

Energy security, moratoria and domestic gas: Australia, LNG and its gas policy catch-22*

Christopher Flynn^{A,C} and Emily Tsokos^{B,C}

^AGilbert + Tobin (Sydney).

^BGilbert + Tobin (Perth).

^CCorresponding authors. Email: cflynn@gtlaw.com.au; etsokos@gtlaw.com.au

Abstract. In a region undergoing rapid and profound geopolitical change, energy security will be more important than ever. As a key regional energy producer, Australia will play a fundamental role in the energy security of its major trading partners. However, ironically, it also faces energy security challenges of its own.

Over the next 12 months, as Australia becomes the world's largest producer of liquefied natural gas (LNG), its own domestic gas demand will also continue to grow. At the same time, one or more of our LNG facilities is expected to start to face significant upstream gas supply constraints. All of them will experience greater global competition. Yet, ever increasing pressure continues to be exerted on Australia's governments to restrict, curb or even completely stop further exploration and development of hydrocarbons around the country. In New South Wales, Victoria and the Northern Territory that pressure has effectively ended new gas exploration and development for the foreseeable future. Elsewhere, it has resulted in increased regulation and uncertainty.

There is a natural tension between Australia's domestic energy security, its economic and national security interests in remaining at the heart of regional energy security, and important environmental objectives. However, these concepts and priorities do not need to be mutually exclusive, but can be achieved in balance with the right policy settings.

This paper will discuss the political impasse we have reached, and the main policy options available to thread the needle between securing an economic domestic supply of gas and allowing our gas explorers, producers and exporters to continue to grow. It will seek to provide a practical analysis against the backdrop of the rapidly changing regional economic and political environment, as well as seeking to inform and stimulate the broader debate.

Keywords: Australia, China, domestic gas, emissions intensity, energy balance, energy mix, energy policy, energy security, environmental policy, exploration, gas reservation, leadership, moratoria, natural gas, net exporter.

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Introduction

Australia is at a cross-road. From the naissance of the liquefied natural gas (LNG) industry in the 1970s where 'the loneliest gas in the world' was commercialised and brought to market, Australia will soon become the largest global exporter of LNG. Today, against a backdrop of global instability and States taking an increasingly strategic approach to their energy security, Australia needs to quickly re-evaluate its energy and environment policy settings, both in terms of its domestic energy security, and in terms of remaining a key contributor to regional energy security in Asia.

That re-evaluation will require a more balanced, long-sighted and strategically nuanced approach to energy security and energy policy than Australia has traditionally taken. It will need to focus on appropriately diversifying Australia's energy platform through maintaining market incentives, market transparency and allocative efficiency. As a relatively lower carbon-intensive fossil fuel, natural gas has an important part to play in that transition.

However, public debate in Australia has lacked any real constructive appraisal of Australia's energy security and broader environmental concerns and objectives. Rather, public debate in Australia has been locked in a zero-sum game of

*This paper was originally drafted in December 2016 and updated progressively during the review process to 29 March 2017. This was necessary as events in South Australia developed rapidly over this time. Publishing requirements have not allowed the paper to be updated between 29 March 2017 and publication (even as developments in that market continue unabated).

binary and mutually exclusive alternatives between energy (and, in particular, fossil fuels) on one hand, and immediate environmental ‘fixes’ on the other. Politically, the result has been the imposition in New South Wales, Victoria and the Northern Territory of blunt moratoria or other restrictions on natural gas exploration and development activities.

Predictably, with such comprehensive restrictions on new natural gas projects, as demand grows both domestically and for our exporters, Australia’s domestic gas market has tightened significantly. As State and Territory governments progressively lock-up new gas reserves under moratoria and other restrictions on arguable environmental grounds, the gas that is produced domestically will increasingly follow the money. It will be exported given the higher prices that LNG attracts.

So acute has the matter become that, on the cusp of Australia becoming the world’s leading LNG exporter, one of our own utilities is conducting a feasibility study around building an LNG import terminal in New South Wales. The net result is while several governments prevent further gas exploration in key basins on environmental grounds, Australian utilities are forced to consider importing gas from countries with potentially much weaker or non-existent environmental regulation. In other words, Australian restrictions of gas exploration under its own very strict environmental regulations may actually encourage gas exploitation in places where similar standards just don’t exist. It’s a catch-22 (Flynn 2016).

Indeed, following continual power shortages in South Australia and the closure of the Hazelwood coal fired power station in Victoria, eastern Australia is in something of an energy security crisis. The policy backflips, inter-governmental bickering and political quick-fixes resulting from South Australia’s problems may count for little following Hazelwood’s closure. On a normal summer’s day running at full capacity, Hazelwood is capable of generating over half of South Australia’s peak demand. As a thermal power generating facility, its closure in an increasingly dysfunctional electricity market will have serious implications for energy security in south-east Australia.

At the same time, the Commonwealth Government balks at introducing an emissions intensity scheme. It is broadly acknowledged that these schemes are the most economically efficient way to encourage investment in renewable energy and decrease emissions. In terms of energy security, Australia could also benefit from broadening the diversity of our energy supplies that this helps to achieve. That would allow us to maintain our base-load electricity generation capacity while reducing emissions and increasing renewable supply.

The implications for Australia’s own gas market, power production (and prices), and industrial and retail consumers will be profound. Ultimately, if Australia does not fix these policy settings quickly, it stands to lose in terms of energy security, economic growth and the environment.

Energy security

Coming in to the twenty-first century, following the end of the Cold War, many commentators saw a new age of trade liberalism, globalisation and international cooperation being ushered in (Fukuyama 1992). The feeling was that the Western international order had triumphed and that, progressively, free

market liberalism, democracy and international cooperation would spread throughout the international community and amongst States. Only a quarter of a century later, those predictions seem naïve at best (for a counter point see Kagan 2009). At worst, they may even prove to have been reckless.

Indeed, it now feels increasingly apparent that the opening decade or so of this century has given rise to the most strategically challenging international environment for some time. Even if viewed over the past 12 months alone, there can be little doubt that the international order is changing very quickly. Russian actions in Syria, the Caucasus and Eastern Europe, China’s robust efforts to quickly develop a position whereby it can project force and secure sea lines of communication (SLOCs) in the South China Sea, civil and political upheaval in North Africa and democratic political crises in several Western countries. With its new administration, the United States, the world’s second largest consumer and producer of energy, has begun to eschew its traditional preference for multilateral free trade arrangements in favour of a more isolationist and protectionist approach. Collectively, these events have and will continue to place real strain on the rules-based international order built-up and developed since the end of World War II.

All of these things point to our now passing through a significant pivot of history. As was the case throughout the twentieth century energy sits at the very centre of these events (Slade 1923; Karas 2003). This, in turn, has resulted in a renewed interest in energy security in many parts of the world. Consequently, energy security has again come to the fore of economic and foreign policy and re-asserted itself as a key component of national policy and international relations globally. Australia’s response, however, has been much less convincing.

But what is ‘energy security’? As a term, it is often used but is either loosely defined or not defined at all and so, usually, it is little understood. At the turn of the century, the United Nations Development Program defined it as:

‘the availability of energy at all times in various forms, in sufficient quantities, and at affordable prices’. (Goldemberg 2000)

Since then, this formulation for energy security has been employed by many commentators (Andrews-Speed *et al.* 2005; Vivoda 2012). However, as a basis from which to approach key questions regarding energy demand and supply, and the behaviour and policy settings of producers and consumers, it risks being too general to be properly useful. Today’s more complex, dynamic and challenging international environment demands a more nuanced and robust definition than this broad-brushed approach. In that context, a more suitable definition of ‘energy security’ is provided by Atsumi, as being a state in which:

‘The required volume of energy can be provided to consumers (governments, businesses, and citizens, etc.) when needed, in the required form (crude oil, petroleum products, electric power, etc) at the required quality and at a reasonable price, whether in times of peace or war.’ (Atsumi 2003; p. 9)

This more expansive and detailed definition provides a better basis from which to understand the way in which energy security affects both national policy and foreign affairs, and consequently, the places that the petroleum industry and oil and gas regulation hold with respect to those matters. Importantly, it touches on the key elements of energy security – certainty, consistency, diversity, and balancing demand and supply. It also does justice to energy security's position in a country's policy settings. That is, as a fundamental component of a state's national security and economic prosperity. Indeed, '[energy security] underwrites our stability, our standard of living and, ultimately our independence' (Flynn 2007).

Nowhere has the re-emergence of the strategic importance of energy security been as clearly evident as in Asia. And in Asia, it is China that now sets the pace in terms of regional energy security. Increasingly, other regional powers (such as Japan and Korea), react to China. As Australia has become an important energy supplier to the region generally, Australia's energy security should be also viewed in the context of China's own energy security policy settings.

This, together with the rapid growth of key economies in Asia (particularly China and India) has resulted in key consumers and producers of hydrocarbons taking a more 'strategically oriented' approach to energy security, rather than the more 'market oriented' approach traditionally favoured by the West (Mitchell 2001). The market oriented approach favours reliance on allocative efficiency and price signals to achieve an optimal balance between demand for, and supply of, energy and energy related commodities, whereas a strategic approach to energy security incorporates more subjective and political considerations into the energy security equation. In China's case, in practice it is characterised by four policy objectives:

- (a) maximising domestic output of oil and gas;
- (b) diversifying the sources of oil purchased through international markets;
- (c) investing in overseas oil and gas resources through state-owned enterprises, focusing on Asia and the Middle East; and
- (d) upgrading and expanding infrastructure to bring this overseas oil and gas to Chinese markets (Andrews-Speed *et al.* 2005).

Over the past 25 years, China has transitioned from being largely self-sufficient in terms of the energy it consumes, to being the world's largest oil importer (Smith 2016). As it has done so, China's own energy policy settings and the way in which it approaches its own energy security have changed markedly. In 2005, the United States' former Deputy Secretary of State, Robert Zoellick, complained that China's more strategic approach to energy security was increasingly mercantilist and that:

'China's economic growth is driving its thirst for energy. In response, China is acting as if it can somehow 'lock-up' energy supplies around the world.' (Zoellick 2005)

China's more mercantilist strategic approach to its energy security has been reflected in two key ways:

- (a) paying highly competitive prices and making political accommodations to acquire upstream and downstream oil and gas interests around the world; and
- (b) moves to secure vital sea lines of communication (Blumenthal and Lin 2006), such as its recent activities in the South China Sea and East China sea.

As a key net energy exporter, middle power and island nation, Australia is uniquely leveraged to these developments. Indeed, Australia is on the cusp of becoming the world's largest exporter of LNG (International Gas Union 2015). This is a good thing. For the reasons mentioned above, it is in Australia's national security and economic interests that it becomes a key part of the energy security solution in Asia. However, becoming a key part of the regional energy security equation still requires Australia to ensure that its own energy security is in order. Doing that necessitates nuanced national energy policy settings that get this balance right. This is not occurring.

Australia's energy mix

Diversification and energy security

Implicit from Atsumi's characterisation of energy security above is the fundamental importance of diversity of energy sources. Indeed, diversification is the '*key to energy security*' (Yergin 2006). After switching the Royal Navy from coal to oil in 1913 during the lead-up to World War I, Winston Churchill declared that '*safety and certainty in oil lie in variety and variety alone*'. Almost a century later, another British politician, Dr Liam Fox, applied Churchill's test to a modern economy as such:

'diversity in the types of fuels we use; diversity in the geographical sources of those fuels and the security structures that will guarantee the safe transport of these fuels.' (Fox 2006)

In this regard, at least, over the past several decades, Australia has made reasonable progress. Both production and consumption of energy in Australia (including the uses of it), have become much more diverse and varied over that time. The best example of that diversification has been through the growth in production and uses of conventional and unconventional natural gas. However, as discussed below, that progress risks being weakened by relatively recent changes to natural gas regulation in several States as well as the Northern Territory.

Diversification should be implemented both horizontally and vertically. In this way, diversification operates with respect to energy security in a manner not dissimilar to portfolio theory with respect to financial investments (Awerbuch and Berger 2003). Diversification should not be limited only to the categories of the sources of energy within the energy platform. Diversification should also apply to the sources of energy within a particular category. Approaching diversification in this way also improves resilience and security of the energy platform from disruption, terrorist attacks or cyber-attacks (Karas 2003).

Natural gas in Australian energy production

Economically, energy is a very significant contributor to Australia's bottom line. In the 2014–15 financial year, energy

contributed AUD 96.6 billion to Australia's economy, reflecting ~6.1 per cent of total gross domestic product (Department of Industry, Innovation and Science 2015a). Energy related industries contributed 1.3 per cent of Australia's total employment in the same financial year.

That contribution is expected to continue to grow. According to McKinsey & Company (2016), final energy consumption will grow by 21 per cent between 2014 and 2030. The biggest driver of growth in Australia's energy consumption will come from industry, led by the oil and gas sector (particularly for use in Australia's LNG facilities). According to McKinsey & Company (2017), Queensland's three LNG projects have effectively tripled demand for natural gas in eastern Australia.

In terms of production, natural gas remains the fastest growing component of Australia's energy mix when measured over the past 10 years. Production of natural gas increased by 5 per cent during 2015 (Department of Industry, Innovation and Science 2016). This growth has been driven primarily by

growth in coal seam gas production – now constituting 18 per cent of total domestic gas production, and almost half of total gas production in eastern Australia (Department of Industry, Innovation and Science 2015b). It has also been led predominantly by the needs of Australia's new LNG facilities. As those facilities continue to come on line, the demand for natural gas is expected to continue to grow. Fig. 1 and Table 1 clearly show the growth of natural gas as a component of Australia's energy production.

Australia's energy balance

Australia's energy balance has changed markedly over the last several decades. During that time, Australia has also become a key regional energy exporter. By the 2014–15 financial year, Australia's net energy exports equalled approximately two-thirds of the country's total energy production. Consequently, Australia's domestic gas production needs to meet both domestic

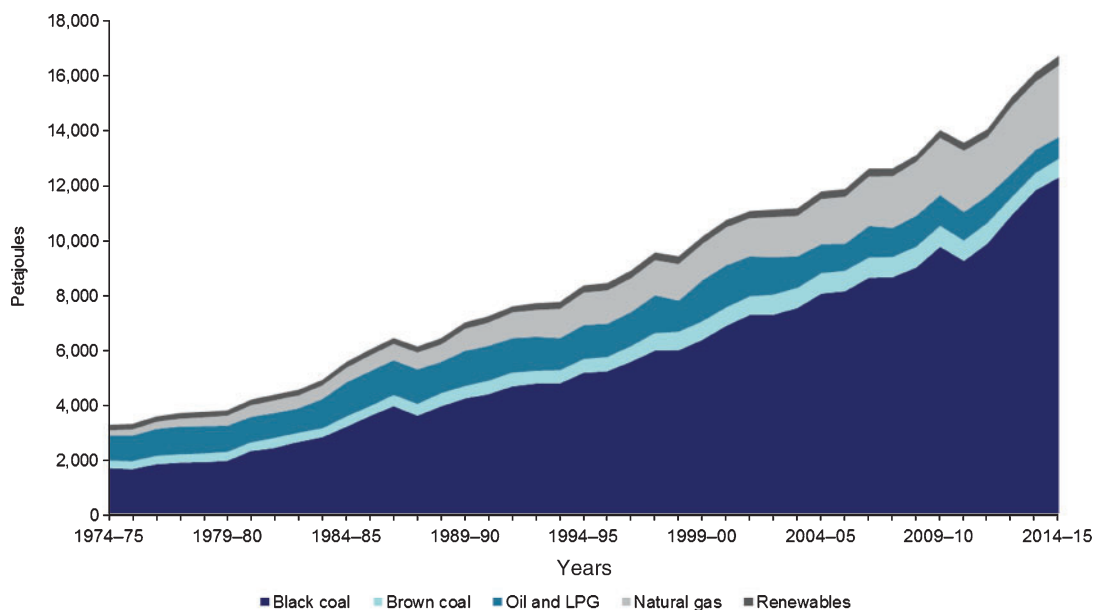


Fig. 1. Australian energy production, by fuel type. Source: Department of Industry Innovation and Science (2016) *Australian Energy Statistics*, table J.

Table 1. Australian energy production, by fuel type

Source: Department of Industry Innovation and Science (2016) *Australian Energy Statistics*, table J

Commodity	2014–2015		Average annual growth	
	PJ	Share (%)	2014–2015 (%)	10 years (%)
Black coal	12287.9	73.5	4.1	4.7
Brown coal	678.4	4.1	8.5	–1.0
Natural gas	2607.1	15.6	5.2	4.9
Oil and LNG	704.9	4.2	–5.4	–2.1
LPG	89.7	0.5	–10.7	–3.8
Renewables	343.3	2.1	1.6	2.1
Total	16711.2	100.0	3.8	3.9

and international demand (Department of Industry, Innovation and Science 2015b). Figure 2 below depicts the growth of Australia's net energy exports since the mid-1970s and arguably illustrates the trend that the majority of Australia's total annual energy production will continue to be exported to meet and capitalise on international demand, particularly for LNG, in the short and medium term (Table 2, Table 3).

Even without any regulatory changes, moratoria or other restrictions on natural gas exploration and production, meeting international demand has resulted in very significant price increases (including retail gas increases averaging 8 per cent

per annum over the past decade as domestic prices continue moving towards parity with higher international prices, and the supply-side tightening in the domestic gas market (Department of Industry Innovation and Science 2015b). These effects, in turn, have been exacerbated by '[u]ncertainty around the supply response, together with a lack of market mechanisms to assist price discovery and risk management.' (Department of Industry Innovation and Science 2015b)

While it is an economically significant achievement for Australia to (soon) become the world's leading exporter of LNG, the resultant increase in gas prices and the tightening

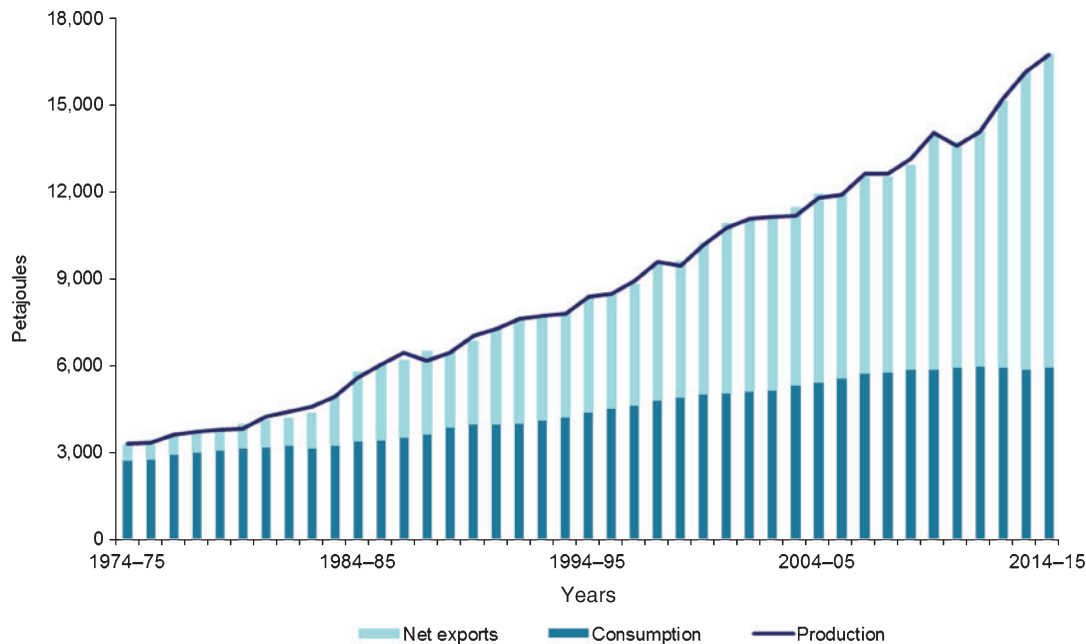


Fig. 2. Australian energy balance. Source: Department of Industry Innovation and Science (2016) *Australian Energy Statistics*, table J.

Table 2. Australian electricity generation, by fuel type

Source: Department of Industry Innovation and Science (2016) *Australian Energy Statistics*, table O

Commodity	2014–2015		Average annual growth	
	GWh	Share (%)	2014–2015 (%)	10 years (%)
Fossil fuels	217871	86.3	3.1	0.4
Black coal	107639	42.7	1.8	–2.1
Brown coal	50970	20.2	10.6	–0.8
Gas	52463	20.8	–3.6	9.7
Oil	6799	2.7	35.6	9.3
Renewables	34488	13.7	–6.9	5.3
Hydro	13445	5.3	–27.0	–1.9
Wind	11467	4.5	11.8	23.5
Bioenergy	3608	1.4	11.4	–1.0
Solar PV	5968	2.4	22.9	59.3
Geothermal	1	0.0	27.3	2.7
Total	252359	100.0	1.6	0.9

Table 3. Australian energy exports, by fuel typeSource: Department of Industry Innovation and Science (2016) *Australian Energy Statistics*, table J

Commodity	2014–2015		Average annual growth	
	PJ	Share (%)	2014–2015 (%)	10 years (%)
Black coal	11062.9	84.5	4.6	5.9
Coal by-products	18.5	0.1	–32.5	N/A
LNG	1362.6	10.4	7.7	8.5
Crude oil	560.6	4.3	2.3	1.7
LPG	57.0	0.4	–14.1	–3.1
Refined products	26.0	0.2	5.6	–11.3
Total	13087.6	100.0	4.6	5.8

of the domestic supply market can, at least partly, be attributed to the lack of political will and leadership. This issue, coupled with the influence of political and other vested interests has created and prolonged a situation of uncertainty over gas production and supply. For example, as discussed below in *Shutting down the gas*, in recent years certain State and Territory governments in Australia have locked-up swathes of the country from further gas exploration and development largely on purported environmental concerns. These restrictions, the political uncertainty they create and the prices that LNG attracts mean the gas is more likely to be exported. Given the position with respect to gas demand, together with the relative price elasticity of demand, such restrictions on future gas supplies could create potentially acute energy security problems. Indeed, according to McKinsey & Company (2017), current planned investment in the gas sector of up to AUD 40 billion may not be enough to allow producers to meet demand through to 2030. McKinsey & Company suggest an additional AUD 10 billion of investment may be needed.

In a tightening domestic market and strategically challenging international environment, the potential effects on Australia's own energy security are clear. Those impacts will not be insignificant. The implications of Australia's current and projected energy balance affect the certainty, security and quality of energy supply in the domestic market and the challenge of balancing demand and supply through effective government policies (Department of Industry, Innovation and Science 2015b).

Shutting down the gas

Although the demand for natural gas from domestic and export customers continues to grow, over the past several years, State and Territory governments in Australia have progressively 'locked-up' vast areas of the country from key gas exploration and development activities. Moratoria or restrictions on unconventional, and in some cases also conventional, gas exploration and development have been put in place in Victoria, New South Wales and the Northern Territory. Politically, further restrictions are also the policy of opposition politicians with respect to certain parts of South Australia (ABC News 2016) and Western Australia (De Poloni and

Taylor 2016; Taylor 2016). We have set out the State and Territory restrictions in Table 4.

The regulatory restrictions imposed on gas exploration and development in various States have been compounded by the chilling effect on exploration activities of sharply lower oil and gas prices globally. For example, according to the Australian Bureau of Statistics, Western Australia has experienced a substantial decline in exploration activity (decreasing by ~14.9% in real terms, or 33.1% on a seasonally adjusted basis) over the past 18 months (Australian Bureau of Statistics 2016).

The implications for gas prices, and Australia's energy security generally, of the moratoria and restrictions in various States and Territories are potentially significant. The COAG Energy Council (2016a) has stated that one of its priorities is '[b]alancing supply and demand is critical to ensuring that Australian consumers and industry can access affordable gas when and where they need it.' Another key issue recognised by the COAG Energy Council (2016b) in terms of gas market reform is the need to increase the overall supply of gas to consumers as well as the number of suppliers in the market, particularly on the east coast. There is also serious concern that several of Australia's LNG projects may also experience gas supply shortfalls (The Australian 2015), potentially further compounding domestic gas supply constraints.

However, increasing the overall supply of gas to consumers and suppliers has become more difficult to achieve as vast areas of Australia's potential onshore exploration acreage are, or have recently become, subject to a moratorium on such activities. This exacerbates the already heightened supply risk of potential near-term tightness (and corresponding price increases) in the market, particularly on Australia's east coast (Department of Industry, Innovation and Science 2015b).

The green paradox

The political rationale for these restrictions follows the intensive lobbying and efforts of environmental and agricultural interest groups. Those efforts have mobilised broad-based popular support in a significant part of the Australian electorate against gas exploration and development, particularly with respect to unconventional gas and the use of hydraulic fracturing (or 'fracking'). Those environmental concerns can be broadly grouped into two general categories: the environmental effects of

Table 4. Australian State and Territory Restrictions on Gas Exploration

STATE/TERRITORY	COMMENT	STATUS
New South Wales	A new 'comprehensive' gas licencing system has been implemented under NSW's 2014 'Gas Plan.' (NSW Government 2014) Under the Gas Plan, the granting of petroleum exploration licences is now overseen by the state's Environment Protection Authority under strict environmental guidelines and other considerations. However, there remains a freeze on the granting of new petroleum exploration licences. No new petroleum exploration licence has been granted since April 2011.	Effectively restricted
Victoria	In August 2016, the Victorian Government announced its intention to introduce a permanent ban on the exploration and development of all onshore unconventional gas in Victoria (including the use of hydraulic fracturing and coal seam gas exploration). The Victorian Government has also indicated that it will maintain the current moratorium on onshore conventional gas exploration and development until at least 2020 (Premier of Victoria 2016) The <i>Resources Legislation Amendment (Fracking Ban) Bill 2016</i> which implements these restrictions was successfully passed by Parliament on 7 March 2017 and given Royal Assent on 15 March 2017. The Victorian Government has advised that exemptions to the ban will remain for other types of activities that are not covered by the current moratorium, such as gas storage, carbon storage research and accessing offshore resources. Exploration and development for offshore gas will not be affected.	Restricted
Queensland	Unconventional gas exploration and development activities permitted under regulation.	Allowed
South Australia	Unconventional gas exploration and development activities permitted under regulation. Opposition politicians considering unconventional gas exploration and development restrictions over parts of South Australia, including a policy for a 10 year moratorium on hydraulic fracturing in the state's south-east (ABC News 2016).	Allowed
Western Australia	Unconventional gas exploration and development activities permitted under regulation. The Labor Party (while in opposition) proposed unconventional gas exploration and development restrictions over parts of the State including banning hydraulic fracturing across large parts of the state's south-west (De Poloni and Taylor 2016). At time of writing, an incoming Labor government in Western Australia (after the 11 March 2017 state election) is being formed and so it remains to be seen whether restrictions on gas exploration will be implemented as promised. However, given the position adopted by Labor governments in other states and territories, it seems fair to assume that the working assumption must be that these restriction will be imposed.	Allowed, but change of government brings new potential for restrictions
Tasmania	Moratorium on hydraulic fracturing in place until March 2020.	Restricted
Northern Territory	Earlier this year the Northern Territory Labor Party made an election promise to ban hydraulic fracturing until it could hold an independent inquiry and consultation. In February 2017 the inquiry was commissioned and assessment and identification of risks regarding hydraulic fracturing in the Northern Territory has begun. Community consultations are expected to commence in March 2017. Following the Labor Party's election victory in August 2016, it has implemented the moratorium. It is noted that the inquiry is being undertaken even after an earlier inquiry into hydraulic fracturing conducted by Allan Hawke AC in 2015, which concluded that the environmental risks associated with hydraulic fracturing could be managed subject to an effective regulatory regime (Northern Territory Government 2014). Following the Hawke inquiry, the environmental regulatory framework for onshore oil and gas activities in the Northern Territory was amended to ensure that environmental risks and impacts are appropriately managed. Yet, even against this backdrop of tailored regulatory intervention through increased safety and environmental management, it was not enough to appease the relevant interest groups and the popular vote.	Restricted

natural gas exploration and development; and fugitive emissions and the emissions released when natural gas is consumed (see for example Union of Concerned Scientists 2017). However, as well-intentioned as these interests may be, there has been little discussion around the broader impacts these restrictions may have economically and, ironically, also on the environment.

The various moratoria and restrictions placed on gas exploration and development activities around Australia may

ultimately be detrimental to broader environmental concerns. As new gas reserves are progressively 'locked-up' under moratoria and outright bans on arguable environmental grounds, gas which is produced domestically will increasingly follow the money. It will be exported given the higher prices LNG attracts. For example, in New South Wales, a major inquiry and subsequent report of the Chief Scientist and Engineer (2014) concluded that the risks of gas development can be

effectively managed with the right regulation, engineering solutions and constant learning through monitoring and research. The resulting supply constraints in an already tightening market will be reflected in prices paid domestically for natural gas (Department of Industry, Innovation and Science 2015a). Naturally, in the absence of sufficient domestically produced natural gas, as demand for gas continues to grow domestically, the market will look to other sources of supply.

In November 2016, AGL Limited announced it is conducting a feasibility study around building an LNG import terminal in New South Wales (Letts 2016; Reuters 2016). If Australia did start importing LNG to meet domestic demand, it would likely need to do so from countries with much weaker or non-existent environmental regulation. Consequently, and somewhat ironically, Australian restrictions of gas exploration under its own very strict environmental regulations may actually encourage gas exploitation in places where similar standards do not exist.

The consequences of these policies for Australia's energy security and the broader economy go well beyond those that are directly affected by tightness in gas supplies. Those consequences extend to power generation. A tighter market for gas, and the higher prices that follow, will effect power generation both in terms of current gas-fired thermal power generation capacity in the economy, and in terms of providing motivation for investment in new gas-fired thermal power generation capacity. As a gas-fired power station typically produces significantly less emissions than a coal fired power station, yet provides the same capability in terms of base-load power generation capacity, natural gas has an important to play in terms of directly and indirectly diversifying Australia's energy platform, as well as in its transition to a lower emissions economy.

The net effect is that the failure of state, territory and federal governments to harmonise environmental and energy policy in Australia may in fact be to the broader detriment of both the environment and Australia's energy security.

Getting the balance right

The 'goal'

In light of the above, from a policy perspective, the objectives of energy and environmental policy in Australia need to be properly balanced and take the following into account:

- (a) sustainably and genuinely seeking to reduce both fugitive and combustion emissions caused by fossil fuels over the long-term (Blythe and Lefevre 2004);
- (b) ensuring Australia's own domestic energy security by creating and maintaining an environment that allows, and fosters investment into, a diverse energy platform that includes appropriately regulated hydrocarbon exploration and development activities (Department of Industry and BREE 2013; p. 31);
- (c) maintaining appropriate policy settings to support Australia's important LNG export businesses (and the role they play in Australia's trade, economic and national security interests as key pieces of the broader Asian energy security environment);
- (d) ensuring that energy markets in Australia operate transparently (Department of Industry and BREE 2013; p. 61) and efficiently, particularly so as to appropriately and efficiently allocate risk and promote competition; and
- (e) given the increasingly 'strategically oriented' approach regional states are taking to energy security, rather than the more 'market oriented' approach favoured by Australia, doing each of the above in a strategically nuanced way to ensure that Australia maintains its domestic energy security while continuing to play a key role in regional energy security.

Unfortunately, much of the debate in Australia around these matters has been binary (Remeikis 2016) and dominated by special interests. Consequently, rather than being a debate focussed on achieving a balance between the elements of good energy and environmental policy, pursuit of each of these elements has been framed in a manner that suggests that they are mutually exclusive of any or all of the other elements, rather than being complimentary policy measures.

Politically that has resulted in an unsustainable long-term policy mix where neither energy nor environmental objectives are appropriately supported. It has manifested itself primarily in three key areas of energy and environmental policy: the appropriateness of imposing domestic gas reservations; the appropriateness and effect of moratoria and restrictions on upstream natural gas exploration and development activities; and the need to use market mechanisms to encourage the market to tackle fossil fuel emissions (rather than the blunter policy instrument of regulatory restrictions). The remainder of this article will briefly tackle each of these matters from the perspective of improving and maintaining Australia's energy security.

Key policy options

Addressing Australia's energy security concerns requires demand-side and supply-side measures to be taken by governments and regulators. This section considers some of those measures along with some broader initiatives.

Domestic gas reservation

Domestic gas reservation policies are often promoted as an effective method to improve energy security by ensuring a prescribed volume of gas is reserved for consumption in the domestic market. That may be the case where the externalities and other costs resulting from such a requirement are outweighed by the benefit to the broader economy of providing for a regulated supply of natural gas in this way (for example, in lower cost gas producing developing economies seeking to stimulate investment in domestic power generation and local industry through a guaranteed availability of natural gas).

Australia, however, is not in that position (either as a low cost developing economy, or with as a developed economy with a developing domestic gas sector). As a highly developed market economy with very significant natural gas reserves, imposing a domestic gas reservation policy would not necessarily result in an increase in domestically available gas supply. Rather, over time, due to the dampening effect it can have on investment, it may ultimately result in a further tightening of gas supply

through higher domestic costs, greater market inefficiency and by encouraging important risk capital to be deployed in jurisdictions without such requirements. This is especially the case in circumstances where Australia's own gas market has become linked to the broader regional market (McKinsey & Company 2017).

It is for these reasons that the Commonwealth Government has previously stated that it does not support a domestic gas reservation policy (Department of Industry, Innovation and Science 2015b). In its 'Inquiry into the east coast gas market' the Australian Competition and Consumer Commission (ACCC 2016; p. 20) also recommended against implementing domestic gas reservation policies. The ACCC's rationale for its position was that while in the short-term such policies may reduce prices for domestic users as additional gas is forced onto the domestic market above efficient market demand, in the longer term a gas reservation policy would dampen gas supply to the market overall as artificially reduced prices weaken the economic incentives for further gas exploration and appraisal (ACCC 2016; p. 68).

Despite these concerns, the Australian Labor Party went to the 2016 federal election promising to implement a national domestic gas reservation policy if it were elected (Australian Labor Party 2016; Beech 2017). The proposed policy would have extended to any new LNG export facility, a significant expansion of an existing natural gas export facility or a significant material expansion of supply. Such proposals should be resisted as it is likely that, over the longer term in a developed economy such as Australia's, these measures will be counter productive.

Labor's policy also proposed a Foreign Investment Review Board-style 'Domestic Gas Review Board' whereby any new or proposed project would require approval as to whether it would be in 'national interest'. For its part, 'national interest' was to be defined as taking into account a cost-benefit analysis considering economic, strategic, social, regional, industrial and employment impacts, as well as the maintenance of a strong and viable natural resources industry. On the basis of the concerns laid out by the ACCC, the imposition of multiple overlapping subjective tests to determine whether a project would be consistent with the 'national interest', together with imposing a domestic upstream *and* downstream gas reservation policy would likely have reduced supply, increased prices and discouraged investment in the sector.

In anticipation of the demand created by its LNG projects, Western Australia introduced a domestic gas reservation policy in 2006. That policy is intended to ensure that sufficient supplies of gas remain available to underpin Western Australia's own long-term energy security and economic development (Government of Western Australia 2006). It was designed in the context of Western Australia having a developing domestic gas sector that sits separately from the integrated gas trading market operating on Australia's eastern seaboard.

In Western Australia, LNG participants are required to reserve the equivalent of 15% of LNG production from each export gas project (which can be offset from sources other than the fields producing the exported gas). This requirement to provide domestic gas is tied to a project proponent's access to land. The North West Shelf, Gorgon and Pluto projects currently provide domestic gas to Western Australia and when completed,

the Wheatstone project will also provide domestic gas. Prelude and Ichthys, although offshore Western Australia, operate in Commonwealth waters and are outside the reach of Western Australia's domestic gas policy. The Browse project (currently on hold due to project economics) has also made domestic gas commitments pursuant to the policy.

Indeed, the Economic Regulation Authority (ERA 2014) has recommended that Western Australia rescind its gas reservation policy as soon as practicable. The ERA re-affirmed the market oriented approach that policy intervention can only be justified where market failure occurs. Higher domestic gas prices in and of themselves do not reflect market failure *per se*, particularly where they arise through the operation of free market dynamics. In its report, the ERA also asserted the position that, in properly functioning markets, such policies may actually reduce domestic gas supply over the longer term through reduced incentives for investment in the gas industry, inhibited efficiency and innovation, and by assisting uncompetitive industries at the expense of investment in other sectors.

Legislation was introduced in Queensland in 2011 that permits acreage to be reserved for gas to be supplied to the domestic market. In January 2017, in light of the tightening gas situation on the East Coast, the Queensland government released acreage for gas exploration in the Surat Basin on the condition that it can only be used for 'future domestic use' (Chambers 2017). No other States or territories currently have domestic gas reservation policies.

For its part the Northern Territory actively promotes that 'there will be no reservation of gas for domestic use in the Northern Territory, in contrast to contemplation of gas reservations in other States' (InvestNT 2016). As a point of distinction from the Western Australian position, the Northern Territory approach clearly seeks to capitalise on the potentially stifling effect the gas reservation policies can have on investment that have been noted by the Commonwealth, the ACCC and the ERA.

Consequently, the policy emphasis should focus on efficiently bringing more gas to market (both in terms of domestic consumption and exports), in a manner consistent with broader environmental objectives. Currently, Australia has 10 LNG projects either in operation or under construction. However, given domestic costs and relatively subdued oil prices, it is unlikely that any new major project will commence that has not already made a final investment decision in the near future.

Additionally, several of those LNG projects face significant potential gas supply constraints in the near future. The tightening domestic gas supply market, coupled with the increasing demand for gas from these facilities, together with the relative environmental benefits from gas-fired thermal power generation (as opposed to coal) (Department of Industry, Innovation and Science 2016), will ultimately require governments to focus clearly on encouraging conventional and unconventional natural gas exploration and development activities. As the East Coast gas supply shortage looms, the issue of national domestic gas reservation will be at the forefront of discussion. Hoping to stave off hard-wired regulatory requirements to reserve volumes of gas for domestic consumption, some gas producers are voluntarily directing volumes of gas to the domestic market (Hewett 2017). Hopefully, given the costs of introducing a domestic reservation policy, and the counter-productive consequences of doing so

(such as the potentially dampening effect on exploration activity), the governments will steer clear of this quick-fix solution.

Encouraging gas exploration and development

As outlined above, growing demand for natural gas from domestic consumers and exporters (Department of Industry, Innovation and Science 2015b) poses real challenges to Australia's energy security and the economy both in terms of natural gas itself, but also in term of future potential base-load power generation (Department of Industry, Innovation and Science 2016). Ultimately, effectively and efficiently resolving those challenges will require new natural gas reserves (both conventional and unconventional) to be found and developed in a manner that allows more gas to flow to market (Stevens 2017). However, under current policy settings and oil prices, the outlook for petroleum exploration, both onshore and offshore, is extremely subdued.

Indeed, rather than improving, the outlook for hydrocarbons exploration activity has worsened (even when measured relatively to other comparable markets). According to the Australian Bureau of Statistics (2016), total petroleum exploration expenditure fell 30.8 per cent (or about AUD 131.3 million), to AUD 295.3 million in the June quarter, 2016. If this trend continues the existing LNG projects will struggle to fulfil their existing obligations to North Asian buyers and the domestic gas price will continue to rise.

In October 2016, BP withdrew plans to commence an oil exploration program in the Great Australian Bight where reserves were estimated to be ~1.9 billion bbl (at a USD 44 oil price, valued at approximately USD 84 billion) (Fitzgerald and Palmer 2016). BP's withdrawal followed a public exchange between Australia's offshore petroleum regulatory safety authority (NOPSEMA) and BP with respect to its environmental approvals. That exchange, in turn, followed intensive political and public lobbying by environmental special interests groups (SMH 2016). Ultimately, a combination of regulation, environmental lobbying and low oil prices appear to have influenced BP's decision to deploy its exploration capital elsewhere (Thomson *et al.* 2016).

Given the typical value, materiality and term of off-take contracts from Australia's LNG projects (and, accordingly, the terms and tenor of the financing arrangements that help to underpin them), more of Australia's domestically produced gas will be exported. However, under existing policy settings, domestically produced supply is forecast to fall by 16% through to 2030 across onshore and offshore developments (McKinsey & Company 2017). Ultimately, McKinsey & Company (2017) predicts gas supply will fall short of gas demand by 465PJ by 2030. Consequently, without an appropriately planned regulatory response to encourage domestic hydrocarbons exploration and development activity, Australia risks being caught in cycle of declining hydrocarbons production and rising demand for natural gas. Politically, economically and strategically that position would be unsustainable and damaging.

To avoid that occurring, stakeholders need to engage with the Commonwealth, State and Territory Governments to agree upon policy settings that encourage appropriately regulated hydrocarbon exploration and development activities. Those activities will need to include greenfield and brownfield coal seam gas developments (together with related infrastructure) (McKinsey &

Company 2017). The corresponding regulations will need to be sensitive to and accommodate valid environmental concerns based on international best practice. Those environmental concerns will, in turn, need to be sensitive to and accommodate broader energy security, economic and other environmental strategies such as longer term emissions reduction, and the potential encouragement of hydrocarbon exploration activities in much more weakly regulated jurisdictions if restrictions remain in place in Australia.

Doing this requires a degree of harmonisation between environmental and energy policy and between different governments that has been conspicuously absent in Australia. It would also mean that Australia could immediately reconsider and lift the onshore gas moratoria and restrictions (outlined above in *Shutting down the gas*). It would mean levels of environmental and safety regulation in petroleum exploration and development that meet sensible, justifiable community expectations (rather than maintaining outright bans on important economic activities that can be safely regulated).

Government and industry stakeholders have an important role to play. Both need to build strong, open relationships with stakeholders to restore the community's perception of gas as a reliable source of energy that has a strong part to play in Australia's the energy mix. Industry now has an opportunity to engage meaningfully to propose and advocate policy changes on these grounds. Given the political impasse we currently have, and the lead time and capital required developing hydrocarbon resources, unless there is a meaningful dialogue in the near future, this opportunity may pass.

Recently, the South Australian government proposed that landowners receive 10% of the royalties payable by gas producers in respect of gas produced at the landowner's property (Kehoe 2017). This measure is clearly designed to encourage landowners to allow further gas production on their land. However, to properly encourage gas exploration and production the recent restrictions on those activities, in both greenfield and brownfield sites, need to be relaxed (while remaining sensitive to legitimate environmental concerns).

The unexpected rise of the opposition to gas exploration in Australia and elsewhere has damaged the industry's reputation. However, the industry can learn from this by taking community engagement very seriously. At the same time, more needs to be done to promote the petroleum industry and the benefits that it has brought and continues to bring to Australia.

Encouraging renewable energy

As mentioned above, energy security is strongly correlated with diversity of energy supply. Quite apart from its clear environmental benefits, renewable energy offers a path to a broader and more diverse energy platform. When complimented with appropriate base-load power, together with other sources of energy, energy security is improved.

However, from an energy security perspective, it is important that policy settings to encourage renewable energy in a way that provides a balanced path and transition from thermal base-load power so as to ensure ongoing reliability and security of supply. An emissions intensity scheme can help to do this. An emissions reduction scheme can also assist in dealing with a key externality associated with gas production and combustion (being the

associated environmental costs). Economically, an emissions intensity scheme assists in achieving allocative efficiency through price signals by internalising those costs.

Recently, the Commonwealth Government again failed to take steps to implement an emissions intensity scheme. It is broadly acknowledged that these schemes are the most economically efficient way to encourage investment in renewable energy and decrease emissions. Emission intensity schemes also naturally motivate energy producers and consumers to improve energy efficiency. Energy efficiency, in turn, remains fundamental in developing and implementing any policy aimed at ensuring affordability and sustainability in the energy market.

In terms of energy security, Australia could also benefit from broadening the diversity of our energy supplies that this helps to achieve. Doing so would allow us to maintain our base-load electricity generation capacity while reducing emissions and increasing renewable supply.

As part of a broader move towards a sustainable and balanced environmental policy framework that includes robust lower emissions targets, lifting current moratoria and restrictions on gas exploration and development activities (under strict and appropriate environmental guidelines as proposed above), Australia would also benefit from the implementation of an emissions intensity scheme. In terms of Australia's power generation capacity, doing so will encourage the transition from high emission fuels (such as coal), through lower emission fuels (such as natural gas) (Department of Innovation, Industry and Science 2015a), to an appropriate renewable energy platform (once technology is available and sufficiently developed to allow renewable energy to provide and maintain sufficient base-load capacity). In other words, in such a framework, natural gas is a key element in the progression to a genuinely low or carbon neutral secure energy platform.

As we have seen recently in South Australia, at this stage, inappropriate reliance on renewable energy (as opposed to thermal base-load power generation), poses real challenges to power network stability and energy security. Natural gas has a key role play in the transition to a low carbon energy platform. Given the importance of energy security to economic growth and political stability, in a balanced, sustainable and sensible policy setting, natural gas is not mutually exclusive of longer term ambitious environmental objectives. Rather, it is complimentary to it.

Adjusting the way that the National Electricity Market sets power prices

As indicated throughout this paper, natural gas contributes to energy security both as a primary fuel and also through its use in the production of electricity. However, for reasons also mentioned above (in particular, the externalities associated with the environmental costs of producing and consuming natural gas), successive governments have adopted policy settings aimed at encouraging investment in renewable energy. As both forms of generation operate in the same national electricity market, to ensure that the transition from base-load thermal power to a stable electricity network relying primarily on renewable power and power storage can occur in a sustainable

way, in this new market environment renewed consideration will also be need to be given to way in which the National Electricity Market (NEM) prices power generated by market participants (AEMC 2017).

Currently, power generators offer to supply power at each 5 min 'dispatch interval' on a given day. Those offers are stacked by ascending price order. The power generators are then progressively scheduled into production to meet prevailing demand, starting with the lease-cost generation offer. However, the price payable for power during that 5 min dispatch interval is the highest price offer that is called into generation (AEMO 2010). Ultimately, in the current market, that highest price offer is usually made by gas-fired power generators (Marxen 2017).

The market's settlement interval is 30 min. The spot price for each settlement interval is the average of the applicable price for each 5 min dispatch interval during that 30 min settlement interval. If gas generation is called, the price for each 5 min dispatch interval will be the price bid by the gas generators (since it is the highest price that is called into generation). Consequently, the average of the price for the six dispatch intervals (which is the spot price for the 30 min settlement interval) will be the price bid by the gas generators.

The critical role of gas-fired generators as the marginal source of NEM supply at times of peak demand means that any inefficiency in gas markets may well spill over into the NEM. This reinforces the need to have the supply-side constraints on gas production relaxed, with the corresponding dampening effect this should have on gas prices over time. An emissions intensity scheme (as discussed above), could help to ensure that the externalities associated with gas production and consumption are appropriately internalised.

Finally, the way that the NEM sets the price of power in the market may need to be adjusted so that the price for a settlement interval is not, effectively, the average of the highest prices bid during the relevant dispatch intervals. By amending the rules to provide for 5 min price settlement, rather than 30 min price settlement, more accurate price signals can be achieved as it would more accurately reflect the generators' bids for that 5 min dispatch interval, rather than being effectively averaged with the price for the other relevant dispatch intervals. It could also potentially encourage fast start high priced generators to bid for each dispatch interval, as they would no longer be discouraged by the possibility of the price being reduced by the price in the other relevant dispatch intervals. The corresponding benefits in terms of allocative efficiency and so, energy security, would be clearer (AEMO 2016; Evans 2017; Parkinson 2017).

Encouraging competition

Measures that encourage competition upstream and downstream while respecting the heavy reliance on joint venture structures as a risk sharing and mitigation tool will also be important. This will be particularly the case where an upstream asset may be stranded and/or where transportation infrastructure is tightly held by one or only a few market participants.

A failure or lack of competition anywhere in the supply chain for hydrocarbons can have a chilling effect on energy security. That is because it can lead to efficiency losses due to a tendency

for price to be above cost and output to fall below the efficient level of production. Politically (as against economically), it also creates difficulties as it can lead to a transfer of wealth from consumers to producers.

In this regard, the ACCC (2016; chapters 6 and 7) has recently voiced some concern regarding the exercise of market power (including monopoly pricing) by some pipeline owners, and has called for legislative reform that would allow it to more directly confront this perceived problem. The ACCC (2016; p. 111) notes that, by effectively lowering ex-plant gas prices for producers and/or increasing delivered gas prices for users, monopoly pricing by pipeline owners can lead to lower than efficient levels of gas use and investment in downstream facilities, and lower than efficient levels of gas production and investment in gas exploration and reserves development.

However, an independent review conducted for the COAG Energy Council has concluded that there is not widespread support for the type of legislative reform sought by the ACCC, and that it is doubtful that such reform would address the real concerns of pipeline customers (Vertigan 2016). The independent review instead recommends more limited reform of the third party access regime, including enhanced requirements for disclosure and transparency around pipeline service costs, pricing and contract terms, and a new framework for binding arbitration. The reforms proposed by the independent review aim to facilitate efficient commercial solutions while avoiding unnecessary regulatory burden.

Conclusion

Natural gas has a fundamental part to play in Australia's energy and national security, economic growth and stability and its transition to a low carbon economy. Australia's new role as a key regional energy exporter, together with the increasing importance of natural gas in its own economy, is positive for Australia's long-term economic growth and prosperity. However, neither Australia's energy nor its environmental policy settings support Australia sustainably taking advantage of this opportunity.

Those policy settings need to be harmonised and rebalanced to allow Australia to:

- (a) sustainably and genuinely seek to reduce both fugitive and combustion emissions caused by fossil fuels over the long-term;
- (b) support Australia's own domestic energy security by creating and maintaining an environment that allows, and fosters investment into, a diverse energy platform that includes appropriately regulated hydrocarbon exploration and development activities;
- (c) maintain appropriate policy settings to support Australia's important LNG export businesses (and the role they play in Australia's trade, economic and national security interests as key pieces of the broader Asian energy security environment);
- (d) ensure that energy markets in Australia operate transparently and efficiently, particularly so as to appropriately and efficiently allocate risk and promote competition; and

- (e) do each of (a)–(d) above in a strategically nuanced way to ensure that Australia maintains its domestic energy security while continuing to play a key role in regional energy security, given the increasingly 'strategically oriented' approach that regional states are taking to energy security, rather than Australia's traditional 'market oriented' approach.

Governments, with the assistance of industry, need to assert strong, meaningful leadership in order to achieve these goals. Constantly managing popular opinion, reacting to short and impatient media cycles and treating the outcomes of energy policy and environmental policy as mutually exclusive will perpetuate the current unsatisfactory policy framework. The implications for Australia's own gas market, power production (and prices), and industrial and retail consumers would be profound. Ultimately, if we don't fix these policy settings quickly, Australia stands to lose in terms of energy security, economic growth and the environment.

We have recently seen in South Australia the issues with the policy settings that have created an unprecedented energy crisis and the quick-fix proposals that the State Government is now trying to implement. At time of writing, the immediate proposal is to include a \$360 million government-owned gas-fired power plant (for back-up gas supply) and Australia's largest battery storage facility (Evans and Potter 2017). The looming East Coast gas shortage has now thrust this issue into the spotlight and we expect it to play out among as the Commonwealth and State and Territory Governments are now urgently compelled to take this issue seriously. In the end, when this political failure inevitably causes power and gas prices to rise and our domestic energy security is compromised, our leaders will pay the political price. The knee-jerk reactions and policy reversals that quickly follow will mean that this price will be exacted by both sides of the equation – from consumers and conservationists. There will be nowhere in the electorate to hide.

But ultimately, the real price will be paid by all of us. And it will be measured both in real terms and a tremendous opportunity cost.

Conflicts of interest

None.

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The authors



Christopher Flynn is a partner in Gilbert + Tobin's Corporate Advisory and Energy + Resources groups. He advises companies and government clients on projects and transactions in the energy and resources sector, and in public international law. His experience spans throughout Australia and more than 50 other countries. His clients include Total SA, Rio Tinto, Engie (formerly GDF Suez), Kumul Petroleum Holdings Limited (PNG's national oil company), KKR, Fotowatio Renewable Ventures, GLNG Operations and Orica Limited. Chris also led (pro bono), the international legal team that helped to secure the freedom of Australian journalist, Peter Grete, from incarceration in an Egyptian gaol. He also provided support to counsel assisting in Chan and Sukumaran.



Emily Tsokos is an experienced energy and resources lawyer with particular expertise in the oil and gas sector. She has transactional and advisory experience in a range of energy and resources projects across multiple international jurisdictions. Emily has advised on project structuring and prepared key agreements on several international LNG projects. She also has extensive experience in petroleum asset acquisitions and sales, multi-jurisdictional M&A, joint venture arrangements and commercial contract negotiation. Prior to joining Gilbert + Tobin, Emily worked in-house at Shell as legal counsel to the upstream business (on Prelude FLNG prior to FID) and as a senior associate in international law firms in Perth and Paris. Emily holds a Bachelor of Laws and a Master of Laws from the University of Western Australia. Emily is admitted to the Supreme Court of Western Australia. She was also previously registered at the Paris Bar.