



**CANADIAN GLOBAL AFFAIRS INSTITUTE**  
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# **A Study of Liquefied Natural Gas Development in Australia and Requisite Learnings for Canada**

by Kelly J. Ogle  
November 2019

# LNG SERIES

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## **A STUDY OF LIQUEFIED NATURAL GAS DEVELOPMENT IN AUSTRALIA AND REQUISITE LEARNINGS FOR CANADA**

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**G**lobal energy demand continues to increase, and natural gas is the only hydrocarbon that can easily lead to further reductions in global carbon intensity. Current technologies, investments and consumption trends suggest that natural gas will be central to any global energy transformation. Moreover, abundant gas resources remain undiscovered and liquefied natural gas (LNG)<sup>1</sup> will be a significant component of the global transition to a lower carbon future.

On Oct. 12, 1964, the first LNG cargo was delivered from Algeria to the U.K.'s Canvey Island regasification terminal. Today, there are more than 400 trade routes and upwards of 50 countries participating in the global LNG trade. Australia possesses vast onshore and offshore caches of natural gas and for a time in 2018 Australia overtook Qatar as the world's largest exporter of LNG. Although, Alberta and British Columbia hold similar potential, Canadian gas is completely landlocked. Pipeline infrastructure and egress from Canadian gas fields is extensive but tidewater connectivity remains elusive.

What circumstances allowed Australia to react to the rapidly expanding global LNG business? What did Australian natural gas developers do differently? How did Australian governments factor in decision-making? This begs the question: Why is Canada so late to the game? Are there unknowns that hinder Canada's ability to participate globally? Combining an historical evaluation/analysis of Australia's system of governance, regulatory bodies, natural gas reserves, egress and global market conditions, this paper examines Australian development of export gas. What lessons can Canada learn as its burgeoning LNG business expands toward economic export of LNG?

## Children of the Same Mother

Like Canada, Australia is a constitutional monarchy wherein the federal government and sub-national jurisdictions (provinces and territories in Canada; states and territories in Australia) employ the Westminster parliamentary system of governance. Australia is a commonwealth federation of six states and two self-governing territories. Each state has a governor, a premier (head of government) and a two-chambered Parliament.<sup>2</sup> The federal government has no power to override the decisions of state governments except in accordance with the federal constitution; however, it can and does exercise that power over territories. The Australian House of Representatives has 150 single-member electorates, each representing about 80,000 to 90,000 voters. The most populous state, New South Wales, has 49 electorates, while the smallest, Tasmania, has five. Elections for the House of Representatives are usually held every three years.<sup>3</sup>

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<sup>1</sup> The liquefaction process condenses gas by super cooling (-162C) and LNG takes up about 1/600th the volume of natural gas in the gaseous state.

<sup>2</sup> New South Wales, Victoria, Queensland, Western Australia, South Australia and Tasmania, the Australian Capital Territory and the Northern Territory. Queensland has had only one chamber since 1921.

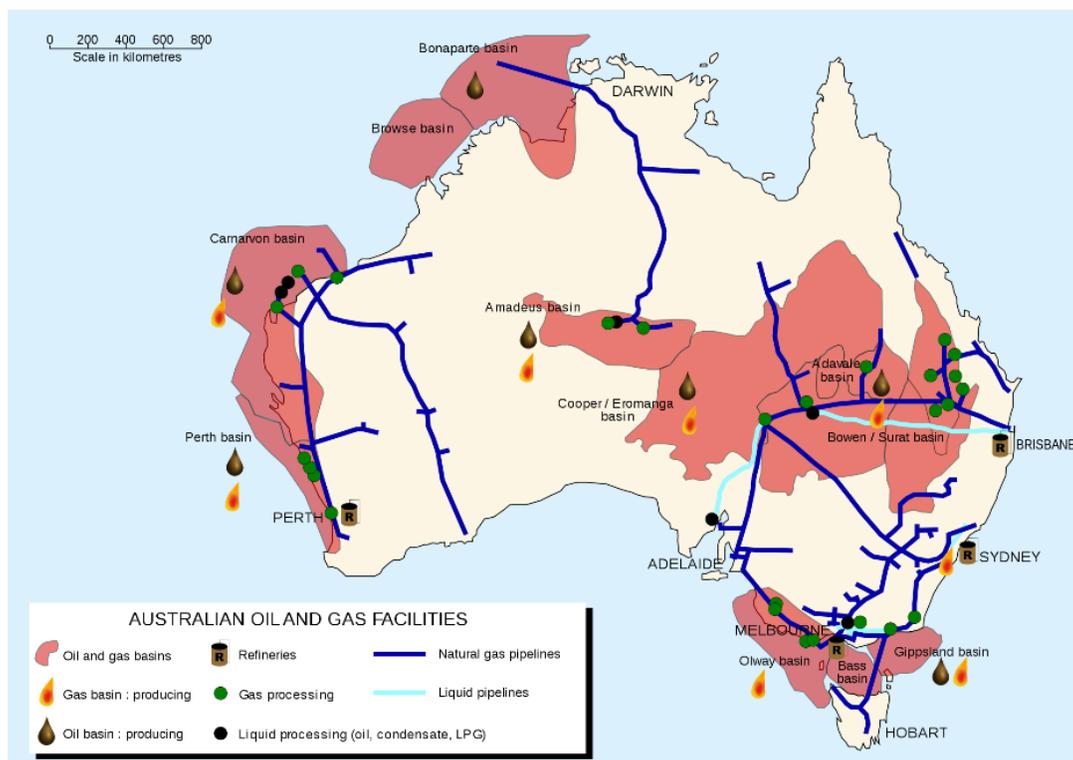
<sup>3</sup> <http://moad-web.s3.amazonaws.com/heracles/production/054/a90/437/054a904372eb7953f0c545270fe9a77e94e5983013f86bfc16561a05ee55/61-System-of-government-75e046216.pdf>



Australia's elected senate is one major difference between the two countries.<sup>4</sup> All states, regardless of population, elect 12 senators, while each territory elects two. Senators serve six-year terms, except for territory senators, whose term is the same as the House of Representatives. Australian interstate disputes, and regional alienation in the form of small states' resentment of large states' domination, command less attention than in Canada and an elected senate deserves some credit for this.<sup>5</sup> Another significant difference between Canada and Australia is mandatory registration and voting; fines are levied for non-compliance.

The development of large infrastructure projects, such as LNG, can be heavily influenced by the support that the project has from host governments, regulatory conditions and political stability.

While Australia is perceived as relatively stable, the past decade has witnessed serious volatility and numerous developmental setbacks largely caused by existential factors such as commodity prices, resource policy inertia and infrastructure gridlock. Moreover, virulent Australian anti-development, anti-fracking movements are in place in virtually all states.



## Production and Reserves

Although the majority of Australia's natural gas is located offshore Western Australia, gas has been produced offshore Southeast Australia for over 40 years. Four gas basins account for almost

<sup>4</sup> Australia's senate, which is elected by proportional representation. [Howard Cody](#), "Lessons from Australia in Canadian Senate Reform," *Canadian Parliamentary Review* 18 2: 1995.

<sup>5</sup> *Ibid.*

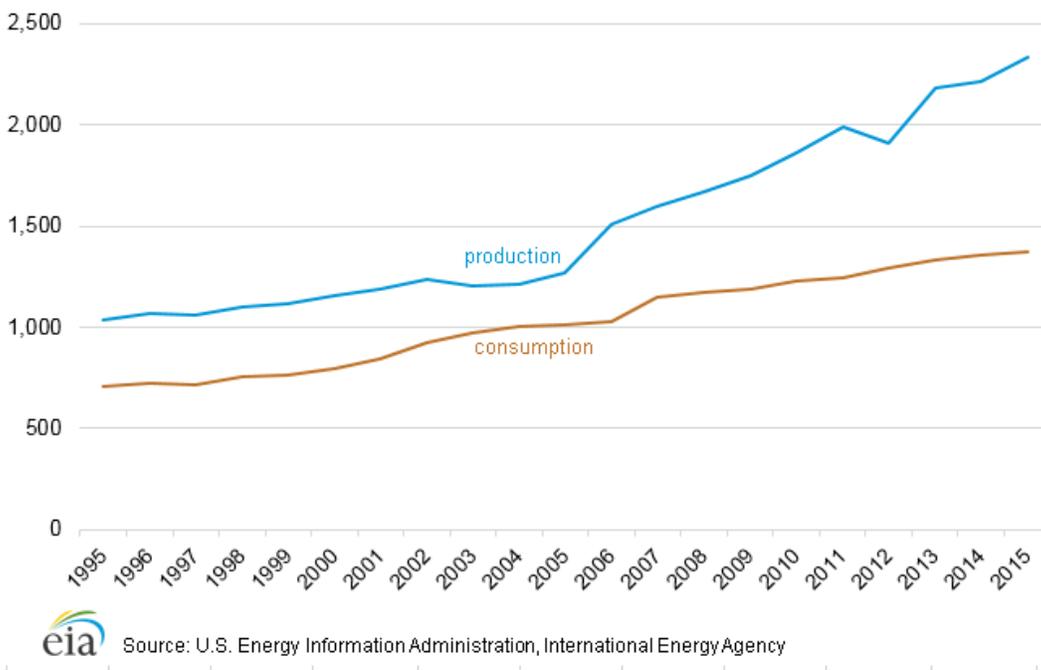


90 per cent of total estimated resources. On- and offshore the West Coast are the Carnarvon and Browse basins; the Bonaparte Basin is in the north and the Gippsland Basin is in the southeast. As well, there are unconventional coal seam gas (CSG)<sup>6</sup> fields in the Surat/Bowen basins on the East Coast.

Natural gas production in Australia climbed to nearly 100 BCM in 2017,<sup>7</sup> a 20-per-cent increase from 2016, largely as feedstock for new LNG export facilities and strong natural gas demand in regional markets.

No pipelines run east to west as local gas is cheaper to produce and exploit than paying for transportation. From a demand perspective, domestic consumption of gas is mainly used in manufacturing, electricity generation, mining and residential. Increasing domestic demand and a dramatic rise in LNG exports are creating difficulties as regional and federal authorities seek to find a balance between the interests of Australian consumers and producers who wish to generate higher export revenues and to guarantee export commitments. Unfortunately, domestic prices have risen above international prices, producers are locked into meeting export commitments and severe penalties exist for missing cargoes.

**Figure 5. Australia's dry natural gas production and consumption, 1995-2015**  
billion cubic feet



<sup>6</sup> CSG is natural gas (methane) which is sourced from underground coal formations, sometimes known as coalbed methane. CSG is increasingly being used to supply gas to Eastern Australia. In conventional gas fields, the gas exists in permeable sandstone reservoirs. CSG, however, is found in coal seams, where underground water pressure keeps it contained. Pumping water out of the coal seam releases this pressure and allows gas to escape from the coal into a well.

[https://www.aph.gov.au/About\\_Parliament/Parliamentary\\_Departments/Parliamentary\\_Library/pubs/BriefingBook44p/GasDebate](https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/BriefingBook44p/GasDebate)

<sup>7</sup> Australia is the eighth largest producer of natural gas in the world. Canada is fourth. See: <https://yearbook.enerdata.net/natural-gas/world-natural-gas-production-statistics.html>



## Transportation and Consumption

The historical overarching issue facing the domestic gas market has been delivery of enough supply to meet ever-growing demand. Moreover, the nature of the challenge is specific to each regional domestic market. Australia's well-developed natural gas pipeline networks are largely privately owned and operated. Except for Western Australia and Tasmania, the Australian Energy Regulator oversees regulation which varies depending on competition. In the main, natural gas is transported from the key production centres to main economic hubs in the east or to the coast for export. However, consumers are increasingly worried about the impact of new LNG export projects both on domestic prices and the availability of gas for the domestic market.

## Resource Regulation

Commonwealth, state and territory governments collect royalties for both onshore and offshore mineral and petroleum products. Although energy is of national significance, there is no common royalty regime across all Australian states and territories. Therefore, in 2011 the Council of Australian Governments (COAG) established the Standing Council on Energy (SCE). The SCE was comprised of representatives of the commonwealth, state and territorial governments who cooperate to harmonize energy policy, legislation and market rules. Subsequent legislation is administered by each Australian state and territory, and the commonwealth, with some variations between jurisdictions. In 2014, the SCE became the COAG Energy Council with a mandate to provide a "forum for collaboration on developing an integrated and coherent national energy policy ..."<sup>8</sup> The council meets twice a year and discusses and advises on stakeholder engagement, resources and markets, and market reforms. Later in 2014, the council released its vision for the gas market and the Australian Gas Market Development Plan in order to improve visibility and accountability.<sup>9</sup>

At the commonwealth level, the Australian government administers and collects taxes and charges on the recovery of oil, gas and condensate with a profits-based levy on all oil and gas projects both onshore and offshore.<sup>10</sup> State and territorial governments also recover taxes, royalties and rents from these activities. Petroleum royalties and taxes are paid at different rates depending on whether they are offshore or onshore. While onshore royalty rates vary by state,<sup>11</sup>

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<sup>8</sup><http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/COAG%20Energy%20Council%20Communique%20-%20Final%20-%202011%20May%202014.pdf>

<sup>9</sup><http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/COAG%20Energy%20Council%20Communique%20-%202011%20Dec%202014%20-%20FINAL.pdf>

<sup>10</sup> The petroleum resource rent tax (PRRT) is a profit-based tax levied at 40 per cent of net revenues (sales receipts less eligible expenditures) from gas projects. This is paid for by onshore and offshore oil and gas developments. <https://www.ato.gov.au/Business/Petroleum-resource-rent-tax/>

<sup>11</sup> New South Wales – 10 per cent of the value at the wellhead of the petroleum (before Jan. 1, 2013, the rate of royalties for the first five years of commercial production was nil; and for the sixth year six per cent, rising by one per cent each year up to 10 per cent of the wellhead value in the 10th year). Northern Territory – 10 per cent of the gross value at the wellhead of all petroleum products produced from the licence area. Queensland – 10 per cent of the wellhead value. South Australia – 10 per cent of the net post-wellhead sales value. Victoria – 10 per cent of net wellhead value of the petroleum produced. Tasmania – 12 per cent of the gross value of petroleum at the wellhead. Western Australia – 10-12.5 per cent of the wellhead value of petroleum produced. In 2009, the royalty rate for tight gas was reduced from 10 per cent to five per cent.



offshore petroleum royalties currently only apply to the North West Shelf (NWS) production area and state and territory waters.<sup>12</sup>

Since 1989, LNG's economic impact has been substantial with room to grow.<sup>13</sup> If so, LNG exports would surpass metallurgical coal as Australia's second biggest resource and energy-export earner. According to Malcolm Roberts, chief executive of the industry lobby, the Australian Petroleum, Production and Exploration Association (APPEA), "Australia's LNG projects will deliver decades of economic growth, jobs and exports."<sup>14</sup> However, in the past few years, domestic gas supply worries stalled LNG development. Australian gas supply and demand challenges are a microcosm of global issues; Eastern Australia markets are undersupplied and face pricing pressures while at the same time exporting gas via LNG. Furthermore, some of Australia's woes are self-inflicted. The state governments have legislated moratoriums on gas development in Victoria, New South Wales, Northern Territory and Tasmania, creating regional gas shortages. There are no penalties for not supplying the domestic market, but severe penalties for shorting Asian customers.

In April 2017, then-prime minister Malcolm Turnbull initiated the Australia Domestic Gas Security Mechanism (ADGSM), giving the minister of resources the authority to curb Australia's LNG exports. Turnbull suggested that the "shortage of domestic gas supplies has resulted in dramatically higher prices in Australia – higher than prices paid in the markets to which Australian gas is being exported."<sup>15</sup> The ADGSM came into effect on July 1, 2017 and will be reviewed in 2019 to assess its overall effectiveness and efficiency.<sup>16</sup> Some suggest that the ADGSM follows a new wave of resource nationalism around the Asia-Pacific region in the name of national energy security.<sup>17</sup> Industrial gas users praised the plan while the natural [gas industry voiced strong opposition](#), considering the policy damaging to Australia's reputation as a dependable global LNG supplier.<sup>18</sup>

Australia also possesses very large prospective gas resources<sup>19</sup> with coal CSG the main source of unconventional gas production, making Australia the third largest producer of CSG globally. According to the International Energy Agency (IEA), CSG is projected to continue to grow in importance in Australia.<sup>20</sup> However, onshore production in Australia has raised social and

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<sup>12</sup> State and territorial waters are defined as three nautical miles offshore. Outside that limit, commonwealth jurisdiction applies. In 1967, commonwealth and state officials reached agreement on an offshore constitutional settlement. The agreement includes a 60:40 revenue sharing arrangement of the 10-per-cent royalty rate of the wellhead value. Any royalties exceeding 10 per cent go entirely to the state.

<sup>13</sup> In 2017-2018, LNG exports earned Australia nearly A\$38 billion, up 36 per cent year over year, and are forecast to rise to A\$48.4 billion in 2018-2019.

<sup>14</sup> [https://www.appea.com.au/media\\_release/national-resources-statement-outlines-a-blueprint-for-success/](https://www.appea.com.au/media_release/national-resources-statement-outlines-a-blueprint-for-success/)

<sup>15</sup> The Australian Domestic Gas Security Mechanism (ADGSM) is in place to ensure there is a sufficient supply of natural gas to meet the forecast needs of energy users within Australia. If LNG projects' use of domestic gas results in a supply shortfall in a domestic market, those projects may be required to limit their exports or find new gas sources. <https://www.industry.gov.au/regulations-and-standards/australian-domestic-gas-security-mechanism>

<sup>16</sup> <https://www.lexology.com/library/detail.aspx?g=012200dd-0656-4c10-adfb-7045348b8307>

<sup>17</sup> <http://www.mondaq.com/australia/x/608668/Oil+Gas+Electricity/Everything+You+Need+To+Know+About+The+Australian+Domestic+Gas+Security+Mechanism+What+Does+This+Mean+For+Australian+LNG+Exporters+And+Corporations+Importing+From+Them+Everything+You+Need+To+Know+About+The+Australian+Domestic+Gas+Security+Mechanism>

<sup>18</sup> <https://www.forbes.com/sites/thebakersinstitute/2017/07/05/australias-conflicting-natural-gas-policies/#3132ce3d7741>

<sup>19</sup> Prospective resources are those quantities of petroleum which are estimated, on a given date, to be potentially recoverable from undiscovered accumulations. <https://www.spe.org/en/industry/petroleum-resources-classification-system-definitions/>

<sup>20</sup> In the IEA's *World Energy Outlook (WEO) New Policy Scenario (NPS)*, Australia becomes the world leader in CSG production by 2025, with an output of more than 60 bcm – almost half of the world's total CSG supply, and production continues to grow to reach a projected 90 bcm in 2040.



environmental concerns regarding impacts on aquifers, land access and public health. As a result, several states banned onshore unconventional gas exploration. In March 2017, the state of Victoria banned all onshore gas exploration, imposing a moratorium on any onshore petroleum exploration and production until July 2020. Other states followed. In New South Wales, no additional wells were drilled between 2014 and 2017 because of a blanket ban on developing unconventional gas. In the Northern Territory, which extends from the centre of Australia to its northern coastline, a series of scientific studies confirmed the state's gas potential.<sup>21</sup> However, a September 2016 moratorium stalled all activity, banning hydraulic fracturing amid concerns the drilling method could harm the environment. It commissioned an inquiry into the environmental, social and economic risks of the extraction process and 18 months later accepted the inquiry's conclusion that the risks were manageable. The moratorium on fracking was lifted with strict new laws to be in place before exploration or production can occur.<sup>22</sup> In September 2017, Western Australia also announced a moratorium on hydraulic fracturing while it examined the potential risks associated with the drilling technique. After a 12-month independent inquiry by Australia's Environmental Protection Authority, the Western Australian government also lifted the fracturing moratorium.

In late 2018, a task force from the governments of the commonwealth, the states and the Northern Territory released a non-partisan initiative to deliver a road map for the entire resources sector. The Resources 2030 Taskforce was created to help the resource sector advance and be more globally competitive in the medium to long term.<sup>23</sup> The report criticized federal and state governments for not collaborating on much-needed policies to promote exploration. It called for more streamlined regulations that avoid unnecessary duplication. The report follows years of lobbying by the APPEA and other oil and gas trade bodies for the government to allow drilling in new basins. The APPEA pointed out that petroleum exploration in Australia is at its lowest level in more than 20 years, mainly due to endless conflicts over the role of renewables in energy supplies. Furthermore, the gas industry has been frustrated over a decade-long failure to effectively integrate energy policy and climate policy.

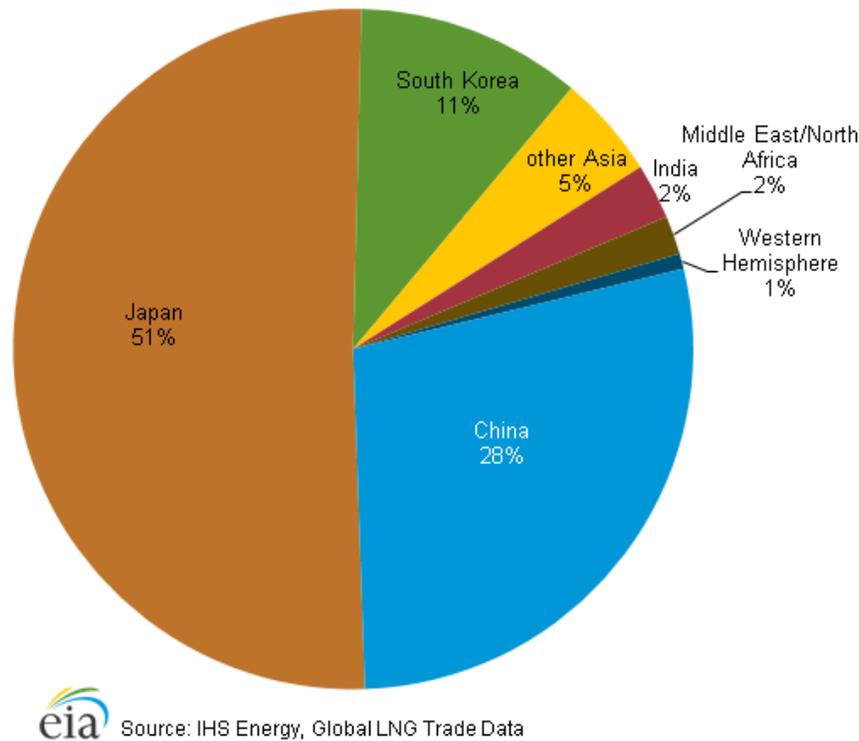
In the Pacific basin consumer markets, geographic proximity and abundant natural gas resources have made Australia a leading LNG supplier. Asian markets are almost exclusively the terminus of Australia exports. Japan is the largest importer of LNG from Australia, purchasing about 51 per cent of Australia's exports in 2016, mostly through long-term contracts. The 2011 Fukushima nuclear power plant accident increased natural gas-fired generation as a substitute for lost nuclear capacity. Other key consumers include China, South Korea and [Taiwan](#).

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<sup>21</sup> <https://theterritory.com.au/invest/key-sectors/oil-and-gas>

<sup>22</sup> Where they have relaxed the ban, the rules about well location (proximity to settlement, Aboriginal title, farming, parks, water, etc.) effectively eliminated all new activity.

<sup>23</sup> <file:///C:/Users/Trafina/Documents/Personal%20Files/CGAI/LNG%20Paper/resources-2030-taskforce-report.pdf>

**Figure 6. Australia's LNG exports, 2016**

The North West Shelf Venture began shipping cargoes in 1989.<sup>24</sup> Until 2004, export volumes were stable around 10 bcm per year. Five years later, they had doubled. The project has since grown to include five production units (or trains). It now produces up to 16.3 million tonnes per annum (mtpa).

At the beginning of 2017, Australia had seven existing LNG export facilities with a total capacity of almost 2.9 Tcf/y.<sup>25</sup>

Australia's LNG development experienced several challenges. Relatively compressed timetables, cost inflation and labour shortages led to delays in almost all energy projects. The LNG schemes in Northern Territory and Western Australia have experienced problems from inception, with cost overruns and project delays undermining project economics. The Pluto project provides a stark example.

Pluto received final investment decision (FID) and sanction in July 2007 with first LNG scheduled for February 2011 and an estimated development cost of US\$11.2 billion. However, in November 2009, a six- to 10-per-cent increase in the cost estimate was blamed on lower than budgeted

<sup>24</sup> Operated by Woodside Petroleum on behalf of a consortium that also includes Shell, BP, Chevron, BHP and MiMi (Mitsubishi and Mitsui), the project has delivered more than 3,000 cargoes to the Asia-Pacific region as well as supplying the domestic West Australian market.

<sup>25</sup> <https://www.appea.com.au/oil-gas-explained/operation/australian-lng-projects/> Darwin LNG (2006), Pluto (2012), Queensland Curtis (2014), Gladstone LNG (2015), Australia Pacific LNG (2015), Gorgon (2016) and finally, Wheatstone's first cargo was in October 2017. Two large Australian LNG schemes are currently at various stages of development. These draw from gas fields off the north coast of Western Australia (Prelude and Ichthys). In total, Australia has almost \$80 billion worth of LNG projects under construction.



productivity in both onshore and offshore construction. Labour practices were a prominent issue and two strikes saw half the workforce walk off the job in December 2009 and June 2010.<sup>26</sup> The proponent announced a six-month delay in the project's commissioning and a further seven-per-cent increase in costs. In June 2011, another six per cent was added to the overall cost estimate and a further commissioning delay to March 2012. First LNG was exported in May 2012, 15 months late and \$3.7 billion over initial estimate.



Projects in the east suffered from execution issues as well, and since commissioning, the three East Coast LNG projects have run well below nameplate capacity although exports did pick up in late 2018 and early this year. This is largely a production-type challenge; the necessity of continually drilling CSG wells to sustain gas production drives high production costs and access to services, not to mention increasing environmental pressures.

Another key catalyst to the rising costs of early LNG projects was rapidly increasing raw material costs, particularly steel. Unfortunately, engineering procurement contractor (EPC) bids were prepared for FID long before first construction. As global LNG development was already in a frenzied state, project investors could not pass the risk of materials cost escalation to the EPC as part of the construction contract. Past experiences in Qatar caused contractor reluctance to take fixed-price risk. Therefore, such risks and liability for higher raw material and labour costs could not be passed on to the project proponent. More recent Australian projects focused on

<sup>26</sup> Labour practices in Australia play a role. Small groups can unionize (such as tugboat deckhands) and can demand large wage increases. Unions stage negotiations so that after a small union strikes a robust gain, the next union steps up and starts from there. This creates a kind of arms race. Plus, labour contracts expire before the projects are done, shifting negotiating leverage to the union. Finally, the labour force takes almost a month off every year for summer holidays, and whole projects simply shut down. Productivity is therefore low.



modularized equipment to minimize construction work at the site due to high labour costs and personnel restrictions.

At the time, Australian trade unions wielded significant power in the country. Furthermore, in a country with a relatively small population, the development of seven LNG plants at the same time led to a shortage of skilled labour, a situation exacerbated by strict foreign worker rules.<sup>27</sup> Furthermore, until September 2013, the Labour government imposed severe restrictions on visas and forced companies to provide exact estimates of their workforce. Domestic employees were hugely advantaged – skilled, semi-skilled and unskilled such as laundry workers or drivers.

In summary then, LNG development was hamstrung by increasing labour costs caused by a tight labour market in the oil and gas sector, a strengthening local currency, some project management and design inefficiencies, general cost inflation for materials and an increasing focus from regulators and the local population on the environmental impact of projects. The weakening of the Australian dollar after 2012 eases some of the cost pain for some projects, but nevertheless it seems likely that only brownfield expansions, or floating liquefaction, will be seriously considered in the future. In 2014, Brian Songhurst of the Oxford Energy Group made the same observations.<sup>28</sup> The high costs of Australian projects were driven by a strengthening Australian dollar, very high construction costs and the remote locations far from any infrastructure.

## Supply and Demand

Natural gas is destined to have an expanded share of the energy mix for power generation, space heating, petrochemical feedstocks and transportation fuels. Until the end of the 20<sup>th</sup> century, most global jurisdictions with natural gas resources looked first to ensure domestic supply and Australia was firmly in that camp.<sup>29</sup> Horizontal drilling and hydraulic fracturing changed all that, as enormous reserves and marketable resources<sup>30</sup> were freed up for export. In the next decade, production is forecast to grow dramatically in the Middle East, Russia and Eurasia, North America and Africa, greatly exceeding localized demand. At the same time, Europe, Asia and Oceania will face growing supply deficits.<sup>31</sup> LNG solves some of the geographic difficulties and the growth in LNG is largely attributable to this increasing mismatch between areas of natural gas supply and

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<sup>27</sup> <http://online.wsj.com/article/BT-CO-20130207-718721.html>, <http://www.bloomberg.com/news/2013-04-25/highest-paid-workers-driving-shell-gas-terminal-offshore.html> <http://www.theaustralian.com.au/national-affairs/local-project-costs-40pc-above-the-us/story-fn59niix-1226386836012#mmpremium> <http://www.immi.gov.au/Visas/Pages/457.aspx> <http://www.theage.com.au/comment/the-age-editorial/changes-to-visa-caps-could-hurt-all-workers-20140312-34moy.html>

In Canada, Newfoundland-Labrador offshore petroleum resources are jointly managed by the federal and provincial governments through the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB).<sup>27</sup> The Nova Scotia generic royalty regime has reasonably similar structure and parameters.

<sup>28</sup> [https://ora.ox.ac.uk/objects/uuid:40de2a7f-7454-4d7d-977b-972112fb0f9a/download\\_file?file\\_format=pdf&safe\\_filename=NG-83.pdf&type\\_of\\_work=Working+paper](https://ora.ox.ac.uk/objects/uuid:40de2a7f-7454-4d7d-977b-972112fb0f9a/download_file?file_format=pdf&safe_filename=NG-83.pdf&type_of_work=Working+paper)

<sup>29</sup> The potential shortages of gas and the price rises that are anticipated in Eastern Australia have led some commentators to describe the situation as an energy crisis, and have also led to calls for a domestic gas reservation policy, as has been implemented in Western Australia.

<sup>30</sup> Marketable resources refer to natural gas that is in a marketable condition, after the removal of impurities and after accounting for any volumes used to fuel surface facilities. Marketable resources are recoverable using existing technologies, based on geological information, but much of the drilling necessary to produce the natural gas has not yet been performed.

<sup>31</sup> Global Energy Outlook, **Jasper van de Staaij**, **Bram Smeets** and **Ole Rolser** are associate partners in the Amsterdam office. **James Eddy** is a partner in the London office, **Namit Sharma** is a partner in the Amsterdam office and **Christer Tryggestad** is a senior partner in the Oslo office.



demand.<sup>32</sup> Globally, there is plenty of gas and increasing absolute demand; however, the difficulty remains in reserves location versus markets.

In the past decade, eight new Australian LNG projects, plus at least four in the United States and a handful of others caused forecasters to predict a long-term global glut, well into the 2020s. However, current global LNG surpluses are likely to be as little as 10 million tonnes in the early years of the 2020s and will not last.<sup>33</sup> According to consultancy Wood Mackenzie, by 2025 the market is likely to switch to an annual deficit of about 50 million tonnes, and there simply aren't enough projects being approved to meet the potential supply gap.<sup>34</sup> In a total market of more than 350 million tonnes a year, such a small surplus really amounts to a market that is more or less in balance.

Moreover, the narrative of industry over-investment in capacity did not completely factor China into the expanding supply/demand nexus. From 2015 to 2018, Chinese LNG demand tripled and China became the world's second largest LNG buyer. The major drivers were coal-to-gas switching in industry and buildings, and an increasing role for gas in electricity generation and transport. Gas is presently seven per cent of the country's overall energy mix. However, the Chinese government has set an aggressive target of 30 per cent by 2030. After several years of modest increases, several other large northeast Asian players<sup>35</sup> have again become active in global LNG contracting activity as well.

Although a handful of shovel-ready projects in the United States, Canada and East Africa exist, in 2017 just one LNG project reached a FID, that being the relatively small Coral floating LNG development in Mozambique. It takes several years to go from FID to moving cargoes of LNG from supply hubs to markets. The rapid build-out in the past decade was partly driven by the steep rise in oil prices and its direct impact on the LNG price. However, when crude prices crashed in 2014, gas prices followed and many LNG projects in the FID process were suspended and/or terminated. Canada certainly suffered this fate as the approximately 20 former projects on the books were reduced to the two B.C. projects that exist today, LNG Canada<sup>36</sup> and Chevron/Woodside.<sup>37</sup> Furthermore, the discount between domestic gas prices in Australia versus LNG prices in Asia confirmed the huge Australian gas supply. The arbitrage caused the rapid

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<sup>32</sup> Jennifer Winter, Sarah Dobson, G. Kent Fellows, Dexter Lam and Paul Craig, "An Overview of Global Liquefied Natural Gas Markets and Implications for Canada." <https://ideas.repec.org/a/clk/briefi/v11y2018i21.html>

<sup>33</sup> <https://www.thegwpf.com/renewable-energy-an-existential-risk-to-australian-industry/>

<sup>34</sup> [https://www.ogj.com/articles/2018/12/western-gas-signs-mou-for-equus-gas-project-off-western-australia.html?cmpid=enl\\_ogj\\_ogj\\_daily\\_update\\_2018-12-14&pwid=81fd07e63fb5b52db154893cb0396eee5afb16d151659b9d0be3ec1f0c5862cd20d87145ed803f0ef099c277ba65fa5f572fa8648cd5f277d8787e26e0a21643&eid=325570852&bid=2327872](https://www.ogj.com/articles/2018/12/western-gas-signs-mou-for-equus-gas-project-off-western-australia.html?cmpid=enl_ogj_ogj_daily_update_2018-12-14&pwid=81fd07e63fb5b52db154893cb0396eee5afb16d151659b9d0be3ec1f0c5862cd20d87145ed803f0ef099c277ba65fa5f572fa8648cd5f277d8787e26e0a21643&eid=325570852&bid=2327872)

<sup>35</sup> The major LNG buyers – CNOOC, CPC, JERA, KOGAS, PetroChina, Sinopec and Tokyo Gas – account for more than 50 per cent of the global LNG market.

<sup>36</sup> LNG Canada is a large industrial energy project to build and operate an LNG liquefaction, storage and loading terminal in the port of Kitimat, B.C. in order to export liquefied natural gas produced by the project's partners in the Montney Formation gas fields of British Columbia, near Dawson Creek, B.C.

<sup>37</sup> The proposed Kitimat LNG Project is a 50/50 joint venture between Chevron Canada Limited (Chevron) and Woodside Energy International (Canada) Limited (Woodside). The Chevron-operated project comprises upstream resource assets in the Liard and Horn River basins in northeast B.C., a 471-kilometre pipeline, and a natural gas liquefaction facility at Bish Cove near Kitimat.



build-out. If Australia domestic gas had been priced relative to oil, there would not have been an arbitrage opportunity.

This is about to change and 2019 could be a record year for LNG project sanctions,<sup>38</sup> with over 220 mmtpa of gas targeting final FID. “Looking forward, 2019 will be the biggest year ever, in terms of LNG capacity sanctioned, for liquefaction project FIDs. Asia’s major buyers will be at the forefront in ensuring this next generation of LNG supply is brought to market.”<sup>39</sup> However, LNG development will remain volatile until the disconnect between markets and price closes and surpluses disappear.

LNG buyers are price makers, and historical long-term contracts will only be part of the pricing equation. Buyers have led the charge to link LNG indexes to other natural gas prices, such as the U.S. benchmark Henry Hub and short-term contracts, even spot pricing. Furthermore, price is not the only factor, albeit the most important. In more mature markets, such as Japan, South Korea and Taiwan, uncertainty will mean more room for spot and short-term purchases.

## Lessons for Canadian LNG

Late last year, Australia was the world’s largest exporter of LNG and will be a leading natural gas exporter for decades to come. Why did Australia react so fast to the rapidly expanding global LNG business? The major reason is geographic. All of Australia’s states and territories border the oceans, coastal terrain is conducive to large, industrial projects,<sup>40</sup> and there is a long history of selling commodities to Asian markets via coastline. As an example, Australia has supplied coal to Asian nations for decades. Furthermore, unlike Canada, there are no interstate borders to trade and Australia’s offshore LNG export capacity does not face the challenges (physical and societal) of traversing several mountain ranges and communities. Conversely, Canada has had to look south to the U.S. for markets.

How did Australian governments factor in decision-making? The establishment of the Standing Council on Energy which became the COAG Energy Council in 2014, combining federal, state, territorial and municipal policy-makers was a step in the right direction. Any effort to harmonize energy policy, legislation and market rules and regulatory streamlining should be beneficial. Has it been effective? The council’s approach is based on several principles: promoting the interests of electricity and gas consumers; overseeing competitive electricity and gas markets and effective regulation of network monopoly infrastructure; greater productivity, energy efficiency and sustainability; industry and stakeholder participation in policy development and implementation;

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<sup>38</sup> Some of the less prepared or competitive projects will slip into 2020 and beyond, but front runners to get the green light include the US\$27-billion Arctic LNG-2 in Russia, at least one project in Mozambique and three in the U.S. Nearer to Asia, expansion and backfill projects in Australia and Papua New Guinea will also be in the race.

<sup>39</sup> [https://www.ogj.com/articles/2018/12/western-gas-signs-mou-for-equus-gas-project-off-western-australia.html?cmpid=enl\\_ogj\\_ogj\\_daily\\_update\\_2018-12-14&pwhid=81fd07e63fb5b52db154893cb0396eee5afb16d151659b9d0be3ec1f0c5862cd20d87145ed803f0ef099c277ba65fa5f572fa8648cd5f277d8787e26e0a21643&eid=325570852&bid=2327872](https://www.ogj.com/articles/2018/12/western-gas-signs-mou-for-equus-gas-project-off-western-australia.html?cmpid=enl_ogj_ogj_daily_update_2018-12-14&pwhid=81fd07e63fb5b52db154893cb0396eee5afb16d151659b9d0be3ec1f0c5862cd20d87145ed803f0ef099c277ba65fa5f572fa8648cd5f277d8787e26e0a21643&eid=325570852&bid=2327872)

<sup>40</sup> The Ichthys Project is offshore Western Australia, but the LNG plant is in Northern Territory because the WA state placed such a high bar for environmental siting of the plant. The project decamped to Northern Territory.



and regulatory and governance reform to streamline processes and decision-making and deliver outcomes more efficiently and consistently.<sup>41</sup> This is certainly something Canada should explore. Siloed regions and pressure from communities, environmentalists and overarching federal policies are turning the Canadian courts into the regulator. Perhaps a national body such as Australia's COAG Energy Council could help solve some of Canada's infrastructure and resource development gridlock.

What did Australian natural gas developers do differently? Australian LNG development experienced several challenges. Relatively compressed timetables, cost inflation and labour shortages led to delays in almost all energy projects. Increasing labour costs, a tight labour market, a strong currency, inefficiencies, cost inflation and an increased focus on the environmental impact of projects all conspired to slow development. How should Canadian LNG developers view this historical record and what lessons can Canada learn as its burgeoning LNG business expands toward economic export of LNG?

Canadian developers are aware of the cost of raw materials, potential labour challenges and societal pressures. According to Susannah Pierce of LNG Canada, the five-member consortium is making every effort to stay ahead of these issues. The large complex modules cannot be manufactured in Canada and will be purchased offshore under fixed EPC conditions. Moreover, tariffs will not apply as the Canadian steel industry should not be affected.<sup>42</sup> In fact, the Canadian steel industry should benefit as the LNG sector has the potential to help support the 120,000 direct and indirect jobs that exist today in the Canadian steel industry.<sup>43</sup>

LNG developers must also be wary of the potential for labour disruption, shortages and wage escalation. In the case of LNG Canada, Pierce advised the following:

LNG Canada has spent more than \$2.5M to date creating a robust workforce development strategy to attract women, First Nations, and youth into the trades in order to build new capacity. This includes a commitment to having 25% apprenticeships on site. Memoranda of Understanding (MOUs) between the joint venture partners and unions contain terms and conditions to mitigate site unrest and promote harmony on a managed open site; no strikes, no lockouts etc. Domestic supply and demand analyses by the partners, government, labour, First Nations and owners (e.g. WDAG in BC) provide advanced view of potential shortages which will trigger training programs, investments and/or sourcing plans to mitigate risk.

The LNG Canada project can provide a blueprint for other Canadian LNG projects. However, time is of the essence. The rapid build-out of LNG projects in the past decade was partly driven by the steep rise in oil prices. A variety of factors, largely driven by escalating project costs coupled with a falling gas price, moved most Canadian projects from the drawing board to the shelf. Like any

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<sup>41</sup> <http://www.coagenergycouncil.gov.au/about-us/our-role>

<sup>42</sup> <https://www.bnnbloomberg.ca/ottawa-reportedly-backs-lng-canada-on-steel-tariffs-1.1143242>

<sup>43</sup> "The Canadian Steel Industry's Ability to Compete Internationally," *Report of the Standing Committee on International Trade*, presentation by the Canadian Steel Producers, March 9, 2017. <https://www.ourcommons.ca/Committees/en/CIIT/StudyActivity?studyActivityId=9175882>



commodity, the price of gas is the key. Unless LNG price driven by Asian demand returns to the \$8-\$12 per MMBtu range, it will be difficult for the few remaining planned LNG projects to be profitable. Moreover, projects must have requisite expansion capability. According to global LNG expert Geoffrey Cann, “Aside from Northwest Shelf and Darwin, I believe all the Australian projects were designed to expand. The economics of those projects improve with growth because much of the infrastructure (jetties, power plant, tankage, housing) is already in place. Yet Australia is struggling to sanction projects. They are not competitive.”<sup>44</sup>

Despite all of this, LNG Canada stands out as its owners are heavily involved in Asia Pacific LNG trading. All of the parties are truly global. Furthermore, Shell and Petronas are among the world’s largest companies. Along with Japanese multi-conglomerate Mitsubishi Corp., the project has attracted other Japanese companies who have purchased long-term contracts for LNG Canada’s gas. Finally, China (PetroChina) and South Korea (Korea Gas) are also part of the LNG Canada project. One would have to look far and wide to find this lineup of global players.

Canada has a moral obligation to provide the rest of the world with this country’s clean, responsibly developed energy to improve lives and preserve the environment. Furthermore, natural gas delivered as LNG to global markets will be the lowest GHG-emitting gas in the world.<sup>45</sup> However, continued discord and subsequent gridlock with the build-out of large projects clearly in the long-term national interest are baffling. Does Canada require an overarching resource policy body? Perhaps a truly national strategy to kick-start additional Canadian LNG development would help. If not, the ability to compete with other LNG export projects in the U.S. Gulf Coast, in Asia or Australia, will disappear. Canada will miss the global demand increases about to occur in the next decade and beyond. All levels of government must coalesce to take advantage of this global opportunity so Canada can become a major LNG supplier. There are abundant reserves, while drilling, completion and production technologies are efficient, and environmentally the best in the world. Internally, a sophisticated delivery system is in place. When connected with West Coast and East Coast points of sale, Canada will provide market benefits. Moreover, Canadian projects need to be competitive with U.S. projects. The U.S. currently has huge advantages: year-round deep-water ports, favourable governments, tolling models, gas FOB, Henry Hub pricing, deep technical skill set on the Texas Gulf, reusable infrastructure and low construction cost. However, Canadian LNG shipped from the West Coast will have shorter shipping times and distances and is thereby much more competitive.<sup>46</sup>

All levels of government and Canadians must support LNG development. Let the departure of energy majors and international companies from the oilsands be a lesson. Moreover, investors

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<sup>44</sup> Interview with the author. Geoffrey Cann is a former partner with one of the Big 4 consulting firms and has more than 30 years of experience advising the oil and gas, energy and technology companies to help create lasting value. His clients include very large integrated oil companies, downstream petroleum refiners and marketers, pipeline companies, fracking services, drilling and completions services, logistics, LNG projects and many more. His work focuses on the intersection of a business problem and a technology solution, and since 2013, the impacts of digital technologies and the oil and gas industry. His work has included projects around the world in Canada, the U.S., Australia, Hong Kong, Japan, China, Korea and the Caribbean.

<sup>45</sup> The Kitimat LNG plant plans to be an all-electric plant powered by clean, renewable hydroelectricity from BC Hydro.

<sup>46</sup> <https://www.fortisbc.com/est/marine/save-money-with-bcs-lng-for-marine-vessels>



have left the industry. Canada's LNG sector needs to attract domestic and foreign investment. If not, Canada will miss a great nation-building opportunity.

Finally, is the debacle over infrastructure development the catalyst needed to make changes to Canadian federalism? Certainly, mandatory voting is a first step. An elected Senate? Probably a wishful chimera and certainly too large of a discussion for this paper. However, an overarching strategic and pan-national resource policy arm is a must.

## ► About the Author

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**Kelly J. Ogle** is President and CEO of the Canadian Global Affairs Institute. He is a senior executive and scholar with more than 35 years of entrepreneurial experience covering several business sectors including oil and gas, agriculture, trucking, residential development and golf course construction and operations. He has also served as a board member for various corporations, both public and private and has experience in all committee types; health and safety, audit, compensation and corporate governance. Mr. Ogle has also participated in the securing and disbursement of more than \$1 Billion in debt and equity funding of oil and gas ventures, managed the clearing of numerous prospectuses, Annual Information Forms and Information Circulars. As well, he has orchestrated the merger, acquisition, strategic alternatives processes and/or sale of numerous oil and gas corporations as CEO, President and/or Managing Director.

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