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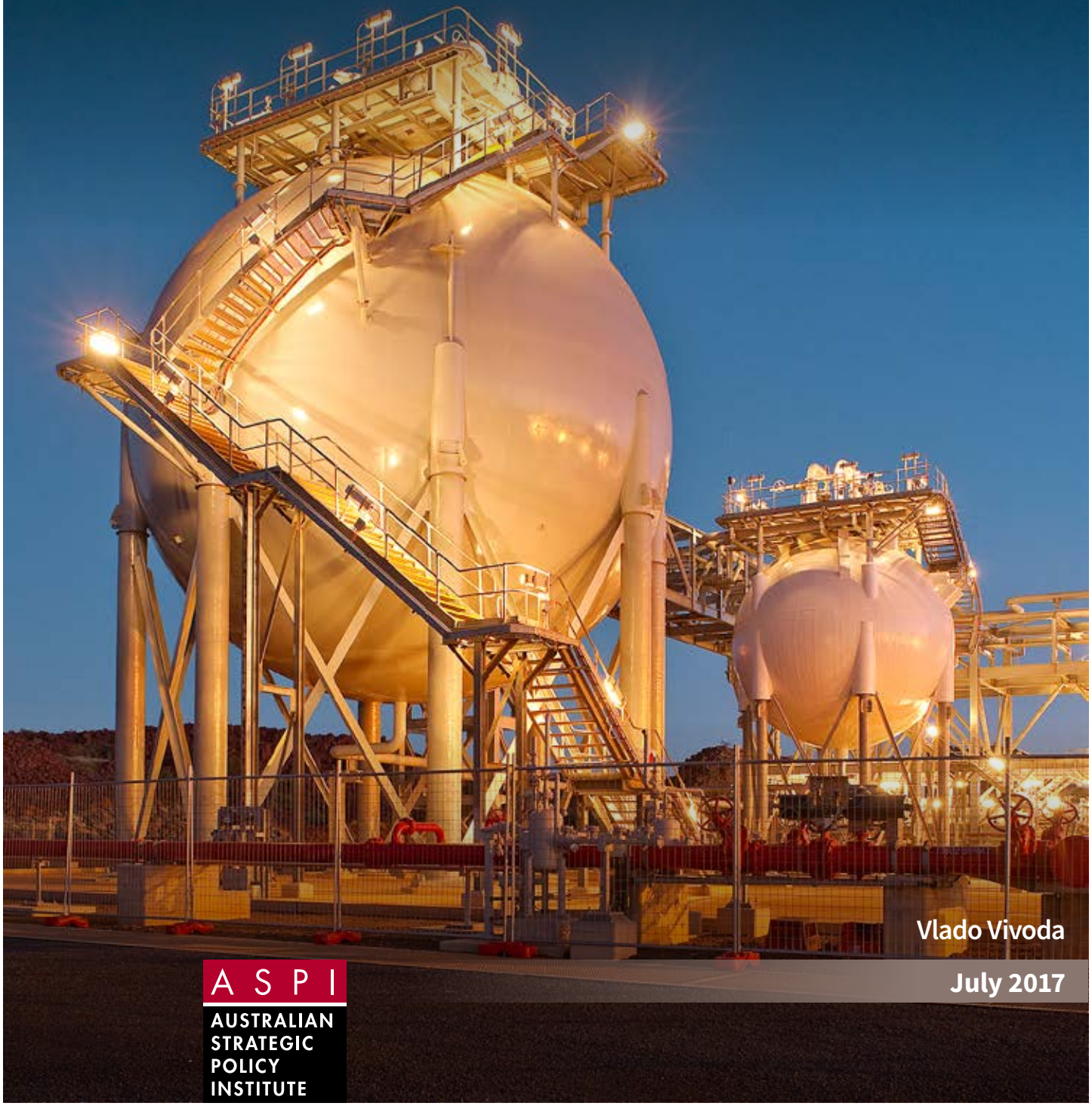
Australia and Germany

A new strategic energy partnership



Vlado Vivoda

July 2017

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Cover image: Propane sphere, Pluto LNG onshore gas plant.
Photo courtesy Woodside Energy Ltd.

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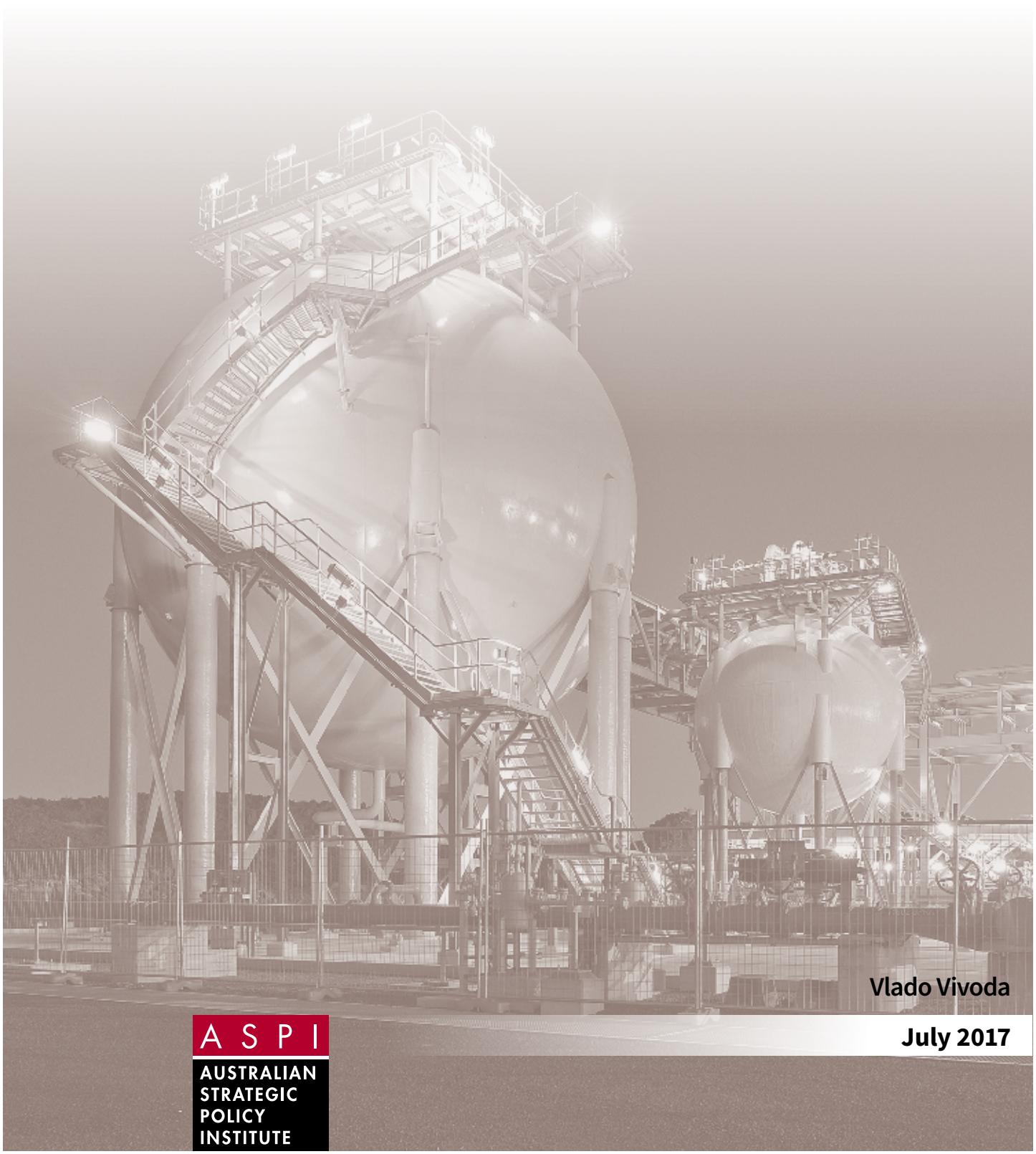

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German Chancellor Angela Merkel (R) and Australian Prime Minister Malcolm Turnbull (L) hold the final report of the Australia-Germany Advisory Group in their hands as they pose for the media following their meeting at the chancellery in Berlin, Germany, 13 November 2015. © EPA/WOLFGANG KUMM via AAP.

FOREWORD

This ASPI paper by Dr Vlado Vivoda is a key outcome of several discussions between the Australian and German governments about energy security in Berlin in mid-2015. The starting position was the proposition that to ensure its ongoing energy security, Germany needed to further diversify its energy supply sources, perhaps through new sources of liquefied natural gas (LNG) imports. Australia is, of course, one of the world's biggest LNG producers and exporters. We were keen to assess whether this could be the basis of a closer dialogue on energy security between Australia and Germany.

My visit to Berlin that year was to lead our participation in the Australia–Germany Advisory Group, which had been formed after the Brisbane G20 summit to broaden, deepen and strengthen bilateral ties between Australia and Germany across a wide range of areas. Leading figures from industry, academia, science, the arts and public policy from both countries agreed to form the advisory group.

In November 2015, our report and recommendations asked ASPI to 'undertake a study on Australia's role as a strategic supplier of LNG, which will include a focus on potential options for a strategic relationship with Germany on energy security.'

Dr Vivoda's report is the outcome of this proposal. His careful analysis makes it clear that the combined factors of distance and economics won't immediately see Australia becoming Germany's prime LNG supplier, but it's also apparent that a bilateral strategic dialogue on energy is timely and important.

On the margins of the 2017 Berlin Energy Transition Dialogue, Australia and Germany committed to establish an Australia–Germany Energy and Resources Working Group. By offering an important cooperation framework to strengthen bilateral energy relations, this new forum will contribute to stronger energy security ties between the two countries.

We welcome the fact that Australia and Germany are now talking on energy security. This is an important investment in long-term strategic thinking for both countries, which is taking place in the context of a deepened and higher profile bilateral relationship..

Beyond LNG supply, Australia and Germany can learn a lot from each other in addressing common energy challenges and prospects. Stronger bilateral cooperation in the energy sphere in accord with our national energy policies will benefit both countries.

I welcome this contribution from Dr Vivoda and ASPI. It's a timely reminder of the increasingly close relationship between Australia and Germany.

Senator the Hon. Mathias Cormann
Minister for Finance and Deputy Leader of the Government in the Senate.

July 2017

CHAPTER 1

Introduction

States participate in international energy markets in order to meet their energy and foreign policy objectives or advance broader strategic, geopolitical or economic interests. Regardless of their status (as importers or exporters) and policy approach (market-based or strategic), states are locked in a web of interdependent energy relationships. Markets reconcile their competing and complementary strategies and interests.

The dynamic interaction between state strategies and market forces shapes outcomes, constantly changing the pattern of interests and dependencies in international energy relations. Shifting energy interests and dependencies lead to new relationships. Common values often facilitate even greater cooperation and can lead to strategic partnerships. Against this background, this paper evaluates the prospects for the development of a strategic energy partnership between Australia and Germany based on the potential for Australia to emerge as Europe's major supplier of liquefied natural gas (LNG).

As Germany reduces its reliance on coal-fired power stations and phases out nuclear power, Australia is set to become the world's largest LNG exporter. In Germany, natural gas is imported exclusively through cross-border pipelines, mainly from Russia. In February 2016, amid concerns that Russia would cut off supplies to Europe, the EU released a strategy aimed at diversifying gas imports away from Russia. Australian LNG has been identified as one of the alternatives.

At first glance, Australia's growing export capacity, backed by its reputation as a safe, reliable and secure supplier, seems to be a perfect fit in Europe's quest for new suppliers and in Germany's search for new sources of electricity. Despite these potential synergies, this paper argues that Australia is unlikely to emerge as an LNG supplier to Germany in the foreseeable future. However, there's much value for Australia and Germany in strengthening the broader energy relationship.

The paper proceeds as follows. Chapter 2 provides an overview of key concepts, drivers and trends in energy policy approaches that informs the discussion in later chapters. Chapter 3 tracks the evolution of international gas markets and highlights the role of the LNG trade in cross-regional market integration over the past decade. Chapter 4 (Australia) and Chapter 5 (Germany) survey key aspects of national policies and approaches to natural gas markets. The focus is on the role of the two countries in the international gas trade. Finally, Chapter 6 analyses the implications for the bilateral energy relationship.

CHAPTER 2

Policy trends

National energy policy frameworks summarise existing policies and formulate strategies to support the delivery of their core objectives. Traditionally, the main objective was to secure access to reliable energy supplies at affordable or competitive prices. Increasingly, in addition to availability and affordability, policies are aimed at improving the environmental sustainability of energy choices. The challenge of concurrently meeting these three objectives is referred to as the 'energy trilemma'—a term coined by the World Energy Council.

Looking for simultaneous progress towards all three objectives, policymakers face complex and sometimes contradictory choices. The three objectives are regularly in tension, and difficult trade-offs are often required (Maurin & Vivoda 2016). For example, improved sustainability requires a trade-off with affordability when significant capital expenditure is directed at reducing greenhouse gas emissions. Alternatively, improved supply security requires a trade-off with affordability when an importing state decides to diversify supply sources and transportation routes.

Ideally, policies should be framed so that the three objectives are tackled concurrently, with none (explicitly) given precedence over the others. However, political reality dictates otherwise and one objective is often privileged over the other two. Most often, policy outcomes involve compromises among interested parties.

The relative significance of the three objectives is influenced by the national and international policy setting in which states and markets interact. This also includes national views on the teleology of the markets and the optimal degree of state intervention. In state capitalist systems, such as China, Japan and Russia, government control is stronger than in countries that have a market capitalist tradition, such as the US, the UK and Australia. National governments also vary greatly in the importance they attach to the environmental sustainability of energy choices relative to supply security and affordability.

Two ideal-type policy approaches are based on diametrically opposing views of the role of the state in energy markets: strategic and market-based (see box). In practice, there's always a degree of intervention even by the most market-oriented governments. For example, conventional wisdom tends to attribute the 'shale gas revolution' to free market forces and the private property system. While they certainly played a role, a little-known government incentive also played its part: the US Government provided for tax incentives in order to stimulate activity in unconventional gas development (Sidortsov & Sovacool 2015).

During the 1970s and the early 1980s, the energy sector was heavily politicised, and security of supply was on top of the political agenda. The involvement of major consuming governments in the gas market reflected the prevailing interventionist approach to economic management, as well as concerns over security of supply. In Europe, state-owned companies held statutory monopolies as importers and wholesale traders. Long-term contracts between well-established parties, with secure prices, were essential to protect both the supplier and the buyer.

Ideal-type energy policy approaches

The *strategic* approach posits that leaving energy to market forces doesn't provide optimal outcomes. Government intervention in energy-related activities is necessary in order to steer the markets towards the state's best interests. The thrust is that energy, including natural gas, is too strategically important to be left to market forces alone.

Governments use a range of strategies and regulatory instruments to steer the market towards desired objectives. For example, subsidies and taxes can promote or curb the use of a specific energy source; state ownership of energy companies and infrastructure may lead to greater control across the value chain; diplomatic activity and the provision of foreign assistance to resource-rich governments can improve access to energy resources (Vivoda & Manicom 2011; Stoddard 2013; Hancock & Vivoda 2014).

In contrast, according to the *market-based approach*, energy markets should be exposed to the same conditions as other commodity markets. The belief is that open and competitive markets deliver energy at the best prices and ensure adequate and reliable supplies. Government interference is needed only in times of market failure (Vivoda & Manicom 2011).

The market approach is characterised by agnosticism about the source of energy imports; eschewal of policies that seek to promote the interests of national over foreign firms; liberalisation of domestic resource sectors and integration with international markets through open trade and investment policies; and foreign policy cooperation with other states to improve the functioning of international markets on a multilateral basis (Hancock & Vivoda 2014; Wilson 2014).

The suppliers regarded the powerful position of state-owned monopolies as a guarantee that the purchase obligations under long-term contracts would be fulfilled (Radetzki 1999).

The 1986 oil price collapse contributed to a changed government attitude towards energy. This had already begun in the early 1980s, as a consequence of Ronald Reagan's and Margaret Thatcher's crusades in favour of politically unhampered market solutions and competition. As the decade evolved, there was increasing disillusion with the far-reaching energy policies implemented in the preceding years. The oil price collapse was seen as a confirmation that energy supplies were ample and that public interventions to assure supply security, such as those in the form of national monopolies, were costly and unnecessary. Public support for the rigid gas market structure was heavily diluted as a result. Prevailing attitudes, values and beliefs during the 1990s were based on the idea that the markets were more efficient than governments (Helm 2004).

Since the turn of the century, intensified competition, high and volatile prices and ambitious renewable energy targets have motivated governments to adopt a more proactive attitude. This is reflected in the policy trend to consider energy increasingly as a strategic issue in both exporting and import-dependent countries. As a consequence, energy supply and demand are increasingly shaped by geopolitical developments and government intervention.

The general trend towards more government intervention has important implications for international relations. For example, Russia, the world's largest gas exporter, has identified natural gas as a key strategic asset. The European Commission's objective to diversify the EU's natural gas supply away from Russia is motivated by geopolitical and strategic considerations. In response to a series of disputes between Russia and Ukraine over transit fees and gas deliveries, the commission is facilitating the construction of LNG receiving terminals in order to provide a second source of gas supply for member states that are most at risk of possible Russian supply cuts (Luciani 2016).

A distinction must also be drawn between energy importers and exporters. Countries with limited energy resources are most vulnerable to the effects of high prices and supply disruptions. As a consequence, policy often has a strong security dimension. Policy instruments aimed at securing stable and affordable supplies may include strategic bilateral agreements with producing countries and domestic support for alternative sources of energy in order to reduce fossil-fuel import dependency.

Heavy reliance on one gas supplier can be viewed as a significant security risk, as it allows suppliers to leverage that dependence in pursuit of broader political and economic objectives. It can also lead to collateral damage as a result of a dispute along the supply chain. For example, in 2009, the escalation in the payment dispute between Russia and Ukraine resulted in a supply disruption that lasted for 13 days.

Heavy reliance on one gas supplier can be viewed as a significant security risk, as it allows suppliers to leverage that dependence in pursuit of broader political and economic objectives.

Energy exporters seek to sell their volumes at high prices to reliable consumers, generating a stable inflow of revenues. Exporters often face a trade-off between increasing export capacity and providing domestic consumers with sufficient energy supplies at affordable prices. Some natural gas producers have policies that limit gas exports. Common drivers for export limits include the desire to extend national reserves further into the future and the maintenance of acceptable domestic natural gas prices.

For some exporters, security of demand is the equivalent of supply security for import-dependent states. Excessive reliance on one buyer increases their exposure to rapid fluctuations in demand due to market forces, deliberate purchasing decisions or exogenous shocks. For example, in the months leading to the March 2011 Fukushima disaster, Japan absorbed 70% of Australia's LNG exports. For several years, Australia benefited from Japan's relentless pursuit of additional LNG supplies.

CHAPTER 3

Towards the global natural gas market

Natural gas is the world's third-largest source of energy after oil and coal, accounting for 24% of primary energy use. It's mainly used for electricity generation and in the industrial, residential and commercial sectors. Among major economies, the share of natural gas in the primary energy supply ranges from less than 10% in the case of China and India to more than 50%, as in the case of Russia. Among the member states of the Organisation for Economic Co-operation and Development (OECD), natural gas accounts for 20–30% of primary energy use.

Natural gas is 30% and 50% less carbon-intensive than oil and coal, respectively (Stevens 2010), so it's often regarded as a transitional or bridging fuel to a sustainable energy system (Kumar et al. 2011). While natural gas contributes to lowering CO_2 emissions by displacing coal or oil, an increased share of gas in the global energy mix isn't sufficient on its own to put the world on a carbon emissions path consistent with an average global temperature rise of no more than 2°C.

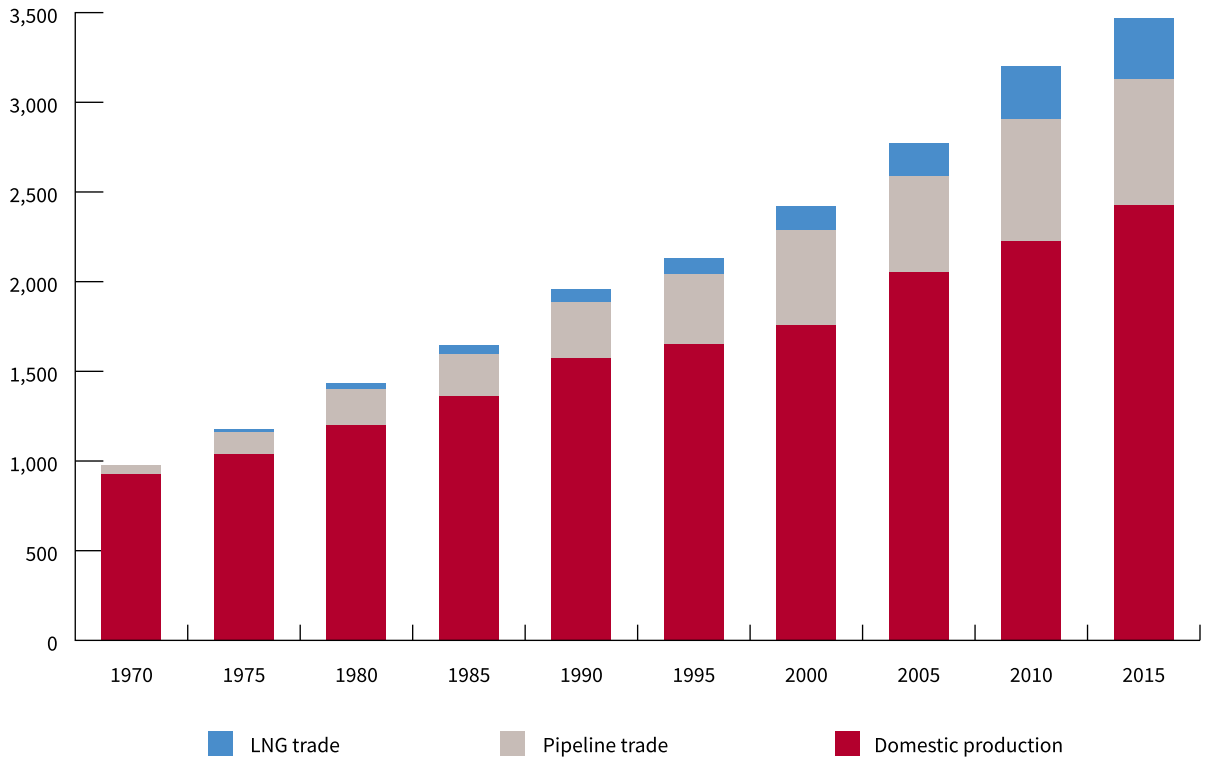
In 2016, 69% of global natural gas demand was supplied from domestic production. The remaining 31% was supplied via cross-border pipelines (in gaseous form) and via seaborne trade (as liquefied natural gas).[1] Pipeline flows account for around two-thirds of the international trade, and the remaining one-third (or 10% of global supply) is supplied as LNG. Since the 1990s, global LNG trade has been growing faster than both domestic production and pipeline supply (Figure 1).

International gas trade is centred on three distinct regional markets: Europe, North America and Asia. In 2016, the European market absorbed 56% of cross-border pipeline flows and 16% of LNG. Germany is the world's largest importer of pipeline gas, absorbing around one-third of the EU's cross-border imports. Russia is the main European supplier of natural gas and also the world's largest exporter. Given that natural gas accounts for 53% of Russia's primary energy supply, most indigenous gas production is consumed domestically; only one-third is exported, mainly via pipelines. Other important European gas suppliers include Norway (pipelines) and Qatar (LNG).

The North American market is largely self-sufficient. While it accounts for 18% of cross-border pipeline trade, those flows are intraregional, mainly between Canada and the US. North America absorbs only 3% of the global LNG trade. The shale gas revolution led to a substantial increase in gas production, and in 2009 the US replaced Russia as the world's largest gas producer. Although the US remains the world's largest natural gas consumer, the gas is almost exclusively supplied from domestic production.

Asia has dominated the global LNG trade since the late 1970s. In 2016, Asian states imported 70% of internationally traded LNG, but only 9% of gas traded via cross-border pipelines. Japan accounts for half of Asian demand and is the world's largest LNG importer. Due to its geographical isolation and strained relations with its closest neighbours, Japan isn't connected to international gas pipelines and only imports LNG. Asia's main LNG suppliers are Qatar and Australia. Uniquely among Asian importers, in China, LNG competes with coal, the country's most important energy source, domestically produced gas and pipeline gas imports from Myanmar and Central Asia.

Figure 1: Natural gas supply, by source, 1970 to 2015 (bcm)



Source: BP 2016.

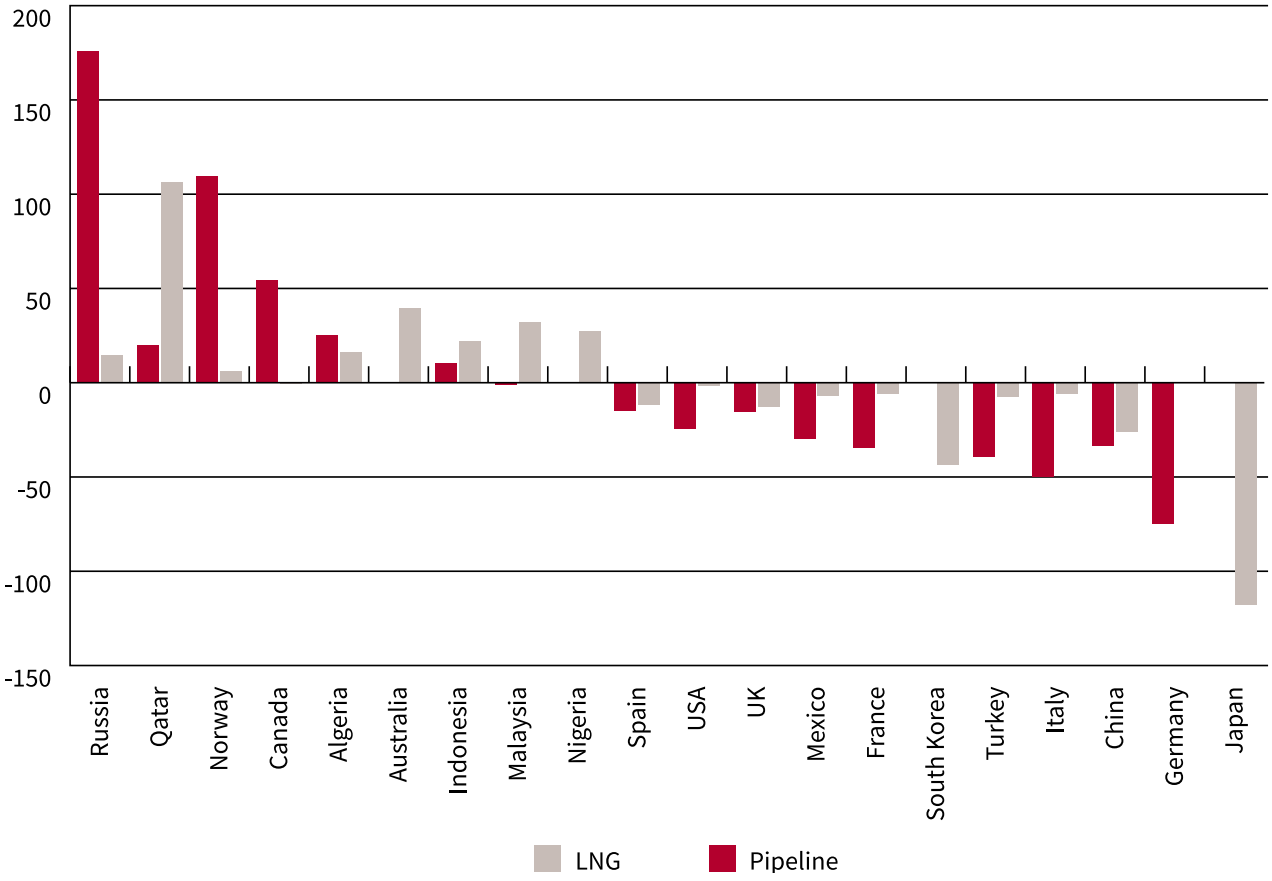
The LNG trade requires capital-intensive investments in complex infrastructure for liquefaction, regasification, shipping and storage (see box). The large capital costs and the inherent inflexibility in the supply chain have required contractual arrangements that protect both the gas supplier and the buyer over the long term. Consequently, the contractual price of traded LNG has been almost exclusively benchmarked against crude oil prices on an energy-equivalent basis. Long-term contracts (typically 15–25 years) with strict pricing mechanisms and destination clauses offered additional protection (IEA 2013). These arrangements have offered little opportunity for flexibility in delivery without financial malaise (Vivoda 2014a).

Because of high costs and long lead times, trends in the LNG trade have changed very gradually.

High capital intensity and risks associated with development times that can stretch for up to a decade have historically limited substantial project participation to players with strong financial and political resources. Because of high costs and long lead times, trends in the LNG trade have changed very gradually.

On the supply side, the trade has been the principal option available to bring otherwise stranded gas reserves (such as those in Indonesia and Malaysia) to stranded customers (such as Japan and South Korea). On the demand side, stranded customers have included countries with no indigenous gas resources or access to commercially viable pipeline supply. With energy security high on the agenda, long-term contracts guaranteed secure gas supplies and transparent pricing (Vivoda 2014a). Without a price reference for natural gas, oil provided a sensible alternative as the main competing fuel.

Figure 2: Major natural gas exporters and importers, 2015 (bcm)



Source: BP 2016.

The LNG value chain

LNG is natural gas that has been liquefied in order to facilitate storage or transportation. Depending on its exact composition, natural gas becomes liquid at approximately –162°C. Liquefaction enables the gas to be shrunk to 1/600th of its original volume. To be transported, the gas is first liquefied in a LNG liquefaction plant consisting of one or more modules (known as 'trains'), each of which is an independent unit for gas liquefaction. Specially designed cryogenic sea vessels (LNG carriers) or cryogenic road tankers are used for its transport to its destination. At the destination, LNG is either stored or converted back into natural gas at regasification plants and then delivered to the end user by pipeline (Cassidy & Kosev 2015). Regasification terminals are commonly connected to storage and pipeline distribution networks to enable distribution to end users, which are either local distribution companies or independent power plants.

In the commercial development of an LNG value chain, suppliers sign sale and purchase agreements with receiving terminals, while receiving terminals sign gas sale agreements with end users. Only when the customers are confirmed and the development of a greenfield project is deemed economically feasible can the sponsors of an LNG project invest in its development and operation.

Growing at an average annual rate of 6%, global LNG trade has more than doubled in just over a decade. The growth has been driven by major cost reductions along the supply chain, increases in ship capacity and strong demand for gas as new players entered the market on both the producer and consumer sides. The number of countries that participate in the LNG trade has increased from 26 in 2004 to 58 in 2016 (GIIGNL 2005, 2017).[2]

As the first means to connect gas fields to customers, pipelines provide a cost-effective method for transporting large quantities of gas over short distances. However, pipeline trade is uneconomical over long distances and is therefore restricted to regional markets, where price differentials are usually marginal.

In contrast, the LNG trade is cost-effective over long distances. It can supply natural gas to virtually any regasification terminal in the world. LNG cargoes can be rerouted to take advantage of arbitrage opportunities between markets with different price mechanisms. The new importing countries, often located far from the existing pipeline networks, were searching for supplies adapted to their highly localised and fast-growing needs, and LNG perfectly fitted the profile.

Contracts are becoming shorter and more flexible, spot markets are gaining in liquidity, and contractual pricing schemes are moving from oil-indexation towards gas-to-gas pricing.

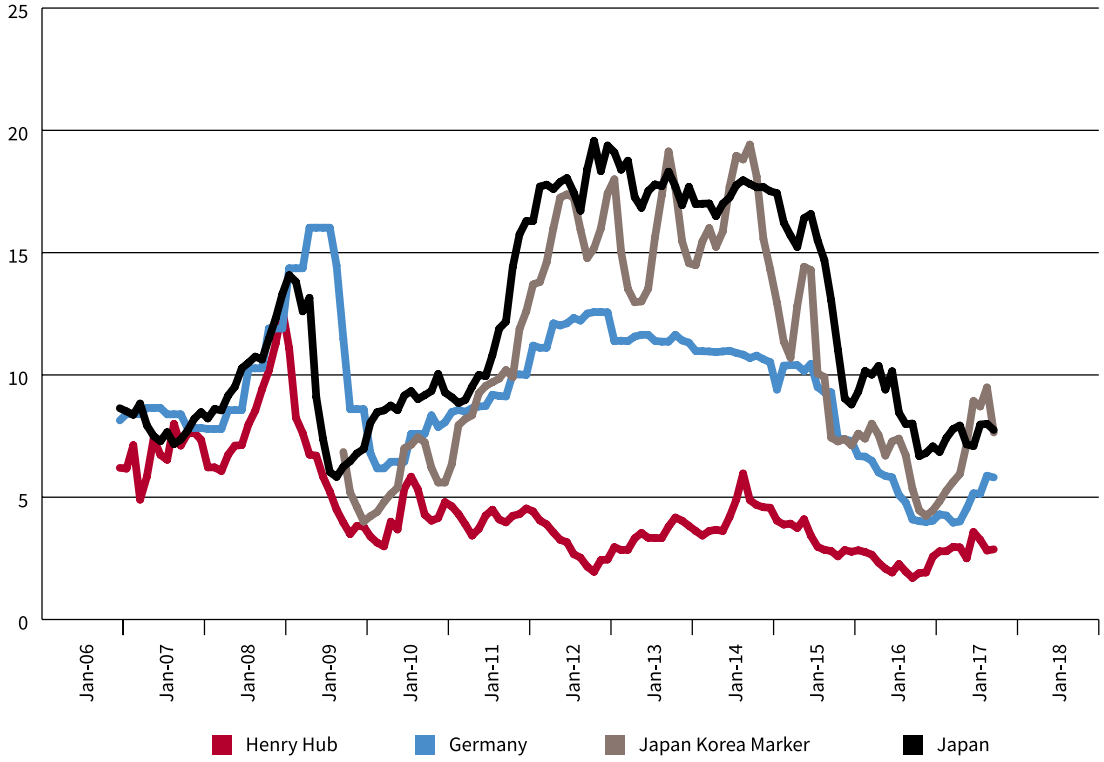
Rapid growth in the LNG trade over the past decade has had a significant effect on contracts and pricing. Contracts are becoming shorter and more flexible, spot markets are gaining in liquidity, and contractual pricing schemes are moving from oil-indexation towards gas-to-gas pricing. The proliferation of market participants has made destination clauses in long-term contracts more difficult to enforce.

While long-term contracts continue to dominate the international market, the share of trade under spot and short-term contracts has increased over the past decade from 12% to 28% of global LNG trade (GIIGNL 2017). Under spot and short-term transactions, LNG is contracted for periods of four years or less. Spot and short-term contracts increase importers' choices, add liquidity to markets and allow importers to hedge financially and physically (EY 2013).[3] As shorter term sales proliferate, they undermine the long-term contract and pricing structure, which has hitherto been an important institutional feature of the international gas market.

The rationale for the continued linkage of long-term contract gas prices to crude oil began to weaken during the 1990s. Oil-indexation lost its relevance because oil is no longer an alternative fuel to natural gas in electricity generation. The historical justification for oil-indexation was the security of supply. However, with increasing liquidity in the LNG market, some of the security 'premium' has become untenable. Developments across regional markets since 2009 point to a gradual shift from oil-indexation towards a global (gas-on-gas) pricing model. The growth in the LNG trade has provided the missing link allowing market integration across three historically separate regions: North America, Europe and Asia.

The main reference points for gas prices are the Henry Hub (HH) price in the US, the average German border price and the average Japanese LNG import price. Figure 3 shows the price movements in three regional gas markets since 2005, along with changes in the Japan Korea Marker, a spot assessment price for LNG trade in Asia, established in February 2009. Significant price divergence that started developing in late 2010 and lasted for four years occurred in a period of intense competition between oil-indexation and gas-on-gas pricing systems.

Figure 3: Natural gas monthly average prices in North America, Europe and Asia, June 2006 to March 2017 (US$/MMBtu)



Source: Quandl.

High gas prices in the US prior to 2009, along with tax incentives, stimulated greater investment in exploration and production. This, in combination with the shale gas revolution, led to a substantial increase in gas production and a sharp decline in gas prices and their divergence from international oil-linked prices. However, despite the surge in production, the US has remained largely disconnected from the international trade. As a result, the shale gas revolution has reduced domestic gas prices (Henry Hub) and opened up more LNG (previously supplied to the US) to other markets (Ritz 2016).

After market liberalisation in the 1990s, the UK largely shifted from oil-indexation to the spot market, referencing the National Balancing Point indicator. In continental Europe, where gas market liberalisation has been a slow process, natural gas remained largely (90%) indexed to oil until 2005. Spot indexation gradually gained ground from 2006 to 2008. High LNG spot prices in Asia during that period attracted flexible cargoes away from the Atlantic Basin and induced European buyers under long-term contracts to negotiate additional flexibility into commercial arrangements in order to share the benefits of arbitrage (Rogers & Stern 2014).

Starting in late 2008, a number of forces converged, leading to a structural shift in gas pricing in Europe. The net consequence of growing US gas production was a boost in LNG deliveries to Europe. An increase in LNG supply coincided with lower demand caused by economic recession. As a consequence, spot prices dropped and remained well below oil-indexed prices (Melling 2010). In 2014, following several years of competition between the two pricing systems, the gas-on-gas mechanism for the first time had the greater share in price formation relative to oil-indexation (IGU 2016).

Unlike in Europe, where parallel pricing mechanisms were in effect for some time, Asian LNG imports remained almost exclusively benchmarked against the average monthly price of crude oil imported to Japan, known as the Japan Crude Cocktail price. Oil-indexed pricing has remained the norm, as Japan and South Korea, the

world's largest LNG importers, don't have access to pipeline gas. Historically, satisfied with secure supplies, Asian importers showed little interest in abandoning oil-indexation or long-term contracts. For as long as they were willing and able to afford LNG under long-term contracts and pass the costs on to customers, oil-linked pricing remained unchallenged.

Some opposition to this form of pricing emerged in Japan in early 2008, following the price spike after the Niigata–Chuetsu–Oki earthquake. However, tight market conditions didn't persist. There was a significant drop in Asian demand, which reached its nadir in May 2009 when a cargo from Australia's North West Shelf project was delivered to France's Montoir terminal.

The real challenge to long-term contracts and oil-indexation came after the March 2011 Fukushima disaster, when those traditional structures proved too rigid to respond to a substantial demand shock. In contrast to 2008, tight market conditions were sustained for close to four years. From May 2011 until January 2015, with crude oil consistently priced around US$100/barrel, Asian LNG prices remained above US$15/MMBtu.

In the immediate aftermath of the Fukushima disaster, Japanese utilities rushed into the spot market to secure LNG supplies to replace lost nuclear power. Japanese buyers were also quick to sign long-term supply agreements for future supplies (10.7 mtpa was committed in 2011) from new Australian projects, in the process bolstering the future of several LNG projects and putting Australia's resource industry in line for a multi-billion-dollar bonanza (Wallace 2011). This initially ad hoc procurement strategy was supplemented by liquefaction tolling agreements to secure Henry Hub-linked supplies without destination clauses from the US.

The significant drop in oil prices since late 2014 has enabled Asian LNG prices to converge with North American and European prices (see Figure 3). At the same time, Asian spot prices (Japan Korea Marker) have also declined as new Australian supplies have entered the market. Consequently, the differential between LNG prices in Asia and elsewhere has largely disappeared. The Asian market is gradually moving away from oil-indexed long-term contracts towards a flexible pricing mechanism that reflects regional supply and demand. The emergence of large quantities of flexible LNG supplies from the US will lead to further convergence between North American prices and spot prices in other regions (IEA 2016a).

Lessons learned from the historical evolution of international oil and coal markets suggest that the gas market is rapidly globalising and evolving towards greater interregional trade and a global pricing model (gas-on-gas). In other commodity markets, the emergence of new players—countries and companies—and cross-border flows led rapidly to globally competitive markets for those commodities.

CHAPTER 4

Natural gas in Australia

Policy context

The Australian Government's long-term energy vision and policy preferences are set out in Energy White Papers (EWPs). In 1988, the government released its first formal Energy White Paper (DPIE 1988). Subsequent versions were released in 2004, 2012 and 2015. The discussion in the white papers has consistently been framed around Australia's economic policies, espousing a market-based approach and limited government intervention in energy markets, as reiterated in the most recent version:

> A key to better market outcomes is to limit the role of government in markets … Policy interventions in the market framework should not be used to force market outcomes beyond the reliable and competitively priced supply of energy. (DIIS 2015)

The underlying assumption, shared by both major political parties, is that freely functioning energy markets best serve Australia's interests and provide optimal outcomes in prices and in balancing supply and demand (Vivoda 2015). The underlying philosophy of Australia's 'macro-economic' approach is reflected in policies aimed at encouraging private-sector and foreign investment in energy export projects, removing market impediments to energy exploration and production, expanding cross-border energy trade and supporting free and competitive energy markets, both globally and in Australia (Yates & Greet 2014).

There's notable continuity in the government's commitment to attract investment and increase the supply of low-cost energy to international markets, without any consideration of potential market oversupply or other risks to demand:

- Australia can, and should, continue to play a major role in supplying the domestic and world economies with low-cost energy (Energy Task Force 2004).
- Export development will continue to play a critical role in Australia's energy future and bring substantial economic benefits to the nation (DRET 2012).
- Australia must be a productive, cost competitive and reliable energy supplier if we are to secure private sector investment in energy resources developments to increase exports … the best way to ensure energy supply at the lowest possible cost is to build more competitive energy markets … LNG export industry, underpinned by foreign investment, provides an enormous opportunity for the nation's economy … With the right policy settings, our importance to global energy markets will continue to grow (DIIS 2015).

Energy security is defined as:

- … the adequate, reliable and competitive supply of energy where adequacy is the provision of sufficient energy to support economic and social activity; reliability is the provision of energy with minimal disruptions to supply; and competitiveness is the provision of energy at an affordable price which does not adversely impact on the competitiveness of the economy and which supports continued investment in the energy sector (DIIS 2016a).

The secure supply of energy is considered essential to economic growth and the prosperity and wellbeing of all Australians.

While security of demand isn't a concern, the government continues to monitor non-market security issues confronting Australia's oil supplies through the periodic National Energy Security Assessment. Although EWP 2015 stated that the next assessment was due in mid-2015, it remains a work in progress at the time of writing.

Historically, the federal government has strongly opposed policies that limit gas exports, and that was highlighted in the 2012 and 2015 EWPs. Mandating a proportion of gas for the domestic market wouldn't be in the long-term interests of consumers and the Australian community (DRET 2012). Such a policy 'would act as a tax on the production of LNG leading to lower profits from gas production. Less profitable gas production would attract less investment' (DIIS 2015).

... the Turnbull government pledged to secure domestic gas supply with the introduction of export restrictions to ensure that the Australian market has adequate supplies before exports are permitted.

However, in April 2017, Australia's longstanding non-interventionist gas policy took a dramatic turn. Amid dramatically higher gas prices in Australia than in its export markets, caused by shortage of domestic gas, the Turnbull government pledged to secure domestic gas supply with the introduction of export restrictions to ensure that the Australian market has adequate supplies before exports are permitted. From 1 July 2017, the Australian Domestic Gas Security Mechanism will ensure that gas supply in Australia always meets the forecast needs of the local market (Turnbull 2017).

Supply, demand and infrastructure

Australia's known conventional natural gas reserves have increased threefold over the past two decades. Unconventional gas resources have grown substantially in recent years. Coal seam gas (CSG) has been used commercially since 2015. Over the past decade, Australia's natural gas production has doubled. Although the nation's gas reserves are a world-class resource, domestic sales have been stagnant. When LNG exports from Queensland began in January 2015, the east coast gas market was effectively linked to Asian markets, leading to price increases. As a consequence, Australia's gas consumption dropped by 4.1% in 2016, as end-users increasingly shifted to other energy sources (BP 2017).

Australia has more than 33,000 kilometres of high-pressure steel pipelines, of which more than 25,000 kilometres is used for natural gas transmission. The country is divided into three gas markets due to the geographical isolation of the western and northern markets from the large eastern market. Natural gas production is therefore either consumed within each market or exported as LNG. There are limited storage options in the eastern market.

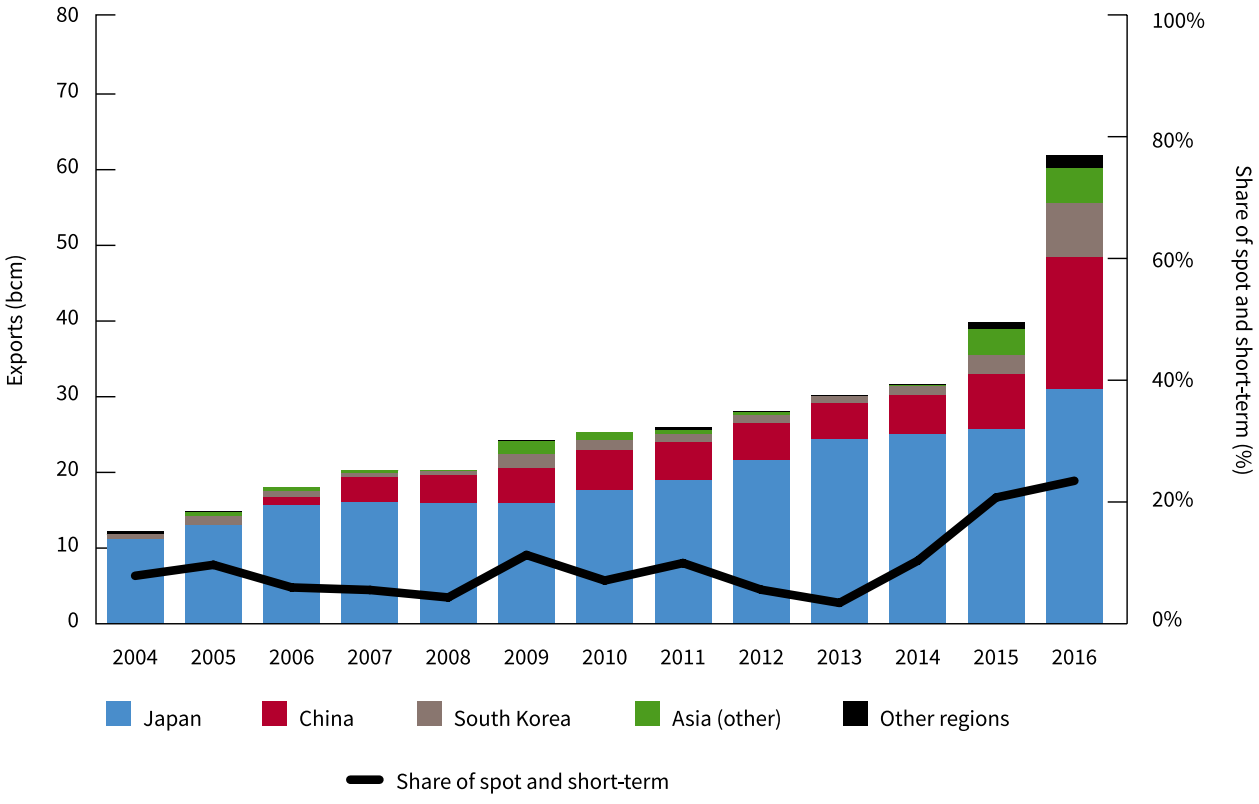
LNG exports

Australia exported its first LNG cargo in 1989 from the North West Shelf project. Japan was a de facto monopsonist (the only buyer) until 2004, when larger volumes began flowing to South Korea (Figure 4). In 2015, Australia became the second-largest LNG supplier after Qatar, supplying 12% of globally traded volumes. In 2016, following a 52% annual increase in production, Australia's share in global LNG supplies increased to 17% (GIIGNL 2017).

The vast majority of Australia's LNG is sold to the Asian market. In 2016, Japan absorbed 50% of Australian LNG production, while China, South Korea, India and Singapore imported much of the remaining volume. Australia is also Japan's largest LNG supplier, providing 27% of imports (GIIGNL 2017).

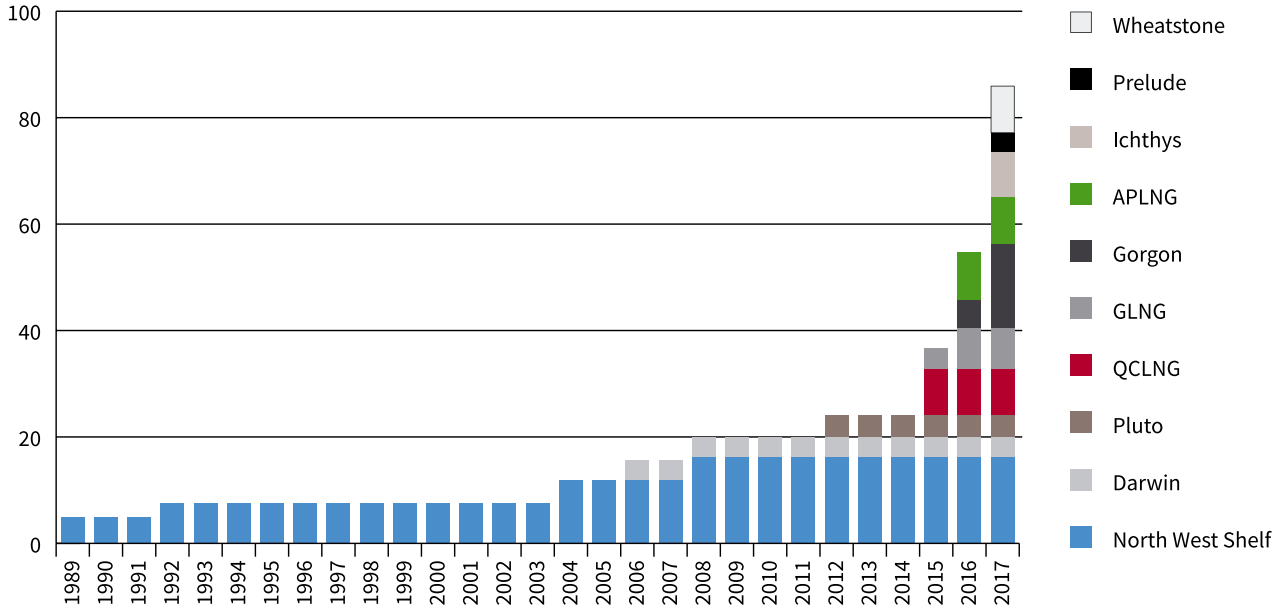
LNG accounts for the bulk of recent resources and energy investment in Australia. It's Australia's third-highest goods and services export behind iron ore and coal. Currently, seven liquefaction plants are operating in Australia, and three additional projects are expected to be operational in 2017. Facilitated by Asian investment, Australian LNG exports increased significantly in 2016 and will continue to increase throughout 2017 as those projects are brought on line. On completion, the new projects will bring Australia's export capacity to 86 mtpa (Figure 5). Australia is forecast to rival Qatar as the world's largest LNG exporter by 2021 (DIIS 2016b, IEA 2016a).

Figure 4: Australia's LNG exports, by destination and type of contract, 2004 to 2016 (bcm)



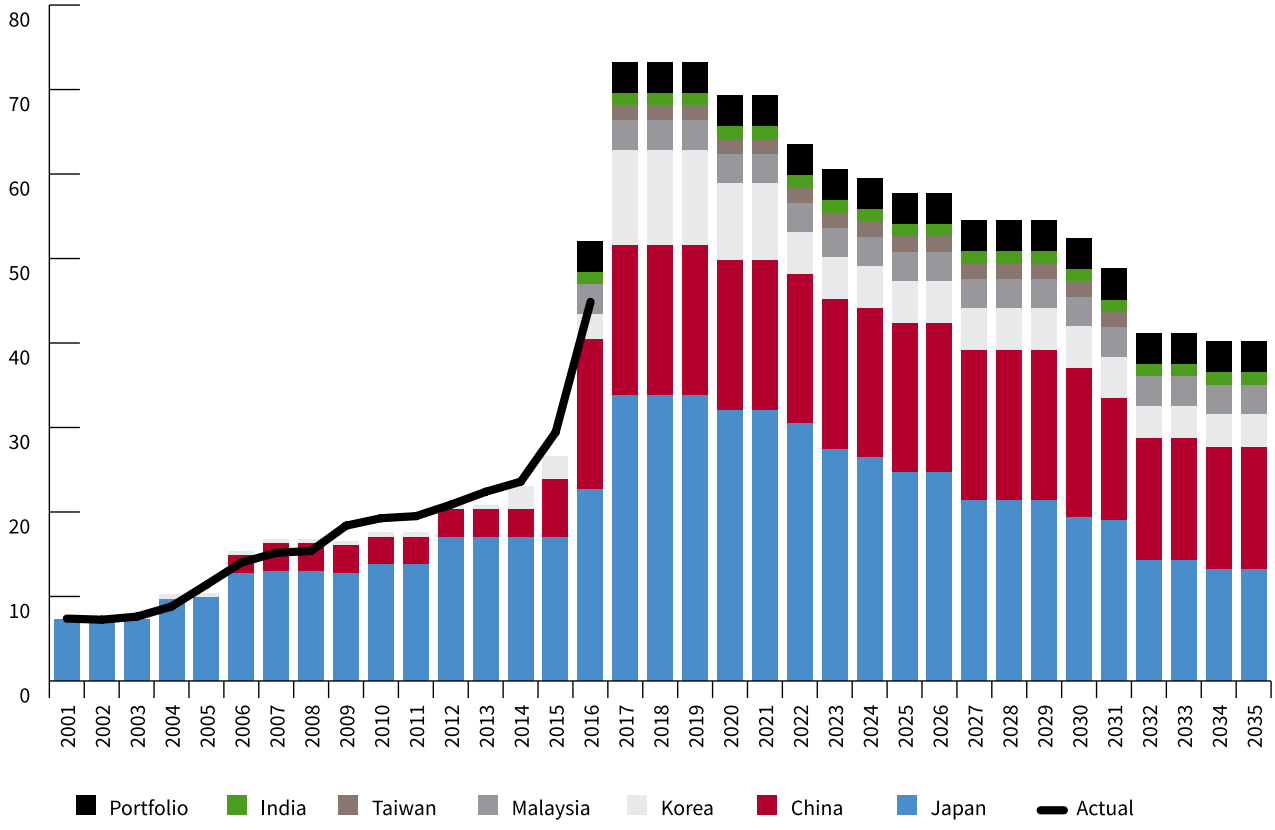
Sources: GIIGNL, various years.

Figure 5: Australian nameplate liquefaction capacity, by project, 1989 to 2017 (mt)



Sources: GIIGNL, various years; company websites.

Figure 6: Australian LNG under long-term contracts, by destination, 2001 to 2035 (mt)



Sources: GIIGNL, various years; company websites.

Australian LNG breaks world records on several fronts. Australia's the first country to have had seven LNG projects under construction at the same time. It's also at the forefront of technological advances, including the world's first floating LNG facility (Prelude LNG) and the first CSG-to-LNG project (Queensland Curtis LNG).

However, the LNG industry has changed dramatically since the A$200 billion investment boom entered its full swing in 2007 and 2008. Most of the new projects were commissioned at the height of the commodities boom, when the oil price was near the US$100/barrel mark and demand showed no sign of easing. The overriding sentiment, which has been exacerbated by the decline in the price of oil since 2014, is that most of the country's new LNG projects aren't competitive globally and are costlier than competitors in North America or Africa (McKinsey & Company 2013; IEA 2013).

Case study: The sucker's payoff

Rich in energy resources, Australia has an interest in maximising the economic potential from those resources. Energy exports have been a national economic development priority since the late 1980s. To increase supplies, successive Australian governments have sought to facilitate foreign investment, support open and transparent international energy markets and ensure that Australia's seen as a highly reliable and competitively priced supplier.

The growth in energy exports over the past decade has raised Australia's profile in the Asia–Pacific region, earning it a seat at the table at several regional forums (Yates & Greet 2014). The perception (or misperception) of Australia as a strategically important energy supplier to a region increasingly dependent on imports doesn't come as a surprise. Indeed, Asian buyers of Australian coal and LNG have always regarded their purchases as serving strategic national interests. Australia's market-based approach is incompatible with an otherwise securitised conceptualisation of energy across the region (Phillips 2013).

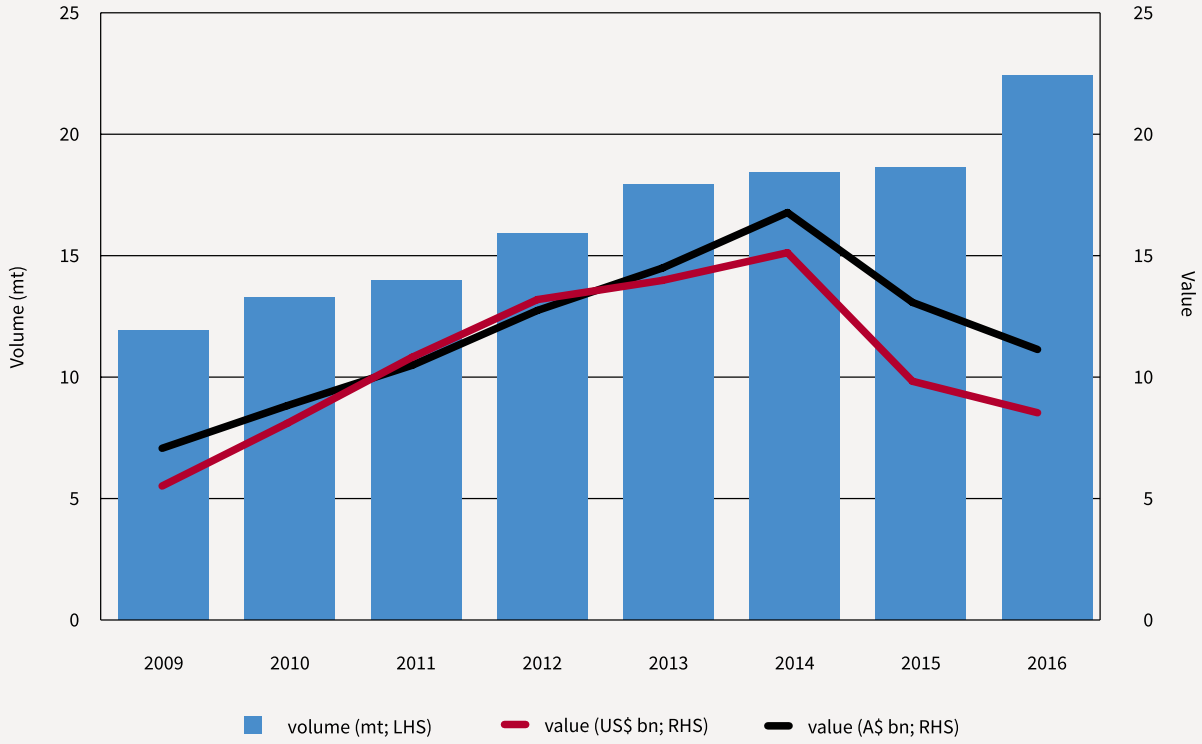
Developments in the international system have induced other suppliers to view their energy resources increasingly as an asset to achieve economic and political objectives. Deliberate strategic supply decisions are often used to advance other policy agendas. Although the Australian balance of trade has been increasingly dictated by the value of energy exports, successive energy policies did not address market oversupply or other demand-side risks as potential threats to Australia's national interests and economic future (Vivoda 2015).

While record-breaking, the simultaneous construction of seven new LNG projects with a combined capacity equal to 25% of current global LNG demand has been described as 'one of the worse investment cases of the last decades in the oil and gas sector' (Maugeri 2014).

When the main customer in a market follows a logic of strategic calculations, the failure of the main supplier to accept the customer's definition of the game sets the supplier up to receive what Leaver and Ungerer (2010) have referred to as 'the sucker's payoff': oversupply, followed by a drop in prices and export revenue. Sheer size, the great goal of Australian policy, is a self-defeating asset for a supplier unless accompanied by self-restraint (Leaver & Ungerer 2010). The unfolding reality revealed an inescapable trade-off between prices and volumes, as illustrated in the case of Australia's LNG exports to Japan, its major customer (Figure 7).

The future sustainability and profitability of Australian LNG exports are predicated on a high oil price and a voracious appetite for natural gas in Japan, China and South Korea—Australia's major current and future customers (see Figure 6 for contracted volumes until 2035). As substantial volumes of lower-cost LNG move into Asian markets, Australian projects at the high end of the supply curve will become increasingly vulnerable: situations in which sellers may be forced to renegotiate contracts will arise.

Figure 7: Australian LNG exports to Japan, by volume and value, 2009 to 2016 (mt, Abn, USbn)



Source: Ministry of Finance (2017).

CHAPTER 5

Natural gas in Germany

Policy context

Germany's energy policy is framed around the *Energiewende*, an integrated policy framework and long-term energy and climate strategy aimed at a fundamental transformation of the energy system by 2050 (Agora Energiewende 2015). Following the adoption of *the EU climate and energy package* in 2009, Germany has taken the fundamental decision that, over the long term, it will obtain the greater part of its energy supply from renewable energy sources. By prioritising climate mitigation and environmental stewardship, Germany's energy policy approach is unique among major economies.

In September 2010, the government adopted *The energy concept*, a roadmap for implementing a long-term strategy for a low-carbon energy system based on developing renewable energy and improving energy efficiency. *The energy concept* is aimed at securing supply and protecting the climate while at the same time promoting the growth and competitiveness of German industry.

A comprehensive package of legislation (*The energy package*) was adopted in June and July 2011. In addition to the gradual phase-out of nuclear power by 2022, these laws focus mainly on ramping up grid expansion and the continued development of renewable energy. In April 2012, the Federal Ministry for Economic Affairs and Energy (Bundesministerium für Wirtschaft und Energie, or BMWi) published an overview of Germany's new energy policy (BMWi 2012).

Germany has also made a decision to phase out subsidies for domestic production of hard coal and to decommission all hard coal mines by 2018. Reacting to the oil crises in the 1970s, Germany introduced subsidies for uncompetitive domestic coal by compensating power plant operators for the cost difference between coal and imported oil and gas. During the 1990s, Germany's coal subsidies were by far the greatest in Europe (Schellnhuber 2004).

While the decision to phase out subsidies for coal production and decommission coal mines is likely to result in a gradual decline in the share of coal in Germany's energy supply, coal's share has increased since 2010. The gradual phase-out of nuclear power has required flexible medium-term sources of electricity supply to complement intermittent renewable energy sources. The 2010 and 2011 policy and legislative measures made no explicit commitments to promoting greater use of natural gas (a significantly less emissions-intensive fuel than coal) as a bridge to a more sustainable energy future. Driven by market forces, German utilities mainly replaced lost nuclear power with cheap coal. However, as nuclear capacity is phased out and coal production is decommissioned towards the end of the decade, the share of natural gas is likely to grow (Dickel 2014).

In the context of the *Energiewende*, security of gas supply 'remains a commandment that foreign policy must obey' (Westphal 2012). In support of natural gas supply security, the government has adopted the following measures (BMWi 2016c):

- the diversification of supply sources and transmission routes
- stable relationships with supplier countries
- long-term gas supply contracts
- a highly reliable supply infrastructure that includes underground storage facilities
- access to LNG terminals.

Energy partnerships are the German Government's strategic instrument for promoting bilateral cooperation with producing, transit and consumer countries that are considered important in the context of Germany's high fossil-fuel import dependence (BMWi 2016b).

Supply, demand and infrastructure

Natural gas produced from Germany's conventional fields supplies less than 10% of the nation's demand. Germany's gas production has dropped by more than 50% since 2007, and further declines over the coming years are estimated to be at an average annual rate of 5% (BP 2016). The extraction of unconventional gas is politically controversial, and the industry has been limited to exploratory drilling. Natural gas demand in Germany has increased by 14% since 2014 although it is still short of the 2006 peak (BP 2017).

Germany has a diversified and flexible natural gas supply infrastructure that includes more than 510,000 kilometres of pipelines.

Germany has a diversified and flexible natural gas supply infrastructure that includes more than 510,000 kilometres of pipelines (Map 1). Gas deliveries from Norway reach Germany via Norpipe and Europipe I and II (total capacity 54 bcm/year). Gas deliveries from Russia reach Germany via Nord Stream (capacity 55 bcm/year), Yamal (capacity 33 bcm/year) and the Ukraine pipeline system (total capacity 120 bcm/year). Natural gas from the Netherlands is transported to Germany via four main pipelines (or interconnection points). The proposed Nord Stream 2 pipeline will provide an additional 55 bcm/year from 2019. It will largely follow the route of existing Nord Stream infrastructure from Russia's Baltic coast to Greifswald in Germany.

Map 1: Major European natural gas pipelines

Source: Economist.com/graphicdetail.

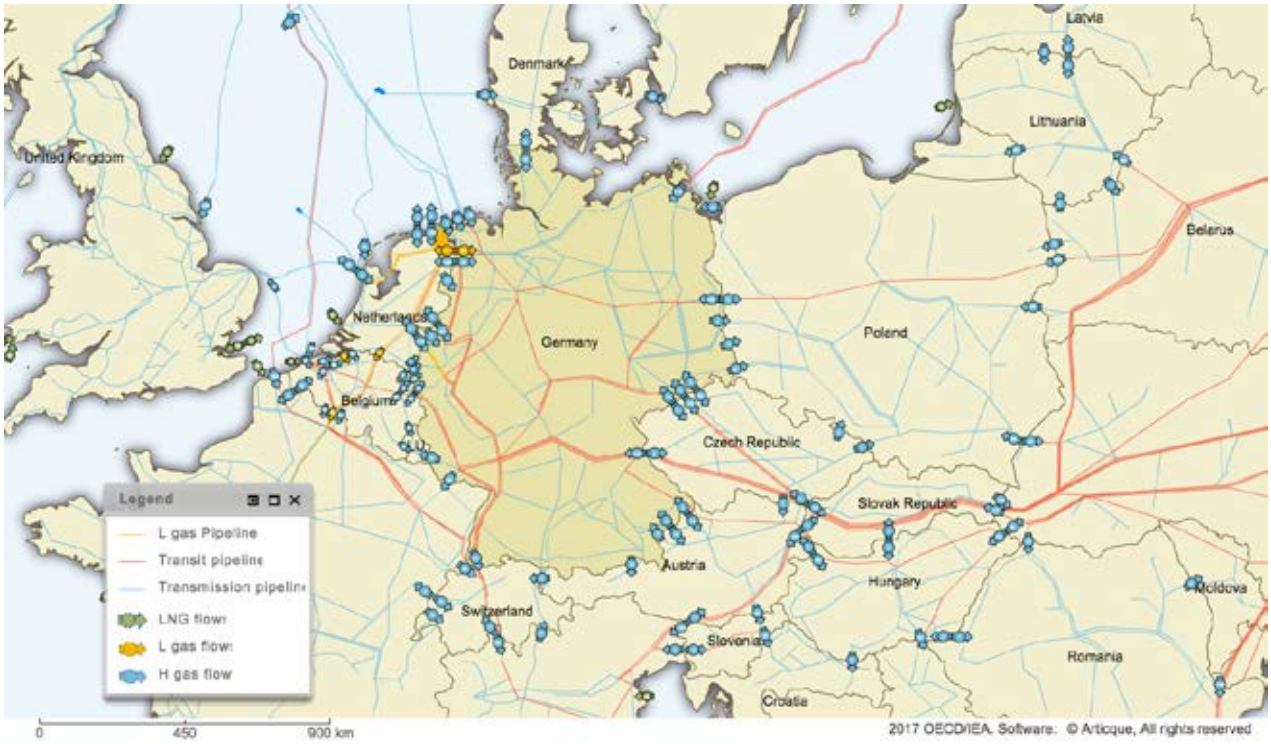
Germany doesn't have any LNG import terminals (Map 2). Plans to build a receiving terminal in Wilhelmshaven were shelved in 2011 because interest was insufficient for long-term commercial viability. The terminals in Zeebrügge (Belgium), Rotterdam (Netherlands) and Świnoujście (Poland) can be accessed via the pipeline network. Under current market conditions, a receiving terminal would require large subsidies from the German Government—an option that Berlin doesn't support.

> Small-scale LNG is seen as a growth opportunity, and Germany is considered well placed to absorb excess cargoes as the global market for the fuel is becoming glutted.

The German Government expects LNG to become an increasingly important source of natural gas for Europe in the future, so it considers access to LNG terminals to be important. For that reason, it encourages German companies to secure LNG volumes from strategic suppliers and purchase regasification capacities in LNG terminals in neighbouring countries (BMWi 2016d). In June 2013, E.ON signed a 20-year agreement with Canada's Pieridae Energy for the supply of 5 mtpa from Goldboro LNG, North America's closest mainland LNG export terminal to Europe, to Western Europe and other destinations from 2020. With E.ON's backing, Pieridae Energy CEO Alfred Sorensen secured a promise of favourable loan guarantees from the German Government, which enabled the deal (McCarthy 2015). Through Uniper, its energy trading spin-off, in September 2013 and May 2014, E.ON signed two medium-term contracts for the supply of Qatari LNG to the GATE Regasification Terminal in Rotterdam and the Isle of Grain in the United Kingdom, respectively.

Small-scale LNG is seen as a growth opportunity, and Germany is considered well placed to absorb excess cargoes as the global market for the fuel is becoming glutted. Plans are underway to build two small-scale LNG terminals in Hamburg (Botzki 2016). Wilhelmshaven and Brunsbüttel are currently under consideration as locations for medium-sized terminals (Engel 2016).

Map 2: Major natural gas infrastructure in Germany and neighbouring countries



Source: IEA (2016) (www.iea.org/gtf/#).

Germany maintains the largest natural gas storage capacity in the EU and the fourth-largest in the world, after the US, Russia and Ukraine. Natural gas storage facilities play an important role in balancing seasonal fluctuations and ensuring security of supply. At the end of 2013, Germany had 51 natural gas storage facilities in operation, containing 23.8 bcm of usable gas (BMWi 2016d). The storage capacity could supply the whole country for up to three months. This storage volume is set to increase over the coming years.

The February 2012 cold wave

In February 2012, a cold wave put Germany's natural gas supply infrastructure under considerable pressure. Lessons learned from this incident will provide important input for future decisions by those planning infrastructure and emergency-response policy.

Due to extremely cold temperatures across Europe, end-user demand for natural gas in the south of Germany increased significantly, reaching an all-time high in some areas. High demand coincided with a drop in supplies from Russia, and Waidhaus, a key entry point, recorded a 30% reduction.

Notably, there were no supply disruptions in Germany. This was facilitated by Germany's gas storage, diverse natural gas supply routes and both national and international cooperation between transmission system operators. German natural gas storage facilities were 67.5% full at the time, with 14 bcm of available storage.

While the flexibility provided by underground gas storage proved crucial, gas swaps between transmission system operators also played an important role. To offset higher demand and reduced supplies from Russia, additional supplies of gas were sourced from Norway, the Netherlands and the UK, as well as additional LNG deliveries to European terminals (IEA 2014).

The EU framework

The February 2012 cold wave (see box) demonstrated that natural gas supply infrastructure in Germany is secure, diversified and reliable. However, the need for intervention by the authorities in the event of a major supply crisis can't be ruled out. Precautionary measures have been taken to evaluate the extent of cooperation required from all EU member states and available options to mitigate the impact on supplies.

In the EU, security of gas supply is a shared responsibility of natural gas enterprises, member states (notably, through their competent authorities) and the European Commission within their respective areas of activities and competence. This shared responsibility requires a concerted exchange of information and cooperation among stakeholders. The EU framework provides an additional layer of supply security to Germany and other member states.

In December 2010, EU Regulation no. 994/2010 on measures to safeguard the security of gas supply was adopted. The regulation included a requirement that EU member countries meet the N-1 standard. Germany is compliant with the N-1 standard due to its high degree of infrastructure reliability, including its diversification of supply routes and substantial storage capacity. Germany's N-1 compliance is further enhanced by a requirement to have 'reverse flow' capacity at border crossing points when needed (EC 2014a).

The tests showed that a prolonged supply disruption would have a substantial impact on the EU. Eastern member countries and Energy Community countries would be particularly affected.

As required by the European Energy Security Strategy, the EU conducted stress tests to analyse the ability of Europe's energy system to cope with a severe gas disruption during the winter of 2014–2015. The stress tests simulated two energy-supply disruption scenarios for a period of one or six months: a complete halt of Russian gas imports to the EU; and a disruption of Russian gas imports through the Ukrainian transit route.

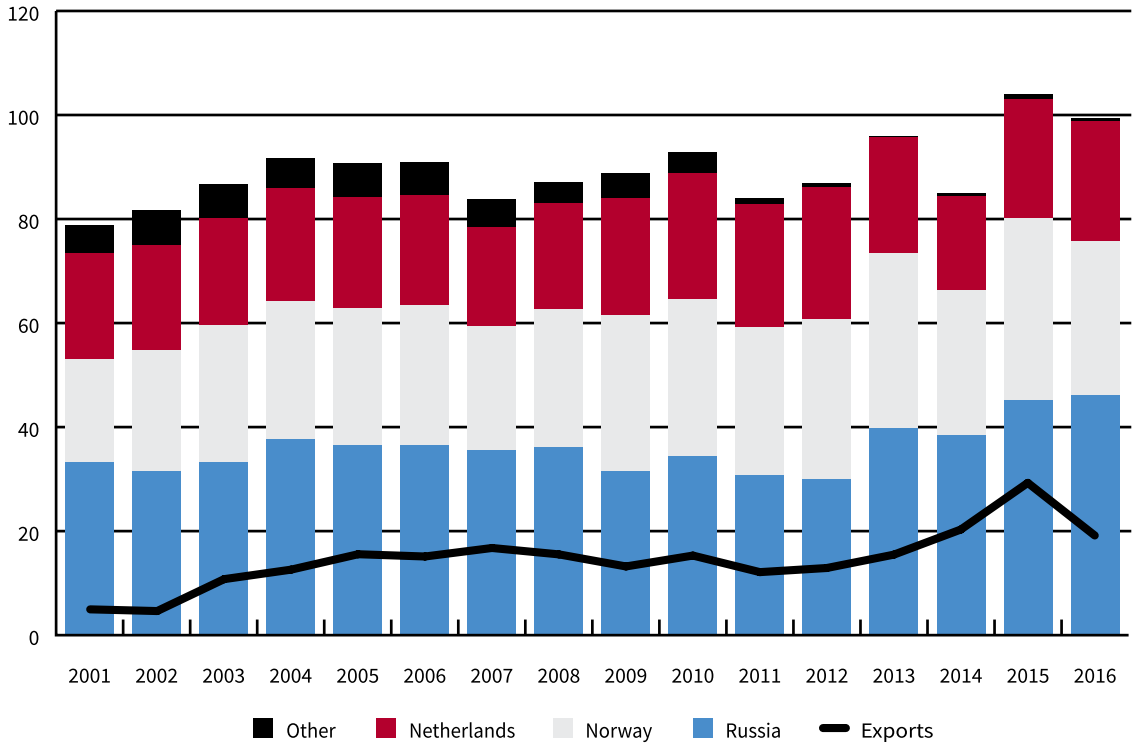
The tests showed that a prolonged supply disruption would have a substantial impact on the EU. Eastern member countries and Energy Community countries would be particularly affected.[4] The report also confirmed that consumers would remain supplied even in the event of a six-month gas disruption if all countries cooperate with each other (EC 2014b).

Pipeline imports

Approximately 90% of Germany's natural gas demand is met with imports. Natural gas is imported exclusively by cross-border pipelines, mainly from Russia, Norway and the Netherlands and, in smaller volumes, Denmark and the UK (Figure 8). The 'oligopoly of suppliers' has persisted due to Germany's pipeline-based import structure (Westphal 2014). According to government figures, German companies have 922 bcm of natural gas contracted for delivery via Germany's cross-border pipeline network until 2025.

Germany is an important natural gas transit hub due to its comprehensive cross-border pipeline infrastructure and its central location in Europe. Large volumes of gas from Russia (see box) and Norway transit the country for delivery to other markets. In 2016, 19% of Germany's pipeline imports were re-exported, mainly to France, the Netherlands, Italy and Switzerland (BP 2017). This means that its cross-border natural gas pipeline network also needs to be considered in a broader European context.

Figure 8: Germany's natural gas imports, by source, and re-exports, 2001 to 2016 (bcm)



Source: BP various years.

Case study: Germany's strategic energy partnership with Russia

The German–Russian energy partnership is based on more than four decades of positive experience of *Ostpolitik* and Cold War détente, the Kohl–Gorbachev deal over German reunification and, more recently, the Schröder–Putin alliance (in Germany referred to as *Wandel durch Handel* or 'change through trade'), which culminated in the decision to build the Nord Stream pipeline.

The partnership had its beginnings during West Germany's Ostpolitik era, following the discovery of the Urengoy gas field in 1966 (Victor & Victor 2006). The Soviet Union began supplying gas to Germany in 1973, under Chancellor Willy Brandt's *Wandel durch Annäherung* ('change through rapprochement') strategy (Westphal 2008). In 1970, a 20-year contract was signed between the Soviet foreign trade ministry and Ruhrgas for the delivery of gas to West Germany under the *Erdgasröhrengeschäft* ('pipes for gas') arrangement. Under that deal, Soviet gas was exchanged for German steel pipes financed by German banks, and credit risks were underwritten by a government credit agency. West Germany's natural gas relationship with the Soviet Union expanded substantially after Ruhrgas signed additional long-term contracts in 1972 and 1974 (Stern 2005).

The pipes-for-gas arrangement was based on a bilateral political and commercial consensus to bind Russian gas suppliers and German buyers with long-term oil-indexed contracts, spanning 20–30 years and with minimum take-or-pay arrangements requiring 75% to 85% of the quantity to be purchased, creating an intentional interdependence in the natural gas value chain (Westphal 2014). The US didn't view the increase in energy cooperation between the USSR and West Germany positively. American leaders expressed concern that increased European dependence on Soviet natural gas supplies would make them vulnerable to political pressure under the threat of supply cuts (Karkalanov 2016).

When the Berlin Wall came down in 1989, Soviet deliveries supplied more than 30% of West Germany's gas demand, and there had been several years of uninterrupted supplies to West Berlin (Stern 2005). Further expansion included the construction of the Yamal pipeline (1997) and Nord Stream pipeline (2011), which bypassed transit countries and directly connected Russia and Germany across the Baltic. From 2019, Nord Stream 2 will supply an additional 55 bcm/year directly from Russia.

Nord Stream serves the geopolitical interests of both countries, reducing transit risks in Belarus and Ukraine. From the German perspective, it provides direct connection to historically stable and reliable Russian gas supplies, bypassing rent-seeking transit states, which have historically benefited from relatively low gas prices (Aalto 2009, Goldthau 2016). The second Nord Stream pipeline will serve Germany's commercial interests, as it will secure substantial supplies at affordable and preferential prices in the context of close ties between Russia's Gazprom and German energy companies, particularly E.ON Ruhrgas and BASF Wintershall (Aalto & Korkmaz Temel 2014). Nord Stream 2 will also strengthen Germany's role in European gas transit, which has increased significantly since the Russia–Ukraine gas dispute in 2014 (Loskot-Strachota 2016).

Another milestone in the relationship was the attempt to break the monopoly of Ruhrgas in the German gas market in the early 1990s. Ruhrgas's ownership and sole access to pipelines (along with local distributors) provided considerable market power vis-a-vis customers, who were becoming increasingly frustrated with monopolistic price discrimination. Structural change wasn't possible as long as the pipelines remained the exclusive preserve of one company (Radetzki 1999).

As a large consumer of natural gas, the chemical giant BASF (through Wintershall, its oil and gas subsidiary) had a strong interest in diversifying away from Ruhrgas and the high tariffs that the company imposed. Gazprom represented a logical (and possibly the only) way for Wintershall to secure sufficient gas to become a significant player in the German market (Kopp 2015). In 1993, Wintershall and Gazprom established Wingas, a joint pipeline and wholesale marketing company. Wingas aggressively built a pipeline system parallel to that of Ruhrgas, and that introduced some competition in the late 1990s. The Wingas challenge against the dominance and inflexibility of Ruhrgas was driven by market dynamics and not by shifts in the regulatory regime (Radetzki 1999). Germany opened its gas market completely by 2001, but greater competition emerged very gradually (Schellnhuber 2004).

CHAPTER 6

Implications and recommendations

The LNG trade

The two case studies (on the 'sucker's payoff' and German–Russian dealings) illustrate the extent of strategic thinking in Australia's and Germany's policy approaches. In the Australian case, oversupply and falling prices have conferred bargaining power upon buyers, empowering them to find their way around oil-indexation and strict destination clauses attached to Australian LNG sales. For Australia, it's apparent that future strategic influence won't arise directly out of market share, but from meaningful adjustments to the ends served by energy resources. This lesson should resonate in the context of a potential strategic energy relationship with Germany.

In the context of the *Energiewende*, the security of gas supply is inseparable from German foreign policy. Bilateralism is a historically developed practice of realising the security of supplies and is best exemplified by Berlin's strategic partnership with Moscow. Since the 1970s, German–Russian relations have developed in a pragmatic direction and have, until recently, been characterised by great breadth and mutual interdependence, particularly in the energy sector. Germany has seen Russia as a stable and reliable supplier with a track record stretching over four decades. The gas dimension of the relationship has remained robust due to converging geopolitical and commercial interests. The longstanding business relationship between the Soviet/Russian and the German gas industries has remained stable and symbiotic (Kopp 2015).

The resilience of German–Russian bilateralism, most recently reaffirmed by the plans to build the Nord Stream 2 pipeline, has acted as a constraint on EU-level external energy relations. The EU's key energy security objective is to diversify natural gas supply away from Russia. The European Energy Security Strategy was launched in 2014 in response to concerns about the delivery of Russian gas via Ukraine. Two of the main long-term objectives include 'diversifying supplier countries and routes' and 'speaking with one voice in external energy policy' (EC 2014c). The EU's LNG strategy, released in February 2016, aims to 'exploit the full potential of access to a growing international LNG market and to make the EU an attractive market for suppliers' (EC 2016).

The EU's Third Energy Package (TEP) of 2009 does not apply to sub-sea natural gas pipelines bringing natural gas to the border of the EU's internal natural gas market. Nord Stream 1 and now Nord Stream 2 belong to the category of external pipelines that are used for the transportation of natural gas to EU markets. In March 2017, the European Commission recognised that the EU energy acquis[5] and TEP do not apply to the Nord Stream 2 project (Talus 2017). While the Nord Stream pipelines do not contravene the EU energy law, from the EU perspective, Germany's support for Nord Stream 2 undermines the credibility of the common energy policy aimed at the diversification of supply routes and suppliers, including for LNG (Loskot-Strachota 2016). A European gas market that's fragmented and opaque enables Russia to extract higher prices for its gas exports and use supplies for political gain. The availability of large volumes of cheap Russian gas via Nord Stream 2 would limit the willingness of EU customers to sign long-term LNG supply contracts. It would affect LNG imports via existing infrastructure (Świnoujście in Poland and

Klaipėda in Lithuania) and hinder the construction of potential new facilities (such as in Wilhelmshaven in Germany). At the same time, even a marginal diversification of European imports from pipelines to LNG helps in contract negotiations with existing pipeline suppliers (Russia, Norway and Algeria). This also applies in the case of Germany (Gusev & Westphal 2015).

Therefore, while committed to Nord Stream 2, Germany also supports the EU's LNG strategy. On one hand, Nord Stream 2 will provide the option of securing additional Russian supplies at affordable and preferential prices. It will also bypass problematic transit states while strengthening Germany's own position as a transit state in the European gas market. On the other hand, additional European LNG imports from Australia, the US or Canada will give Germany additional leverage in contract negotiations with Russia and Norway. Gary Lineker once remarked, 'Football is a simple game; twenty-two men chase a ball for 90 minutes and at the end, the Germans always win.' While the interaction between strategic policies and gas market forces mightn't be as simple as football, the outcome may as well be the same.

It's apparent from this discussion that Australian LNG cargoes won't be reaching Germany's northern shores any time soon. With an option to secure more gas from a reliable and affordable supplier (Russia), and supported by resilient supply infrastructure and a drop in demand, Berlin has no intention of subsidising a receiving LNG terminal. While both Germany and the EU would welcome Australian (or any other) LNG supplies to Europe, their preference would be for spot or short-term cargoes and gas-on-gas pricing. The EU may consider a longer term arrangement for projects of common interest: in this case, LNG receiving terminals that help it meet its security-of-supply objectives (such as Krk in Croatia).

The implication for EU policy is that expanding LNG infrastructure at a time of softening demand could result in investment in stranded assets that are never fully utilised.

Global LNG export capacity is forecast to increase by 45% between 2015 and 2021, and 90% of additional capacity will come from the US and, as illustrated in the first case study, Australia. There's also significant uncertainty about the level of future EU gas demand, which has dropped by 20% since 2010. According to the *Medium-term gas market report 2016*, released in June 2016 by the International Energy Agency (IEA), 'Europe's flexibility to take in additional LNG is limited by slow demand growth, cheap coal and competitive Russian supplies' (IEA 2016a). The bad news for Australia is that oversupply in global LNG markets 'will lead to fierce competition, with flexible US and Qatari volumes set to fight hard to gain access to European customers' (IEA 2016a). The implication for EU policy is that expanding LNG infrastructure at a time of softening demand could result in investment in stranded assets that are never fully utilised (Raines & Tomlinson 2016).

Case study: Russia's revisionism and the potential gas supply disruption to Germany

Energy dependency has often been cited as one of the main drivers of continuity in Germany's Russia policy (Timmins 2011). In German public discourse, that dependency has historically been framed in positive and mutually beneficial terms. Russia has been perceived as a reliable supplier that's as dependent on the security of demand and stable flow of revenues as much as Germany is dependent on its supplies (Röhrkasten & Westphal 2012). That perception wasn't significantly altered by Russia's gas disputes with Ukraine.

Recent changes in the relationship demonstrate that Germany's Russia policy isn't constrained by Germany's dependence on Russian supplies (Adomeit 2015). The policy changed in response to the Ukraine crisis, Russia's annexation of Crimea and the war in eastern Ukraine. In March 2014, Chancellor Angela Merkel warned that Moscow risks substantial damage, economically and politically, if it refuses to change course on Ukraine. Berlin's response to events in Ukraine has been based on a firm condemnation of Russia's action and a willingness to impose sanctions (Forsberg 2016). Germany hasn't been shy of criticising Russia's belligerence and has been willing to bear the economic cost of imposing sanctions on Russia in retaliation for breaches of international law (Dibb 2016). The change is likely to last for the foreseeable future, making a quick return to 'business as usual' highly unlikely (Adomeit 2015). In the most recent development, in late 2016, German politicians and the head of the foreign intelligence service have warned that hackers and others acting for the Russian state could undermine Germany's September 2017 Bundestag election, with the aim of undermining Chancellor Merkel's Christian Democratic Union (Wagstyl 2017).

While Merkel has defended Nord Stream 2, labelling it a 'commercial project', that shouldn't be seen as a broad capitulation to pressures from German industry and commerce. Merkel's position on Nord Stream 2 notwithstanding, it's highly unlikely that German Government policy will soon return to its pre-2014 approach to Russia (Adomeit 2016). In the immediate aftermath of Russia's annexation of Crimea, Merkel stated that 'there will be a reconsideration of the entire energy policy'. Although Germany's dependency on Russian supplies is by no means the most pronounced in comparison to that of other EU member states, Merkel stressed that it was necessary to reduce EU dependence on Russia and that a new 'long-term orientation' should be set in motion (cited in *Spiegel* 2014).

A continuing deterioration in German–Russian relations would affect Berlin's thinking on energy security. In the event of further deterioration of relations between Russia and NATO countries, Germany may be presented with a relatively sudden change of Russian posture. German imports of Russian gas in 2016 amounted to 46 bcm, or 46% of total imports (BP 2017). A major interruption to Russian gas supplies would pose a severe problem for Germany, as short-term substitution of large volumes of Russian gas isn't feasible.

Politically motivated disruptions are unlikely, as they weren't used even at the height of the Cold War (Stern 2005). Three factors limit Moscow's ability to use gas as a political bargaining chip. First, given Russia's dependence on energy export revenues for its economy, a gas cut-off would be a self-defeating measure. Second, the global gas glut has resulted in lower prices, weakening the appeal of Russian offers of cheaper gas in exchange for political concessions. Third, Russian ability to cut gas supplies to Europe is less credible due to EU preparedness as a consequence of new regulation (such as stress tests) combined with new infrastructure (such as interconnectors and LNG facilities). A move towards a more liquid and transparent gas market has reduced the role of politics, limiting the Kremlin's ability to subvert market rules (Miller 2016).

Berlin's best option

While a politically motivated Russian gas supply cut is unlikely while markets are oversupplied, it's prudent for any import-dependent government to engage in strategic analysis of long-term options if such a scenario were to materialise. The global LNG market will remain oversupplied until the end of the decade. However, concerns about gas supply security could reappear on the horizon sometime in the early 2020s (IEA 2016a). LNG market development is very much about getting investments right and in time. For Germany and other European consumers, a diversification strategy aimed at securing long-term contracts from strategic LNG suppliers and political allies (Australia, Canada and the US) can provide a valuable insurance policy against the potential loss of Russian supplies over the longer term.

In this context, in addition to continued support for the EU's LNG strategy (discussed above), Berlin's best option is to act as an 'enabler' of new projects, providing diplomatic and financial support for German companies to secure long-term contracts in projects that otherwise would not be realised. As illustrated in Chapter 5, favourable loan guarantees provided to Canada's Pieridae Energy have enabled E.ON's flexible 20-year supply agreement. This precedent provides a model for a potential arrangement between Australia and Germany. Under such an arrangement, German companies (for example, E.ON in Canada) or their energy trading spin-offs (such as E.ON's Uniper in Qatar) would require financial backing from the government to secure flexible LNG supply contracts in Australian projects that would otherwise not constitute a viable investment.

Transparent and open gas markets

The IEA's most recent biennial ministerial meeting was held in Paris in November 2015, when executive director Fatih Birol laid out three main pillars for modernising the IEA in a transformed global energy landscape. One of the pillars is to broaden the core mandate of energy security to factor in the rising role of LNG in the global energy trade (IEA 2015). In a keynote address at G20 Natural Gas Day in Beijing in June 2016, Birol said that governments and industry must take action to ensure the security of natural gas supplies in the coming decades. He also highlighted the role that the IEA will play in this respect, based on the new mandate on gas supply security (IEA 2016b).

While Germany's international energy engagement policy is mainly aimed at promoting dialogue on renewable energies and energy efficiency (BMWi 2016a), the IEA's broader mandate provides an opportunity for greater cooperation between Australia and the EU. According to its LNG strategy, the EU aims to step up efforts to cooperate closely with international partners to promote free, liquid and transparent global LNG markets. This includes intensifying dialogues with current and future suppliers and other major LNG consumers to remove obstacles to the trading of LNG on global markets (EC 2016). For the EU, a specific aim is to remove barriers to imports from new suppliers, such as the US. One of the action points identified in the LNG strategy is for the European Commission to pursue regular discussions on LNG with Australia (EC 2016).

For Australia, open and transparent global energy markets are considered the best means of promoting national economic interests (DIIS 2015). One of Australia's engagement priorities through the IEA is to promote the development of efficient, transparent and competitive global energy markets to help address energy access, affordability and security challenges (DIIS 2016c). The broader scope of the IEA's mandate provides an opportunity to solicit the EU's advice about ongoing gas market reform in Australia, particularly with regard to market mechanisms to assist price discovery, ensuring that supply responds flexibly to market conditions (DIIS 2015).

Energy transition: towards a level playing field

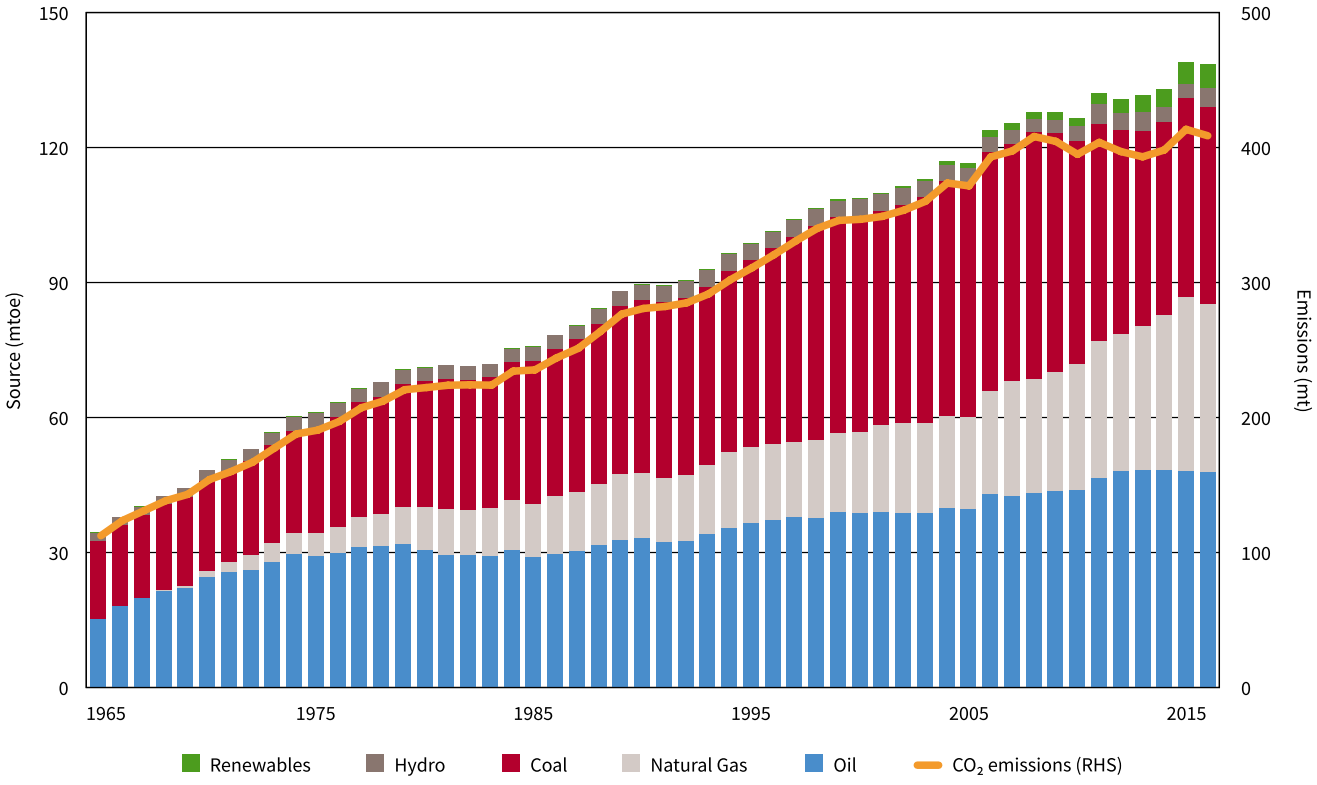
Energy transitions are continuously unfolding processes that gradually change the composition of energy sources (Smil 2010). The world is transitioning towards a lower-emissions energy future. For Germany, the energy transition provides the solution to the challenges of climate change and energy security. One of the goals of the *Energiewende*

is to reduce fossil-fuel import dependence over the medium to long term. By increasing the share of zero-carbon sources in the primary energy supply, Germany aims to reduce exposure to price fluctuations in international energy markets and improve supply security (BMWi 2016a). According to Kirsten Westphal, in the context of volatile prices and growing geopolitical risks, 'the *Energiewende* is the most important pillar for Germany's supply security, because it is the most reliable part of energy policy.' Expanding renewable energy is 'a strategic imperative' (cited in Amelang 2015).

Australia's energy export policy is in stark contrast to Germany's sustainable energy policy. According to one media commentator, the actions outlined in the EWP 2015 'read like a wish-list drawn up by the oil, coal and gas industries' (Phillips 2015). While EWP 2015 made cuts to renewable energy targets and subsidies because such interventions 'distort market signals and cause unintended disruptions to competitive energy markets' (DIIS 2015), the government continues to support the coalmining and natural gas industries through subsidies for fossil fuel use and production.

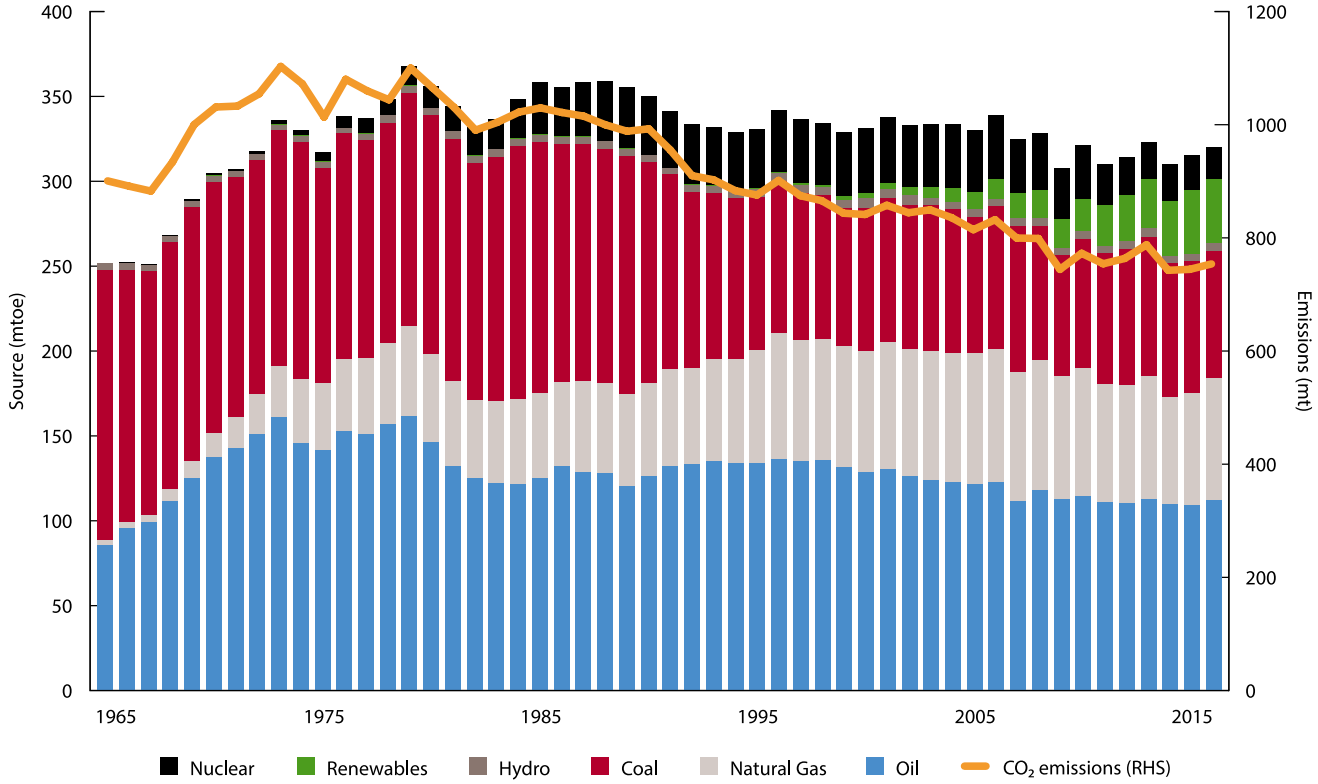
EWP 2015 acknowledges that Australia has world-class solar, wind and geothermal resources and good potential across a range of other renewable energy sources (DIIS 2015). However, that potential remains largely unrealised. In 2015, renewable sources supplied 14.6% of Australia's and 30% of Germany's electricity needs (Clean Energy Council 2016, Agora Energiewende 2015). In 2016, excluding hydroelectricity, renewable energy supplied 3.9% of Australia's primary energy use, which is below the OECD average (4.9%). The corresponding figures for the EU (8.3%) and Germany (11.7%) are significantly higher (BP 2017). The structure of Australia's primary energy use has remained consistent over the past half-century (Figure 9), in contrast to Germany's (Figure 10).

Figure 9: Australia's primary energy use, by source (mtoe), and CO_2 emissions (mt), 1965 to 2016



Source: BP 2017.

Figure 10: Germany's primary energy use, by source (mtoe), and CO_2 emissions (mt), 1965 to 2016



Source: BP 2017.

Under the Paris climate agreement, Australia has committed to reducing greenhouse gas emissions by 26–28% below 2005 levels by 2030. Achieving that target under current policy settings would be impossible. Australia may not have a sustainable future if the nation remains tied to a fossil-fuel-based energy system that can rapidly become marginalised by global society. It's perfectly reasonable to ask whether the existing patterns of government intervention correspond to the public interest and to contemplate reformulating policy to tip development in more socially desirable directions.

There's no doubt that the *Energiewende* has had its critics. Most, unsurprisingly, are associated with the fossil-fuel and nuclear industries, which have much at stake. Yet, over the past two decades, Germany has successfully broken the nexus between electricity demand and economic growth. Following years of scepticism, even the IEA has embraced the *Energiewende*. Internationally, Germany plays an active role in promoting the global transition to sustainable energy supply (BMWi 2015). Numerous countries seek to emulate the *Energiewende* as a model for decarbonisation, including China, the world's fastest-growing renewable energy market (Fuchs 2016). Of course, each country is starting with a different set of circumstances, and policies need to be tailored to suit the specific context.

In 2012, Ceramic Fuel Cells, a Melbourne-based CSIRO spin-off company that invented a renewable energy electricity generator, was forced to move to Germany because of a lack of opportunities in Australia. Its generator could cut electricity bills by up to 50% for households and small businesses. The company moved its operations to Germany to benefit from government subsidies not on offer in Australia (Stewart 2014). More recently, South Australia was effectively penalised by the National Electricity Market for its success in attracting renewable energy to the state (Slezak 2016; Harmsen 2017).

The *Energiewende* provides a blueprint for expediting the worldwide integration of technologies that will be necessary to reduce fossil-fuel dependence and combat climate change (Westphal 2012). With its strong focus on innovation, the Turnbull government is likely to support the early adoption of new technologies. However, without the government playing an active role, Australia will remain a passive importer of technologies instead of an innovator and major exporter.

Strategic energy partnership

The Australia–Germany Advisory Group was established in 2014 to examine ways to build closer ties between the two countries. One of its recommendations was for Australia and Germany to introduce an annual '2+2' strategic dialogue involving foreign and defence ministers from both countries (DFAT 2015). The inaugural 2+2 meeting in September 2016 marked a historic milestone in the development of bilateral political and strategic relationship (Australia–Germany Advisory Group 2016). The dialogue will serve as a key vehicle for strategic discussion between the two countries and provide a valuable opportunity to engage in a robust, wide-ranging discussion among policymakers, business leaders and other stakeholders on how best to shape strategic thinking in both countries, including on energy security.

In March 2017, building on the Woodside Petroleum-sponsored side event for Australian and German delegates at the LNG18 Conference in Perth in April 2016, the German Federal Ministry for Economic Affairs and Energy and the Australian Department of the Environment and Energy signed a 'Declaration of Intent to establish an Australia–Germany Energy and Resources Working Group' (BMWi 2017; Frydenberg & Canavan 2017). As one of the key recommendations of the high-level German–Australian Advisory Group, the working group will engage in dialogue on trade in energy and resources, climate change, lessons and opportunities from Germany's energy transition, as well as options for engaging non-governmental institutions in energy research fields (Australia–Germany Advisory Group 2016).

A regular exchange of experience and best practices on long-term energy strategies in both countries is aimed at promoting and accelerating the shift to an environmentally friendly, secure and affordable energy supply. The dialogue will assist both governments in boosting energy productivity, fostering the expansion of renewable energy, ensuring stable investment conditions are in place and improving security of supply via diversification of energy sources (BMWi 2017; Frydenberg & Canavan 2017). The working group will provide an opportunity to learn from each other in addressing the issues faced by both countries in a transforming energy sector as they move to a lower emissions future. Australia can learn valuable lessons from the *Energiewende* that can help in accelerating change towards zero-carbon energy systems that promote economic growth.

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NOTES

1 In comparison, international trade in crude oil and petroleum products accounts for two-thirds of global demand.

2 In 2016, 19 countries had liquefaction facilities, while 39 countries had LNG receiving terminals.

3 LNG for spot and short-term trading is available because of excess production (above the fulfilment of the producers' supply obligations) or is available from plants with marginal capacity obtained by debottlenecking.

4 The Energy Community is an international organisation containing the EU, represented by the European Commission, and the countries of Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Kosovo (in line with UN Security Council Resolution 1244 and the International Court of Justice opinion on the Kosovo declaration of independence), Moldova, Montenegro, Serbia and Ukraine—these countries are known as the 'contracting parties'. It aims to extend the EU's internal energy market to southeastern Europe and the Black Sea region.

5 https://www.energy-community.org/portal/page/portal/ENC_HOME/ENERGY_COMMUNITY/Legal/EU_Legislation. The Energy Community acquis comprises the core EU energy legislation in the area of electricity, gas, environment, competition, renewables, energy efficiency, oil and statistics.

ACRONYMS AND ABBREVIATIONS

bcm	billion cubic metres
BMWi	Federal Ministry for Economic Affairs and Energy (Germany)
CSG	coal seam gas
EU	European Union
EWP	Energy White Paper
HH	Henry Hub
IEA	International Energy Agency
LNG	liquefied natural gas
MMBtu	million British thermal units
mtoe	million tonnes of oil equivalent
mtpa	million tonnes per annum (LNG)
OECD	Organisation for Economic Co-operation and Development
TEP	Third Energy Package

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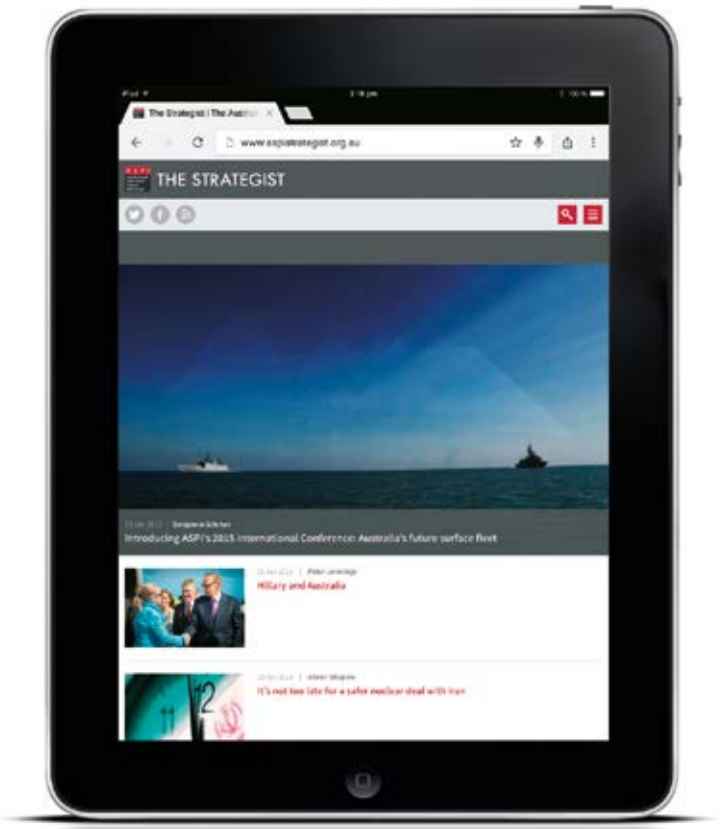

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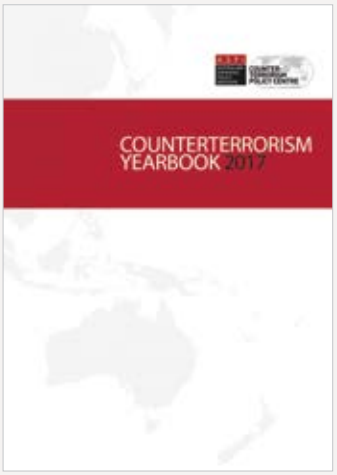

Australia and Germany

A new strategic energy partnership

Australia's growing export capacity, backed by its reputation as a safe, reliable and secure supplier, seems to be a perfect fit in Europe's quest for new suppliers and in Germany's search for new sources of electricity. Despite these potential synergies, this paper argues that Australia is unlikely to emerge as an LNG supplier to Germany in the foreseeable future. However, there's much value for Australia and Germany in strengthening the broader energy relationship.

The paper provides an overview of key concepts, drivers and trends in energy policy approaches that informs the discussion in later chapters. It tracks the evolution of international gas markets and highlights the role of the LNG trade in cross-regional market integration over the past decade. A chapter on Australia and another on Germany survey the key aspects of national policies and approaches to natural gas markets. The focus is on the role of the two countries in the international gas trade. The paper analyses the implications for the bilateral energy relationship.

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