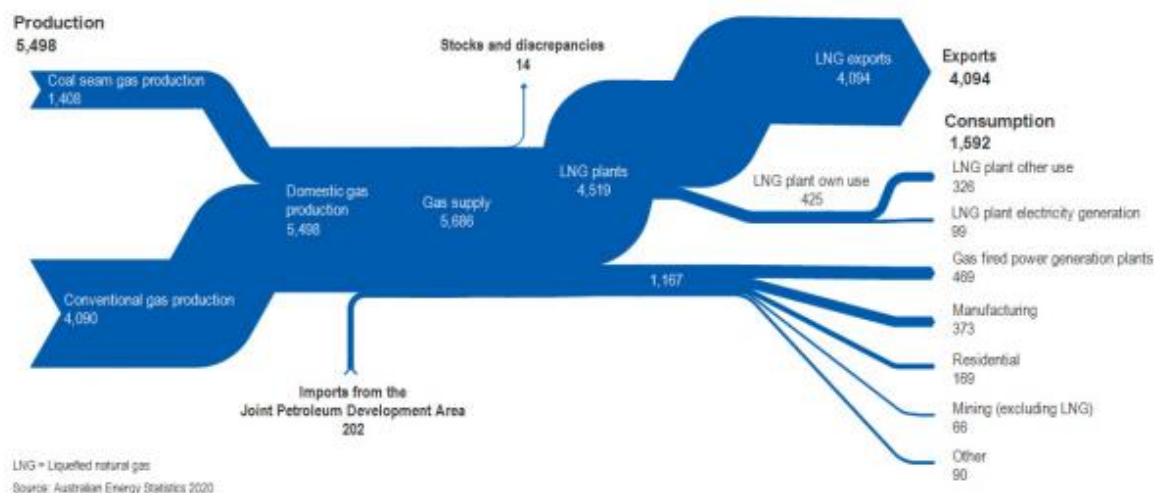
China's new climate policy will have profound impacts on Australia's exports of coal and LNG.

LNG is a far higher emitting fuel than piped gas, and LNG from coal seam gas is higher emitting than LNG from conventional fields. Some 9% of the gas that enters an Australian LNG plant is burnt just to produce LNG. (Figure 8). A further 2-6% of the gas is burnt or vented in the shipping process.¹³

If China is serious about its climate pledges, it will cut imports of LNG first while favouring domestic production and piped gas from Russia and its central Asian neighbours, as these are lower emitting sources. China already sources gas from central Asia as well as the new pipeline, the power of Siberia (commissioned in December 2019), from Russia.

Figure 8: Australian Fossil Gas Flows – Over 9% Of the Gas That Enters an LNG Plant Is Burnt to Produce LNG

Figure 2.3: Australian natural gas flows, petajoules, 2018–19



Source: Department of Industry, Science, Energy and Resources (2020) *Australian Energy Statistics*, Tables A and F and internal sources

¹² BBC. Climate change: China aims for "carbon neutrality by 2060. 22 September 2020.

¹³ IEEFA. Is this the gas industries Volkswagen moment. Page 9.

India

Emerging Asia does not beat to the same drum with many markets going in different directions. Growth out of emerging Asia is constrained by lack of gas infrastructure.

The Indian market in particular is extremely price sensitive and recent increases in imports need to be taken cautiously as history has shown that if prices rise, Indian purchases decline. Notwithstanding its price sensitivity, the Indian government is aiming to lift the share of gas in its energy mix from around 6% currently to 15% in 2030, although the target is considered to be ambitious.¹⁴

The direction of LNG exports from other emerging Asian countries is less certain.

Simon Nicholas, IEEFA analyst for emerging Asia, has written the following on two critical markets, Bangladesh and Pakistan, and the outlook is *not* one that will drive LNG growth globally.

Bangladesh

With Bangladesh currently reliant on diminishing domestic gas and expensive oil-fired power to meet its electricity needs, the nation has been targeting increased reliance on imported coal and LNG to meet future power demand.

Bangladesh's Power System Master Plan – released in 2016 and revised in 2018 – was written by Japanese power utility TEPCO and sponsored by the Japan International Cooperation Agency (JICA). Unsurprisingly, the plan called for reliance on coal and LNG power generation – technologies that Japan was in a good position to sell to Bangladesh.

However, more recently the Bangladesh government appears to have become concerned about the environmental impacts of coal and the increasing difficulty in financing coal-fired power as more banks distance themselves from such projects. The power ministry has reportedly requested authority to cancel 13,000 megawatts (MW) of proposed coal power projects and replace them with LNG-fired power.¹⁵

Even if Bangladesh is now solely focused on LNG, there remain question marks over the nation's capacity addition plans. The nation currently has significant overcapacity with only around 12,000MW of the more than 20,000MW available required during peak demand. Overall utilisation of power capacity was 43% per the Bangladesh Power Development Board's (BPDB) latest annual report.

With capacity payments to idle plants and government subsidies propping up the BPDB both rising towards unsustainable levels, some major decisions concerning further capacity additions will need to be made in the near future.

¹⁴ Department of Industry. [Resource and Energy Quarterly](#). September 2020. Page 71.

¹⁵ The Business Standard, [Bangladesh plans to abandon coal, go for LNG](#), 25 August 2020.

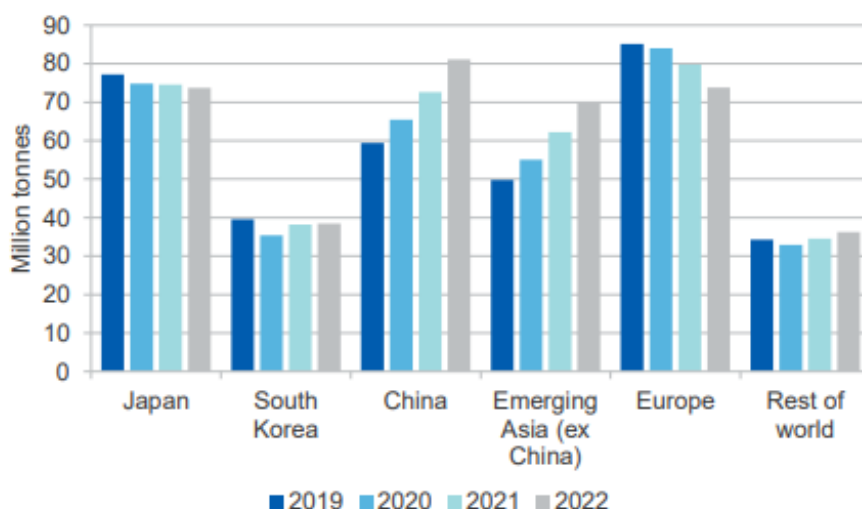
Pakistan

Like Bangladesh, Pakistan has identified a need to move its power system away from reliance on diminishing domestic gas and imported oil. There was initially some focus on imported coal and LNG as a replacement with several new power stations utilising both fuels completed in recent years.

However, there is now increased emphasis on energy security in Pakistan with an intention to become reliant mostly on domestic coal, renewable energy and hydro power. This is evidenced by Pakistan's latest long term power plan which sees power plants fuelled on imported coal and LNG running at utilisation rates of 14% and 22% respectively by 2030. Strangely, the plan sees another 20,000MW of LNG-fired power added between 2030 and 2047 but running at an overall utilisation rate of just 0.8% by the latter date. The plan claims that this extra LNG capacity is needed to back up the intermittency of renewable energy, a claim that has been challenged by many stakeholders and looks likely to be quickly revised in the next iteration of the plan which is updated each year.

With the government focused on energy security, and its domestic coal and hydro plans financed by China via the China-Pakistan Economic Corridor (CPEC) program, the role of imported fossil fuels in the nation's power future looks limited.

Figure 9: World LNG Import Forecasts¹⁶



Notes: Emerging Asia includes India.

Source: Nexant (2020) World Gas Model; Department of Industry, Science, Energy and Resources (2020)

Recent forecasts from Australia's Office of the Chief Economist (Figure 9) 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 and South Korea, it is unlikely that this will be the case.

¹⁶ Department of Industry, Science, Energy and Resources – [Resources and Energy Quarterly](#) – September 2020. Page 69.

Further, all will be compounded if Biden wins the 2020 U.S. election as the Democrats will also embark on ambitious climate goals, the implications of which will reverberate around the globe.

The Australian Gas Industry

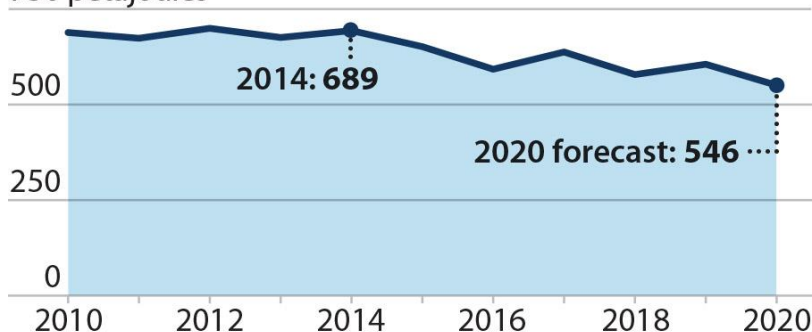
The Shrinking Australian Gas Market

Eastern Australian domestic gas use has been falling since 2014. 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 in the future.

Eastern Australia Domestic Gas Use Is Falling

Consumption has declined 21 percent since 2014

750 petajoules



Source: AEMO

Figure 10: Eastern Australian Gas Use Is Down

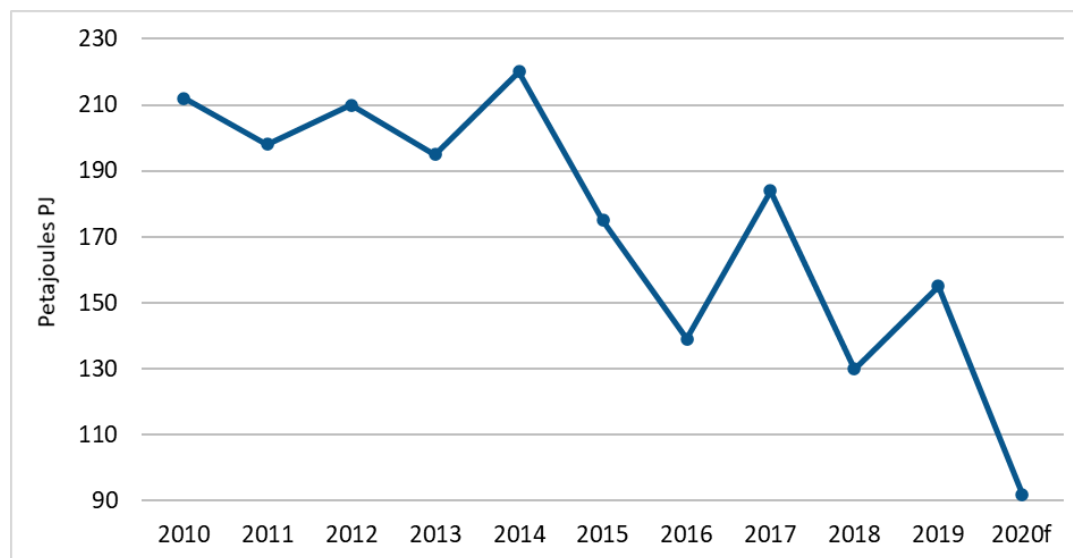
Gas Usage in the National Electricity Market Is Declining Significantly; Gas Is No Longer a Transition Fuel

In Australia, gas usage in gas-fired power plants has declined by 58%¹⁷ since 2014 whilst renewables have increased to produce 25% of the energy in the National Electricity Market (NEM).¹⁸

¹⁷ AEMO. [Gas Annual Consumption Total](#).

¹⁸ OpenNEM. [NEM](#).

Figure 11: Gas Usage by Gas Powered Generation in the National Electricity Market (NEM) 2010-2020

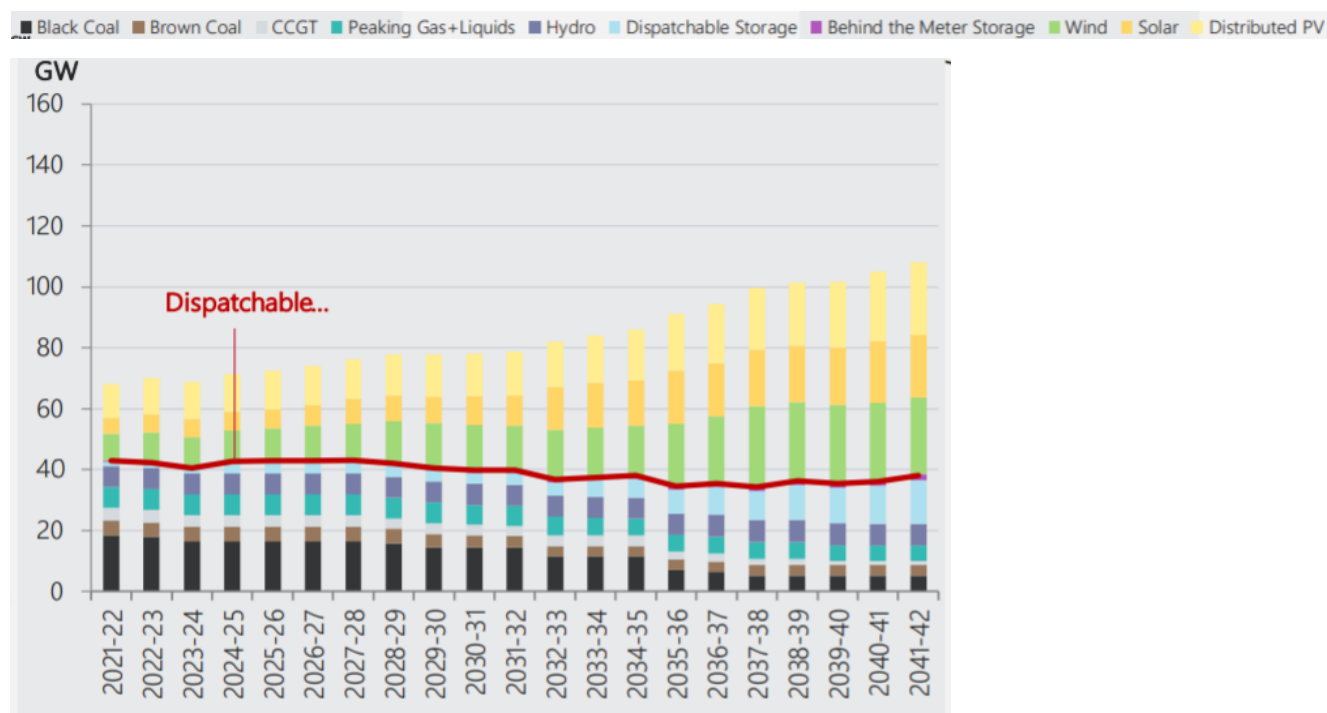


Source: Australian Electricity Market Operator (AEMO), IEEFA.

The Australian Energy Market Operator (AEMO), the only agency to model a future electricity grid in its Integrated Systems Plan,¹⁹ has shown that in a renewables rich grid, by 2040, the role of gas is smaller than it is today. (Figure 12.)

¹⁹AEMO. 2020 *Integrated Systems Plan*. July 2020.

Figure 12: AEMO Integrated Systems Plan – Least Cost Development – Central Scenario



Source: Australian Electricity Market Operator (AEMO) Integrated Systems Plan. Page 40.

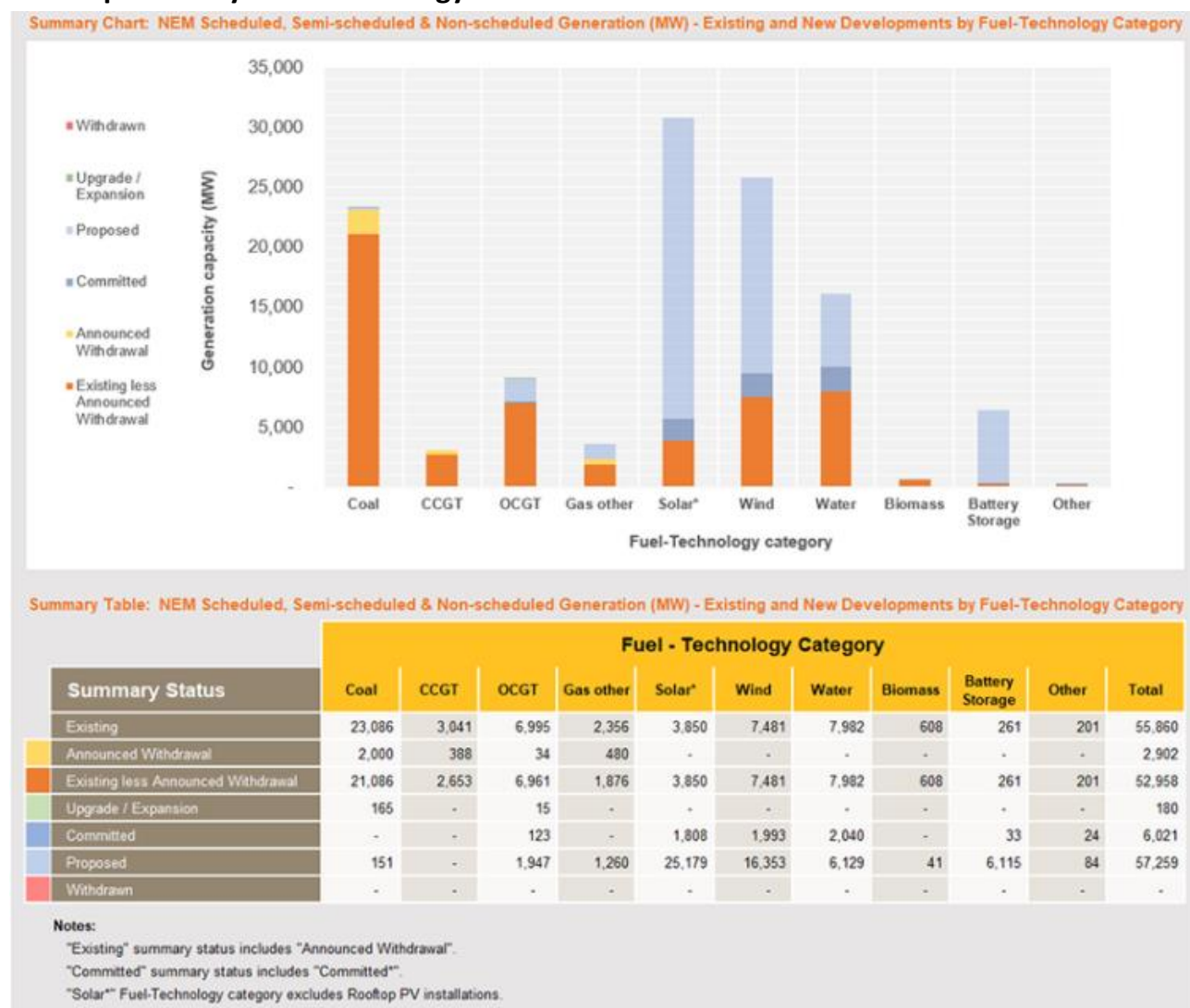
Note: Gas is the combination of CCGT (Combined Cycle Gas Turbines or gas baseload plants) and Peaking gas plus liquids (Open Cycle Gas Turbines or gas peaking plants).

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

“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.”²⁰

²⁰ AEMO. 2020 Integrated Systems Plan. July 2020. Page 53.

Figure 13: Australian Electricity Market Operator - Existing and New Developments by Fuel Technology



Source: AEMO.

Gas peaking plants, also known as open cycle gas turbines (OCGT), only contributed 1.5%²¹ of the NEM's generation in the year to 1 July 2020 whilst accounting for 12.5%²² of capacity. Put simply, capacity in gas peaking plants is needed, but they are not run for long. Not much gas is needed to power them.

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

²¹ OpenNEM. [NEM](#).

²² AEMO. [Generation Information](#).

the tender nine times over-subscribed.²³

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

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.²⁴

On 17 August, 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.²⁵

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.

AGL's Climate Statement commitments 2020²⁶ 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.²⁷

AGL has set a goal of installing 1,200 megawatts (MW) of new battery storage and demand response capacity by 2024²⁸, 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.²⁹ It plans to construct a 150MW battery in the first instance following the station's closure in 2023. Further, at its Torrens Island gas-fired power station in

²³ ABC. [NSW Government's renewable energy plan attracts more than 100 potential investors](#). 23 June 2020.

²⁴ Renew Economy. [AGL says batteries at tipping point, but renewables “choked” by connection woes](#). 13 February 2020.

²⁵ Renew Economy. [AGL says batteries starting to compete with gas generators for peaking services](#). 17 August 2020

²⁶ AGL. [Climate Statement and Commitments 2020](#).

²⁷ Renew Economy. [AGL targets 1.2GW of new battery storage by 2024, plans tender](#). 13 August 2020.

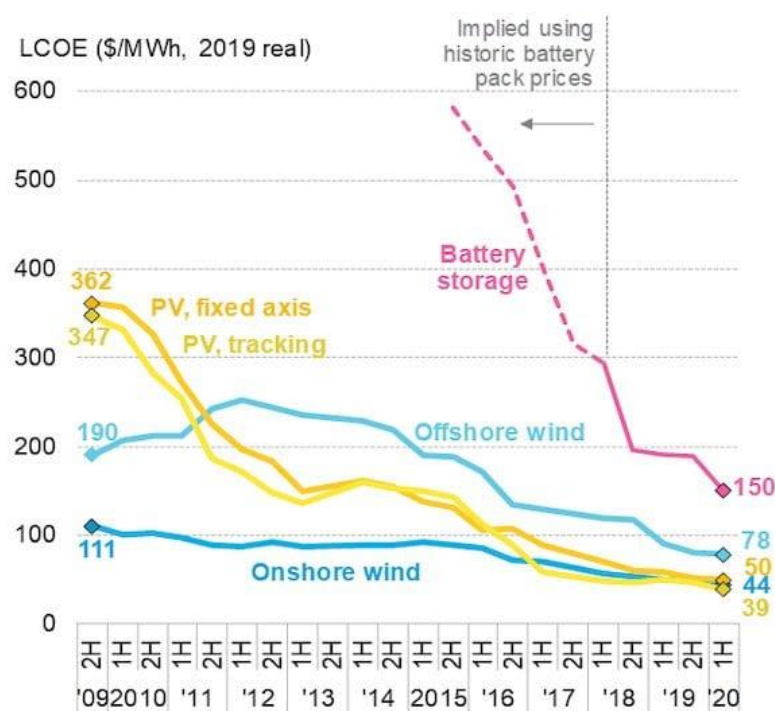
²⁸ Renew Economy. [AGL targets 1.2GW of new battery storage by 2024, plans tender](#). 13 August 2020.

²⁹ Renew Economy. [AGL seeks approval for 500MW big battery at site of Liddell coal generator](#). 14 August 2020.

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 14: Battery Cost Deflation Even Steeper Than Wind and Solar



Source: Bloomberg NEF.

U.S.

In the U.S., we are seeing grid scale battery projects emerge that are of a scale to rival gas peaking plants. Vistra in the U.S. has approval to expand an energy storage system under construction at its Californian gas-fired Moss Landing generation station to 1,500MW/6,000MWh.³⁰ This is gigawatt-scale battery energy storage.

At present, the largest battery in the world is the Hornsdale Big Battery in South Australia. It boasts a size of 150MW/193MWh. Hornsdale is 10% of the power and 3% of the duration of Vistra's new battery. Vistra's is the largest battery storage installation in the world and when completed, will be larger in capacity than every

other utility-scale battery energy storage system in the U.S. combined.

³⁰ PV Magazine. [Plan to deploy 1,500 MW/6,000 MWh storage project gets approval in the US](#). 14 August 2020.

And Capital Dynamics, an independent global private asset management firm, has signed an agreement with U.S. energy company Tenaska to develop a portfolio of nine battery energy storage system (BESS) projects located throughout California. In total, the projects will provide approximately 2,000MW of power.³¹ The scale of this investment into grid scale batteries is unprecedented.

Australia

Meanwhile in Australia, grid scale battery investment has arrived. 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.³² The Goyder South project in South Australia proposes 1200MW of wind energy, 600MW of solar PV, and a 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.

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.

Whilst in the short-term grid scale batteries will not totally usurp the role of gas in the power system, increasingly they will eat into gas' market share. The continued decline of gas as a fuel source for power generation looks assured.

The Australian Gas Industry Division – West Australia vs Eastern Australia

The Australian gas industry is clearly divided between the efficient Western Australian LNG industry and the financially disastrous East Coast Coal Seam Gas (CSG) to Liquefied Natural Gas (LNG) industry.

The Development of the East Coast Gas Industry

The East Coast gas industry was irrevocably altered by the opening of 3 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.³³)

Following the development of Gladstone, the east coast market went from 'domestic only gas' to exporting over 70% of its gas.³⁴ The subsequent price rises in the market saw domestic gas consumption decline by 21% in the period 2014 – 2020.

³¹ Capital Dynamics. [Capital Dynamics Expands Strategic Relationship with Tenaska to Develop Energy Storage in California](#). 19 August 2020.

³² Renew Economy. [Neoen files plans for \\$3bn wind and solar farm with battery 10 times bigger than Hornsdale](#). 20 August 2020.

³³ IEEFA. [Australia's Export LNG Plants at Gladstone: The Risks Mount](#). June 2017.

³⁴ AEMO. [Gas Annual Consumption Total](#).

Table 1: The 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.

The gas companies made two fundamental mistakes:

1. They dramatically underestimated the costs of the LNG plants,³⁵ and
2. They got their production costs for gas horribly wrong. Far from producing gas at \$2.20-2.70/GJ they produced gas between \$3.50/GJ and \$8.50/GJ.³⁶

The result has been that \$24bn has been written off the failing east coast CSG to LNG industry to date.

Shell is attempting to sell a 26.25% stake in its failed investment. Santos has already written off \$1.5bn of its investment in its Narrabri project. Rystad, the energy consultant, estimates that at current pricing, 18% of east coast gas production is uneconomic.³⁷

The Staggering Write-Offs in the East Coast CSG to LNG Industry

The three export plants at Gladstone are owned by a consortium headed by Santos, Origin Energy and Shell. (Table 2)

³⁵ IEEFA. [Australia's Export LNG Plants at Gladstone: The Risks Mount](#). June 2017. Page 21.

³⁶ IEEFA. [Australia's Export LNG Plants at Gladstone: The Risks Mount](#). June 2017. Page 22.

³⁷ Rystad Energy. [Up to 42% of Australian gas resources uneconomical at current LNG netback prices](#). 3 April 2020.

Table 2: Ownership of The Three Export Plants at Gladstone

Project	Annual Capacity (MT)	Consortium Lead	Shareholders	Shareholder Percentage	Comment
Australia Pacific LNG (APLNG)	9	Origin Energy	Origin Energy	37.5	Origin Energy is an Australian Stock Exchange listed public company. Origin is responsible for the operation of the APLNG gas fields and the main gas transmission pipeline.
		Conoco Phillips	ConocoPhillips	37.5	ConocoPhillips is a US based oil and gas multinational. It is responsible for the construction and operation of the two train APLNG facility on Curtis Island.
			Sinopec	25	Sinopec Group is China's second largest crude oil and natural gas producer. It is China's largest petroleum products and chemicals producer and supplier.
Santos Gladstone LNG (GLNG)	7.8	Santos	Santos	30	Santos is an Australian Stock Exchange listed public company.
			Petronas	27.5	Petronas is Malaysia's national oil and gas company and the worlds second largest exporter of LNG.
			Total	27.5	Total is a large French integrated oil and gas major.
			Kogas	15	Kogas is short for Korean Gas Corporation- the world's largest LNG importer.
QCLNG	8.5	Shell	Shell	73.75	Shell took over British Gas (BG Group) in February 2016. BG had in turn taken over Queensland Gas Company in November 2008. Shell also owns Arrow Energy.
			CNOOC	25	China National Offshore Oil Corporation ("CNOOC"), the largest offshore oil & gas producer in China, is a state-owned company operating directly under the State-owned Assets Supervision and Administration Commission of the State Council of the People's Republic of China. Founded in 1982 and headquartered in Beijing.
			Tokyo Gas	1.25	Tokyo Gas is a supplier and distributor of gas and electricity into Japan.

Source: *Total*; *Shell*; *APLNG*.

Each of the companies has suffered major write downs:

- Santos has written off \$7.0bn since 2014 on its east coast CSG and LNG assets including the recent July 2020 announcement of a \$1.1bn write down.³⁸
- Origin has written off \$4.7bn since 2014 including its recent July 2020 announcement of a \$746m write down.

³⁸ Santos Annual Reports 2014-2019 plus its July 2020 announcement to the ASX.

- Shell took over BG group in 2015. Prior to the takeover, BG Group wrote down the value of its CSG to LNG assets in Australia by US\$6.8bn (A\$7.7bn).³⁹ In May 2017, Shell wrote off a further \$1.2bn following poor drilling results.⁴⁰ In June 2020, Shell announced up to US\$22bn in write downs including US\$8-9bn⁴¹ on its Australian assets Prelude and QCLNG (its failing CSG to LNG investment). IEEFA estimates that the write offs taken on QCLNG are A\$2.9bn. Shell (and BG Group) write offs on its failed CSG to LNG investments total an estimated \$11.8bn.

The three lead companies in the consortium that own the three export CSG to LNG plants at Gladstone have written off \$24bn since 2014 on their failed investments.

We Need the Gas for Industry

The east coast gas market is one market connected by pipelines. The industry constantly wants to push state against state by saying, for example, that NSW is not “self-sufficient” in gas. In economic terms, this is nonsense. Historically, NSW has only ever been a bit player in east coast gas production, sourcing its gas from efficient and cheap sources in the Moomba/Cooper and Bass Strait basins.

The idea that each state should produce all of its products, including energy inside its own borders, runs counter to any idea of some states being better at producing products than others. This is fundamental comparative advantage economic theory. Successful economies will produce what they are cost effective at producing, and will trade to acquire products that they are not good at producing. Forcing each state to produce all of the products that it consumes will send Australia down a road to economic poverty.

The Narrabri Project Is High Cost Gas That Will Force Up the Price of Gas on the East Coast

The average cost of production for existing gas fields on the east coast of Australia is \$3.05/GJ, according to Core Energy, commissioned by AEMO.⁴² Santos, in their supplementary submission to the Independent Planning Commission which recently approved the project, stated that Narrabri will have costs of \$6.40/GJ. IEEFA estimates that pipeline costs to Sydney will be \$2.10/GJ, which prices Narrabri gas at \$8.50/GJ delivered into Sydney (the required destination point).

Narrabri gas is high cost gas at more than twice the cost of existing fields. It is simply not possible to bring down the cost of a commodity by producing it at a high cost, as Santos will do at Narrabri. The proposition is absurd.

³⁹ Mining Weekly. [BG Group reports massive write-down on Aus assets](#). 4 February 2015.

⁴⁰ The Australian. [Shell's \\$390m asset write-off casts doubt on CSG reserves](#). 2 May 2017.

⁴¹ Shell. [Shell second quarter 2020 update note](#). 30 June 2020.

⁴² AEMO. Core Energy and Resources. [Gas Reserves and Resources and Cost Estimates](#). November 2019. Page 13.

Narrabri gas has been pledged to the Sydney consumer by Santos. Santos is planning to supply the domestic market with high cost gas whilst exporting lower cost sources of gas. It will use the high costs at Narrabri to justify pricing the domestic market at a premium.

Essentially, the Narrabri gas project will not bring down the cost of gas for the domestic consumer as Santos claims, nor will it have *no* effect on the domestic market as the Department of Planning maintains. The Narrabri gas project will force up the price of gas for the domestic consumer.

The Effects of the CSG to LNG Industry on the Australian Economy

Of far more significance than the losses incurred by Santos is the effect of the East Coast CSG to LNG industry on the Australian economy. For many years prior to 2014, the price of gas in Australia was steady at \$3-4/GJ. Australians are often told that they must pay export parity pricing for gas now that Australia is a large exporter. Nothing could be farther from the truth. As report⁴³ after report issued by the ACCC has shown, Australian consumers pay well above what they should.

The ACCC's first inquiry into the gas industry, the East Coast Gas Inquiry 2015, concluded with a report in April 2016.⁴⁴ In April 2017 the government directed the ACCC to start another gas inquiry for a period of three years. In July 2019 the inquiry was extended to December 2025. It is now essentially a never-ending inquiry that republishes the same conclusions again and again. The government responds with precious little action and certainly none that makes a material difference to the gas and electricity consumer on the east coast of Australia.

We are now up to the ACCC's 9th report on the east coast gas industry. All the reports essentially say the same thing: that consumers are being price gouged by the gas industry and are paying more than they should for gas on a consistent basis.

⁴³ ACCC. [Inquiry into the east coast gas market](#). April 2016.

⁴⁴ ACCC. [East Coast Gas Inquiry 2015](#). 22 April 2016.

Figure 15: The Never Ending ACCC Gas Inquiry



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Gas inquiry 2017-2025

On 19 April 2017 the Australian Government directed the ACCC to conduct a wide-ranging inquiry into the supply of and demand for wholesale gas in Australia, as well as to publish regular information on the supply and pricing of gas for the next three years. On 25 July 2019, Treasurer the Hon Josh Frydenberg MP, wrote to the ACCC extending the ACCC's inquiry into the gas market until December 2025.

Issues



Gas inquiry January 2020 interim report

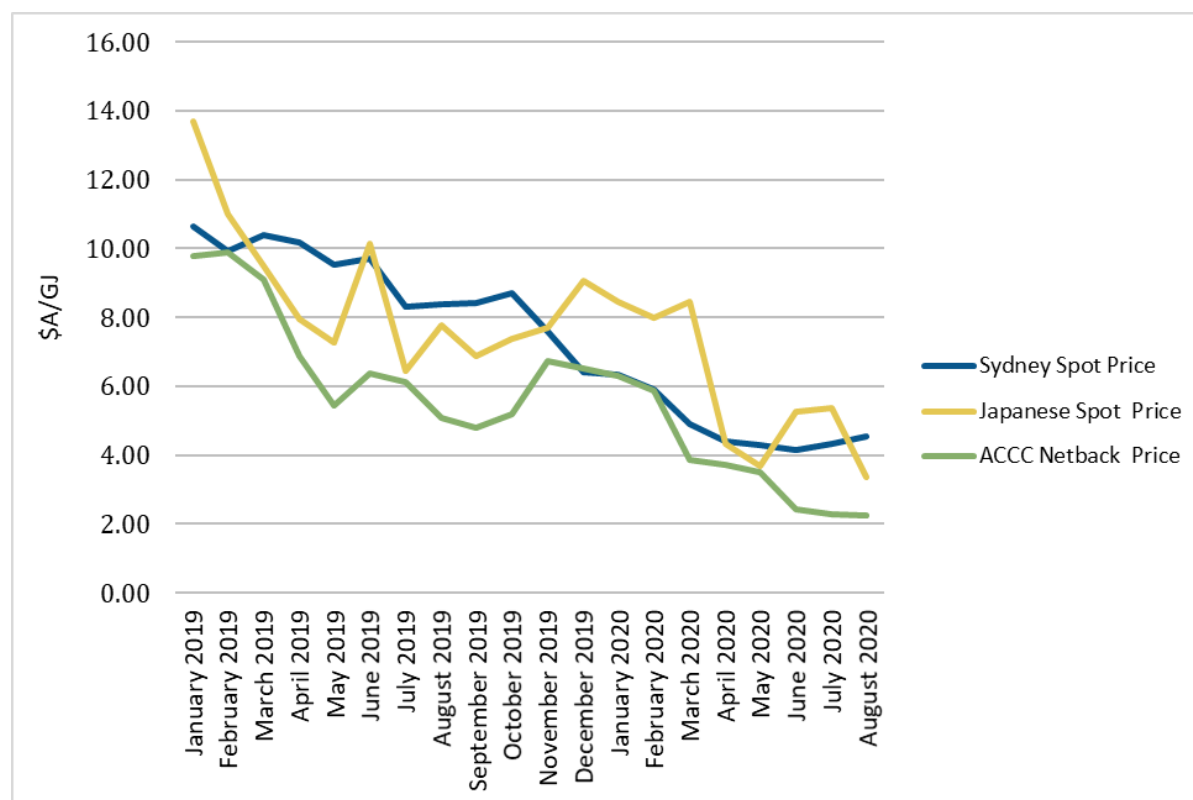
This is the eighth interim report of the Australian Competition and Consumer Commission's (ACCC) inquiry into gas supply arrangements in Australia. The ACCC has continued its focus on the operation of the East Coast Gas Market, where there are immediate and longer-term concerns.

18 Feb 2020

Source: ACCC.

Australian Gas Consumers Pay More for Gas Than Australia's Asian LNG Customers

**Figure 16: Spot Gas Prices in Japan, Sydney and the ACCC Netback Price
January 2019 – August 2020**



Source: Australian Energy Market Operator (AEMO), Ministry of Economy Trade and Industry (METI), The Australian Competition and Consumer Commission (ACCC).

Figure 16 shows how Australian gas consumers have, for most of the time, paid more for gas than consumers in Japan (Australia's largest export customer). For almost the entire period, Australian consumers have paid a higher price than the ACCC deems appropriate. The ACCC uses the netback price as a benchmark for what Australian consumers should be paying.⁴⁵

The east coast gas industry – or cartel - has consistently price gouged the Australian domestic consumer and the Australian and state governments have allowed them to. The cartel has used the Australian gas consumer to socialise its losses on the export market. Cartels, incidentally, are an illegal market structure, as is the price fixing that so clearly occurs.

The cost of the gas cartel to the economy has been immense. Not only has gas priced itself out of the electricity system, except for very niche peak power applications, it

⁴⁵ ACCC. [Gas inquiry 2017-2025](#). 3 August 2020.

has also destroyed Australian gas intensive manufacturing. Gas use in industry has fallen 12% since 2014.⁴⁶

High Gas Prices Have Ensured High Electricity Prices on the East Coast of Australia

According to the ACCC, high gas prices have led to high electricity prices in the NEM:

*"Another major factor in wholesale prices has been the significant shortages in competitively priced gas at a time when gas-powered generation would often be the logical source of replacement for lost coal-fired capacity. Gas prices have doubled or tripled in recent years. We estimate that for every \$1/GJ rise in gas prices, the wholesale price of electricity rises by up to \$11/MWh, depending on regional differences in the NEM."*⁴⁷

The leveraged effect of gas prices on electricity prices is profound. For example, we can compare actual gas prices with the more reasonable National COVID Commission – Advisory Body's (NCC) gas price target of \$4/GJ. Over late 2019 and early 2020, wholesale contract gas prices were \$8-11/GJ.⁴⁸ When gas contribution to the NEM is strong and prices are high, \$4/GJ gas would reduce wholesale electricity prices by up to \$60/MWh.

The effect of inflated gas prices on electricity prices is profound. Narrabri is expensive gas and as shown, will raise the price of gas as the gas cartel recovers its high costs. High gas prices will raise electricity prices in the NEM placing a massive burden on the entire economy, not just gas consumers.

For Some Applications There Are Substitutes, For Others We Currently Need Gas

Many high heat applications for gas can be substituted with cheap renewable power. Some however cannot at present, and therefore there needs to be some gas production. This gas, however, can be sourced from existing gas fields.

With the cost of renewable green hydrogen falling, it is likely that the need for gas for industry is a short term need. Much like with wind and solar, once industry scales up the cost of green hydrogen will fall. Scaling up the hydrogen industry may need some government support, just as solar and wind did in the early stages. By 2030, it is expected that green hydrogen will be cost competitive across all 'hard to decarbonise' sectors.⁴⁹

⁴⁶ AEMO. See Table 1.

⁴⁷ ACCC. [Retail Electricity Pricing Inquiry—Final Report](#). Page viii.

⁴⁸ ACCC. [Gas Inquiry 2017-2020. Interim Report](#). Page 9.

⁴⁹ Yong-Liang Por IEEFA. [Great Expectations](#). August 2020.

The Solution Involves Looking at Demand as Well as Supply

The federal and NSW governments have set the level of gas needed at 70PJ pa, being somewhat conveniently the same production levels as determined in the recently approved Narrabri gas project.

Gas use in residential and commercial applications can largely be substituted for cheaper electrical heating in the form of air conditioners, induction cooking and heat pumps for hot water.^{50 51} This would make available up to 190PJ pa and would dwarf the proposed contribution from Narrabri.⁵²

Policy Responses Would Fix the Problems in the East Coast Gas Market

Gas production on the east coast of Australia has tripled since 2014. Exports have gone from zero to over 1400PJ yet there is still talk of gas “shortages”. The east coast has enough gas. The problem is essentially one of price and market structure, not shortages.

Western Australia faced a similar problem to the east coast but successfully ensured cheap and bountiful sources of gas for the domestic gas consumer by implementing a domestic gas reservation.

On the east coast, a domestic gas reserve on existing and prospective gas fields would solve both the supply and price problems being experienced in the domestic market. For a more in-depth review of the east coast gas market and how a domestic gas reservation could be implemented, please see IEEFA's report, “Towards a Domestic Gas Reservation in Australia.”⁵³

Gas Is Predominantly Methane – A Potent Greenhouse Gas Emitted into the Atmosphere

Emissions From Gas Have Been Underestimated

Nature, the eminent scientific journal, published a major new study earlier this year showing that emissions of the potent greenhouse gas – methane – from fossil fuel production are 25% to 40% higher than previously understood.⁵⁴

The research measured methane levels in ice cores. The methane produced by fossil fuel extraction has a signature that can be identified. By measuring methane

⁵⁰ Melbourne Energy Institute. [Switching off gas - An examination of declining gas demand in Eastern Australia](#). 26 August 2015.

⁵¹ Environment Victoria. [A Gas-free recovery? New report shows how phasing out gas will benefit all Victorians](#). 3 June 2020.

⁵² See Table 1.

⁵³ IEEFA. [Towards a Domestic Gas Reservation in Australia](#). 9 July 2019.

⁵⁴ Nature. [Preindustrial 14CH₄ indicates greater anthropogenic fossil CH₄ emissions](#). 19 February 2020.

radiocarbon from more than 200 years ago when there were no industrial sources, the researchers knew that all fossil methane from that era had to be emitted naturally. They found that almost all of the methane emitted to the atmosphere was biological until about 1870. That is when the fossil component began to rise rapidly. The timing coincides with a sharp increase in the use of fossil fuels.

Significantly, researchers discovered the levels of naturally released methane from fossil fuels are about 10 times lower than previous research reported. IEEFA notes gas producers can no longer blame flatulent cattle for the emissions their industry produces. As the researcher says:

*"We've identified a gigantic discrepancy that shows the industry needs to, at the very least, improve their monitoring," said Benjamin Hmiel, a researcher at the University of Rochester and the study's lead author. "If these emissions are truly coming from oil, gas extraction, production use, the industry isn't even reporting or seeing that right now."*⁵⁵

Methane Venting and Leakages

Methane is the greatest threat to the warming climate. If gas leaks and venting account for more than 2% to 3% of methane produced, it is worse for the climate than coal.⁵⁶ With the installation of methane leak detection equipment on new gas projects, companies are facing new challenges to necessarily overcome.

In 2019, BP admitted that:

*"The wider energy industry leaks about 3.2% of the gas it produces, which is probably almost enough to offset the benefit of switching from coal to gas."*⁵⁷

Essentially, BP is acknowledging that gas is worse than coal for greenhouse gases. The gas industry in Australia must do the same.

⁵⁵ Nature. [Preindustrial 14CH₄ indicates greater anthropogenic fossil CH₄ emissions](#). 19 February 2020.

⁵⁶ Page 26. "A general consensus has emerged from these studies that climate benefits of natural gas replacing coal are lost where fugitive emissions from all upstream operations are greater than 3% of total production" (Alvarez et al 2012; Zavala-Araiza et al 2015) in CSIRO Energy. [Whole of Life Greenhouse Gas Emissions Assessment of a Coal Seam Gas to Liquefied Natural Gas Project in the Surat Basin, Queensland, Australia. Final Report for GISERA Project G2](#). July 2019.

The lower level of 2% was based on a shorter 20-year (Global Warming Potential) time frame as opposed to the 100-year time frame. Sourced from correspondence with Professor Ian Lowe.

⁵⁷ Bloomberg. [BP to Install Permanent Methane Leak Detectors on New Projects](#). 10 September 2019.

Emissions Released in Gas's Supply Chain

The gas industry's claims of low emissions, echoed by governments, are based on a half-truth. IEEFA notes that the promotion of 50% less emissions from gas is at best dishonest and is designed to mislead and deceive the public, investors and gas consumers.

According to GISERA, the gas industry-funded and gas industry controlled, arm of Australia's CSIRO⁵⁸, gas consumed domestically produces:

- 31% fewer emissions when burned in an open cycle gas turbine (OCGT), commonly known as a gas peaking plant, or
- 50% fewer emissions when burned in a more efficient combined cycle gas turbine (CCGT), commonly referred to as a gas baseload plant.

Combined cycle gas turbines (CCGT) are not a large part of the electricity system in Australia for one very simple reason – they are very expensive to run. Gas prices in Australia are simply too high and it is not economic to run them when there are cheaper sources of power. In the U.S. there is a large fleet of CCGT gas power stations as gas prices are reasonable.

If gas is to be used as a transition fuel in Australia, CCGT would need to be retired and more of the emissions-intensive open cycle gas turbines will be needed. OCGT are less efficient but far more flexible because they can be rapidly started and shut down to fill in the gaps when renewable power is deficient.

A Full Life Cycle Analysis Gives a Totally Different Picture

The industry's claims of gas producing 50% less greenhouse pollution than coal also fails to consider a full life cycle analysis of the product.

Australia is the world's second-largest exporter of gas⁵⁹, with the gas industry exporting about three quarters of the gas it produces. Gas must be liquefied for export in an extremely energy intensive process that super cools the gas to minus 160°C. Robert Howarth, a leading Cornell University gas emissions expert, said in a submission to the Irish parliament that:

*"To liquefy and transport the gas requires a substantial amount of energy: to import one cubic meter of gas as LNG would require 1.2 cubic meters of gas to be produced, with 0.2 cubic meters consumed to produce and transport the LNG (Hardisty et al, 2012, Energies, 5: 872-897)."*⁶⁰

⁵⁸ GISERA. [Whole of Life Greenhouse Gas Emissions Assessment of a Coal Seam Gas to Liquefied Natural Gas Project in the Surat Basin, Queensland, Australia. Final Report for GISERA Project G2.](#) July 2019. Page viii.

⁵⁹ Australian Government. Department of Industry. [Resources and Energy Quarterly December 2019.](#)

⁶⁰ Testimony of Robert W. Howarth, Ph.D. Cornell University, Ithaca, NY 14853 USA before the Joint Committee on Climate Action House of Oireachtas, Ireland. 9 October 2019. Page 2.

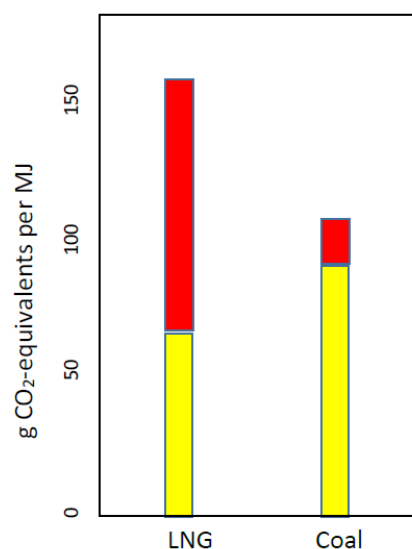
The energy intensity of the LNG process is best illustrated by the fact that 17% of the methane produced is used just to produce and transport the LNG. The direct emissions of methane in the shipping process are unknown.

Howarth explains:

"LNG is kept in liquid form by allowing some methane to "boil off," resulting in evaporative cooling. In a typical voyage, 2 to 6% of the LNG is lost as gaseous methane due to this boil off. Usually, the methane is used as fuel to help power the ship, but it seems highly likely that some is emitted to the atmosphere, although I am aware of no data on this emission."

He concludes that, by taking into account all of the emissions and burning as fuel, LNG produces more greenhouse gases than coal.

Figure 17: Electricity Produced with LNG Emits More Greenhouse Gases Than Coal-fired Electricity



Source: Robert W. Howarth

Note: Figure 17 shows the greenhouse gas footprint of LNG imported to Ireland from the U.S., compared to coal. Emissions of carbon dioxide are shown in yellow. The red bars indicate methane emissions in units of carbon dioxide equivalents.⁶¹

⁶¹ Estimation of greenhouse gas emissions: Emissions of carbon dioxide are as reported in Howarth's 2011 paper and are based on data from the US Department of Energy. Emissions of methane from coal are as reported in 1996 by the Intergovernmental Panel on Climate Change. Methane emissions for LNG are based on a 3.5% emission rate for shale gas in the United States, as determined in my 2019 Bio geosciences paper, and the estimate of Hardisty et al. (2012) on the amount of natural gas consumed in the process of producing and transporting LNG. Methane emissions are converted to carbon dioxide equivalents using the 20-year global warming potential of 86 reported by the Intergovernmental Panel on Climate Change in their 2013 synthesis report.

Because most of the gas Australia produces is exported, it is misleading of the gas industry to claim that gas emits 50% less greenhouse gas than coal. The 50% figure covers only domestic consumption. Once the effects of liquefaction, shipping, regasification and distribution are considered, LNG may well be a more damaging way of producing power than coal.

New Gas Fields Are Higher Emitting Than Old Fields

Gas is a high greenhouse gas emitting fuel and those emissions are increasing. In a paper on Australia's emission standards, IEEFA⁶² estimated that between 2014 and 2019, the emissions intensity of Australia's gas production increased by around 30% due to the influx of new gas projects, as newer projects release higher rates of greenhouse gas emissions. In that period, the average amount of greenhouse gas emissions associated with gas production increased from 0.54t of CO₂-e per tonne to 0.7 tonnes of CO₂-e per tonne of LNG produced.

The original gas plants in the north of Western Australia (Rankin and Goodwyn fields) had low reservoir CO₂ (3v%). A further, similar steep increase in emissions is likely to be repeated when the five original north west shelf plants finally deplete their currently producing reservoirs and gas is piped (as foreshadowed by Woodside) from the Browse area 900km away. Those fields are reported to contain 10-16 v% CO₂ and in combination with compression for the long pipeline, make them far more emissions intensive than the old fields.

Every state and territory in Australia has some sort of net zero emissions target by 2050. Producing and consuming more gas is fundamentally opposed to current state and territory government policies on emissions. Australia must be looking to reduce production and consumption of gas, and not to increase it if the country is to meet the net zero targets.

Even if Australia chooses not to implement greenhouse gas targets, it looks as if Europe, China and even possibly the U.S. will force its hand.

⁶² IEEFA. [The Growth of Australia's LNG Industry and the Decline in Greenhouse Gas Emission Standards](#). April 2020.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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