



PACIA Submission
Victorian Inquiry into Onshore Unconventional Gas

10 June 2015

Contents

1.	Executive summary.....	1
2.	Recommendations.....	2
3.	Gas, Chemistry and the Australian Economy.....	2
4.	Gas is vital for a strong, competitive Victorian economy.....	4
5.	Victoria has the research expertise to support competitive, sustainable growth.....	6
6.	Certainty is needed for investment – by industry.....	7
7.	Certainty is needed for investment – by landowners and communities.....	8

1. Executive summary

Victoria is the largest domestic consumer of gas in the East Coast market. As such, gas plays a critical role in a healthy, competitive and sustainable Victorian economy. Future investment in a sustainable Victorian economy requires certainty in the responsible supply of gas to grow Victoria's traditional industries, focused on meeting domestic and global demand for a broad range of products and services in emerging sectors. These include: Food and fibre; New energy technologies; Medical technologies and pharmaceuticals, and Transport, defence and construction technology¹.

There are two global changes currently in play that provide significant opportunity for the Victorian economy to remain healthy, competitive and sustainable. The first is the growth in domestic, regional and global population, wealth and education driving unprecedented demand for a broad range of products and services. These are identified clearly in the Victorian Government's Future Industry Fund initiative and those of other State governments and regional economies. The second is that these same drivers of growth are increasing the demand for energy, which is being met by the East Coast Gas Market transitioning from a historical domestic focus to a major global LNG supplier. The implications of this transition have created uncertainty and negatively impacted domestic users in Victoria.

As these two changes continue to gain momentum, Victoria has the opportunity to support and facilitate the social, economic and environmental benefits from the responsible and reliable supply of gas and its value-adding by industry to meet unprecedented demand. This will require the development of additional gas supplies, including on-shore unconventional gas.

But an increased level of certainty is needed by investors, land-users and communities so Victoria can confidently make use of its endowment in natural resources for the long term benefit of all Victorians. It is critical that decisions made by business investors, land users, communities and policy makers are informed by sound science, the relevant experiences of other jurisdictions and a complete understanding of how value-adding to the Victorian endowment in gas can deliver net social, economic and environmental benefit.

The chemicals and plastics industry turns gas into exports and jobs. The safe and efficient supply of feedstock and energy into this key sector has for some time added significant value to Victoria's resource wealth. Gas is a key energy input for many industries as a proven, reliable source of heat, steam and other process needs. Importantly, it is also a critical and non-substitutable source of Methane and Ethane feedstock used by the chemical industry to supply and underpins a broad cross-section of Victorian industries, their current supply chains and potential export and employment growth.

However, the ongoing lack of certainty in Victoria risks the inevitable investment and employment to meet new demand going elsewhere – either to other States within Australia or lost to overseas economies and communities. This alternative would see the Victorian economy continue losing economic output and jobs as a result. Deloitte Access Economics have already forecast the Victorian manufacturing sector alone likely to lose \$23Bn of economic output and 1,500 jobs between 2014 and 2021 in net present value terms² as a result of the supply tightness and price increases resulting from the East Coast market transitioning to a global LNG market.

¹ *Victorian Government Future Industries Fund*, May, 2015

² "Gas Market Transformations – Economic consequences for the manufacturing sector". Deloitte Access Economics, July, 2014

A strategic approach by government, industry and communities that enables value adding to gas focused on the Victorian economy meeting domestic and global growth opportunities can provide a confident, structured model for sustainable development that balances social, economic and environmental needs and opportunities.

Invitation:

PACIA is pleased to invite the members of the Victorian Parliament's Environmental and Planning Committee to tour some of State's chemical and polymer facilities and see firsthand where and how gas is transformed and value-added into products able to equip the Victorian economy for future sustainable growth.

2. Recommendations

1. To complement the current onshore, unconventional gas inquiry, the Victorian Government commission a cost benefit study that investigates a strategic approach to the responsible and reliable supply of gas and its value-adding opportunity. This would include:
 - a. The important role and contribution of gas as an energy source and feedstock throughout the Victorian economy and its value chains
 - b. The types of businesses that are able to add-value to the development of its gas resources, including onshore gas
 - c. The value-chains, including feedstock for chemical and polymer production, that can transform gas to meet the governments objectives of growing Victorian industries for products and services in emerging sectors:
 - i. Food and fibre
 - ii. New energy technologies
 - iii. Medical technologies and pharmaceuticals
 - iv. Transport, defence and construction technologies
 - d. The net benefit outcomes from this opportunity including employment, business competitiveness, future growth, Gross State Product and other key indicators

3. Gas, Chemistry and the Australian Economy

The chemistry industry – comprising the chemicals and plastics sectors - is the second largest manufacturing sector in Australia³:

- supplies 109 of Australia's 111 industries – about 80% of the sector's outputs are inputs to other sectors of the economy
- contributes \$11.6 billion to Australia's gross domestic product
- comprises 5,500 small medium and large businesses nationally, and
- directly employs more than 60,000 people.

³ "Elements in Everything – current profile and future trends for the Australian chemicals and plastics industry", CSIRO, March, 2013.

Diagram 1: Inputs from the chemistry sector to the Australian economy



In common with all of these businesses, is the demand for both gas and electricity for lighting, power, heat, steam and manufacturing processes generally.

Importantly, within this cohort is a group of unique businesses who manufacture chemicals using natural gas as a feedstock. These chemical processes convert the raw gas molecule into a range of significantly value-added intermediate and finished products used throughout the economy.

PACIA’s survey of the national gas usage for chemical feedstock in October 2013 shows the following consumption:

Feedstock PJ	Process PJ	Total PJ
110	20	130

The feedstock and process usage component amounts are inseparable in a chemical plant and

its processes. Based on the BREE national figures published in October 2013⁴,

- 130 PJ accounts for 9.7% of the 1,335 PJ domestically consumed in 2011/12; and
- 130 PJ accounts for 30.4% of the 427 PJ domestically consumed by the manufacturing sector (the largest user in the economy itself).

4. Gas is vital for a strong, competitive Victorian economy

The East Coast gas market is the largest domestic market in Australia, consuming 687 PJ in 2012⁵. Victoria is the largest East Coast domestic consumer of gas at 219 PJ or 32%⁶. Industry consumes the largest proportion of Victorian gas at 40%⁷, or 87.6 PJ, for a broad range of applications, businesses and value chains important to Gross State Product. PACIA has identified that 37% of Victorian industrial gas is consumed for chemical feedstock demand. Given the large concentration of broader chemicals and plastics industries that use gas for heat, steam and other process needs, the full demand for gas within this sector is significant and could be estimated to be in excess of 40%. This amount of overall industrial gas consumption is consistent with Victorian employment in the sector of some 21,000, or approximately one third of the national industry.

By way of contrast and scale, within the East Coast market large industrials make up the biggest consumer group at 300 PJ, or 44%. Chemicals and polymers are the largest gas consumers of the large industrials at 87PJ or 29%⁸.

The raw gas is used as a chemical feedstock in the same way that grass is used to make milk and iron ore to make steel. The chemistry industry uses the Methane (C1) and Ethane (C2) components to manufacture a broad range of intermediate and finished products that are then used throughout the economy's supply chains and economy. Table 1 sets out the broader feedstock uses throughout Australia.

In addition to the applications from the two chemical feedstock streams, the table also notes the Megatrends and growth markets, that have been identified by CSIRO⁹ - as an example of their capacity to enable broader economic growth. There is close alignment between these megatrend opportunities and the key sectors identified by the Victorian Government's Future Industries Fund.

PACIA has developed a [Strategic Industry Roadmap](#) that takes account of these growth opportunities and the collaborative actions of industry and government to support sustainable development.

In Victoria, Methanol from Methane and Polyethylene from Ethane are the key feedstock uses. For example:

- Methane is made into Methanol, which in turn is manufactured into agricultural chemicals, water treatment chemicals and biodiesel
- Ethane is made into Polyethylene, which in turn is manufactured by Victorian companies

⁴ *Eastern Australian Domestic Gas Market Study (EADGMS)* p 39. Commonwealth Government, 2014

⁵ *Ibid*

⁶ *Ibid*

⁷ *Victorian Department of Energy and Earth Resources*, 2015

⁸ *EADGMS*

⁹ "Elements in Everything – current profile and future trends for the Australian chemicals and plastics industry", CSIRO, March, 2013.

to package fresh milk for domestic and increasingly higher value exports to regional economies. It is also manufactured into poly pipe that supplies natural gas to Victorian homes and businesses.

Table 1: Gas, chemical feedstock and transformation into growth opportunities

Chemistry		Applications	Megatrends and growth markets
Methane feedstock (C1)	Ammonia / ammonium Nitrate	Fertilisers to increase agricultural yields	Food for all: <i>Agriculture and food</i>
		Refrigeration, supply chain storage	Food for all: <i>Agriculture and food</i>
		Explosives	Resource scarcity: <i>Mining</i>
		Carbon dioxide, soft drinks / medical	Food for all: <i>Agriculture and food, Healthcare and wellbeing</i>
	Sodium cyanide	Gold extraction and processing	Resource scarcity: <i>Mining</i>
	Methanol	Building products: MDF, particle board	Emerging markets: <i>Building and construction</i>
		Agricultural chemicals	Food for all: <i>Agriculture and food</i>
		Water treatment: waste water, sewerage	Emerging markets
		Fuels: biodiesel, GEM transport, fuel cells	Emerging markets
	Peroxide	Cleaning products, pulp, paper, mining, food and textile manufacturing	Food for all: <i>Agriculture and food</i> Resource scarcity: <i>Mining</i>
Ethane feedstock (C2)	Polyethylene	Agricultural piping, irrigation, tanks	Food for all: <i>Agriculture and food</i>
		Agricultural film: silage, grain bunkers	Food for all: <i>Agriculture and food</i>
		Packaging: bag and film; rigid containers; transport film and wrap	Food for all: <i>Agriculture and food</i>
		Industrial, mining, commercial, residential piping for water, gas and other reticulation	Emerging markets, Resource scarcity: <i>Mining; building and construction, Mining</i>
	Ethylene oxide	Surfactants, glycols and polyols for personal care, agriculture, automotive, mining, textiles, furniture, bedding	Food for all: <i>Agriculture and food</i> Emerging markets Resource scarcity: <i>Mining</i>

In addition to these current uses, large, global market scale integrated chemical plants produce a much broader range of intermediate and final products from natural gas. These have the capability to expand the higher value-adding to raw natural gas for both intermediate and finished products in markets such as high technology fibres, agriculture, coatings and pharmaceuticals. These plants operate in economies already competing with Australia to take advantage of unprecedented global growth for a broad range of products. These high value-added products themselves help to create additional foundation and capability for investment and growth in areas including advanced manufacturing, food, fibre and pharmaceuticals to diversify and strengthen these economies.

There are a number of Australian businesses with interest and capability in the development of world scale, integrated chemical manufacturing plants and there may be examples from other sectors where business growth from gas availability is achievable.

The Victorian Government has identified a range of growth areas as part of the Future Industries Fund to change Victoria's energy mix and ensure investment in jobs for the future, including high growth sectors¹⁰ of:

- Medical technology and pharmaceuticals
- New energy technology
- Food and fibre
- Transport, defence and construction technology

The government has identified that these can help “to create sustainable economic growth and dignified work, restoring pride to Victorian industry and manufacturing”. The objective of working with industry leaders and workers, to identify opportunities for cooperation and co-investment is welcomed by PACIA and the broader industry. These industries today already rely on gas as an energy source and for the products of gas transformed by the Victorian chemicals and plastics industry. Their ability to grow will be inherently linked to ongoing supplies of gas.

5. Victoria has the research expertise to support competitive, sustainable growth

Victoria has considerable and enviable research and development expertise to support existing businesses, materials and processes and innovate to create a more competitive, sustainable economy. PACIA is part of a consortium with Monash University, CSIRO and EPA Victoria in the world class Green Chemical Futures facility at the Monash Clayton campus. This facility delivers academic teaching, trains new chemical engineers and provides collaborative R&D support laboratories for industry.

The same consortium overseas the [Victorian Centre for Sustainable Chemical Manufacturing](#). This industry-facing organisation successfully meets the needs of industry for more efficient products and processes by matching the best minds in CSIRO and Monash to deliver outcomes. This is helping drive productivity improvements, exports and jobs.

PACIA and Monash University also manage the Chemicals and Plastics Manufacturing Innovation Network, as part of the Manufacturing Productivity Networks program and recently

¹⁰ Victorian Government Future Industries Fund, May, 2015

launched by Minister D'ambrosio. This places PhD researchers into Victorian businesses to strengthen industry and research collaboration and improve commercialisation outcomes. The program also facilitates and develops innovation networks between the types of businesses that the Industry Innovation Fund has identified as strategically valuable.

6. Certainty is needed for investment – by industry

To realise this potential in Victoria, investment in the type and scale of plant and businesses requires certainty of gas supply, including the responsible development of onshore unconventional gas as the East Coast market transitions to a global LNG market.

However, projections in a recent report by Deloitte Access Economics (DAE) indicate damage to jobs and economic output in the manufacturing sector given the transformations already underway in the East Coast market and the Victorian economy.

The report projects a cumulative impact of \$118Bn in lost economic output and the loss of 14,600 jobs in the manufacturing sector nationally between 2014 and 2021 in Net Present Value terms¹¹.

Within the Victorian economy DAE project \$23Bn of economic loss and 1,500 jobs over the same period.

For the Victorian chemicals and plastics industries the projected losses are \$847M and 850 jobs over the three key sub-sectors of Basic Chemicals, Specialty Chemicals and Consumer Chemicals.

This projected economic damage is unfortunately evidenced by the impacts of the current gas supply uncertainties that Victorian businesses face and the government is aware of. This is in addition to the well-publicised announcement of large companies diverting capital investment to overseas, more competitive economies.

To counter the further, inevitable impacts of supply tightness and price increases and to support growth, the Victorian economy needs to bring on new supplies of gas. Supply tightness and investment will not be resolved with less gas or the same amount, given the LNG dynamics inherent in the East Coast. An increased amount of gas available for value-adding by industry is a key ingredient to future prosperity.

It is important to recognise that the chemicals and plastics industry at a global level will inevitably respond to global growth opportunities - by making investments using gas as a feedstock, transformed into high value-adding products and stimulating employment and prosperity as a result.

Capital flows to areas of opportunity and lowest risk commensurate to the opportunity. Gas is available in all States of Australia and many of our regional economies. Many of these States and economies have undertaken the analysis of how to responsibly bring on new supplies of gas and facilitate investment.

The current stock of plant and equipment in Victoria for chemical production includes ageing assets requiring significant investment to meet global scale opportunity. The companies operating these plants have globally benchmarked expertise to invest in technologies to meet demand growth at necessary scale.

¹¹ "Gas Market Transformations – Economic consequences for the manufacturing sector". Deloitte Access Economics, July, 2014

The opportunity for Victoria is well captured by the Government's vision as part of the Future Industries Fund of "working with industry leaders and workers, to identify opportunities for cooperation and co-investment".

To this end, PACIA is very pleased to invite the PACIA is pleased to invite the members of the Victorian Parliament's Environmental and Planning Committee to tour some of State's chemical and polymer facilities and see firsthand where and how gas is transformed and value-added into products able to equip the Victorian economy for future sustainable growth.

7. Certainty is needed for investment – by landowners and communities

There is a recognised concern and lack of certainty by some landowners and communities in relation the development of onshore, unconventional gas. The recent report on community and stakeholder attitudes to onshore natural gas in Victoria¹² noted three distinct groups within the cohorts consulted:

- 29% indicated overall support. They were summarised as often people with experience in the sector who recognised benefits greatly exceeding costs and who understood the experience of the industry to manage environmental risks and landholders
- 27% indicated overall opposition. They were summarised as expressing fears of the industry profoundly changing the landscape and natural resource base for the worse. They were also noted as having the view that there was a lack of an adequate cost benefit analysis
- 44% indicated overall undecided/don't know. This was acknowledged as a large cohort that can be quite well informed, but generally feel their own knowledge and perhaps the actual knowledge available, is inadequate to fully assess the issues.

It is important to recognise from this feedback that more information is crucial to fill the confidence gap that exists and to support evidence-based decisions about the responsible and sustainable development of Victorian gas.

It seems important then, to complement the current onshore, unconventional gas inquiry, the Victorian Government commission a cost benefit study that investigates a strategic approach to the responsible and reliable supply of gas and its value-adding opportunity. This would include:

- i. The important role and contribution of gas as an energy source and feedstock throughout the Victorian economy and its value chains
- ii. The types of businesses that are able to add-value to the development of its gas resources, including onshore gas
- iii. The value-chains, including feedstock for chemical and polymer production, that can transform gas to meet the governments objectives of growing Victorian industries for products and services in emerging sectors:
 - a. Food and fibre
 - b. New energy technologies
 - c. Medical technologies and pharmaceuticals
 - d. Transport, defence and construction technologies
- iv. The net benefit outcomes from this opportunity including employment, business competitiveness, future growth, Gross State Product and other key indicators

¹² *Report on community and stakeholder attitudes to onshore natural gas in Victoria*, The Primary Agency, April, 2015

PACIA also recognises the important contribution that can be gained from the experiences of other jurisdictions, the science undertaken by them and other forms of objective information, community engagement support available. For example the Federal Government's [Domestic Gas Strategy](#) sets out a range of information sources and relevant experience that is likely to have value to the Victorian inquiry.