



Preliminary Report of the  
*Independent Review into the  
Future Security of the National  
Electricity Market, December  
2016*

australian petroleum production & exploration association limited

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the voice of Australia's oil and gas industry

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## Introduction

Since 1959, the Australian Petroleum Production & Exploration Association (APPEA) has been the peak national body representing the upstream oil and gas exploration and production industry. APPEA has around 60 member companies that explore for and produce Australia's oil and gas. In addition, APPEA's more than 160 associate member companies that provide a wide range of goods and services to the industry. Further information about APPEA can be found on our website, at [www.appea.com.au](http://www.appea.com.au).

APPEA welcomes the opportunity to provide comment on the *Independent Review into the Future Security of the National Electricity Market: Preliminary Report*, released in December 2016 (the Preliminary Report). APPEA's comments in this submission follow our preliminary comments provided to the Review in November 2016. A copy of those comments can be found at [Attachment 1](#).

In addition to the APPEA submission, a number of APPEA members have made individual submissions to the Preliminary Report. This response should be read in conjunction with submissions from individual APPEA members.

APPEA's submission addresses specific aspects of the preliminary report, focussing on those areas that are particularly important for the upstream oil and gas industry.

## The Australian upstream oil and gas industry

It is also important to place our views on the issues raised by the Preliminary Report within the context of the current state and potential future contribution of the upstream oil and gas industry to the Australian economy and to the welfare of all Australians.

Reliable, secure and competitively priced energy is crucial to our everyday lives in Australia. Within this framework, oil and gas plays a key role in meeting many of our energy needs.

Australia has vast resources. Geoscience Australia<sup>1</sup> has estimated that Australia's total gas resources are around 819 trillion cubic feet (tcf) or 900,500 petajoules (PJ). By way of comparison, Australia's production of natural gas in 2014-15 (including exports) was around 2.4 tcf or 2,600PJ<sup>2</sup>, meaning, with favourable policy settings, Australia has more than enough gas to service both domestic and export markets for decades.

Our abundant natural gas resources, in particular, place Australia in an enviable position to maintain long-term, clean energy security domestically and internationally. Natural gas makes it possible for Australia to meet the world's growing energy needs over the coming decades while reducing emissions and addressing the risks posed by climate change.

Just as importantly, the industry creates significant wealth for the country, including through the employment of many Australians, underpinning the revenue collections of governments and generating valuable export revenue for the Australian economy.

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<sup>1</sup> Geoscience Australia, Department of Industry and Bureau of Resources and Energy Economics (2014), *Australian Energy Resource Assessment: Second Edition*, page 97 (available at [www.ga.gov.au/metadata-gateway/metadata/record/gcat\\_fa6d674d-ecbb-6629-e044-00144fdd4fa6/Australian+Energy+Resource+Assessment+-+Second+Edition](http://www.ga.gov.au/metadata-gateway/metadata/record/gcat_fa6d674d-ecbb-6629-e044-00144fdd4fa6/Australian+Energy+Resource+Assessment+-+Second+Edition)).

<sup>2</sup> Department of Industry, Innovation and Science (Office of the Chief Economist) (2016), *Australian Energy Statistics*, page 17 (available at [www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Pages/Australian-energy-statistics.aspx](http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Pages/Australian-energy-statistics.aspx)).

## Natural gas: a low-emissions energy source integral to a low carbon electricity sector

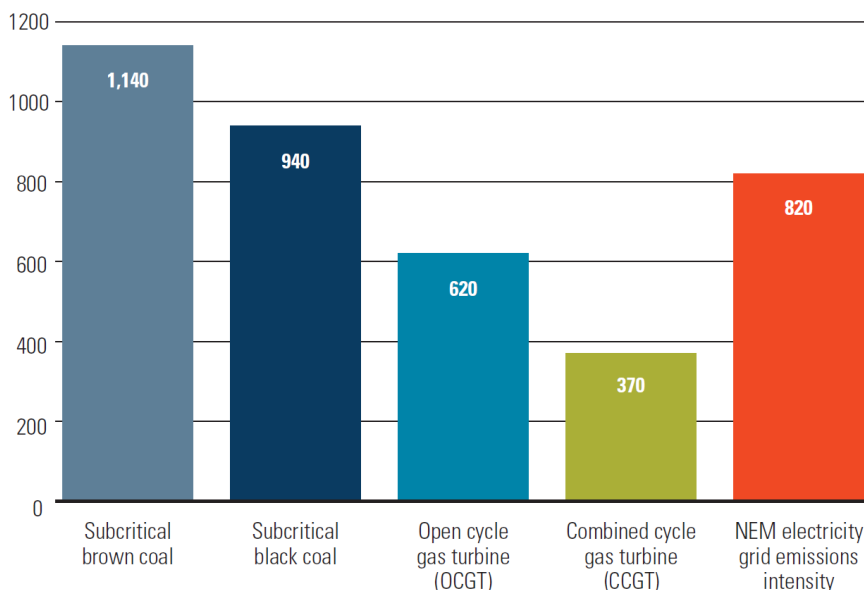
Australia could generate significant additional national economic, environmental and social benefits through greater utilisation of its substantial natural gas resources.

Using more natural gas in Australia's power generation and resource processing would significantly enhance the nation's ability to meet increasing energy needs while at the same time reducing greenhouse gas emissions.

These outcomes are possible because, as data on page 63 of the Preliminary Report shows, available natural gas power generation technologies can reduce greenhouse gas emissions by 55 per cent compared to the National Electricity Market (NEM) average, and by 68 per cent compared to current brown coal generation technologies and 61 per cent compared to current black coal generation technologies.

This is illustrated in Figure 1, which shows, using data from page 63 of the Preliminary Report, the significantly lower greenhouse gas emission associated with the use of gas-fired power generation compared to the use of other conventional fuels.

**Figure 1. Estimated Operating Emissions for New Power Stations (kg CO<sub>2</sub>-e/MWh)**



Source: Data from the Preliminary Report (2016), page 63.

In a similar way, the Australian Council of Learned Academies (ACOLA) in 2013<sup>3</sup> found using gas to provide more baseload and peak electrical power generation in Australia – in scenarios of higher use of both renewables and gas – would deliver substantial emissions reductions. ACOLA found such an outcome would reduce the Australian electricity generation sector's emissions by between 54 Mtpa and 103 Mtpa CO<sub>2</sub>-e (million tonnes per annum, carbon dioxide equivalent) by 2030 – a reduction of 27 per cent to 52 per cent from the base case of 197 Mtpa CO<sub>2</sub>-e in 2012.

The increased use of natural gas also has several additional environmental benefits, such as:

<sup>3</sup> See Australian Council of Learned Academies (2013), *Engineering Energy: Unconventional Gas Production*, June (available at [acola.org.au/wp/project-6](http://acola.org.au/wp/project-6)).

- Reduced emissions of fine particulates.
- Reduced emissions of sulphur dioxide (an important contributor to smog and acid rain) and nitrogen oxides.
- Significantly lower demand for water for power station cooling.

### The critical role natural gas can play in the transition to a lower emissions electricity sector

With this in mind, APPEA welcomes the observations made in the Preliminary Report about the role natural gas can play in the NEM in the future, as we strive to achieve the three goals (the energy trilemma, identified in the Preliminary Report on page 10) of a high level of energy security and reliability, universal access to affordable energy services, and reduced emissions.

In particular, APPEA supports the observations made on page 58 of the Preliminary Report:

*Gas has the potential to smooth the transition to a lower emissions electricity sector. Gas generation provides the synchronous operation that is key to maintaining technical operability with increased renewable generation until new technologies are available and cost-effective. Furthermore, gas is dispatchable when required.*

A recent paper<sup>4</sup> by Syracuse University and the National Bureau of Economic Research, conducted jointly with researchers from the Fondazione Eni Enrico Mattei and Euro Mediterranean Centre on Climate Change in Italy and French Economic Observatory Sciences Po and SKEMA Business School in France, discusses the role of fast-reacting fossil technologies, which includes most gas generation technologies, in supporting renewable energy investments.

It does so by studying the deployment of these two technologies in 26 OECD countries, including Australia, between 1990 and 2013. The paper finds that a 1 per cent increase in the share of technologies such as gas fired generation capacity is associated with a 0.88 per cent increase in renewables in the long-run.

The paper makes a number of very important conclusions, three of which stand out as directly relevant to the energy debate underway in Australia and issues that are being considered by the Independent Review.

Firstly, it shows that countries where gas-fired generation capacity is available are more likely to invest in renewable energy generation particularly over the longer-term.

Secondly, gas-fired generation, due to its quick ramp-up times and lower capital costs compared to traditional baseload technologies, has enabled renewable investments by providing reliable back-up capacity to support variable renewable supply.

And lastly, renewables and fast-reacting gas-fired power generation technologies appear as highly complementary and should be jointly installed to meet the goals of reduced emissions and stable supply.

This means that as the penetration of renewable energy increases, so will the requirements for increased back-up capacity. Serious stresses will be put on energy systems, such as the NEM, unless the relationship and the complementarity between gas-fired power generation and renewable energy technologies are appropriately acknowledged.

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<sup>4</sup> Verdolini E, Vona, F and Pope, D (2016), *Bridging the gap: do fast reacting fossil technologies facilitate renewable energy diffusion?* (available at [www.feem.it/userfiles/attach/20167271022524NDL2016-051.pdf](http://www.feem.it/userfiles/attach/20167271022524NDL2016-051.pdf)).

The paper goes on to argue that a debate that sets up renewables and gas as being in opposition misses this important point.

However, as will be considered further below, current policy arrangements in many jurisdictions are actively working against gas being able to play a more prominent role in addressing the energy trilemma identified in the Preliminary Report.

The Independent Review therefore represents an important opportunity to highlight the role natural gas can play in the transition to a lower emissions electricity sector and to recommend to the Government a package of measures that could increase gas supply and allow gas to play the critical role identified in the Preliminary Report.

### Natural gas and the policy/market divergence

Natural gas-fired generation is expected to play a critical role in the transition to a lower emissions electricity sector

As was noted above, natural gas has a critical role to play in the transition to a lower emissions electricity generation sector. Indeed, central to climate change policy is a larger role for gas-fired power generation to 2030 and beyond.

For example, modelling conducted for the Climate Change Authority, in its research report *Policy options for Australia's electricity supply sector*<sup>5</sup>, forecasts significant increases in gas-fired power generation to 2030 and growth through to 2050 (if carbon capture and storage technology is widely deployed). This is shown in the following table, taken from the report.

**Table 1. Share of generation by technology type by scenario, economy-wide modelling, 2030 and 2050**

Scenario	2030				2050			
	Coal	Gas	Renewable	Other low emission	Coal	Gas	Renewable	Other low emission
Cap and trade (lump sum)	4%	37%	47%	12%	0%	8%	69%	24%
Cap and trade (tax cuts)	4%	38%	46%	13%	0%	8%	69%	23%
Emissions intensity scheme	3%	38%	47%	13%	0%	8%	68%	24%

**Note:** Rows may not sum up to 100 due to rounding. 'Other low emission' is gas CCS and nuclear (coal CCS was available but not deployed in any scenario).

Source: Jacobs for the Climate Change Authority (2016).

This table shows natural gas growing from current levels (of around 10.5 per cent, considered further below) to 37 per cent in 2030 (and possibly as high as 49 per cent if "other low emission", considered in the report as gas CCS and nuclear, is predominantly gas CCS) and 8 per cent in 2050 (but as high as 32 per cent if "other low emission", considered in the report as gas CCS and nuclear, is predominantly gas CCS).

APPEA notes this issue is referenced on page 23 of the Preliminary Report, where the Report observes

<sup>5</sup> See [www.climatechangeauthority.gov.au/reviews/special-review/special-review-electricity-research-report](http://www.climatechangeauthority.gov.au/reviews/special-review/special-review-electricity-research-report) and [www.climatechangeauthority.gov.au/sites/prod.climatechangeauthority.gov.au/files/files/SR%20Electricity%20research%20report/Electricity%20research%20report%20-%20for%20publication.pdf](http://www.climatechangeauthority.gov.au/sites/prod.climatechangeauthority.gov.au/files/files/SR%20Electricity%20research%20report/Electricity%20research%20report%20-%20for%20publication.pdf), page 89, for further information.

*At the request of the COAG Energy Council, the AEMC and AEMO assessed a range of potential emissions reduction policies and their impact on wholesale markets, consumer prices and energy security.*

APPEA recommends these issues receive further attention in the Final Report and feature in the Final Report's recommendations to COAG.

The potentially growing role of natural gas considered in these reports reflects the role gas could play as a lower emissions and cost effective generation technology, both in replacing coal-fired generation and in complementing the growth in renewable technologies.

Intermittent renewable energy requires "on call" electricity generation to manage falls in renewable output or peaks in demand. Gas-fired generation is a key technology capable of delivering that flexible response. As more renewable energy is integrated into the grid, this balancing role becomes more critical.

Eventually, that need may be filled by new systems that allow large-scale, affordable storage of excess renewable energy but for the foreseeable future, gas will be the guarantor of system security and reliability.

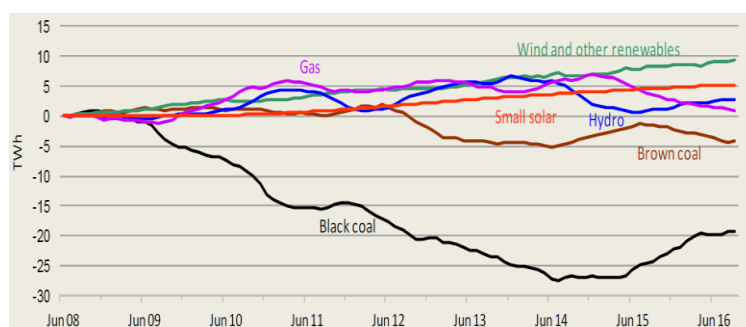
Experience in the United States demonstrates how quickly emissions from the generation sector can be cut by fuel switching. Data from the US Government Energy Information Administration<sup>6</sup> shows energy-related emissions in the US in the first six months of 2016 were at their lowest level since 1991, having fallen about 13 per cent from their peak in 2007. Amongst other reasons, this was possible because the US is developing its abundant unconventional gas resources.

We have a similar opportunity in Australia. There are sufficient resources to underpin a historic shift to a lower emissions generation sector.

This critical role is not being realised and policy actions are making it less, not more, likely

However, in eastern Australia, gas-fired generation is being squeezed out of the market between coal fired generation with its low dispatch cost and renewables, which enjoy various forms of policy support both at a national level and in a number of jurisdictions. Gas's share of the market has been falling over the past two years. This is illustrated in Figure 2, which shows the shares of power generation technologies in the NEM, over the period 2008-09 to 2015-16.

**Figure 2. Share of power generation technologies in the NEM, 2008-09 to 2015-16**



Source: Pitt & Sherry (2016)

<sup>6</sup> See [www.eia.gov/todayinenergy/detail.php?id=28312](http://www.eia.gov/todayinenergy/detail.php?id=28312) for more information.

This “disappearing gas” trend has occurred despite the increasing need, as noted above, for gas-fired power generation to support the grid and support the transition to a lower emissions electricity generation sector.

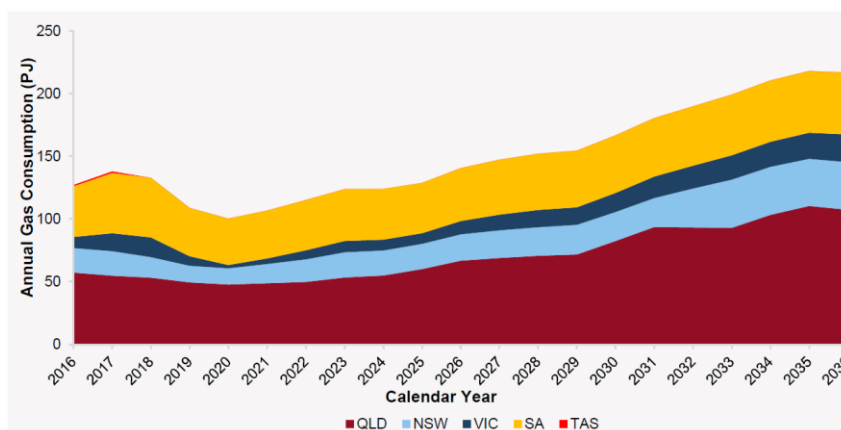
A key consideration for the Independent Review then, is to recommend a package of measures to COAG to allow Australia must also develop new supplies of gas on the east coast.

The eastern Australia market is already very tight with, as is discussed below, shortfalls predicted as early as 2019. Developing new reserves is vital to supplying existing demand, and to develop gas to support an increased role in gas-fired power generation.

The Australian Energy Market Operator (AEMO) prepared *National Gas Forecasting Report*<sup>7</sup> (NGFR) released in December 2016, highlights that the gas industry on the east coast is at a “crossroads”. It finds that in the short-term, gas-fired power generation growth may push supply to “just within” the limit of developed reserves, with the greatest gas supply challenge forecast to occur between 2018 and 2024.

The NGFR finds growth in gas consumption for gas-fired power generation is expected after 2020, necessitated by the assumed achievement of the 2030 emissions reduction target, which can only be met by reducing output of coal-fired generation. Gas-fired power generation demand is projected to grow moderately in the 2020s as mothballed plant returns to the market. In the 2030s, an increase in gas-fired power generation demand is driven by investments in new gas-fired power generation capacity replacing retiring coal-fired generation. This is illustrated in Figure 3, taken from the 2016 NGFR.

**Figure 3. Annual gas-fired power generation gas consumption forecast, by NEM region**



Source: AEMO (2016).

Importantly, the report notes gas-fired power generation

*... is forecast to play a key role in balancing the output from intermittent renewable energy sources as part of the transformation towards a low carbon future, in the absence of alternatives such as large scale storage and demand management.*

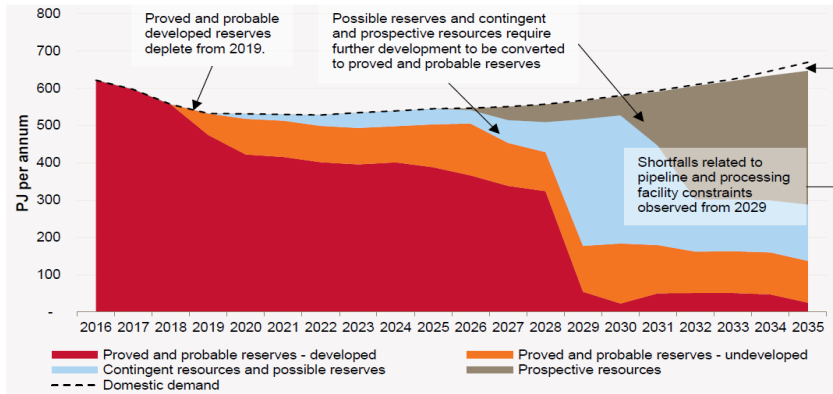
At the same time, AEMO also highlights the challenges facing the east coast gas market, including for gas-fired power generation, in the absence of new reserves development.

<sup>7</sup> See [www.aemo.com.au/Gas/National-planning-and-forecasting/National-Gas-Forecasting-Report](http://www.aemo.com.au/Gas/National-planning-and-forecasting/National-Gas-Forecasting-Report) for more information.



Figure 4 highlights AEMO's forecasts proved and probable reserves depleting from 2019, with further development required to convert possible reserves and contingent reserves into proved and probable reserves to serve the market, including gas-fired power generation, from 2020 onwards. Without further development, the shortfall will grow over time.

**Figure 4. East coast gas market, demand-supply balance, 2016-2035**



Source: AEMO (2016).

### East coast gas reserves and resources

In order to better understand the nature of the potential new supply that can be developed to meet demand, it is important to also understand the nature of east coast gas reserves and resources. Such an understanding is provided by the report AEMO commissions from Core Energy<sup>8</sup>. The most recent (2015) edition of this report, *Gas Reserves and Resources Eastern and South Eastern Australia*, finds 88 per cent of east coast gas reserves are CSG and 90 per cent of gas resources are CSG and unconventional (shale and tight gas), with the largest reserves and resources in the Bowen-Surat Basin in Queensland.

**The findings show clearly that there is no long-term gas supply story that does not involve significant and growing supplies of onshore gas.** Onshore gas supplies over 40 per cent of east gas demand today (and over 90 per cent in Queensland).

**Figure 5. Eastern and South Australian 2P Reserves and 3P/2C Resources by Gas Source, PJ**

Figure 2.1 Eastern and South Australian 2P Reserves by Gas Source | PJ

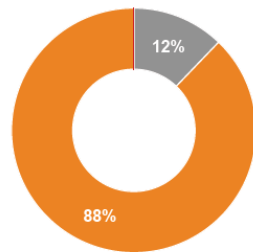
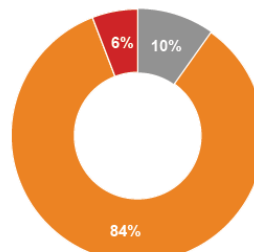


Figure 2.2 Eastern and South Australian 3P/2C Resources by Gas Source | PJ



Legend: ■ Conventional ■ CSG ■ Unconventional

Source: Core Energy Group

Source: Core Energy Group for AEMO (2015).

<sup>8</sup> See [aemo.com.au/-/media/Files/Gas/National\\_Planning\\_and\\_Forecasting/GSOO/2015/Core--Gas-Reserves-and-Resources.pdf](http://aemo.com.au/-/media/Files/Gas/National_Planning_and_Forecasting/GSOO/2015/Core--Gas-Reserves-and-Resources.pdf) for more information.

Developing new reserves in the current market conditions is difficult. Commodity prices remain relatively low. For many companies, balance sheets are stressed and capital raising is challenging. Onshore exploration is an expensive, high-risk activity in a subdued market.

Nevertheless, with the right policy framework, industry can accelerate development.

At its December 2016 meeting, the COAG Energy Council again endorsed the need to bring more supply and more suppliers into the market<sup>9</sup> but this collective position is not supported by all state governments.

The most extreme case is Victoria, which has prohibited all onshore gas activity<sup>10</sup>. Victoria once had a conventional onshore gas industry but now even exploration is will not be allowed, following the passage through the Victorian Parliament of the *Resources Legislation Amendment (Fracking Ban) Bill 2016*<sup>11</sup>.

Until all states support a co-operative COAG agenda to remove the regulatory and other barriers to new gas supply, conditions will only deteriorate.

Such an outcome is also inconsistent with the recommendations of the Australian Competition and Consumer Commission (ACCC)<sup>12</sup> which, after a twelve month inquiry into the east coast gas market, recommended in its *Inquiry into the east coast gas market* final report, in April 2016

*Governments should consider adopting regulatory regimes to manage the risks of individual gas supply projects on a case by case basis rather than using blanket moratoria. Governments should take into consideration the significant effects that moratoria and other restrictions on gas development may have on gas users.*

A later section of this submission recommends a package of measures the Independent Review could, in its final report, recommend to COAG. Such a package could ease gas supply pressures, providing the best chance for gas to play its critical role in a cost-effective transition to a lower carbon electricity sector, as part of a transition to a cleaner energy future.

The stakes for Australia could hardly be greater. A least-cost transition to cleaner energy and energy security for local industry or continuing inconsistent policies that destroy jobs, push up prices and perpetuate higher emissions.

## **Wholesale electricity costs and gas prices**

APPEA endorses the statement on page 41 of the Preliminary Report that “Australians should pay no more than necessary for a secure, reliable and low emissions electricity supply”. Unfortunately, as has been highlighted above, a number of actions by COAG Energy Council jurisdictions have resulted in an electricity supply that is less secure, less reliable, high cost and potentially more emissions intensive than it needs to be. Actions to increase the availability of natural gas can have a positive influence across all of these measures.

<sup>9</sup> See the COAG Energy Council communique, available at [www.coagenergycouncil.gov.au/publications/8th-coag-energy-council-meeting-communique](http://www.coagenergycouncil.gov.au/publications/8th-coag-energy-council-meeting-communique).

<sup>10</sup> See [www.premier.vic.gov.au/victoria-bans-fracking-to-protect-farmers](http://www.premier.vic.gov.au/victoria-bans-fracking-to-protect-farmers) and [www.premier.vic.gov.au/banning-fracking-once-and-for-all](http://www.premier.vic.gov.au/banning-fracking-once-and-for-all) for more information.

<sup>11</sup> See

[www.legislation.vic.gov.au/domino/Web\\_Notes/LDMS/PubPDocs.nsf/ee665e366dcb6cb0ca256da400837f6b/a410fcb47f6f554dca25807200830f9c!OpenDocument](http://www.legislation.vic.gov.au/domino/Web_Notes/LDMS/PubPDocs.nsf/ee665e366dcb6cb0ca256da400837f6b/a410fcb47f6f554dca25807200830f9c!OpenDocument) and [www.appea.com.au/media\\_release/politics-trumps-facts-victoria-wants-gas-just-not-local-gas](http://www.appea.com.au/media_release/politics-trumps-facts-victoria-wants-gas-just-not-local-gas) for more information.

<sup>12</sup> See [www.accc.gov.au/regulated-infrastructure/energy/east-coast-gas-inquiry-2015](http://www.accc.gov.au/regulated-infrastructure/energy/east-coast-gas-inquiry-2015) for further information.

As the Preliminary Report observes on page 33

*Gas-fired generators can help address technical challenges, but there has been a reduction in gas-fired generation capacity.*

Reversing this trend would be one of the most positive outcome that the Review could achieve.

Gas prices in Australia are influenced by a number of factors across the gas market, reflected in demand and supply conditions and ultimately, the market price or the price agreed in contract negotiations.

While linkages to international markets have played a role, it remains important to recall that without access to international markets and the large sources of demand from Asia, it is unlikely that onshore gas resources, which are generally higher cost, could have been developed to the extent they have been.

Without onshore gas developments on the scale that has been seen since 2011, the domestic gas market, including for gas-fired power generation, would have faced a situation of dwindling conventional gas supplies and little prospect of large scale onshore gas developments, which would more likely have remained the relatively small share of the domestic gas market they were between 1996 and 2011.

Seeking to lay "responsibility" for gas price rises solely at the feet of international markets (and thereby implying that restrictions on these linkages would somehow have seen, or would see, gas prices lower) overlooks these important factors.

As the ACCC noted<sup>13</sup> in its April 2016 *Inquiry into the east coast gas market* final report

*The size of the domestic demand in the east coast gas market and historic domestic prices were insufficient to justify development of the bulk of CSG resources in the short- to medium-term. The construction of the LNG facilities has allowed the LNG joint venture parties to connect their CSG resources in Queensland with international demand, which was a much larger market and placed a higher value on gas than domestic users. This has significantly increased the value of CSG reserves and accelerated their development in Queensland.*

The ACCC also found rising production costs have also played a role, noting

*Rising production costs are due to production moving away from areas of high production to areas where the coal seams have less favourable characteristics, such as lower permeability, which require more expensive drilling techniques or additional wells.*

A case study of cost increases can be found at Box 1. This case study focusses on the Kipper field, part of the recent Kipper-Tuna-Turrum gas project in the Gippsland Basin.

### **Case Study 1. Rising Production Costs: Gippsland Basin Second Generation Fields**

When compared to those world class fields discovered in the 1960s the new fields the Gippsland Basin Joint Venture (GBJV) is bringing online are more challenging.

<sup>13</sup> See [www.accc.gov.au/system/files/1074\\_Gas%20enquiry%20report\\_FA\\_21April.pdf](http://www.accc.gov.au/system/files/1074_Gas%20enquiry%20report_FA_21April.pdf), page 40, for more information.

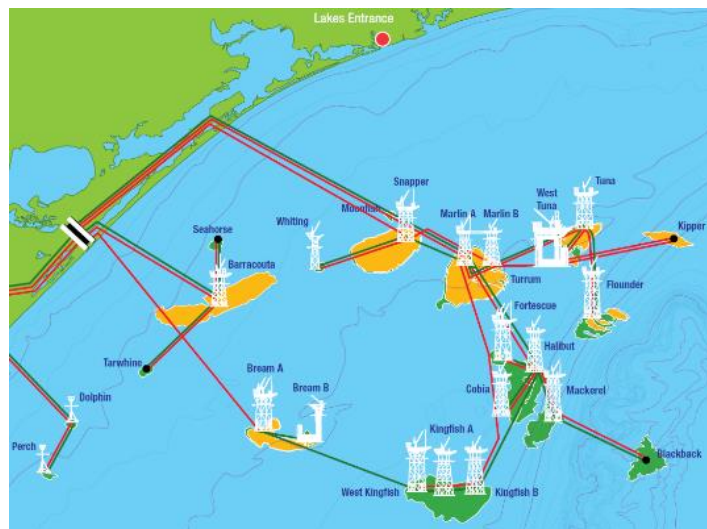
When comparing the Marlin field (production started in 1969) to the Kipper field, Marlin is:

- **Larger:** more than six times the amount of gas in place.
- **Easier:** requires no additional compression given high permeability and strong water drive.
- **Shallower:** both water depth and depth of field below the surface is significantly lower.
- **Purer:** has low reservoir CO<sub>2</sub>, and no mercury.

By comparison the Kipper field is:

- **Smaller:** and has more impurities: it has almost five times the proportion of CO<sub>2</sub> thereby requiring additional processing through a \$1 billion plant to remove this contaminant (12 per cent compared to 2.5 per cent)<sup>14</sup>.
- Requires **additional compression and further work to increase recovery** due to:
  - Significantly lower permeability (100 to >500 millidarcy compared to multidarcy).
  - No water drive meaning the field will see pressures deplete requiring compression to increase recovery.
- In **deeper water** that is almost double the depth (60 metres compared to 100 metres) and also has a **greater distance** to reach the top of the field.

**Figure 6. Oil and gas fields in the GBJV**



Source: ExxonMobil (2016).

The other key factor has been the impact of gas bans and moratoriums, which has significantly impeded sections of the market responding to price movements and bringing on additional supply.

Increases in price have the general effect of making additional supply profitable and in markets where supply is not impeded by bans and moratoriums, this extra supply can place downward pressure on prices. It should come as little surprise to the Independent Review then, that if this normal market response is impeded, the market does not operate as effectively as it should.

<sup>14</sup> More detail is provided at [www.environment.gov.au/submissions/emissions-reduction/safeguard-mechanism/public-submission-exxonmobil-australia.pdf](http://www.environment.gov.au/submissions/emissions-reduction/safeguard-mechanism/public-submission-exxonmobil-australia.pdf) and [corporate.exxonmobil.com.au/en-au/energy/natural-gas/natural-gas-operations/kipper-tuna-turrum](http://corporate.exxonmobil.com.au/en-au/energy/natural-gas/natural-gas-operations/kipper-tuna-turrum).

This is a key reason the very first recommendation of the ACCC in their Final Report was, as noted above, the removal of bans and moratoriums and their replacement with a case-by-case regulatory framework, specifically recommending:

*Governments should consider adopting regulatory regimes to manage the risks of individual gas supply projects on a case by case basis rather than using blanket moratoria. Governments should take into consideration the significant effects that moratoria and other restrictions on gas development may have on gas users.*

By "significant effects", the ACCC was referring to higher than necessary prices and lower gas availability. Analysis by the ACCC found<sup>15</sup>, for example, that additional supply could result in southern gas users paying less for their gas than is currently the case.

**The Independent Review should recommend the urgent removal of existing bans and moratoriums on natural gas supply on the east coast, with their replacement by a comprehensive and consistent regulatory regime across relevant COAG Energy Council jurisdictions.**

This recommendation is the key action the Independent Review could recommend governments take to ensure downward pressure is placed on prices and that natural gas plays the critical role envisaged for it by the Independent Review in its Preliminary Report.

Another influence on electricity prices, briefly observed by the Preliminary Report on page 35, is the various renewable energy subsidies which, while supporting the introduction of renewable energy power generation sources (particularly wind and solar) have artificially suppressed wholesale prices to the point where incumbent, synchronous generators (coal-fired and gas-fired generators) have exited the market.

*Thermal generation is being dispatched less as a result of declining demand and competition from other generators, particularly wind and solar PV, which have short-run marginal costs close to zero (wind and sunshine are free). As a result, wind and solar suppress wholesale prices when they are producing. They rely on subsidies under the Renewable Energy Target through the sale of large-scale generation certificates to make up their fixed costs.*

So, while the subsidy provided to renewable generation through the Renewable Energy Target suppresses, in the short-term, wholesale prices, over time the need to recover their fixed costs means that costs across the economy must increase as a result of the subsidy. This cost is effectively paid by all electricity consumers to meet the cost of large-scale generation certificates<sup>16</sup>. This issue, and its implications for NEM design, should receive further attention in the Independent Review's Final Report.

### **A package of gas supply-related measures the Independent Review should recommend to COAG**

The following section considers a package of measures the Independent Review could, in its final report, recommend to COAG for further consideration. The package could ease gas supply pressures, providing the best chance for gas to play its critical role in a cost-effective transition to a lower carbon electricity sector, as part of a transition to a cleaner energy future.

<sup>15</sup> See [www.accc.gov.au/system/files/1074\\_Gas%20enquiry%20report\\_FA\\_21April.pdf](http://www.accc.gov.au/system/files/1074_Gas%20enquiry%20report_FA_21April.pdf), page 7, for more information.

<sup>16</sup> The level of subsidy provided through the Renewable Energy Target and the costs this imposes on the Australian economy, is considered in detail in the Principal Economics report, *Electricity production subsidies in Australia* (available at [www.minerals.org.au/file\\_upload/files/media\\_releases/Electricity\\_production\\_subsidies\\_in\\_Australia\\_FINAL.pdf](http://www.minerals.org.au/file_upload/files/media_releases/Electricity_production_subsidies_in_Australia_FINAL.pdf)).

## Key recommendation

APPEA's key recommendation was set out above.

**The Review should recommend the urgent removal of existing bans and moratoriums on natural gas supply on the east coast, with their replacement by a comprehensive and consistent regulatory regime across COAG Energy Council jurisdictions.**

## Other options support this key recommendation

Other options support this key recommendation and fall into a number of categories:

- Supply-side options: in addition to the removal of bans and moratoriums on gas exploration and development, rejection of market interventions (such as domestic gas reservation, which has been rejected by all COAG Energy Council jurisdictions<sup>17</sup>, the ACCC<sup>18</sup>, the Productivity Commission<sup>19</sup> and the WA Economic Regulation Authority<sup>20</sup>), reform to reduce the regulatory burden on exploration and development, a multi-jurisdiction version of the South Australian PACE Gas initiative, a funding approach based on access to the Clean Energy Finance Corporation and the Northern Australia Infrastructure Fund. Specifically, these options include:
  - Regulatory reform to expedite gas exploration and production. General support for expedited approvals processes, standardised approval conditions for State and Commonwealth approvals (with an option for bespoke approvals, if required). Expedited approvals, facilitated as appropriate by government-supported regional ecological/groundwater/ environmental studies undertaken in prospective geological basins, to inform regulatory decision making.
  - A multi-jurisdiction initiative based on the South Australian PACE Gas Grant Program<sup>21</sup>. The PACE Gas Grant Program is a \$24 million initiative designed to accelerate investment in gas projects in South Australia through targeted competitive grants. A similar initiative could be developed involving relevant jurisdictions and the Australian Government, building on the experience of the PACE Gas Grant Program. In a similar way to PACE, the grants could be targeted at specific areas and designed to meet specific criteria.
  - Improved access to the Clean Energy Finance Corporation (CEFC)<sup>22</sup>. The CEFC invests commercially to increase the flow of funds into renewable energy, energy efficiency and low emissions technologies. The CEFC makes direct investments which attract private sector finance, as well as through its strategic co-financing partners. The CEFC was created by the Australian Government and operates under the *Clean Energy Finance Corporation Act 2012*. Such investments may

<sup>17</sup> See most recently, the 19 August 2016 Gas Market Reform Package from the COAG Energy Council, which noted "The Energy Council has recognised that reservation policies are shown to stagnate economic investment, in turn, limiting development of reserves and future resource discovery. Consistent with previous Energy Council statements, the Energy Council will continue to pursue market based initiatives and, while noting different existing jurisdictional approaches, *will not pursue national reservation policies*". See

[www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Gas%20Market%20Reform%20Package%20Appendix%20A%20-%20Energy%20Council%20response%20to%20ACCC%20and%20AEMC%27%20reports.docx](http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Gas%20Market%20Reform%20Package%20Appendix%20A%20-%20Energy%20Council%20response%20to%20ACCC%20and%20AEMC%27%20reports.docx) for more information.

<sup>18</sup> See [www.accc.gov.au/system/files/1074\\_Gas%20enquiry%20report\\_FA\\_21April.pdf](http://www.accc.gov.au/system/files/1074_Gas%20enquiry%20report_FA_21April.pdf), pages 7-8 for more information.

<sup>19</sup> See [www.pc.gov.au/research/completed/gas-markets/gas-markets.pdf](http://www.pc.gov.au/research/completed/gas-markets/gas-markets.pdf), pages 20-21 for more information.

<sup>20</sup> See [www.erawa.com.au/cproot/12765/2/Chapter%207.4%20-%20Domestic%20Gas%20Reservation%20Policy.PDF](http://www.erawa.com.au/cproot/12765/2/Chapter%207.4%20-%20Domestic%20Gas%20Reservation%20Policy.PDF) and [www.erawa.com.au/cproot/12769/2/Fact%20Sheet%20-%20Domestic%20Gas.PDF](http://www.erawa.com.au/cproot/12769/2/Fact%20Sheet%20-%20Domestic%20Gas.PDF) for more information.

<sup>21</sup> Further detail can be found at [www.petroleum.statedevelopment.sa.gov.au/latest\\_updates/pace\\_gas](http://www.petroleum.statedevelopment.sa.gov.au/latest_updates/pace_gas) and [www.petroleum.statedevelopment.sa.gov.au/\\_data/assets/pdf\\_file/0003/283962/PACE\\_Gas\\_Program.pdf](http://www.petroleum.statedevelopment.sa.gov.au/_data/assets/pdf_file/0003/283962/PACE_Gas_Program.pdf).

<sup>22</sup> See [www.cleanenergyfinancecorp.com.au/media/222517/CEFC-Investment-Policies\\_161101.pdf](http://www.cleanenergyfinancecorp.com.au/media/222517/CEFC-Investment-Policies_161101.pdf) for more information.

act as a catalyst to expedite gas industry investments and address access to capital and financing challenges facing the industry, particularly smaller companies.

- Access to the Northern Australian Infrastructure Fund (NAIF)<sup>23</sup>. The NAIF may approve loans to 30 June 2021 which total \$5 billion in aggregate (with loan tenors up to the longest term of Commonwealth borrowings). Loans are to be concessional finance to encourage and complement private sector investment in economic infrastructure that benefits northern Australia. This may include developments in airports, communications, energy, ports, rail and water. Investment will be spread across the three jurisdictions in northern Australia.
- Demand-side options: these were considered by the Preliminary Report on pages 23-24 and could be further considered in the Final Report and through the 2017 Review of Australia's Climate Change Policies.
- Ongoing gas market reform: the ongoing gas market reform program underway through the COAG Energy Council<sup>24</sup> could support these options.

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<sup>23</sup> See [naif.gov.au/industry/slicedtech.com.au/wp-content/uploads/2016/11/NAIF-factsheet-November-2016.pdf](http://naif.gov.au/industry/slicedtech.com.au/wp-content/uploads/2016/11/NAIF-factsheet-November-2016.pdf) for more information.

<sup>24</sup> See [www.coagenergycouncil.gov.au/council-priorities/australian-gas-markets](http://www.coagenergycouncil.gov.au/council-priorities/australian-gas-markets) for more information.

**Attachment 1: Blueprint for Energy Security in the National Electricity Market: Independent Review, Meeting with Independent Review Chair, Dr Alan Finkel AO, Canberra, 11 November 2016**



# Blueprint for Energy Security in the National Electricity Market: Independent Review

Meeting with Independent Review Chair, Dr Alan Finkel AO  
Canberra, 11 November 2016



## About APPEA

- The Australian Petroleum Production & Exploration Association represents Australia's upstream oil and gas industry.
- APPEA has 220 members.
- APPEA member companies produce about 98% of Australia's oil and gas.



[www.appea.com.au](http://www.appea.com.au)





## The policy/market divergence

- Central to climate change policy is a larger role for gas-fired generation (GFG) to 2030 and beyond.
  - CCA forecasts more than 300% increase in GFG to 2030.
  - Gas replaces coal-fired plant to cut emissions.
  - Gas complements intermittent renewable sources to maintain reliability
- Reality in 2016 is that GFG is shrinking and gas supply at tipping point.
  - Conventional gas reserves depleting.
  - Exploration at historic lows.
  - Political resistance to onshore, unconventional development.



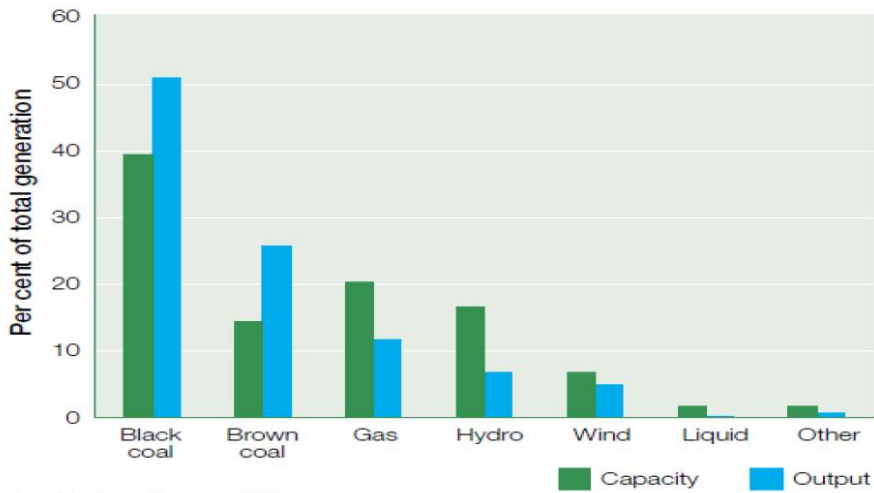
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## Why gas ?

- Unique combination of low emissions, reliability and rapid response.
- Emissions intensity of gas (0.53t) vs brown coal (1.22t) vs black coal (0.88t).
- Gas only reliable alternative to baseload coal – without storage, renewables are *not* firm capacity.
- Renewables poorly aligned with peak demand – gas peaking plant remains essential.

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## NEM today



Source: Australian Energy Regulator (2015)

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## Australia in 2030 (CCA)

Scenario	2030			
	Coal	Gas	Renewable	Other low emission
Reference	63%	12%	24%	0%
Cap and trade	3%	41%	46%	10%
EI scheme	5%	24%	52%	19%

Source: Jacobs modelling for the Climate Change Authority (2016) \* Other low emission is gas CCS and nuclear.

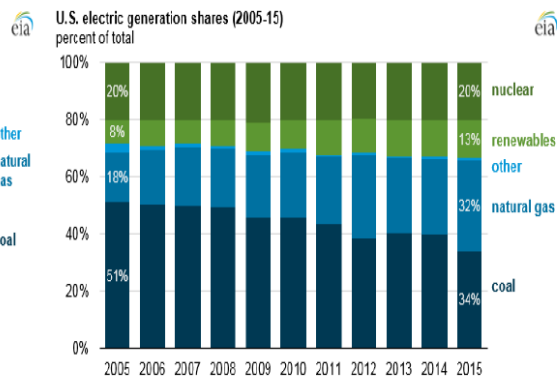
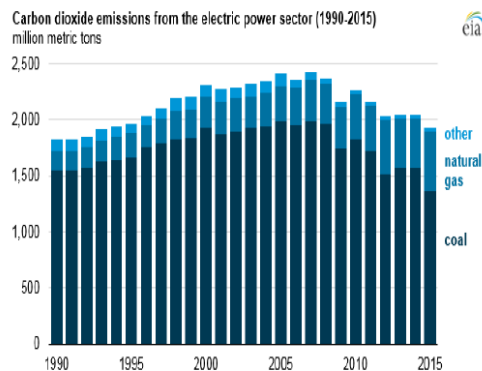
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## CCA's key assumptions

- Carbon price starting at \$69/t (2020), rising by 4.7% pa to 2050 (\$277).
- Coal-fired plant replaced quickly by wind and CCGT.
- Significant price-related falls in demand – e.g. 14% on BAU.
- Modelling on 2° carbon constraint – 2030 target likely to rise.
- Energy security can be maintained despite almost immediate closure of brown coal plants (carbon pricing scenario) and all coal by 2030.

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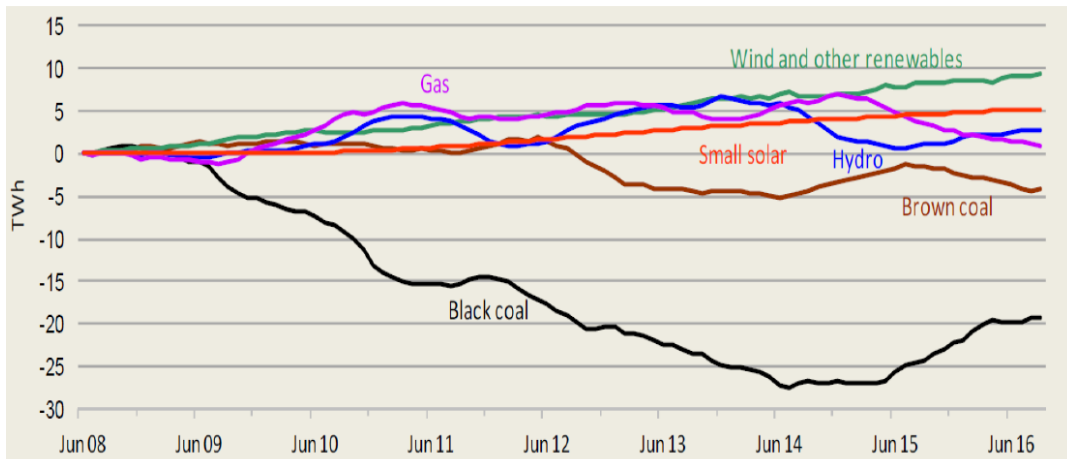
## Fuel switching – the US example



Source: US Energy Information Administration (2016)

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## Disappearing gas



Source: Pitt & Sherry (2016)

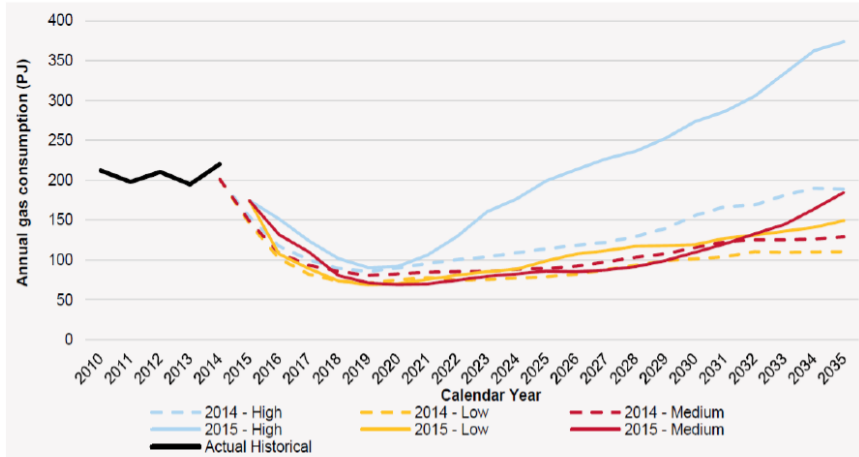
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## Disappearing gas (2)

- GFG output has fallen for twenty-two months in row.
- GFG now only 10.1% of NEM generation.
- 505 MW of GFG withdrawn since 2014 (AEMO).
- 770 MW of GFG scheduled to be withdrawn by 2017 (AEMO).
- AEMO forecast GFG to almost halve from 2014 (220 PJ) to 2020 (69 PJ).
- Gas demand forecast to only rebound after closure of Liddell in 2022.
- GFG overwhelmingly OCGT.

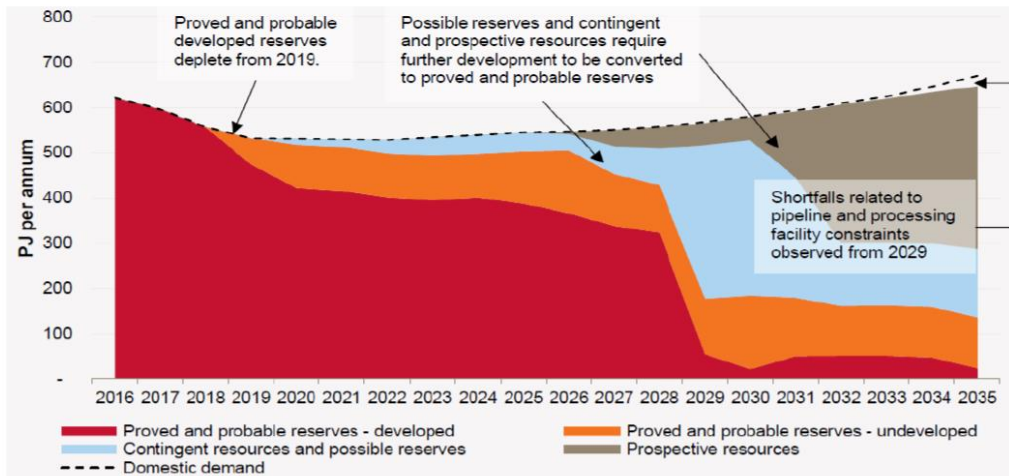
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## AEMO GFG forecast (BAU)



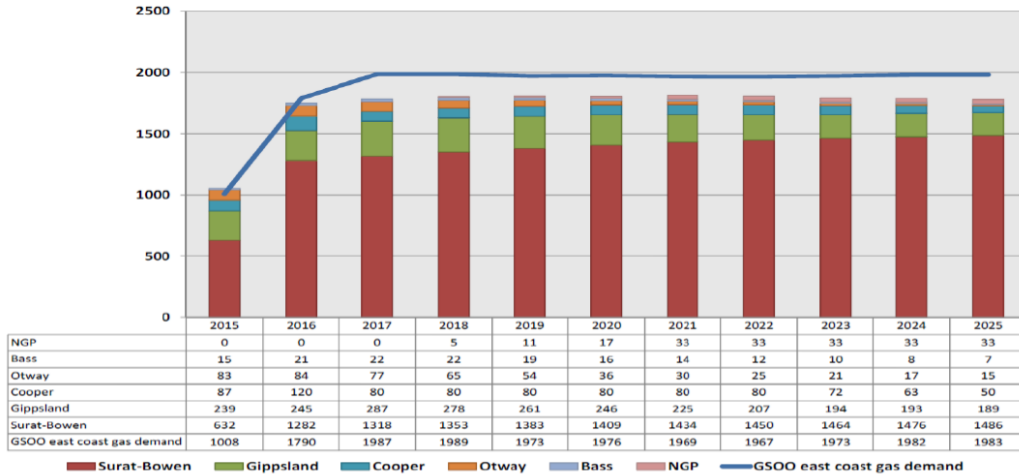
Source: Australian Energy Market Operator (2016)

## The future of the east coast market



Source: Australian Energy Market Operator (2016)

## East coast gas balance, 2016-25



Source: EnergyQuest, Australian Energy Market Operator (2016)

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## Widening gap

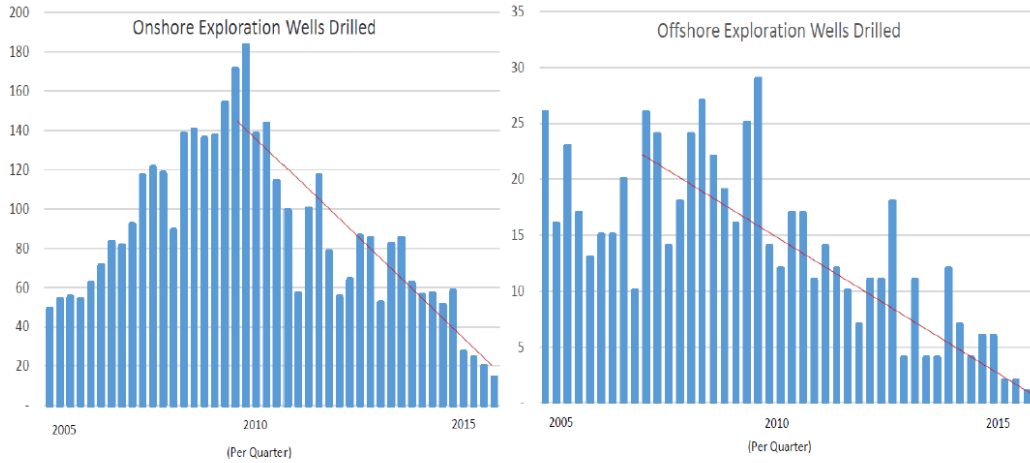
East coast gas demand and supply (PJ/a)			
	2016	2020	2025
CSG plus Cooper to North & NGP supply	1,362	1,506	1,569
LNG demand	1,168	1,444	1,438
Qld domestic demand	181	142	146
Qld surplus/deficit	13	-80	-15
Southern supply including Cooper to South	389	298	211
Southern domestic demand	441	390	400
Southern surplus/deficit	-52	-92	-189
Overall surplus/deficit	-39	-172	-205

<sup>1</sup> Cooper to South refers to 40 PJ of Cooper Basin Gas that is contracted to flow South in 2016. Other Cooper Basin gas is referred to as Cooper to North.

Source: EnergyQuest, Australian Energy Market Operator (2016)

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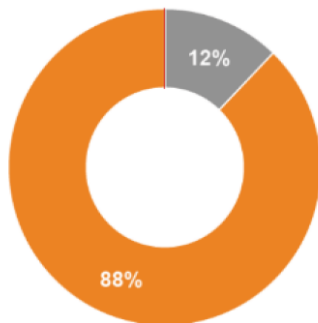
## Exploration in free fall



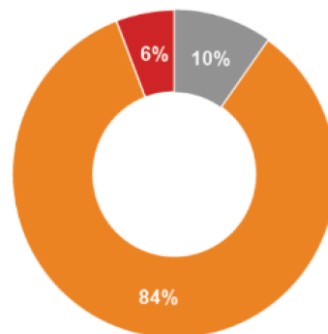
Source: Australian Bureau of Statistics, APPEA (2016)

## Unconventional gas: the new norm

Eastern and South Australian 2P Reserves by Gas Source | PJ



Eastern and South Australian 3P/2C Resources by Gas Source | PJ



■ Conventional ■ CSG ■ Unconventional

Source: Core Energy Group for the Australian Energy Market Operator (2015)