Submission to the *Future Gas Strategy consultation paper*

AUSTRALIAN STEEL INSTITUTE

Submission to the Future Gas Strategy consultation paper

The Australian Steel Institute (**ASI)** is pleased to make a submission to the *Future Gas Strategy consultation paper.*

Introduction

The ASI is the nations peak body representing the entire steel supply chain, from the primary producers through to end users in building and construction, resources, heavy engineering and manufacturing.

Its membership base includes approximately 6,000 individuals that are associated with more than 500 corporate memberships and over 350 individual memberships.

A not-for-profit member based organisation, the ASIs activities extend to, and promote, advocacy and support, steel excellence, standards and compliance, training, events and publications. The ASI provides marketing and technical leadership to promote Australian-made steel as the preferred material to the resources, construction, and manufacturing industries, as well as policy advocacy to government.

The Australian steel industry

The Australian steel industry consists of four primary steel producers, supported by over 300 steel distribution and processing sites throughout the country and hundreds of manufacturing, fabrication and engineering companies.

Australia's primary steel producers and steel product manufacturers together form a strategically important value chain that has the capability to supply in excess of 90 per cent of the steel grades and qualities required in this country. If special categories such as very large diameter pipe, stainless steel, electrical steel, and tinplate are excluded, then the capability is significantly closer to 100 per cent.

Australia produces around 6 million tonnes of steel per annum across five major manufacturing locations. It is important to note the economic and social contribution of the Australian steel industry. It employs over 100,000 people and generates $29 billion in annual revenue, and is associated with a disproportionally large share of skilled jobs in regional and rural areas.

The economic contribution of the Australian steel industry is very significant. Based on recently completed analysis conducted by BIS Oxford Economics, it is estimated that for every $1 million invested,

- 5 workers are employed in the steel and closely related industries,
- $2.8 million output is contributed to the economy, and
- $1.1 million of value is added to Australian GDP.

Steel fabrication is essential for manufacturing of bespoke construction products such as foundations, piling, columns, beams, girders, gantries, platforms, and towers. Areas of specialisation include wind turbine towers, transmission towers, storage tanks, chemical processing plant, boilers and pressure vessels, mining infrastructure refurbishment, mobile equipment for underground and surface mining, mobile cranes, bridges, armoured vehicles for Defence, naval and domestic ship building, rolling stock, truck bodies and trailer chassis.

The steel industry is noteworthy in having a high proportion of jobs and businesses located in regional areas or non-capital cities, where unemployment is typically higher than the national average. The industry is technically complex and requires a highly skilled workforce to support it, encouraging the ongoing presence of high-quality tertiary education institutions in regional areas.

This table sets out the steelmaking capacity and production processes used in Australia:

Company	Manufacturing Locations	Typical Production	Production Process
BlueScope	Port Kembla, NSW	3.2 million tonnes	**Integrated (BF/BOF)**: iron ore / coal / scrap steel Coke Ovens, Sinter Plant, Blast Furnace, BOF steelmaking
InfraBuild	Laverton, VIC	0.7 million tonnes	**EAF route**: scrap steel EAF steelmaking
	Rooty Hill, NSW	0.6 million tonnes	
Liberty Primary	Whyalla, SA	1.2 million tonnes	**Integrated (BF/BOF)**: iron ore / coal / scrap steel Coke Ovens, Pellet Plant, Blast Furnace, BOF steelmaking
Molycop	Waratah, NSW	0.25 million tonnes	**EAF route**: scrap steel EAF steelmaking

The steel industry is a key enabler for the nation’s renewable energy transition and associated legislated climate targets. Between now and 2030 it is estimated that at least 400,000 tonnes of extra fabricated steelwork will be required per annum to service over 23 GW of existing renewable energy generation projects across wind, solar, water and transmission infrastructure.

AUSTRALIAN STEEL INSTITUTE

Future Gas Strategy consultation

The following answers are based on consultation with energy intensive steel product manufacturers that use a significant proportion of natural gas in their energy mix.

Consumers (domestic)

1. **Do you use any international and/or domestic forecasts to inform your outlook of the gas market? We want your views on which scenarios best reflect the demand outlook. Are there any limitations or additional factors impacting the demand outlook you would like to note?**

There is no specific forecast that is widely used. ASI members report using the following information to make decisions on the gas market:

- Reported spot market pricing;
- Market soundings taken when negotiating new contracts;
- LNG netback price series.

2. **What role do you see gas-fired generators playing in supporting Australia's 82% renewable energy targets and beyond?**

The steel industry sees gas-fired electricity generation as playing an important transitional role to provide firming power to support the periods of time that wind and solar generated electricity are not sufficient to meet demand.

3. **How will the expected trends in demand from gas-fired generators impact other gas users?**

The ASI is not in a position to provide a perspective on this question.

4. **What should government do to consider managing these impacts and to mitigate energy peaks caused by regional or seasonal variations?**

The commercial impact of high domestic natural gas costs on local steel product manufacturers is most severe when international competitors are not subject to the same cost impact. In this case, the local manufacturers have had to reduce prices (and therefore shrink margins) in order to maintain market share, or tolerate a loss of market share. In the situation where prices were reduced, this eventually resulted in the recent closure of a large-scale manufacturing facility with the loss or 250 jobs. In the situation where another manufacturer chose to maintain prices with consequent loss of market share, this resulted in the recent loss of jobs equivalent to 25% of the site workforce.

Government policy needs to act to ensure there is sufficient availability of natural gas such that there is a competitive market and commensurately affordable pricing that doesn't disadvantage local competitors relative to international competition. Government policy also needs to ensure that subsidies on input costs, such as natural gas, are appropriately accounted for when assessing anti-dumping cases brought by local manufacturers.

5. **How feasible, and at what scale, are alternatives to natural gas for the electricity sector? You may wish to consider renewable gas alternatives for peaking generation, for example, biomethane and low-emissions hydrogen and other forms of grid-firming technologies like batteries and pumped hydroelectricity. What barriers exist to using these alternatives?**

The ASI is not in a position to provide a perspective on this question.

6. **How much longer will you continue using gas as a fuel source or feedstock for your business? Do you think your consumption of gas will decline over time, and if yes, at what rate?**

A significant proportion of the steel product manufacturing applications for natural gas are for industrial process heating. This use is expected to continue at approximately the same level of usage into the future.

Both of the domestic steel producers that currently use the Integrated (Blast Furnace) process for making liquid iron from iron ore, are actively considering switching, or have committed to the Direct Reduction (DRI) process. The commercial production of DRI typically utilises natural gas to reduce iron ore to iron in a solid-state process. It is estimated that switching from coal-based reduction of iron ore in a blast furnace, to natural gas-based production of DRI, will result in an approximate 60% reduction in green house gas emissions intensity. If this switch to direct reduction ironmaking is adopted as the preferred process for making steel from iron ore in Australia, it will result in a very significant increase in demand for natural gas. Longer term, the DRI process may be operated partially or entirely using hydrogen as the reductant, however this is currently not commercially viable (due to the cost of hydrogen) and remains technically unproven at scale.

7. Are there alternatives that your business can use instead of gas (for example electrification, hydrogen, biomethane or circular economy inputs)? What barriers exist to using these alternatives? How can the substitution of gas be accelerated?

A significant proportion of the steel product manufacturing applications for natural gas are for industrial process heating. Process heating is used in the steel industry for three main applications – hot rolling, heat treatment, and drying / curing.

In the various rolling operations that are used to transform large cross section crude steel into finished products, it is typically necessary to heat the steel to a high temperature such that it can be readily deformed and shaped without damage to rolling equipment. (Hot rolling temperature is typically in the range of 1,000°C to 1,200°C). Because of the large cross section in combination with the speed of operation, this heating is normally done in a gas fired furnace (mostly natural gas) as opposed to electrical induction heating. It may be possible to substitute a significant proportion of hydrogen (potentially 5% to 10%) for existing fossil fuel heating sources, with limited changes to equipment and need for investment. It is probable that these processes could be converted to run on 100% hydrogen fuel but that is likely to require significant upgrades and capital investment.

Heat treatment is a process used to transform the physical structure of steel products in order to achieve improved mechanical properties such as hardness, strength, and wear resistance. Whilst there are many variants, most typically involve heating the steel to a critical temperature and then subjecting it controlled cooling. (Heat treatment is typically conducted at temperatures in the range of 500°C to 800°C). The method of heating employed is again mostly determined by the cross-sectional thickness involved, with natural gas fired heating predominating and some use of electrical induction heating. As noted for hot rolling, it may be possible to substitute a significant proportion of hydrogen for existing fossil fuel heating sources, with limited changes to equipment and need for investment.

Pre-heating, drying and curing is normally associated with the application of surface coatings that are used for corrosion protection and decoration. Some examples of surface coatings include a thin layer of zinc (galvanizing) or zinc/aluminium, paint, or passivation chemical. The surface coating processes typically use a natural gas fired oven or furnace to remove volatiles as part of paint curing, or to drive out moisture to dry water born chemicals. (Operating temperature is typically in the range of 100°C to 200°C.) Again, it may be possible to substitute some of the natural gas with hydrogen in these surface coating processes.

The potential future use of renewably generated hydrogen as a partial or complete replacement for natural gas is predicated on the large-scale availability of hydrogen at a competitive price. The commercially proven hydrogen production processes with potential for large scale operation, such as electrolysis, are very energy intensive. In order to be truly renewable, the electrical energy for electrolysis is sourced from renewable generation such as wind and solar power processes. This in turn requires further very significant increases in the supply infrastructure for renewable electricity generation and transmission. The pace at which this can occur is determined by a range of factors including: permitting and regulatory approvals; availability of appropriately skilled workers across all facets of design, construction and operations; procurement and construction of facilities and infrastructure.

8. What factor/s influence your willingness to adopt electric appliances or processes? How could governments support small businesses to decrease gas consumption?

The main barriers to electrification of natural gas applications are technical and commercial viability. Technical viability is largely related to the ability to achieve the required heating result within the time available. Commercial viability relates to the cost of conversion to new equipment, in combination with the supply cost for electricity.

9. What role might carbon capture, utilisation and storage (CCUS) and negative emissions technologies (NETs) (for example direct air capture and CO2 removal) play in decarbonising industrial processes that are hard to abate in your business or industry?

The commercial viability of technologies such as CCUS seems to relate strongly to the availability of suitable storage facilities such as depleted oil and gas reservoirs, and the associated network pipeline infrastructure to connect with them. In the absence of these enablers in proximity to steel product manufacturing facilities, it is difficult to see how they might play a meaningful role in decarbonisation.

Consumers (domestic)

39. What are the risks to Australia's domestic gas security in the medium (to 2035) to long term (to 2050) for your industry and how can these be addressed?

The ASI is not in a position to provide a perspective on this question

40. What do you see as the biggest risk to the ongoing affordability of Australia's domestic gas supply? For example, what are risks to affordability in the wholesale or retail market?

The feedback from ASI members is that there is insufficient competition amongst suppliers to the domestic market, due to lack of volume available for domestic consumption.

41. What reforms can be made at a Commonwealth, state, territory, or industry level to allow gas supply to be more responsive to domestic demand signals?

Please refer to the answer provided to question 4.

42. What actions are available to lower gas costs, including substitution and new supply, to provide certainty to consumers? How would these actions further the Australian Government's decarbonisation goals?

Please refer to the answers provided to questions 4 and 7.

43. What opportunities exist in your industry to decarbonise supply chains?

The steel industry is technically complex, with a wide range of large-scale manufacturing processes employed. Individual steel producers and manufacturers have each developed strategies to decarbonise according to the unique aspects of the processes used at each site.

These strategies include but are not limited to:

- Sourcing of electrical power from wind and solar farm projects via Power Purchase Agreement arrangements;
- Conversion of coke-based ironmaking to direct reduction ironmaking utilising natural gas prior to transitioning to hydrogen as the reduction agent*;
- Conversion of basic oxygen steelmaking to electric arc steelmaking;
- Increased use of recycled scrap steel as a replacement for virgin iron, in the steelmaking process;
- Substitution of fossil fuel sources of carbon with biomass and other renewable carbon sources;
- Electrification of gas fired industrial heating processes;
- Hot charging of semi-finished products into reheat furnaces to reduce the amount of energy required to achieve temperatures required for rolling into finished products.

* Note that the utilisation of natural gas for direct reduction ironmaking as a replacement for coke-based ironmaking is estimated to result in an approximately 60% decrease in green house gas emissions. The utilisation of hydrogen for direct reduction ironmaking as a replacement for coke-based ironmaking is estimated to result in an approximately 85% decrease in emissions.

44. Do you use any forecasts of gas supply to inform your outlook of the gas market? If so, what are they? You may also wish to consider whether these forecast scenarios consider the technical and commercial uncertainties associated with gas reserves and resources. Which scenarios do you consider best reflect the supply outlook?

Please refer to the answer provided to question 1.

45. Are there any limitations or caveats associated with these scenarios? How do you address these limitations?

Please refer to the answer provided to question 1.

Yours sincerely

Mark Cain

Chief Executive
Australian Steel Institute

Mobile: 0417236807
email: markc@steel.org.au
website: www.steel.org.au

G1, Ground Floor
25 Ryde Road, Pymble
NSW 2073
PO Box 197, Macquarie Park BC, NSW 1670