

Does stopping fossil fuel use seem impossible? State and territory governments can step up and do it in bite-size chunks.

# States Can

*No More Bad Investments (NMBI) model  
legislation for states and territories*



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## *Foreword*

*Nothing here is new. All the climate and fossil fuel information in this document has already been publicly aired in separate chunks in numerous media articles. Many of the facts and figures are sourced from freely available information on government and industry websites.*

*But if you connect all those dots together from the perspective of trying to determine who can stop new climate-damaging projects, and what would happen if state and territory governments were to ban new coal and fossil gas projects, a surprisingly clear picture emerges. The fossil fuel Emperor is wearing no clothes...or maybe just his underpants.*

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## Overview

There is a disconnect between what 'everyone agrees' we need to do in response to the climate emergency - stop using fossil fuels - and their response when anyone seriously proposes any fossil fuel bans. 'Oh we can't do that!' they say, perhaps thinking that the lights will go out or the economy will collapse.

As the Director of the International Energy Agency, Fatih Birol, said (Nov. 2018), 'We have no room to build anything that emits CO<sub>2</sub> emissions'.<sup>1</sup>

Under No More Bad Investments (NMBI) legislation, state and territory governments can take the first and easiest step by banning NEW climate-damaging projects before they start in their own jurisdiction. Generally, activities that cause significant greenhouse gas emissions AND that could be banned immediately with minimal disruption would be included in Stage 1 bans, but an activity banned immediately in one state might be handled as a Stage 2 ban elsewhere.

We don't need to wait on federal government action. All Australian states and territories could immediately adopt at least some of the coal and gas bans discussed in this document, and some could adopt all of them, without upsetting almost anyone except fossil fuel companies.

### **The IPCC 1.5° report and electricity generation**

Electricity generation accounts for 34% of all Australia's greenhouse gas emissions, so is a prime candidate for climate-motivated bans on new projects.

The October 2018 IPCC Special Report urges very rapid reductions in the use of coal and fossil gas for electricity generation. "In modelled 1.5°C pathways with limited or no overshoot, the use of CCS [carbon capture and storage] would allow the electricity generation share of gas to be approximately 8% (3-11% interquartile range) of global electricity in 2050, while the use of coal shows a steep reduction in all pathways and would be reduced to close to 0% (0-2%) of electricity (high confidence)."

But 1.5°C above pre-industrial times is *not* a safe climate. Climate impacts are already destroying lives and ecosystems at a rise of around 1°C. If it were possible we would benefit from achieving better than net zero greenhouse gas emissions (negative emissions) *right now*. Extremely rapid reductions in fossil fuel use are necessary in all sectors, not just electricity generation, and drawdown strategies are urgently needed to reduce atmospheric carbon levels below current levels. All are required much more quickly than the IPCC Special Report says is necessary for any 1.5°C pathway.

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<sup>1</sup> Adam Vaughan, November 2018, *World has no capacity to absorb new fossil fuel plants, warns IEA*, viewed 14 November 2018, <https://www.theguardian.com/business/2018/nov/13/world-has-no-capacity-to-absorb-new-fossil-fuel-plants-warns-iea>

## 1. Setting and sabotaging climate goals

In 2015, South Australia adopted a goal of achieving net zero carbon emissions by 2050. By 2018, all parts of Australia except NT and WA had adopted almost identical goals. All regions except SA, WA, and NSW also have much more ambitious renewable energy targets than those of the federal government.

It is counter-productive, and flies in the face of common-sense, for state and territory governments to simultaneously continue to allow new and avoidable fossil fuel activities that create yet more greenhouse gas emissions. It is even more bizarre given that we need to go beyond net zero emissions and achieve negative emissions much sooner than 2050, and every day of delay will make climate impacts more severe.

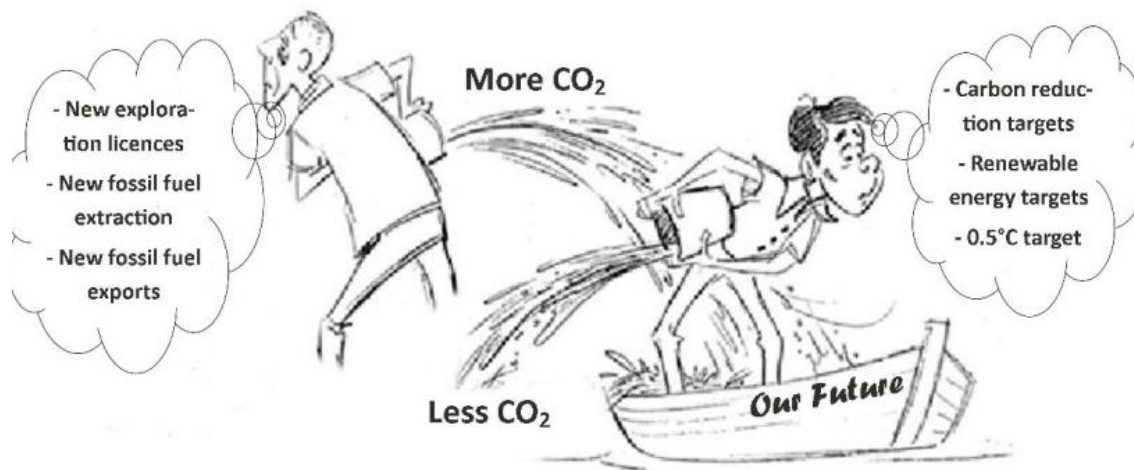


Figure 1: Shooting ourselves in the foot

For example, South Australia has made remarkable progress towards 100% renewable electricity, and even more wind, solar, and storage projects are due to come online over the next few years. Yet if the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) approves drilling for oil in the Bight, the carbon emissions from burning that oil are likely to cancel out any climate benefit of SA's renewable electricity success story many times over.

From March 2017 to March 2018, Australia's greenhouse gas emissions from the electricity sector fell by 8.1 MT, but the climate benefit of that reduction was more than wiped out by emissions increases largely caused by the liquefaction process and fugitive emissions (including flaring and venting) at new LNG projects.<sup>2</sup>

<sup>2</sup> Department of Environment and Energy, March 2018, *Quarterly Update of Australia's National Greenhouse Gas Inventory: March 2018*, viewed 18 October 2018, <http://www.environment.gov.au/system/files/resources/63391569-7ffa-4395-b245-e53893158566/files/nggi-quarterly-update-mar-2018.pdf>

## 2. NMBI model legislation

No More Bad Investments (NMBI) model legislation<sup>3</sup>, co-authored by Environmental Justice Australia and Philip Sutton, focuses entirely on banning NEW projects that would increase climate risk, not because that will be anywhere near sufficient to restore a safe climate, but because that is an easy first step that is possible immediately...and time is of the essence.

The legislation is intended to be enacted by state and territory governments since their approval is required for major new projects. They *can* enact moratoriums or bans in their own jurisdiction, such as Victoria's ban on new onshore gas extraction and Queensland's ban on underground coal gasification (UCG).

NMBI legislation involves a two-stage approach. Stage 1 bans would apply immediately for all NEW climate-damaging activities in supply chains where climate-safe alternatives are already available. In other cases the legislation would provide for pursuing strategies to develop climate-safe supply chains and setting timelines for introducing Stage 2 bans as alternatives become available.

For example, all states/territories could enact bans on new fossil fuel exploration licences immediately. Most jurisdictions, but perhaps not all, could include new fossil fuel extraction and infrastructure projects in the Stage 1 bans. Bans on new fossil-fuelled vehicles are likely to be handled as future-dated Stage 2 bans.

This document focuses specifically on the implications for each state and territory of bans on new activities in just two spheres - coal and fossil gas - but NMBI legislation also provides for bans on all other sources of avoidable climate damage.

	Ban new coal, oil, and gas exploration	Limit new coal and gas exports	Ban new LNG infrastructure	Ban new gas reticulation	Ban sale of new gas appliances	Ban new coal-fired power plants	Ban new gas-fired power plants	Ban new coal mines	Ban new coastal gas wells	Ban new onshore gas wells
ACT	Stage 1								n/a	Stage 1
NSW	Stage 1							Stage 2?	Stage 1	
NT	Stage 1									
Qld	Stage 1							Stage 2?	Stage 1	Stage 2?
SA	Stage 1									
Tas	Stage 1									
Vic	Stage 1									Done
WA	Stage 1						Stage 2?	Stage 1		

Figure 2: Potential Stage 1 and Stage 2 bans in each state/territory

<sup>3</sup> Environmental Justice Australia and Philip Sutton, September 2017, *Safe Climate Transition (No More Bad Investment) Model Act*, <http://www.green-innovations.asn.au/RSTI/NMBI.doc>

## States Can

One or some jurisdictions might enact NMBI legislation long before others do, and the implementation of the legislation would be customised to suit the differing circumstances and constraints in each state and territory.

The important thing is to enshrine in legislation a precedent for introducing urgent climate-motivated bans rather than expecting Australia-wide uniformity. Once one state or territory enacts NMBI legislation, others are likely to be inspired to follow, even if just with the easiest and most obvious Stage 1 bans.

Ultimately all parts of Australia might be covered by a patchwork of state and territory bans.

### States and Territories *can* take Climate Action Now



Figure 3: Step 1 of climate emergency action

### 3. Banning new coal, oil, and gas exploration

Banning new fossil fuel exploration is an obvious and easy step that all states and territories could enact immediately. Even if some new coal mines or gas wells are deemed necessary in NSW or Queensland to meet export contracts, numerous exploration licences have already been granted in those states.

**Note:** This document does not discuss the implications of banning fossil oil projects and other climate-damaging activities - only coal and gas are discussed - but a ban on just new *gas* exploration would not make sense. Petroleum exploration and production licences cover both oil and gas since they are often found together, and if no infrastructure is available to sell the associated gas found at an oil well it is flared or vented. This wastes resources and damages climate without achieving any useful purpose. In 2015, the World Bank estimated that 140 billion cubic meters of natural gas produced with oil is flared at thousands of oil fields worldwide, resulting in emissions equivalent to more electricity than the entire continent of Africa currently consumes.<sup>4</sup>

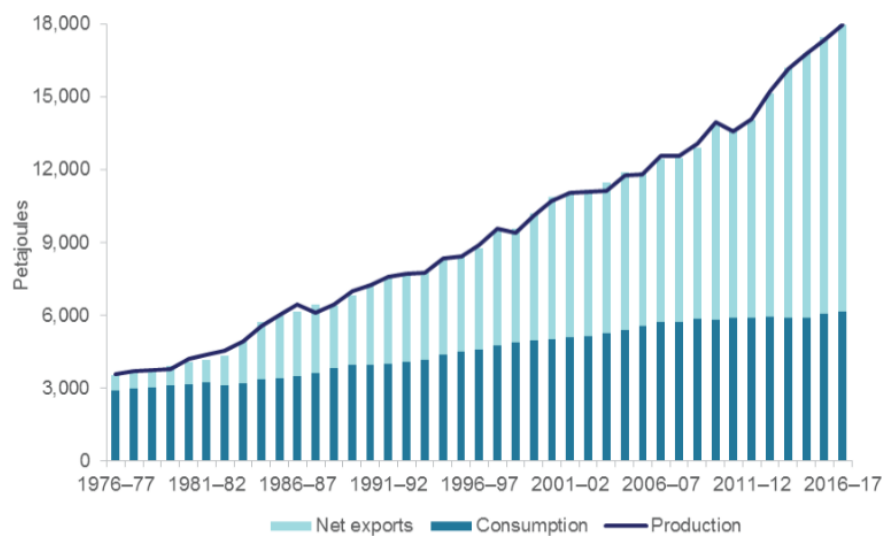
<sup>4</sup> Azeez Aregbe, February 2017, *Natural Gas Flaring—Alternative Solutions*, viewed 17 November 2018, [https://file.scirp.org/pdf/WJET\\_2017022814181642.pdf](https://file.scirp.org/pdf/WJET_2017022814181642.pdf)



## 4. Limiting new coal and gas overseas export contracts

A huge part of Australia's contribution to making climate impacts worse is the high level of fossil fuel exports. Australia's per capita responsibility for exacerbating climate impacts is amongst the highest in the world, but Australia is ranked last in the world on the Sustainable Development Goals (SDGs) Index which factors in the greenhouse gas emissions from burning exported coal and gas at their overseas destinations.<sup>5</sup>

Figure 3.2: Australian energy balance



Source: Department of the Environment and Energy (2018) *Australian Energy Statistics*, Table J

Figure 4: Australian energy production, consumption, and exports

In 2016-17 liquefied natural gas (LNG) exports accounted for 69% of all gas extracted in Australia, and 88% of all extracted black coal was exported.

Existing coal and gas export contracts make it much more complicated for NSW and Queensland to ban new coal mines and gas wells than it is in other jurisdictions. A clear and urgent step in all states and territories is to limit, as much as possible, NEW coal and gas overseas export contracts right now rather than locking in more problems.

State/territory governments may not be able to ban new fossil fuel overseas export contracts directly, but they can place conditions on any new coal and gas extraction projects they approve. If NSW and Queensland, for example, need to continue to allow some new coal mines or gas wells in the short term to meet domestic demand and to enable coal and gas exporters to meet their current export agreements, project approval could be conditional on none of the coal or gas being exported overseas.

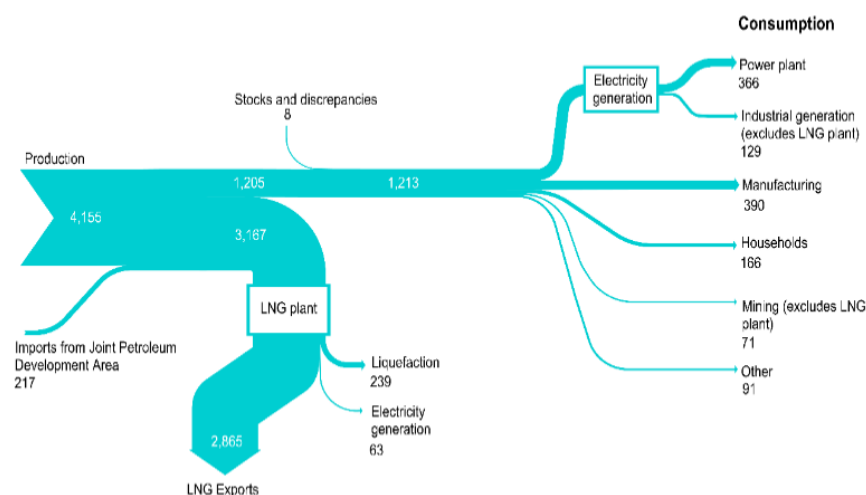
<sup>5</sup> Alex Lenferna, August 2018, *Australia's fossil fuel export trilemma*, viewed 19 November 2018, <https://reneweconomy.com.au/australias-fossil-fuel-export-trilemma-21338/>

## 5. Banning new LNG infrastructure

If all states and territories were to use all available levers to limit new gas overseas export contracts that might suffice to ensure no new LNG liquefaction and *export* facilities are built, but an explicit ban on new LNG facilities would prevent any additional infrastructure being built to supply existing export contracts. It would also prevent LNG *import* facilities being built, as is being proposed in Victoria despite Bass Strait having plenty of gas that could have continued to supply east coast demand for many years if it weren't for LNG exports.

LNG processing uses up a lot of fossil gas (over and above the quantity exported), and creates an enormous amount of avoidable greenhouse gas emissions, without achieving any useful outcome other than enabling transportation by sea.

Figure 2.3: Australian natural gas flows, petajoules, 2016–17



Note: Gas used at LNG plants for liquefaction and electricity generation is included in total gas consumption in the AES, but has been disaggregated in this figure.

Source: Department of the Environment and Energy (2018) *Australian Energy Statistics*, Tables A and F and internal sources

Figure 5: Australian fossil gas consumption, 2016-17

In 2016-17, Australia-wide, 9% of the gas feedstock was used up in the liquefaction process (239 PJ) and another 63 PJ was used to generate the electricity used to process the gas. Liquefaction processing at LNG plants accounted for approximately one-tenth of Australian fossil gas consumption.<sup>6</sup> Household gas use across all of Australia amounted to only 166 PJ.

If all gas liquefaction processing could be stopped right now it would reduce greenhouse gas emissions by almost twice as much as could be achieved by eliminating all household use of fossil gas AND using renewable electricity to operate the replacement electrical appliances.

<sup>6</sup> Department of Environment and Energy, August 2018, *Australian Energy Update 2018*, Page 15, viewed 18 October 2018, [https://www.energy.gov.au/sites/g/files/net3411/f/australian\\_energy\\_update\\_2018.pdf](https://www.energy.gov.au/sites/g/files/net3411/f/australian_energy_update_2018.pdf)

## LNG-related and domestic carbon emissions

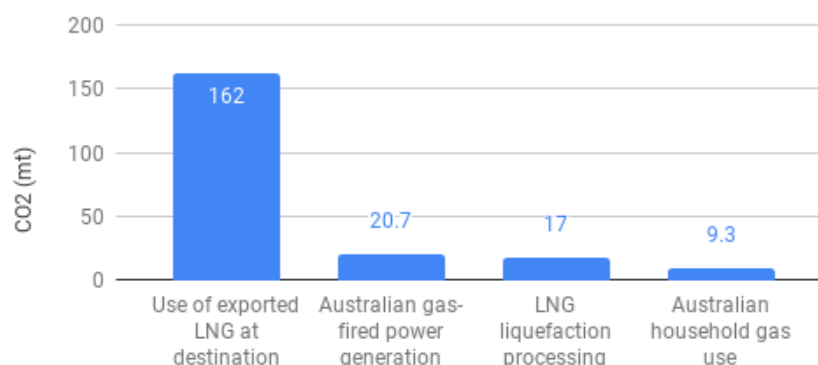


Figure 6: 2016-17 emissions from LNG liquefaction relative to other emissions sources

The 4.4 MT rise in stationary energy (excluding electricity) emissions in the table below is largely caused by LNG liquefaction. Much of the 6.9 MT increase in fugitive emissions is also attributable to the LNG industry, and includes leakage, evaporation and storage losses, flaring, and venting of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O.<sup>7</sup> Together those increases more than wipe out the benefit of the 8.1 MT decrease in emissions from the electricity sector resulting from newly built grid-scale solar and wind, retirement of coal-fired generators, and the efforts of numerous householders who have been installing solar PV and making energy efficiency improvements.

Table 3: 'Unadjusted' emissions by sector, Australia, years to March 2017 and 2018

Sector	Annual emissions (Mt CO <sub>2</sub> -e)		Change (%)
	Year to March 2017	Year to March 2018	
Energy – Electricity	189.6	181.5	-4.3
Energy – Stationary energy excluding electricity	93.9	98.3	4.6
Energy – Transport	98.5	100.6	2.1
Energy – Fugitive emissions	50.4	57.3	13.7
Industrial processes and product use	35.0	36.1	3.2
Agriculture	72.2	73.7	2.1
Waste	12.5	12.6	0.6
Land Use, Land Use Change and Forestry <sup>a</sup>	-22.2	-23.3	-5.2
<b>National Inventory Total</b>	<b>529.9</b>	<b>536.7</b>	<b>1.3</b>

Figure 7: Rise in fugitive emissions 2017-2018

Conventional gas fields in Western Australia and the Northern Territory contain quite large concentrations of CO<sub>2</sub> in raw gas, almost all of which must be separated out before the gas can be liquefied. The Gorgon LNG Project was supposed to include a major Carbon Capture and Storage (CCS) project, but the sequestration part of the project is still not operational. Millions

<sup>7</sup> Department of Environment and Energy, March 2018, *Quarterly Update of Australia's National Greenhouse Gas Inventory: March 2018*, viewed 18 October 2018, <http://www.environment.gov.au/system/files/resources/63391569-7ffa-4395-b245-e53893158566/files/nggi-quarterly-update-mar-2018.pdf>

of tonnes of CO<sub>2</sub>, mixed with considerable volumes of methane, have been released directly into the atmosphere during the first two years of operation. Some critics question the safety and effectiveness of CCS<sup>8</sup>, but even if Gorgon CCS succeeds, those emissions reductions will be offset by LNG emissions from the Ichthys plant in Darwin and the Prelude plant floating in Australia's territorial waters when they are completed.

Climate Analytics includes fugitive and vented emissions in its greenhouse gas emissions from the LNG industry. Accordingly, their emissions figure for 2017 is 25.4 MT, even higher than the greenhouse gas emissions from all Australia-wide gas-fired power generation (20.7 MT). LNG emissions are predicted to rise to 27.6 MT in 2018 and 37.6 MT by 2020.<sup>9</sup>

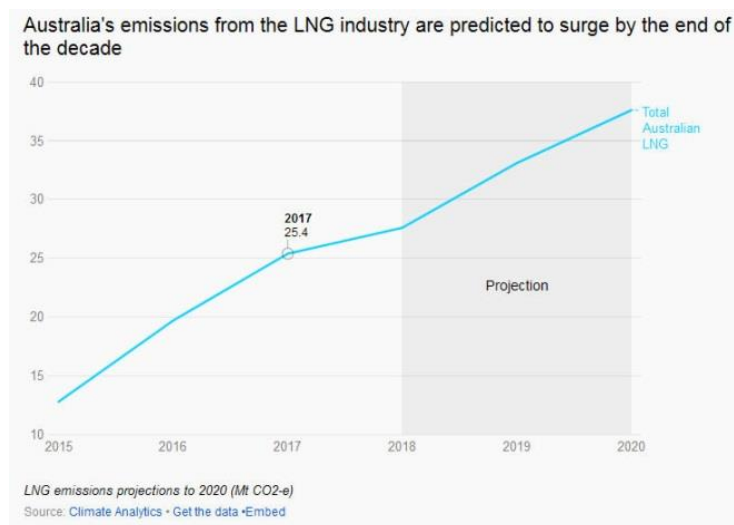


Figure 8: Emissions from LNG processing and fugitive emissions

The federal Department of Environment and Energy notes: "Australia's emissions have risen in the past three years. A major factor in this growth has been the rapid expansion of the LNG sector. Although further growth is expected in the LNG sector as new plants come online in 2018, emissions are projected to decline slightly from current levels, reaching only 551 Mt CO<sub>2</sub>-e in 2020. **Increased emissions from LNG are largely offset by falling emissions in the electricity sector** as a result of flat electricity demand, a decline in the emissions intensity of generation due to the Renewable Energy Target (RET) and the announced closures of coal power stations."<sup>10</sup>

<sup>8</sup> Zobak and Gorelick, August 2015, *To prevent earthquake triggering, pressure changes due to CO<sub>2</sub> injection need to be limited*, viewed 15 November 2018, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4547280/>

<sup>9</sup> Kathryn Diss, June 2018, *How the Gorgon gas plant could wipe out a year's worth of Australia's solar emissions savings*, viewed 29 October 2018, <https://www.abc.net.au/news/2018-06-21/gorgon-gas-plant-wiping-out-a-year-of-solar-emission-savings/9890386>

<sup>10</sup> Department of Environment and Energy, December 2017, *Australia's Emissions Projections 2017*, P9, viewed 29 October 2018, <https://www.environment.gov.au/system/files/resources/eb62f30f-3e0f-4bfa-bb7a-c87818160fcf/files/australia-emissions-projections-2017.pdf>

Turning that quote around, increased emissions from LNG will more than cancel out the climate benefit which would otherwise result from all the widespread climate-positive improvements in the electricity sector. And that's just referring to the greenhouse gas emissions from liquefaction processing itself. Burning that gas overseas is not counted in Australia's emissions, but its negative climate impact cancels out the climate benefit of electricity sector improvements many times over.

Fossil gas production rose by 23% in 2016-17 to 4,155 PJ to support additional LNG export capacity in Queensland and Western Australia. Queensland gas production of 1,328 PJ in 2016-17 was nearly four times what it was in 2013-14. In 2016-17 Queensland oil and gas royalties were \$98 million, compared with \$69 million in 2013-14 before LNG exports commenced.<sup>11</sup> That's \$29 million/year for wasting 99.6PJ (10% of 3/4 of its 1,328 PJ) of its fossil gas production just on converting it to liquid form to prepare it for overseas export, and for causing Australia's greenhouse gas emissions to continue to rise despite other successes at reducing emissions.

All states and territories could ban NEW LNG infrastructure (for exports and imports) immediately. And if banning new fossil gas extraction, preferably in Queensland as well as in other jurisdictions, causes LNG companies to fail to meet their export contracts it would be a singularly effective step from a climate emergency perspective.

### Fossil gas VS Safe climate



NMBI legislation only addresses NEW projects, but the extreme amount of climate damage being caused by the LNG industry suggests that it would benefit us all if some other mechanism could be found for winding back the LNG exports already taking place.

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<sup>11</sup> Queensland Treasury, December 2017, *Royalty Statistics*, viewed 18 October 2018, downloadable from <https://publications.qld.gov.au/dataset/royalty-statistics/resource/bb666798-73e0-4b6c-b935-6589df17ecae>

### 6. Banning new gas reticulation

All state and territory governments could avoid locking in avoidable future fossil gas use by banning gas reticulation to new areas and gas connections to new houses and buildings as Stage 1 bans. City folk might be accustomed to having the choice to use mains gas if they want, but it isn't an essential service and many rural areas don't have reticulated gas.

All-electric houses with solar PV can have close to zero greenhouse gas emissions<sup>12</sup> and low or no energy bills<sup>13</sup> right now, and as the grid transitions to greater percentages of renewable electricity, the carbon footprint of electric appliances will fall even for buildings without solar.

Tasmania and ACT are already very close to 100% renewable electricity, and the ACT is trialling gas-free suburbs. Energy Security Board (ESB) modelling predicts that SA electricity supply will be 75% renewable by 2020 and 80% by 2022.<sup>14</sup> Already all-electric buildings in those jurisdictions have much lower greenhouse gas emissions than any that have both gas and electricity (and two supply charges).

#### Note on gas myths

The 'gas is better' myth is hard to break since gas industry propaganda still makes outdated claims. Not so long ago gas *was* cheap. Old electric appliances were inefficient. The grid was dominated by coal- and gas-fired electricity. But a lot has changed over the last 10 years, including gas prices more than doubling as a result of linkage to international gas markets and great improvements in the efficiency of electric appliances.

An exhaustive Alternative Technology Association (ATA) analysis dating from May 2018 concludes that, "by choosing an all-electric home with solar PV, a new home buyer will be in the order of \$9k to \$18k better off over 10 years, as compared with establishing that home as dual fuel (i.e. electricity and gas) without solar". For new home buyers who don't install solar, choosing to be all-electric results in either lower energy costs or only a minor difference either way (depending on where you live).

According to ATA analysis published in January 2015, all-electric households with efficient electric appliances also have lower greenhouse gas emissions than dual-fuel households in all areas of Australia except Mildura. But that analysis was based on regional electricity emission factors current in 2014, and since then the proportion of renewably generated electricity on the grid has increased significantly in all states, and continues to do so.

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<sup>12</sup> Alternative Technology Association, January 2015, *Are We Cooking the Planet with Gas*, (CAP\_Gas\_Research\_Emissions\_Analysis\_Final\_Report\_210115\_v1.3.pdf), retrieved October 2018 but no longer available online)

<sup>13</sup> Alternative Technology Association, July 2018, *Household fuel choice in the National Energy Market*, viewed 18 October 2018, [https://renew.org.au/wp-content/uploads/2018/08/Household\\_fuel\\_choice\\_in\\_the\\_NEM\\_Revised\\_June\\_2018.pdf](https://renew.org.au/wp-content/uploads/2018/08/Household_fuel_choice_in_the_NEM_Revised_June_2018.pdf)

<sup>14</sup> Giles Parkinson, August 18, *South Australia will be at 100% renewables by 2025 – market operator*, viewed 3 October 2018, <https://reneweconomy.com.au/south-australia-will-be-at-100-renewables-by-2025-market-operator-52312/>

### 7. Banning sale of new gas appliances

All states and territories could also enact immediate bans on the sale of new gas heating and hot water appliances (once stocks currently held in that jurisdiction are depleted).

Residential and commercial use of gas (yellow in the AEMO chart in Figure 10 below) in Australian Energy Market Operator (AEMO) regions (Qld, NSW, ACT, SA, Tas, and Vic) does not seem to have fallen at all yet despite the rise in gas prices. One possible reason is that existing gas appliances have not yet reached the end of their lifespan, and that prior to the hike in gas prices new gas customers were being offered free gas connections.

The Australian Gas Networks 2018 business case for a pipeline extension from Murray Bridge to Mount Barker claimed that use of fossil gas would save residents an average of \$900/year compared with using electricity for cooking, hot water, and heating. It also claimed emissions would be 52% lower<sup>15</sup>. That business case appears to be comparing gas appliances with older electrical appliances using coal-fired electricity. But SA has had no coal-fired electricity generation since May 2016 and modern electric appliances, such as induction cooktops, heat pumps, and reverse-cycle heating/cooling are much more efficient than gas alternatives.

On some days SA wind and solar generation already exceeds the SA electricity demand, and by around 2025 the SA grid is predicted to be close to net 100% renewable electricity.<sup>16</sup>

Regardless of the efficiency of their electric appliances, at that time all-electric households in SA will have close to net zero emissions. Households still connected to fossil gas will continue to generate avoidable greenhouse gas emissions - avoidable by getting off fossil gas.

#### **Freedom of choice**

We all love freedom of choice. It's likely some people would object to a ban on the sale of new gas appliances, as some did when new lighting efficiency standards came into effect in 2009 and stopped the sale of most incandescent light bulbs. But more efficient compact fluorescent options were already available, and now even more efficient LED lighting with better light characteristics is readily available. In hindsight that 'ban' barely caused a ripple.

Members of the public who like cooking with gas might object, particularly if they want to be able to cook during a blackout, but BBQs and gas rings using bottled gas could be used as a backup. However, one way of reducing opposition to whatever package of bans a state/territory government is enacting would be to ban sales of new gas heating and hot water appliances but to continue to allow the sale of gas stoves. Sale of new gas stoves would decline naturally if new gas connections are banned.

<sup>15</sup> Australian Gas Networks, June 2018, *Mount Barker Natural Gas Extension Business Case*, P9, viewed 7 October 2018, [https://www.aer.gov.au/system/files/2018.07.30\\_Mount%20Barker%20Extension\\_Business%20Case\\_PUBLIC.pdf](https://www.aer.gov.au/system/files/2018.07.30_Mount%20Barker%20Extension_Business%20Case_PUBLIC.pdf)

<sup>16</sup> Giles Parkinson, August 18, *South Australia will be at 100% renewables by 2025 – market operator*, viewed 3 October 2018, <https://reneweconomy.com.au/south-australia-will-be-at-100-renewables-by-2025-market-operator-52312/>

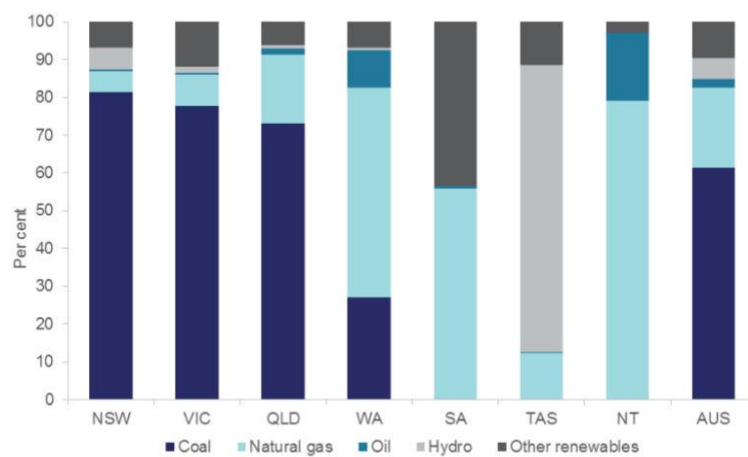


## 8. Banning new coal-fired power plants

Do any states or territories need to continue to allow NEW coal-fired electricity generators in order to 'keep the lights on'?

Australia's high dependency on coal-fired electricity generation has been decreasing, but in 2017 it still provided 61% of our electricity. ACT, Tasmania, NT, and SA currently have no coal-fired electricity generation, but coal-fired power accounts for over 81% of electricity generation in NSW, 77% in Victoria, 73% in Queensland, and 28% in WA.

Figure 3.7: Australian electricity generation fuel mix, calendar year 2017



Source: Department of the Environment and Energy (2018) *Australian Energy Statistics*, Table O

Figure 9: Australian electricity generation fuel mix, 2017

### AEMO regions - NSW, Qld, SA, Tas, and Vic

NSW is currently the Australian Energy Market Operator (AEMO) region that is most heavily dependent on coal. However, many NSW power stations are nearing the end of their lifespan, and new renewable electricity generation and storage is now cheaper to build than new coal-fired generation. The NSW government's 'emerging energy' initiative is preparing for the exit of nearly all its coal fleet over the next 15 years.<sup>17</sup>

Queensland and Victoria too are still highly dependent on coal-fired electricity, but Queensland has a renewable energy target of 50% by 2030, and Victoria's target is 40% by 2025. All new generation in both states, recently completed or at the planning or construction phase, is solar or wind electricity generation.

Coal-fired electricity generation might be almost eliminated in AEMO regions by 2050 simply by all states and territories introducing bans on NEW coal-fired power plants right now, but much quicker would be better.

<sup>17</sup> Giles Parkinson, 1 November 2018, *Billionaire blows up again over Coalition's "fair dinkum" power slogan*, viewed 2 November 2018, <https://reneweconomy.com.au/billionaire-blows-up-again-over-coalitions-fair-dinkum-power-slogan-38220/>



Under NMBI legislation new coal mines could also be banned under either Stage 1 or Stage 2 bans. This would have implications for coal exports (see later), but it would also mean some existing coal-fired power stations might close earlier than otherwise due to a lack of sufficient coal supply.

With bans on new coal-fired power plants in place, and either Stage 1 or Stage 2 bans on new coal mines, market certainty would guarantee rapid expansion of renewable electricity generation, storage, and interconnection capacity. That would 'keep the lights on', even in NSW, Queensland, and Victoria, if those states ban new coal-fired power plants. But an even more rapid transition could be achieved if state and federal governments also implement positive renewable electricity policies.<sup>18</sup>

### WA and NT

Northern Territory could easily ban any new coal-fired power plants since it is not dependent on them (it currently has none). NT relies heavily on use of fossil gas and liquid fuels for electricity generation, but that reliance may diminish as it progresses towards its renewable energy target of 50% by 2030.

Most WA coal-fired power plants are old, and analysis by Sustainable Energy Now (SEN) concludes that replacing them with new wind and solar generation would deliver electricity at less than the current cost and reduce CO<sub>2</sub> emissions by 45%.<sup>19</sup>

40% of WA electricity generation is gas-fired, and there is sufficient gas capacity to provide standby power for 60% renewable electricity, enough to replace all coal-fired generation.

#### How rapid is fast enough?

This document focuses just on bans related to fossil fuels but positive policies also play an obvious part in tackling the climate emergency. A recent UNSW study concluded that even achieving 98% renewable electricity by 2030 and reducing demand by 35% would not be enough to achieve 'Australia's share' of meeting the IPCC 1.5°C carbon budget.<sup>18</sup>

Mark Diesendorf identifies several state-level measures that would speed up the transition to renewable electricity:

- construction of new transmission lines connecting renewable energy zones
- incentives for dispatchable renewables and storage
- reverse auctions with contracts-for-difference to encourage more large-scale renewable electricity in NSW and WA.

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<sup>18</sup> Mark Diesendorf, November 2018, *Renewable electricity policy for Australia*, viewed 22 November 2018, [http://www.tai.org.au/sites/default/files/Renewable Electricity Policy for Australia \[Web\].pdf](http://www.tai.org.au/sites/default/files/Renewable%20Electricity%20Policy%20for%20Australia%20Web.pdf)

<sup>19</sup> Ben Rose, 8 September 2017, *WA grid could reach 85% renewables – and cheaper than 'clean coal'*, viewed 9 November 2018, <https://reneweconomy.com.au/wa-grid-reach-85-renewables-cheaper-clean-coal-46180/>

### 9. Banning new gas-fired power plants

Will the 'lights stay on' if states and territories ban new gas-fired electricity generation?

#### AEMO regions - NSW, Qld, SA, Tas, and Vic

Gas-fired power generation (orange area labelled GPG in Figure 10 below) has been falling rapidly since gas prices rose with the advent of LNG exports in 2014. Gas-fired generation currently supplies 21% of Australia's electricity in Australian Energy Market Operator (AEMO) regions but use of gas for electricity generation is predicted to fall much lower over the next few years as planned renewable energy generation and storage projects are completed.<sup>20</sup>

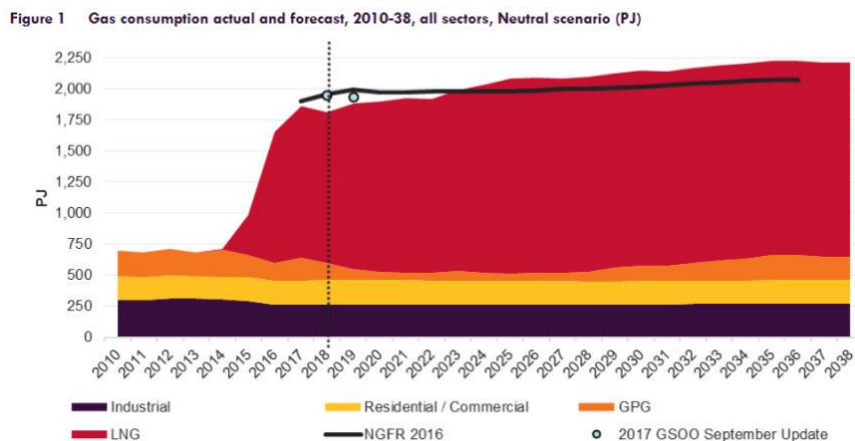


Figure 10: Gas consumption actual and forecast, 2018 GSOO (doesn't include WA or NT)

Currently SA always has a minimum amount (around 300MW) of gas-fired generation in its grid supply to provide 'firming' of wind and solar output, and Queensland often has some in its supply mix too, but other AEMO states quite often have none. Even in SA, the AEMO region most heavily dependent on gas-fired generation, the capacity factor rarely exceeds 50%. (See Appendix A for the amount of currently unused capacity at existing gas-fired power plants.)

Gas-fired electricity is capable of quick changes in output and modern gas peakers can ramp up from zero to full output in 10 minutes, making it very useful for 'filling in the gaps' when solar and wind generation are low. Accordingly the AEMO predicts that SA will still be using a small but diminishing amount of gas-fired electricity even when it reaches net 100% renewable electricity. Eventually even that gap might be filled by renewable gases.

Gas use for electricity generation is forecast to increase from around 2028 according to the above AEMO chart (Figure 10 above), but that assumes states with high percentages of coal-fired generation will build new gas-fired power plants to facilitate greater penetration of renewable electricity. However, renewable electricity generation coupled with storage is already a cheaper option.

<sup>20</sup> AEMO, June 2018, *2018 Gas Statement of Opportunities*, viewed 16 October 2018, [https://www.aemo.com.au/-/media/Files/Gas/National\\_Planning\\_and\\_Forecasting/GSOO/2018/2018-Gas-Statement-Of-Opportunities.pdf](https://www.aemo.com.au/-/media/Files/Gas/National_Planning_and_Forecasting/GSOO/2018/2018-Gas-Statement-Of-Opportunities.pdf)

All AEMO states already have gas-fired power plants which can be switched on when required to meet demand. Provided that the transition to higher percentages of renewable electricity is accompanied by appropriate quantities of storage, there should be no need to allow construction of NEW gas-fired power plants. However new open cycle gas turbine (OCGT) peaker plants which can also use renewable gases could still be built if necessary.

### WA and NT

SEN's modelling shows that about 2,500 MW of OCGT capacity, in addition to 1,000 MW of demand demand-side management and 6,000MWh of battery storage, will be required to enable 85% penetration of renewable electricity.<sup>21</sup>

Since the WA grid does not have any interconnectors to other states, gas-fired generation is likely to play an important backup role for some years. If necessary, WA could set a Stage 2 ban on new gas-fired power plants rather than enacting an immediate Stage 1 ban.

The Northern Territory has three regulated electricity grid networks which are powered by gas-fired generators. The capacity of these is much greater than the current demand, and even existing gas-fired generators are expected to retire or switch to being used as backup as NT transitions towards its 50% renewable electricity by 2030 target.<sup>22</sup> Remote areas are generally serviced by a combination of solar PV and diesel generators.

Much of NT's existing installed fast start gas turbine plant is ideal for filling a backup role, so there would be no adverse impacts from NT banning new gas-fired generation.

#### ACT can...

The ACT is currently the poster child for climate action and might be the first to adopt NMBI legislation. It could easily ban new fossil fuel extraction and infrastructure right now since ACT does not have a coal or gas industry. The ACT already has incentive schemes for fossil-free vehicles and could focus on transport-related fossil fuel bans as Stage 1 or Stage 2 bans.

One tangible result of a ban on new climate-damaging projects in the ACT might be an immediate ban on new gas reticulation (instead of just the current move to drop the regulation making gas reticulation to all suburbs mandatory) and restrictions on installing new gas appliances. When gas appliances reach the end of their lifespan they would be replaced by efficient electric alternatives, eventually allowing gas to be disconnected and eliminating the necessity for a second supply charge. The ACT is very close to reaching 100% renewable electricity, meaning that even now, and even for non-solar households, any new gas use will generate more greenhouse gas emissions than electric alternatives.

<sup>21</sup> Ben Rose, 8 September 2017, *WA grid could reach 85% renewables – and cheaper than 'clean coal'*, viewed 9 November 2018, <https://reneweconomy.com.au/wa-grid-reach-85-renewables-cheaper-clean-coal-46180/>

<sup>22</sup> Alan Langworthy, September 2017, *Northern Territory Roadmap to Renewables*, viewed 9 November 2018, [https://cmsexternal.nt.gov.au/\\_data/assets/pdf\\_file/0008/573353/roadmap-to-renewables-report.pdf](https://cmsexternal.nt.gov.au/_data/assets/pdf_file/0008/573353/roadmap-to-renewables-report.pdf)

### 10. Banning new coal mines

Australia exports 88% of all the black coal extracted from existing coal mines, so at first glance it might seem simple for all states and territories to ban all new coal mines immediately. However, states that rely heavily on coal-fired electricity generation, and particularly those which also export coal, will need to consider whether or not the remaining capacity of existing coal mines will be adequate to meet demand during the transition away from coal use. If it isn't, they could handle bans on new coal mines as Stage 2 bans.

#### Electricity generation

Will the 'lights go out' if states and territories ban new coal mines?

ACT, SA, Tasmania, and NT could easily ban new coal mines right now without any fear of disruption to electricity supply since they don't have any coal-fired power plants. It is likely that Victoria and WA could too, but before setting a Stage 1 ban on new coal mines they should check that the amount of coal remaining in existing coal mines will be sufficient to meet the demand for electricity generation over the period of transition to renewable electricity.

The situation is more complex for NSW and Queensland since they not only rely heavily on coal-fired electricity generation but existing coal export contracts also need to be considered.

#### Coal export contracts

NSW and Queensland both export overseas the majority of the coal they extract.<sup>23</sup>

2016-17	NSW	Qld
Coal produced (kt)	198,161	237,288
Coal consumed (kt)	26,761	25,900
Coal exported (kt)	171,400	211,388

An October 2018 IEEFA report<sup>24</sup> focusing on the future of coal in NSW states that Japan, China, South Korea and Taiwan (our major coal customers) have all introduced policy settings to reduce the consumption of thermal coal and encourage the uptake of renewable energy. Global demand for thermal coal is forecast to drop 28 per cent by 2025, and decline by 59 per cent by 2040, and the Port of Newcastle has already recognised the need to diversify the port away from its over-reliance on coal.

The above report suggests that Australia will not have market demand for its current level of coal exports, particularly as countries attempt to decarbonise in keeping with IPCC commitments, and domestic demand for electricity generation will also fall as new renewable electricity generation replaces coal-fired generation. Even so, is the current remaining capacity

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<sup>23</sup> Department of the Environment and Energy, September 2018, *Australian Energy Update 2018*, Table P, viewed 16 October 2018, <https://www.energy.gov.au/publications/australian-energy-update-2018>

<sup>24</sup> IEEFA, November 2018, *New South Wales Thermal Coal Exports Face Permanent Decline*, viewed 9 November 2018, <http://ieefa.org/wp-content/uploads/2018/10/NSW-Coal-Exports-November-2018.pdf>

of existing coal mines sufficient to meet domestic demand as well as the export quantities already committed in export contracts?

Under NMBI legislation, NSW and Queensland governments could limit NEW coal export contracts via Stage 1 bans on new export-oriented coal mines and handle bans on other new coal mines as Stage 2 bans. Once they investigate the quantity of coal remaining to be extracted from existing mines and the quantities contracted under existing export contracts they could set a timeline for also banning all new coal mines.

Stage 1 bans on new coal mines could apply in cases, like the Galilee Basin, where the output would not contribute to 'keeping the lights on' nor be necessary for meeting existing export contracts.

### Industrial uses

In Australia smelting has been the main use of coal apart from electricity generation. However, Sanjeev Gupta has pioneered the manufacture of 'Green Steel' at his UK steelworks, using renewable electricity to recycle scrap metal feedstock, and he is now planning to do the same at his Whyalla steelworks.<sup>25</sup>

As noted in the September 2018 *Electrifying Industry* report published by BZE, conventional steel production requires coal, but steel can also be made without coal by using hydrogen (produced via electrolysis of water using renewable electricity) or sustainably produced biomass as the reductant. For heat processes, electricity is a remarkably versatile and precise form of energy that can be used to power any industrial heat process, and there is no practical temperature limit to electrical heat.<sup>26</sup>

Converting existing plant to avoid the use of coal would be expensive, but NMBI legislation also provides for banning coal-fired processes in NEW industrial facilities - Stage 1 bans in cases where climate-safe alternatives are already available, and Stage 2 bans as alternatives become available in other cases. Not only would this avoid locking in future greenhouse gas emissions from industry, it would also reduce potential pressure to approve new coal mines to supply industrial demand.

In most states coal production closely matches local coal consumption for electricity generation and/or industrial purposes, and coal imports or exports are not an issue. It is likely that most states and territories except NSW and Queensland could ban new coal mines immediately without disrupting the operation of existing industrial facilities, but they should examine the remaining capacity of their existing coal mines and the demand for coal by existing industrial facilities first.

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<sup>25</sup> Simon Evans, August 2018, *Sanjeev Gupta steps up \$1.37b renewable energy build near Whyalla steelworks*, viewed 19 November 2018, <https://www.afr.com/business/energy/electricity/sanjeev-gupta-steps-up-137b-renewable-energy-build-near-whyalla-steelworks-20180814-h13zcc>

<sup>26</sup> Beyond Zero Emissions, Sept 2018, *Electrifying Industry*, viewed 5 November 2018, downloadable from <http://bze.org.au>

### 11. Banning new fossil gas extraction

In 2016-17, 69% of all gas extracted in Australia was exported, and domestic demand for use in electricity generation is falling. Can all states and territories ban all new gas wells right now and still keep the lights on, keep the wheels of industry turning, and have sufficient gas for residential and commercial use? Do existing gas wells have sufficient capacity to meet existing LNG export contracts?

#### WA and NT

The estimated volume (6.8 EJ) of natural gas needed in Western Australia for electricity supply and industry until 2040, including minerals processing and mining but excluding LNG processing, could be supplied just with the remaining gas reserves linked to existing production facilities in WA even with no new gas fields to replace depleted fields.<sup>27</sup> If anything, WA has a problematic over-abundance of domestic supply due to Synergy's 20-year take-or-pay contracts for fossil gas from the offshore Gorgon project.<sup>28</sup>

The WA government could ban all new gas wells with no fear of shortages. Proposed exploitation of Canning Basin and other unconventional gas resources in WA would be likely to lead to large stranded assets given potential declines in local and global gas demand.

Conventional fossil gas from the Amadeus Basin currently supplies gas throughout NT and has more than enough reserves to continue to do so, but new wells are currently being drilled to supply gas to the new Northern pipeline to Mt Isa.<sup>29</sup> That pipeline effectively links NT-produced gas to the gas markets in eastern states and the LNG export market.

NT itself only uses about 3 PJ/year of fossil gas, so no new gas wells would be needed to meet that demand, particularly as gas-fired electricity generation declines. However, NT was under pressure to lift its moratorium on fracking, and now that has been lifted the Northern pipeline is also going ahead. New gas wells will be needed if NT is to supply gas to the eastern states and/or LNG export companies, but since any gas 'shortage' in eastern states is caused by LNG exports, any new gas wells will in effect mean more LNG exports. Given the enormous climate impact of LNG processing (described above), the NT government would be doing the world a huge favour if it were to ban all new fossil gas extraction.

#### Electricity generation: AEMO regions

As shown in Figure 10 above, only a small and diminishing percentage of the gas from existing gas wells is used for electricity generation in NSW, Queensland, SA, Tasmania, and Victoria. And if new gas-fired power plants are also banned the percentage will diminish even further.

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<sup>27</sup> Climate Analytics, March 2018, Western Australia's Great Gas Gamble, viewed 5 November 2018, <https://climateanalytics.org/media/climateanalytics-report-westernaustraliasgasmamble-2018.pdf>, P36

<sup>28</sup> Daniel Mercer, June 2017, *Synergy caught out by gas glut*, viewed 22 November 2018, <https://thewest.com.au/business/oil-gas/synergy-caught-out-by-gas-glut-ng-b88509182z>

<sup>29</sup> Katrina Beavan, February 2018, *Northern Territory's largest onshore gas producer to increase exploration*, viewed 5 November 2018, <https://www.abc.net.au/news/rural/2018-02-26/gas-exploration-to-increase-in-central-australia/9483022>

If banning new gas extraction causes a supply shortage, LNG export companies might want to prioritise meeting their export contracts, but they could be forced to meet domestic demand first. WA has a gas reservation mechanism. SA gave subsidies to new gas projects in the Otway and Cooper Basins in 2017 on the condition that SA has first call on that gas if SA needs it. In addition, the federal government introduced the Australian Domestic Gas Security Mechanism (ADGSM) which can be triggered if necessary to guarantee domestic supply. Theoretically at least, all states and territories should be able to ban new gas wells without fear of the lights going out, particularly as they add more solar, wind, and storage capacity.

### Industrial uses: AEMO regions

According to the AEMO chart in Figure 10 above, industrial use of fossil gas (purple) is forecast to remain high in AEMO regions and there has only been a slight drop so far despite rising gas prices. Gas is generally considered essential for some industrial purposes, such as the manufacture of fertilisers, but as the BZE *Electrifying Industry* report shows there are other and often better methods of production that don't require fossil gas, such as using renewably generated hydrogen to make 'green' ammonia as is being demonstrated at Pt Lincoln in SA.<sup>30</sup>

NMBI legislation would also provide for bans on new climate-damaging industrial facilities - 'new' being a key point since it would be expensive to convert existing plant to use renewable electricity instead of gas. And, as noted above, Stage 1 bans only apply in cases where climate-safe alternatives are already available. In those cases, banning new gas-fired plant would stop investment in expensive equipment that would lock in avoidable future greenhouse gas emissions. It would also mean that the gas from existing gas wells would continue to meet industrial demand for longer in the wake of bans on new fossil gas extraction.

#### **SA: The good, the bad, and the UCGly**

In 2018 a demonstration project producing carbon-free hydrogen from renewable electricity and water began at Pt Lincoln in SA with the aim of enabling energy storage and the production of green chemicals. It is slated to be one of the first ever commercial plants to produce CO<sub>2</sub>-free 'green' ammonia from intermittent renewable resources.

Concurrently, an underground coal gasification (UCG) pilot project began at Leigh Creek in SA with the aim of producing gas for manufacturing fertiliser at a proposed adjacent facility as well as supplying gas to a proposed small and unnecessary new gas-fired power plant.

UCG has already been banned in Queensland on environmental contamination grounds, but the proponents of the Leigh Creek project claim that their process is safe. If SA had already enacted NMBI legislation banning all new fossil fuel extraction on climate grounds, the application for this UCG pilot project would have been rejected automatically. Claims and counter-claims regarding contamination would have been irrelevant.

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<sup>30</sup> Trevor Brown, July 2018, *ThyssenKrupp's "green hydrogen and renewable ammonia value chain"*, viewed 9 November 2018, <https://ammoniaindustry.com/thyssenkrupps-green-hydrogen-and-renewable-ammonia-value-chain/>



### Residential/Commercial gas users: AEMO regions

Gas for heating, hot water, and cooking accounts for only a tiny proportion of Australia's total gas production, and demand will fall even further as more and more consumers realise they can reduce their greenhouse gas emissions and their energy bills by switching to modern efficient electric alternatives. All-electric households with solar PV can already have close to net zero greenhouse gas emissions and much lower energy bills than a dual-fuel home.

It is likely that residential and commercial gas demand will fall quite rapidly, particularly if bans on new gas reticulation and gas connections to new buildings are included in Stage 1 bans, but in any case, the state and federal gas supply guarantee measures should mean that this diminishing demand can continue to be met by existing gas wells.

### LNG export contracts

WA and NT bans on new gas extraction (onshore and coastal waters within 3 nautical miles) would not impact existing LNG export contracts since the gas projects off their coasts are in Commonwealth waters and under federal jurisdiction. However, more gas wells would be needed in Australian Energy Market Operator (AEMO) regions, or at least in Queensland, to fill the current rate of LNG exports out of Gladstone.

The fossil gas demand in AEMO regions is 590 petajoules/year (PJ/a), but the amount of gas used for LNG exports from Gladstone is now 1,290 (PJ/a) and is forecast to increase to 1,430 PJ/a by 2021.<sup>31</sup>

Conventional gas reserves and resources total 37,981PJ. If none of that were exported it would supply the domestic market in AEMO regions for 64 years at current rates of consumption. Conventional and unconventional reserves total 52,533 PJ.

Export contracts in place for LNG export from Gladstone add up to 494.5 MT over the 20 year contract terms (15 years in one case). Assuming all those contracts are met, that equates to 28,270 PJ by 2036. Adding on 590 PJ/a for domestic demand (11,800 over 20 years at current level of demand) means a total potential gas usage between now and 2036 of 40,007 PJ.<sup>32</sup>

Assuming the demand for gas for power generation, industry, and household/commercial use declines steadily over the next decade due to bans on new gas infrastructure and appliances, conventional gas reserves alone would be enough to meet domestic demand and current export contracts out to 2036.

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<sup>31</sup> AEMO, March 2017, *Gas Statement of Opportunities*, viewed 29 October 2018, [http://www.aemo.com.au/-/media/Files/Gas/National\\_Planning\\_and\\_Forecasting/GSOO/2017/2017-Gas-Statement-of-Opportunities.pdf](http://www.aemo.com.au/-/media/Files/Gas/National_Planning_and_Forecasting/GSOO/2017/2017-Gas-Statement-of-Opportunities.pdf)[https://www.aemo.com.au/media/Files/Gas/National\\_Planning\\_and\\_Forecasting/NGFR/2016/2016-National-Gas-Forecasting-Report-NGFR-Final.pdf](https://www.aemo.com.au/media/Files/Gas/National_Planning_and_Forecasting/NGFR/2016/2016-National-Gas-Forecasting-Report-NGFR-Final.pdf)

<sup>32</sup> Bruce Robertson, June 2017, *Australia's LNG Export Plants at Gladstone: The Risks Mount*, Table 8, Gas Reserves and Resources by Basin, viewed 29 October 2018, <http://ieefa.org/wp-content/uploads/2017/06/Australias-Export-LNG-Plants-at-Gladstone-The-Risks-Mount- June-2017.pdf>



This means that all AEMO states (NSW, Qld, SA, Tas, and Vic) could ban new *exploration* licences right now as long as NEW export contracts are avoided, but more gas wells might need to be drilled to extract all 37,981PJ of conventional gas, and many more coal seam gas (CSG) wells would be needed to extract all the unconventional reserves. The Australian Domestic Gas Security Mechanism (ADGSM) stipulates that, "If LNG projects' use of domestic gas results in a supply shortfall in a domestic market, those projects may be required to limit their exports or find new gas sources".<sup>33</sup>

### **Australian Domestic Gas Security Mechanism (ADGSM)**

Would the federal government trigger the ADGSM to prevent gas exports causing local gas shortages to arise in states or territories where new gas extraction has been banned?

If the ADGSM is enforced, the current output of existing gas wells would meet domestic demand without any new gas wells, but it's highly unlikely that current gas export contracts could be met just from new gas wells in Queensland if all other AEMO states ban NEW gas extraction projects.

States and territories other than Queensland were not party to LNG export decisions and should not be under any obligation to continue to allow new gas wells just to support LNG exports. However, the fact that the gas market spans multiple states complicates the issue. The gas pipeline network links all jurisdictions other than WA now that the Northern pipeline from NT to Mt Isa is being built. Gladstone LNG exporters can potentially export gas (via the pipeline network and/or via gas swaps) from all regions except WA.

At the time the ADGSM was set up the federal government and LNG exporters may not have anticipated that state governments might ban new gas wells and may have assumed it would be a simple matter to drill more gas wells rather than limiting exports. But Victoria already had an onshore gas ban, and at that time NT still had a moratorium on fracking. Proposed new gas fields in NSW have met with fierce community opposition, and SA now has a fracking moratorium in one part of the state.

The federal government has been putting pressure on Victoria to lift its onshore gas ban, so it is likely they'd do the same if other states and territories were to ban all new gas wells, conventional and unconventional, on climate grounds. However, if state governments are taking an explicit climate stance and banning new gas wells to protect their citizens from worsening climate impacts, and at the same time informing the public of the huge climate impacts of LNG exports, it would be very controversial if the federal government sided with big and mostly foreign LNG export companies and refused to trigger the ADGSM mechanism to protect domestic supply.

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<sup>33</sup> Department of Industry, Innovation and Science, *Australian Domestic Gas Security Mechanism*, viewed 5 November 2018, <https://www.industry.gov.au/regulation-and-standards/regulating-australian-resource-projects/australian-domestic-gas-security-mechanism>

The Queensland government in particular would be under a lot of pressure, from the federal government as well as from LNG export companies, to continue to allow new CSG gas wells. Queensland CSG fields are producing significantly less gas than was expected when LNG export contracts were drawn up. Already LNG companies are resorting to buying conventional gas from the Cooper Basin and Bass Strait to meet their export obligations despite the Gladstone LNG environmental impact statement clearly stating that LNG exports would not affect the domestic market.<sup>34</sup>

Lakes Oil sued the Victorian government in response to their ban on new onshore gas extraction on the grounds that the government had previously granted exploration leases to them. Lakes Oil lost that case, but it is highly likely LNG companies would attempt to sue the Queensland government if it were to ban all new gas extraction. Not only has the Queensland government already granted exploration licences but it also approved construction of the multi-billion dollar Gladstone LNG liquefaction and export facilities, albeit based on over-inflated assumptions they were given concerning CSG production prospects.

However, at the time of the signing ceremony for the sale of Queensland's gas on behalf of the UK's BG Group to a Chinese government-owned corporation, BG Group's subsidiary Queensland Gas Company (QGC) did not yet have approval to take the gas. QGC's Queensland Curtis LNG (QCLNG) project had not been through state or federal impact assessment and relevant petroleum tenements had not been granted.<sup>35</sup> Can the Queensland government be considered liable if QCLNG fail to meet export contracts they entered into prior to receiving relevant approvals?

Given the huge rise in greenhouse gas emissions caused by LNG exports, Queensland would indeed be a climate hero if it banned all new gas extraction and thereby caused LNG export contracts to remain unfulfilled. The next best step might be to use all possible levers to limit new export contracts and to ban new LNG facilities immediately, then set a timeline to ban new gas wells closer to 2036 when all of the existing export contracts will have expired. Queensland has recently issued *new* exploration licences with the condition that the gas produced from those tenements be reserved for domestic use.<sup>36</sup> It is possible that existing export contracts might break down or be restructured earlier than 2036 in response to global gas market conditions, so a ban on all new gas wells might be possible earlier.<sup>37</sup>

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<sup>34</sup> Bruce Robertson, October 2018, *IEEFA Australia: In need of a domestic gas reservation policy to bring electricity bills down*, viewed 29 October 2018, <http://ieefa.org/ieefa-update-australia-needs-a-domestic-gas-reservation-policy-to-bring-electricity-bills-down/>

<sup>35</sup> Michael West, May 2017, *The great gas con: how Australia got sucked dry*, viewed 18 October 2018, <https://www.michaelwest.com.au/the-great-gas-con-how-we-got-sucked-dry/>

<sup>36</sup> Qld Dept of Natural Resources, Mines, and Energy, *Qld opens more land to meet domestic gas supply challenge*, viewed 17 November 2018, <https://www.dnrme.qld.gov.au/home/news-publications/news/2018/march/qld-opens-more-land-to-meet-domestic-gas-supply-challenge>

<sup>37</sup> Bruce Robertson, June 2017, *Australia's LNG Export Plants at Gladstone: The Risks Mount*, Table 8, Gas Reserves and Resources by Basin, viewed 29 October 2018, <http://ieefa.org/wp-content/uploads/2017/06/Australias-Export-LNG-Plants-at-Gladstone-The-Risks-Mount- June-2017.pdf>

## 12. Offshore bans - a special case

State and territory governments can enact NMBI legislation and use it to prevent new climate-damaging activities in their own jurisdictions, but it is the federal government that has control over oil and gas projects in Commonwealth waters.

Every year the National Offshore Petroleum Titles Administrator (NOPTA) releases new offshore exploration areas and The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) approves new drilling projects, often with little public awareness or scrutiny. Yet recent gas projects off the coasts of WA and NT will cause vast amounts of greenhouse gas emissions over their lifetimes - emissions that could easily have been avoided since Australia had no need for and gets almost no benefit from those projects.

Most of that gas is being exported as LNG by companies that will pay no tax and no Petroleum Resource Rent Tax (PRRT) for many years, if ever, under current tax settings. Offshore projects are not subject to paying state/territory royalties (with some exceptions in WA), and we don't need more gas to 'keep the lights on'.

Even though state/territory governments have no jurisdiction over offshore projects, they can exert pressure on the federal government to reject applications for new exploration or drilling in waters adjacent to their own jurisdiction and can refuse approval for any onshore support infrastructure for offshore projects.

### SA can...

South Australia no longer has coal-fired electricity generation and is well on its way to replacing most gas-fired electricity. Energy Security Board (ESB) modelling predicts that SA electricity supply will be 75% renewable by 2020 and 80% by 2022, with gas-fired generation playing a small and diminishing part in keeping the lights on as the numerous planned solar, wind, and storage projects reach completion.

In 2017 the previous SA state government provided \$48 million in subsidies for new gas extraction on the condition that SA would have first call on the new gas output if SA needs it. The current SA government could easily ban any *new* gas and coal extraction in SA without any risk to security of supply.

Already in SA all-electric households with solar PV can potentially have zero carbon household energy, or close to it. Even households without rooftop solar will have a carbon footprint close to zero when the SA grid reaches net 100% renewable electricity. Many all-electric solar households already also have close to zero energy costs. It would be counter-productive to continue to allow new gas reticulation in SA, and it makes no sense to allow housing developers to continue to make gas connections mandatory.

SA has an influential gas industry so banning new fossil gas extraction and infrastructure would meet with resistance. However, since SA does not actually need any new gas extraction or new gas-fired power generation, SA could be the first significant and influential test case for state-level bans on new climate-damaging projects.

### 13. Economic impacts

Will the economy collapse if a state or territory bans new coal and gas projects? Media articles make statements such as "LNG exports are rising steadily and filling government coffers",<sup>38</sup> but is that really true?

#### Jobs

There were 14,820 fulltime equivalent renewable energy jobs Australia-wide in 2016-17,<sup>39</sup> and around 40,000 jobs in coal mining. In 2016 oil and gas industry employed 19,000 people.<sup>40</sup>

Media coverage of proposed new coal and gas projects tends to mention the expected number of new jobs, suggesting that such projects will help tackle unemployment. But demand does not necessarily increase just because there is new supply. New coal mines are likely to mean fewer jobs at existing coal mines. Overall there are likely to be fewer coal mining jobs since developers of new mines are planning to use robots rather than humans.<sup>41</sup>

Bans on new coal and gas projects would ultimately cause job losses, but only gradually since employment at existing projects would not be affected by bans on new projects. The growth in new renewable energy projects and other new climate-safe technologies is likely to create enough new jobs to make up for the future 'loss' of new jobs resulting from bans on new fossil fuel projects and also the decline in existing fossil fuel jobs as reserves at existing coal mines and gas wells are depleted.

#### Royalties and subsidies

The only revenue accruing to state/territory coffers is from the generally small amounts paid for licences and the larger amounts paid as royalties for taking possession of the coal or gas. (They also pay state payroll tax, but so does any large company.) Fossil fuel industry hype tends to claim that the royalties and taxes they pay will mean more money for our schools, hospitals, etc., and they will. But how much more?

If ALL coal extraction were to stop immediately, Australia would miss out on about \$5 billion/year in coal royalties, but it is only NEW coal extraction that would be banned under NMBI legislation. If we assume that fossil fuel extraction might increase by 10% if new extraction is still approved, then banning new coal extraction would result in Australia missing out on around \$500 million/year in coal royalties - \$160m/yr in NSW and \$340m/yr in Queensland. (One new major hospital costs around \$2 billion.)

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<sup>38</sup> Stephen Letts, November 2018, *Is Australia the next big 'Big Short' for global investors?*, viewed 11 November 2018, <https://www.abc.net.au/news/2018-11-11/is-the-australian-economy-a-big-short-for-global-investors/10480772>

<sup>39</sup> Australian Bureau of Statistics, April 2108, *Employment in Renewable Energy Activities, Australia, 2016-17*, viewed 18 October 2018, <http://www.abs.gov.au/ausstats/abs@.nsf/0/58E7A93514A911F0CA25827B001AA6D2?Opendocument>

<sup>40</sup> National Energy Resources Australia, 2017, *Preparing Australia's future oil and gas workforce*, viewed 29 October 2018, <https://issuu.com/neranetwork/docs/skillsreport/10?ff&e=28292115/63457895>

<sup>41</sup> Richard Denniss, November 2018, *The economic truth of coal mines*, viewed 18 November 2018, <https://www.afr.com/opinion/columnists/the-economic-truth-of-coal-mines-20181112-h17s9w>

Similarly, banning new oil and gas extraction might result in Queensland missing out on around \$10m/yr. The WA royalty figure in Figure 11 below actually consists of just \$6 million from onshore/coastal projects, with the rest being Commonwealth grants related to north-west shelf gas projects. Offshore projects in Commonwealth waters are under Commonwealth jurisdiction, so a WA state ban on new onshore and coastal gas extraction would mean missing out on very little new royalty revenue at all.

The table below gives an indication of annual revenue from coal and gas royalties. Some state budget reports give oil and gas royalties as one lump sum, or just give a total for all royalty revenue including mineral royalties. However, that is enough detail to deduce that royalty revenue is much lower than many people might suppose based on fossil fuel industry hype.

	NSW	NT	Qld	SA	Tas	Vic <sup>42</sup>	WA <sup>43</sup>
Coal production (MT)	198	0	237	0	0.5	57	6.8
Coal royalties	\$1,600		\$ 3,404.6				<\$3
Gas production (Mcm)	126	1,351	37,114	2,496	0	16,073	50,066
Gas + oil royalties	\$106.33 (*1)	~\$30	\$98				\$649.9
Gas royalties				~\$25			
Total royalties, including minerals					\$45.6	\$59	

\*1: The figure shown as the NSW 'gas + oil' royalty amount is from 2015-16 and is actually the figure for all NSW royalties other than coal.

Figure 11: Royalty figures (in millions) from 2016-17

However, state governments also give subsidies to the coal and gas industries. If subsidies are subtracted from royalty revenue the figures are even worse. For example, in the six years from 2010-2016, the Queensland government received an average of \$1.94 billion/year in coal royalties. But between 2008 and 2014 they spent an average of \$1.27 billion/year on coal subsidies (mainly for coal railways).<sup>44</sup>

In 2017 the SA government received around \$25 million in gas royalties, yet in that year they gave \$48 million in subsidies to gas companies to drill more gas wells.<sup>45</sup>

<sup>42</sup> Treasury and Finance (Victoria), May 2017, *Statement of Finance 2017-18*, viewed 5 November 2018, downloadable from <https://www.dtf.vic.gov.au/previous-budgets/2017-18-state-budget>

<sup>43</sup> Department of Treasury (WA), February 2018, *Overview of State Taxes and Royalties 2017-8*, viewed 12 October 2018, [https://www.treasury.wa.gov.au/uploadedFiles/Treasury/Publications/Overview\\_of\\_State\\_Taxes\\_and\\_Royalties2017-18.pdf](https://www.treasury.wa.gov.au/uploadedFiles/Treasury/Publications/Overview_of_State_Taxes_and_Royalties2017-18.pdf)

<sup>44</sup> The Australia Institute, June 2014, *Mining the age of entitlement*, viewed 19 December 2017, <http://www.tai.org.au/sites/default/files/Mining%20the%20age%20of%20entitlement.pdf>

<sup>45</sup> Department of Energy and Mining, *PACE Gas*, viewed 8 March 2018, [http://petroleum.statedevelopment.sa.gov.au/latest\\_updates/pace\\_gas](http://petroleum.statedevelopment.sa.gov.au/latest_updates/pace_gas)

### Export income

Media coverage also tends to report the amount of money that coal and gas companies are investing in their projects, and this is often expressed as being an investment in the state or territory where the project is located. Readers might assume that the profits from the project will somehow benefit their state or territory even though the majority of coal and gas export companies are not Australian-owned. Profits primarily cover operating expenses and investments in new projects, with remaining profit going to company shareholders.

If some of their shareholders live in Australia, or if it is an Australian company, then some of that share income is spent here. Money spent on local procurement of goods and services also remains here, as do the wages they pay to local staff and any federal or state taxes they pay. The Australian economy does get some benefit, but not the huge amounts implied by media.

Declining coal and gas exports may cause balance of trade issues, but those might be ameliorated by a transition to exporting renewably-generated hydrogen and 'green' ammonia.

### Income tax and PRRT

Australia is responsible for around 1/3 of all global coal exports and will soon be the world's biggest exporter of gas. The greenhouse gas emissions from exported fossil fuels count against the emissions reduction targets of the region where they are used rather than against state/territory targets, but the increase in climate risk caused by approving new export contracts is just as real as if the emissions were counted as being 'ours'. How much federal tax revenue do we receive in exchange for selling our climate future?

Australia's metallurgical coal (179 MT) export earnings were \$38 billion and its thermal coal (203 MT) export earnings were \$23 billion in 2017–18. The value of Australia's LNG exports is \$31 billion and is forecast to increase to \$48 billion in 2019–20, driven by higher export volumes and higher prices.<sup>46</sup>

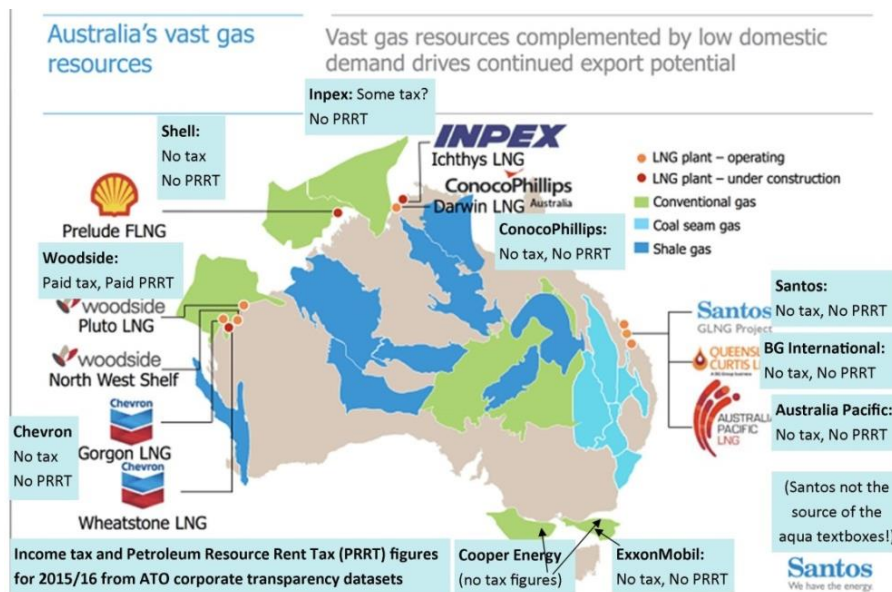
Despite billions in export earnings, the ATO's 2015-16 corporate transparency data shows that there were 39 fossil fuel companies who paid no income tax that year, and most of those had also paid no tax in the previous two years.<sup>47</sup> Those 39 companies had an income of \$71.9 billion between them. Woodside is the only LNG export company that has paid any PRRT so far.

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<sup>46</sup> Office of the Chief Economist, September 2018, *Resources and Energy Quarterly*, viewed 2 Nov 2018, <https://publications.industry.gov.au/publications/resourcesandenergyquarterlyseptember2018/index.html>

<sup>47</sup> Australian Taxation Office, December 2017, *2015-16 Report of Entity Tax Information*, viewed 10 January 2018, <https://data.gov.au/dataset/corporate-transparency>





**Figure 12: Company income tax and PRRT in 2015-16**

Income tax and PRRT are federal taxes and so non-payment of those does not impact state/territory revenues directly, but it does indirectly by affecting services and infrastructure funded by the federal government.

The Australian economy does get some benefit from coal and gas exports, most of which would not be affected in the near future if NMBI legislation bans result in no NEW overseas export contracts, but nowhere near as much benefit as the public might expect.

## Tasmania can...

Tasmania could easily ban new fossil fuel projects under NMBI legislation. It does not have current proposals for new coal or onshore gas extraction. A small amount of gas-fired generation is sometimes present on the Tasmanian grid, but at many times the grid already has 100% renewable electricity (hydro and wind). The Tasmanian Premier has plans for greatly expanding Tasmania's wind generation capacity and aspires to export large amounts of renewable electricity to the mainland via a new transmission cable.

There are proposals to extend the Tasmanian gas reticulation network to the many parts of Tasmania that currently do not have gas reticulation, but that would be counter-productive in a state with abundant hydro-electricity. Tasmania could easily avoid unnecessary household greenhouse gas emissions by banning new gas reticulation and restricting the sale of new gas appliances.

Tasmania proudly claims to be the first state to achieve net zero carbon emissions. It could easily also be the first to adopt all the coal and gas bans discussed in this document.

### 14. Political will

All states and territories have demonstrated a degree of climate-related political will by adopting emissions reduction goals and/or renewable energy targets. They also have regulations on efficiency standards designed to reduce emissions, and at times seem to compete in a 'race to the top' by copying each other's climate-beneficial initiatives. However, so far, none have explicitly banned fossil fuel projects on the grounds that they cause climate damage.

The state-wide Victorian ban on onshore gas extraction appears to be a farmland protection measure, rather than a climate protection measure, since the Victorian Labor government supports gas exploration in coastal waters: "While we continue to encourage offshore gas exploration, only Labor will keep the ban on fracking, which puts farmers first and protects their world-class produce and our environment."<sup>48</sup>

Former SA Premier Jay Weatherill, speaking about the reasons behind SA's renewable electricity progress on 29 October 2018, said that 'climate change represented an existential risk to our state' and that SA was saying to the world 'that this is a place that values action on climate change'.<sup>49</sup> From 2003 SA had a permissive wind farm approval policy which was at least partly responsible for SA's current renewable electricity leadership position and, in 2007, SA was the first state to introduce a Climate Change Act. However, there was no parallel attempt to stop NEW climate-damaging activities. They encouraged gas companies to drill for gas in the south-east of the state when Victoria adopted its onshore gas ban, and in 2017 they gave subsidies for new gas projects in the Otway and Cooper Basins.

Climate-beneficial initiatives from the community and from governments are essential and very welcome, and climate impacts would be worse without them, but it is one step forward and two steps back if state/territory governments sabotage those efforts by continuing to allow NEW fossil fuel projects. In some cases, like LNG projects, the fossil fuel projects they approve cause far more greenhouse gas emissions than the emissions reductions achieved by climate-beneficial efforts.

Generally governments shy away from bans. It is more politically palatable to introduce positive policies such as those that encourage more renewable energy uptake. But even the International Energy Agency is now saying that new fossil fuel projects must be stopped. If state and territory governments were to inform the public about the amount of climate damage caused by continued use of fossil fuels and publicly refute fossil fuel industry myths, the tide of public opinion could change very quickly. It would be seen as a positive policy for a state or territory government to ban NEW coal and gas projects to protect its people.

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<sup>48</sup> Minister for Resources (Victoria), May 2018, *Offshore Gas Exploration To Build Future Supply*, viewed 5 November 2018, <https://www.premier.vic.gov.au/offshore-gas-exploration-to-build-future-supply/>

<sup>49</sup> Jay Weatherill MP, October 2018, *Jay Weatherill talks about South Australia's journey to a renewable-energy future*, listened 2 November 2018, <http://robmclean.buzzsprout.com/203302/844425-jay-weatherill-talks-about-south-australia-s-journey-to-a-renewable-energy-future>



## 15. The way forward

All states and territories could enact at least some of the above bans immediately without upsetting anyone other than fossil fuel shareholders, gas reticulation companies, and manufacturers of gas appliances. Some states and territories could enact all of them.

There is immense value in implementing even just the easy 'no brainer' bans. The first state or territory to do so will be enshrining in legislation the principle that a jurisdiction can ban a class of activity solely on climate grounds. It will set a precedent which other jurisdictions may well emulate in a 'race to the top'.

One by one, all states and territories could enact fossil fuel bans until a patchwork of bans covers all of Australia. They could get rid of coal and gas one chunk at a time and achieve what the federal government seems reluctant to tackle.

Which state will be the first to step up as a climate hero, brave the ire of the fossil fuel industry, and ban NEW and avoidable fossil fuel projects explicitly on climate grounds?

Download an electronic copy of *States Can*:

<https://www.cedamia.org/states-can-nmbi-analysis/>

Download the No More Bad Investments (NMBI) model legislation:

<http://www.green-innovations.asn.au/RSTI/NMBI.doc>

Download the NMBI model legislation Q&A:

<http://www.green-innovations.asn.au/RSTI/NMBI-Q&A.doc>

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## Appendix A - Coal- and gas-fired generator capacity factors

In the following charts published by [Aneroid Energy](#), the upper black line shows the percentage of the total capacity of all AEMO fossil-fuelled power plants that is in use at any given time. The lower grey line shows the percentage of gas-fired generator capacity in use.

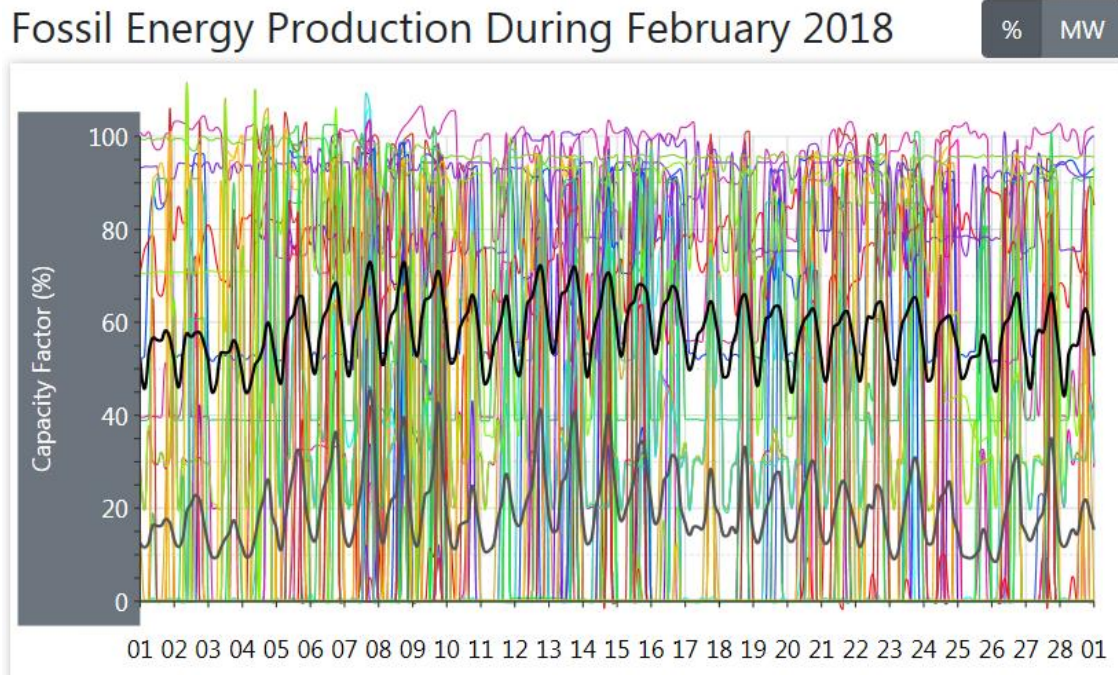


Figure 13: Coal- and gas-fired power plant capacity factors, AEMO regions February 2018

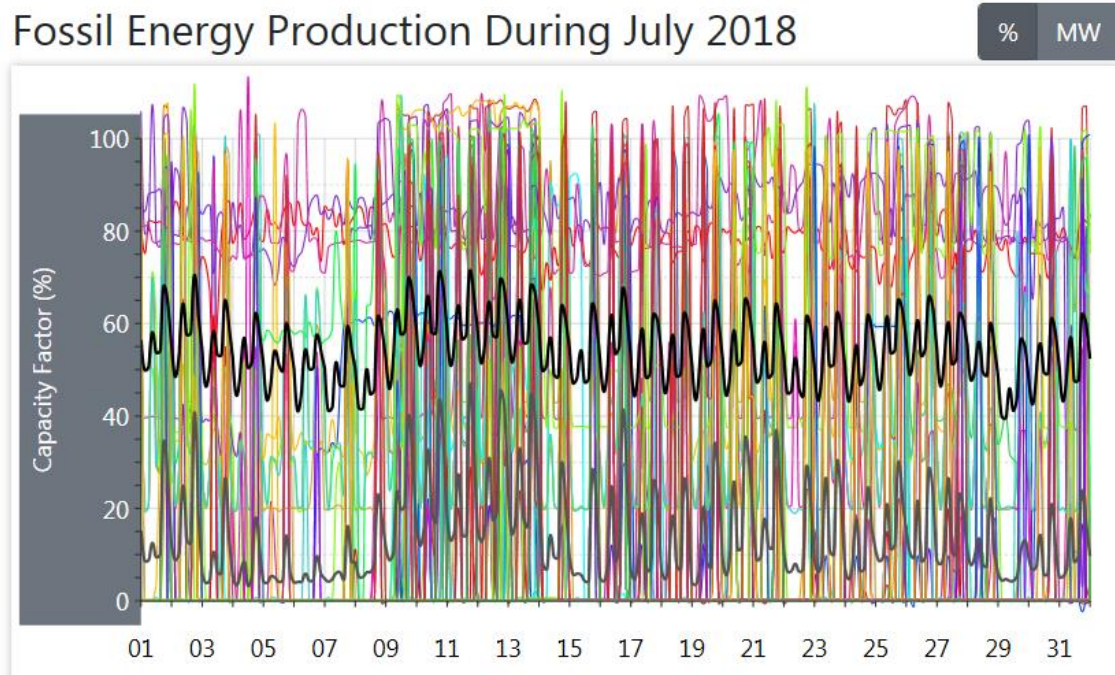


Figure 14: Coal- and gas-fired power plant capacity factors, AEMO regions July 2018

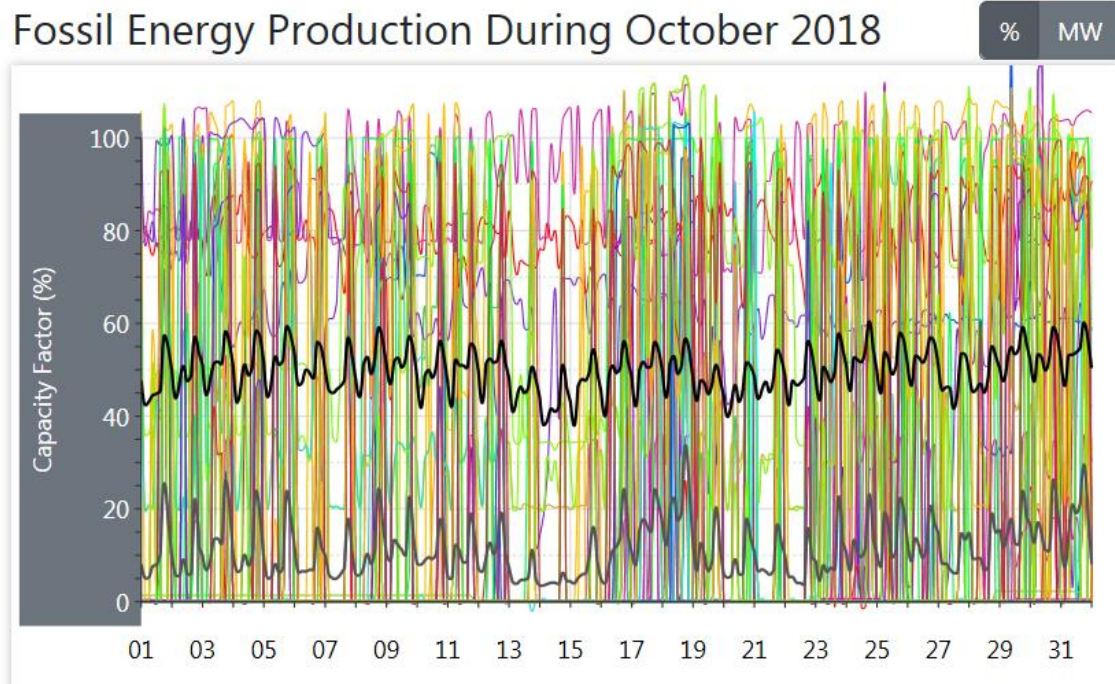


Figure 15: Coal- and gas-fired power plant capacity factors, AEMO regions October 2018

### Capacity factors for SA gas-fired generators

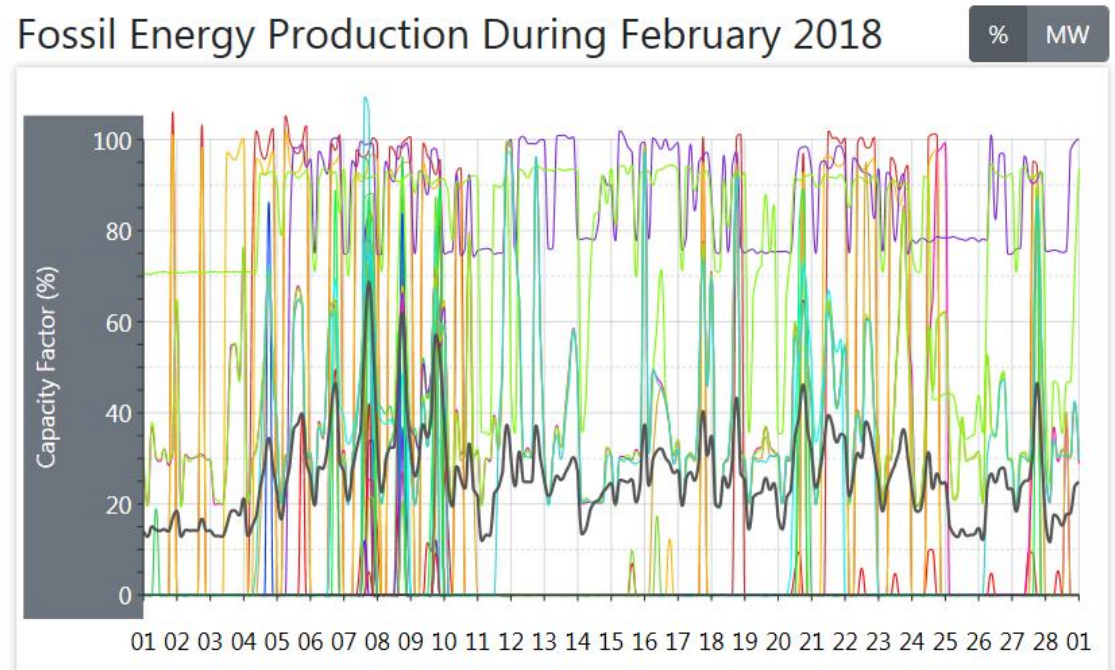


Figure 16: Capacity factors for gas-fired power plants, SA February 2018



## Fossil Energy Production During July 2018

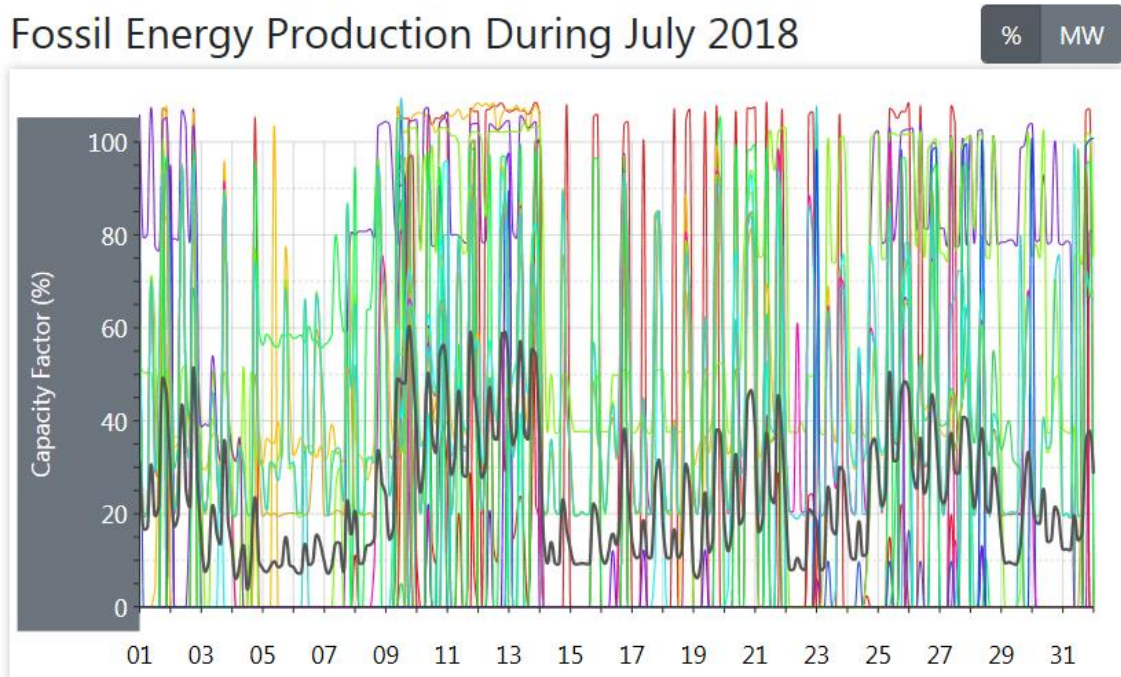


Figure 17: Capacity factors for gas-fired power plants, SA July 2018

## Fossil Energy Production During October 2018

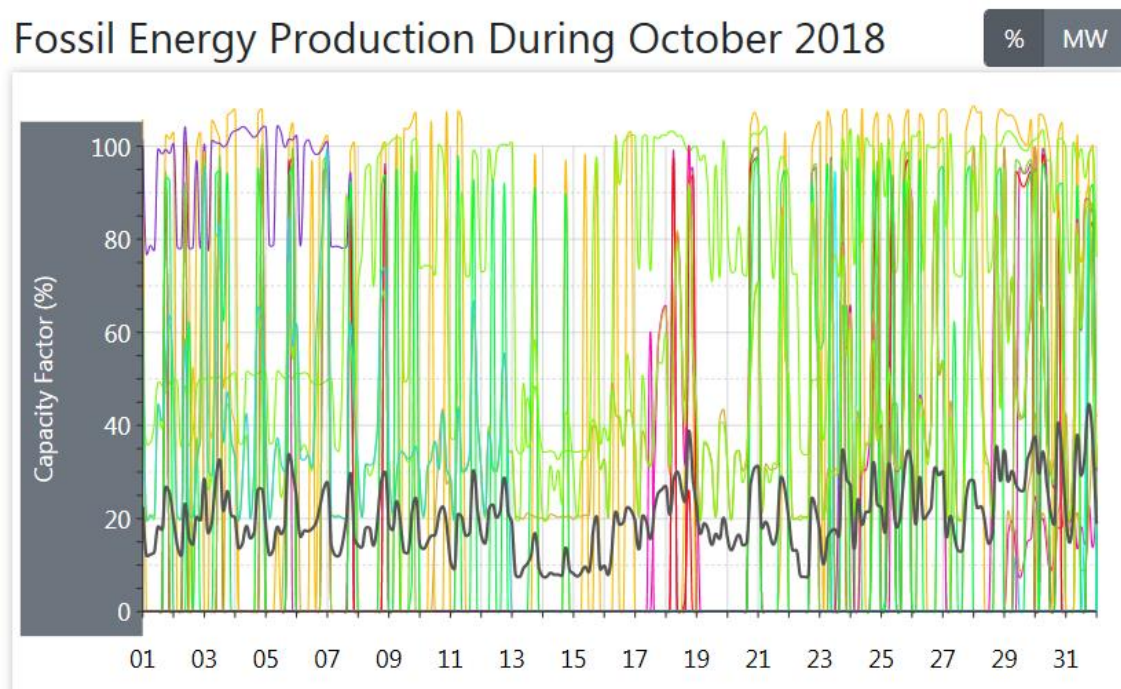
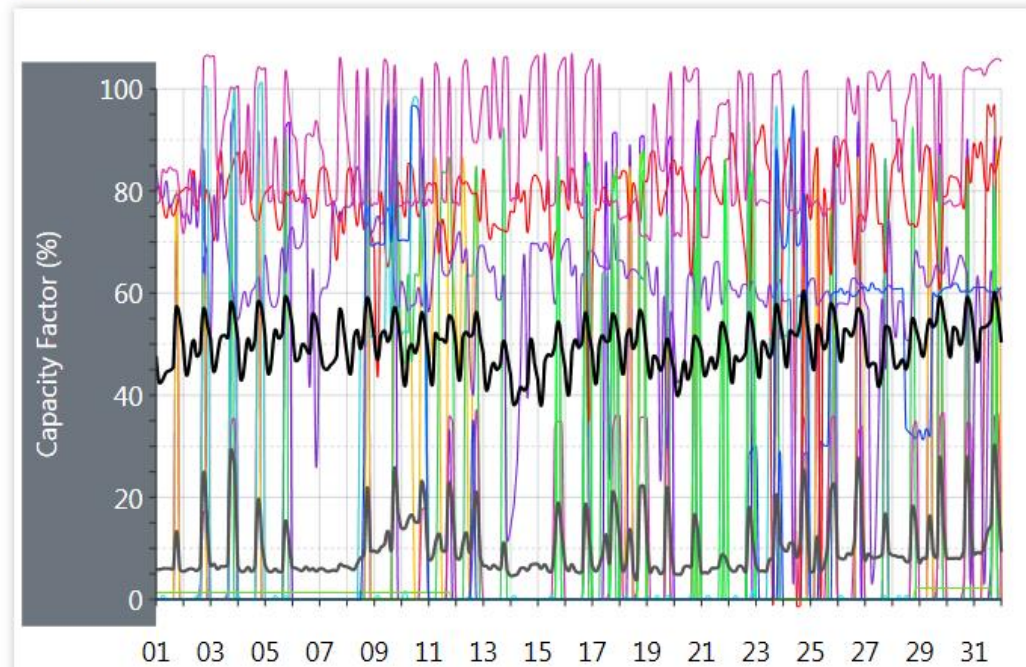


Figure 18: Capacity factors for gas-fired power plants, SA October 2018

### Capacity factors for Queensland gas-fired generators

Fossil Energy Production During October 2018

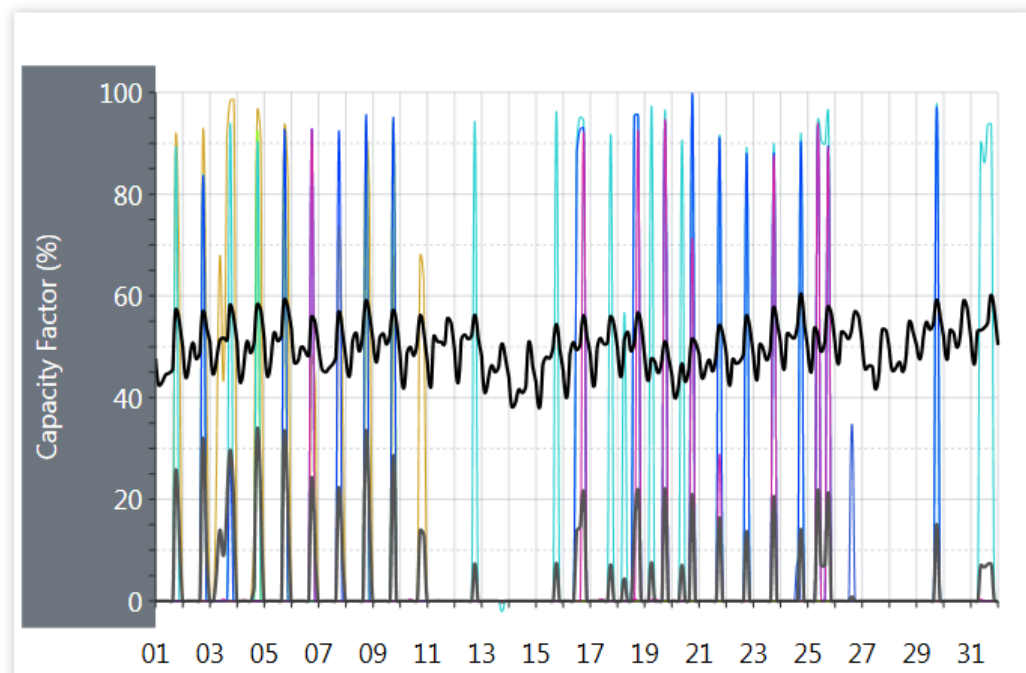
% MW



### Capacity factors for NSW gas-fired generators

Fossil Energy Production During October 2018

% MW

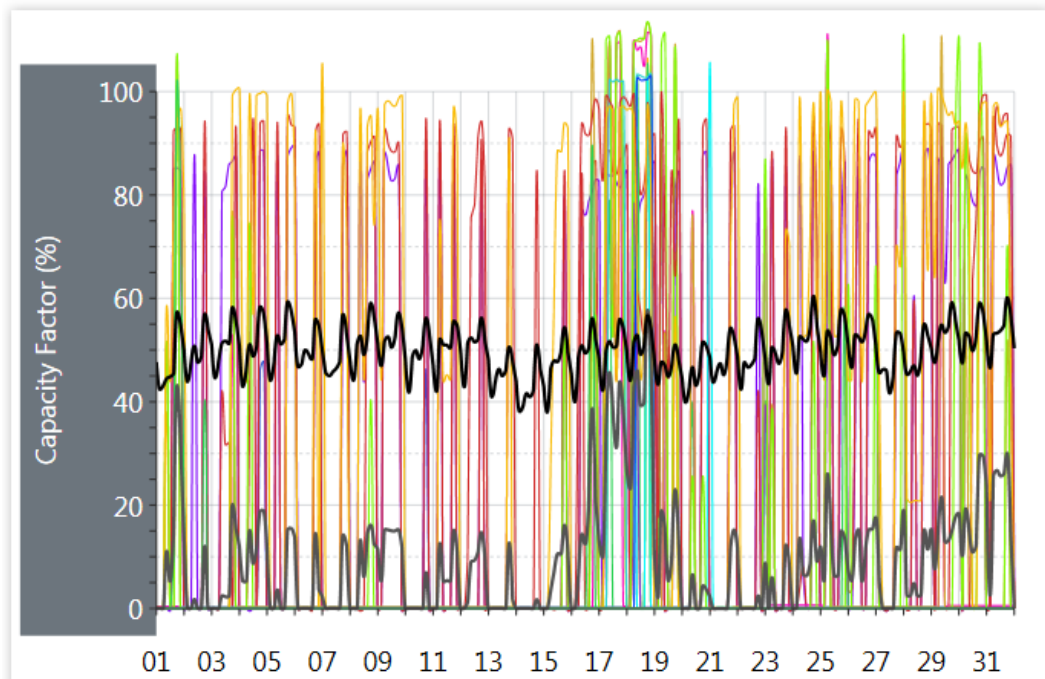


### Capacity factors for Victorian gas-fired generators

Fossil Energy Production During October 2018

%

MW



### Capacity factors for Tasmanian gas-fired generators

Fossil Energy Production During October 2018

%

MW

