# Net Zero Industrial Sector Plan stakeholder questionnaire – **Australian Steel Institute**

## About the Net Zero Industrial Sector Plan

The NZISP is one of the Australian Government's six sectorial decarbonisation plans covering all major components of the Australian economy. The six plans under development cover

- electricity and energy;
- transport;
- industry;
- agriculture and land;
- resources; and
- the built environment.

These sectoral plans will form part of a whole-of-government approach to achieving Australia's emissions reduction targets. Please visit https://www.dcceew.gov.au/climate-change/emissions-reduction/net-zero for more information.

## Questions

1. You had mentioned the role of scrap in the decarbonisation of steel industry.
    a. How much scrap can be diverted from export for use in Australian EAFs?

ASI data indicates that approximately 800,000 tonnes per annum of unprocessed scrap is currently exported. This would potentially all be available for use in Australian EAFs and also BOF steelmaking if it wasn't exported. A smaller but unquantified volume of processed scrap is also currently exported.

    b. What is the likely percentage of emissions reduction possible from the increased use of scrap?

This is very difficult to state as a general principle because there are many different variables that impact the actual reduction which can be achieved at each individual steelmaking site. A useful indication is that the integrated steelmaking process (which uses iron ore and coal to make steel) is four to eight times more greenhouse gas emission intensive than the electric arc furnace process (which scrap steel as the feedstock). The integrated process used to produce approximately 75% of the steel made in Australia. Using the BlueScope Port Kembla integrated steel works as an example, it has been estimated that the use of an additional 20t scrap steel per heat (to achieve approximately 30% of the raw material mix) has the potential to reduce emissions intensity by ~6%.

    c. Given the closure of Molycop, is Australian scrap recycling competitive? What are the key factors for ensuring ongoing competitiveness of local EAF operations?

The ASI understands that Australian scrap recycling is competitive when it competes on an equal basis with international operators. A key cost driver in scrap recycling is the environmental charge associated with correctly disposing of impurities (floc) that are generated during the recycling process. Some international operators are able to avoid this cost by taking advantage of lower or non-existent environmental standards in the countries where they operate.

The key factor for competitiveness of the EAF process is energy cost, principally for electrical energy. A secondary factor is labour cost. The EAF process relies on access to a competitively priced electricity supply in order to remain financially viable.

2. You had mentioned the importance of conducting a full life cycle analysis that includes "Module D" when assessing embodied emissions.
    a. Has the inclusion of Module D led to an increase in low-emission steel use in the US? Can you provide some examples or case studies of how this is being implemented?

The ASI is not aware of the specifics of the use of Module D in the US.

The ASI is directly involved in a project being undertaken by the World Steel Association (WSA), which is investigating Life Cycle Analysis calculations when 'end-of-life' scenarios are included. This is being conducted as part of the WSA constructsteel program, which the ASI is helping to fund. The project will compare a range of building typologies that have been constructed with different building materials e.g. steel, concrete, timber, to then allow for a direct comparison on a like for like basis. The ASI would be pleased to make the results of this project available upon completion. Please refer to the attached proposal document for the details of the work to be undertaken and the academic personnel that will do the analysis.

    b. You said that local businesses say it's "too complicated" to implement Module D, what is needed to simplify the process? Are there gaps in the supply chain and what role does government have in this?

A key consideration for accurate calculation of Module D is that a the specific 'end-of-life' scenario needs to be nominated and described. Whilst it is relatively easy for all parameters required for calculation of Modules A, B, and C to be obtained at the time of construction, the ultimate end-of-life scenario cannot be known with any certainty. For example, at the end of life the construction materials may be landfilled, burnt, recycled, or re-used. Which scenario actually occurs makes a huge difference to the full life cycle result. Many materials that are currently preferred for construction due to being perceived as more sustainable, cannot be readily recycled or re-used and therefore end up as a fuel or in landfill. Ideally the building designer would specify an expected design life for a structure and also nominate the preferred end-of-life scenario that will occur.

An important role that government could play in increasing the implementation of Module D is to require that for all new government buildings that the calculation of the associated life cycle analysis require the inclusion of a nominated end-of-life scenario for the building and all its construction materials.

3. You mentioned that there is an oversupply of fabricated steel from China/Vietnam due to the downturn in construction in China and that this situation is unlikely to ease anytime soon.
    a. How will this affect decarbonisation efforts from Australian steelmakers?

The immediate impact is to reduce the financial viability of Australian steel fabricators because they are obliged to compete on the basis of much reduced or negative profit margins. If the situation occurs for an extended period, it will result in a lack of investment in local capability (due to lack of profitability) which in turn further reduces competitiveness. For the highest cost fabricators or those with limited financial resources to draw on, these are likely to close their businesses and exit the industry, leading to reduced capability. The Australian steelmakers that

supply the fabricators experience reduced domestic sales volume because of less demand from their customers. This leads to a choice to either export the displaced local steel product (which is typically marginal or loss making), or to reduce output which may lead to job losses and reduced profitability. Any loss of profitability in any part of the steel value chain means that there is less ability to fund the required investment in research and new manufacturing process equipment that is needed to enable decarbonisation.

b. Beside carbon leakage and anti-dumping, are there other measures that governments should consider to support local industries?

In order to ensure that the recently legislated Safeguard Mechanism doesn't have unintended negative consequences such as relocation of production to higher emitting international facilities, a policy such as the proposed Carbon Border Adjustment Mechanism is essential for the steel industry. Likewise, given the openness of the Australian economy to imports, and the prevalence of subsidies in many international steel supply chains, a readily accessible and functional anti-dumping system is also essential.

The Australian government has rightly put in place stringent requirements for ethical operation of local businesses, including the requirement for Modern Slavery declarations, quality assurance as defined by adherence to Australian Standards, and a high standard for workplace safety and business practices. When international competitors are not held to the same or equivalent standards of business conduct, this places local industries at a competitive disadvantage. Government policies that specify, mandate, and inspect the compliance of internationally supplied products to the local requirements would help to reduce this competitive disadvantage, whilst also improving the overall standard of products supplied.

An additional overarching measure that is critical for all aspects of steelmaking, and in fact for manufacturing in general, is access to internationally competitive sources of energy. For companies that operate manufacturing processes in multiple countries, it has been noted that Australia is significantly less competitive in terms of energy cost when compared to similar developed economies such as the US. This is reflected in a preference to invest in new plant and equipment where the energy supply is more competitive. At the more extreme end of the spectrum, the less competitive energy costs in Australia have contributed directly to closures and job losses at energy intensive steel product manufacturers. Examples of this include Molycop which closed its 'front end' steelmaking, casting, and rolling operations in late 2023, and Bisalloy which scaled back operations in early 2023.

4. How are rollers, fabricators and the broader downstream steel sector tackling decarbonisation? What are some key barriers that they face?

Approximately 90% of the overall greenhouse gas emissions associated with the production and supply of finished steel products are generated in the crude or semi-finished steel production stage, and therefore this is where the bulk of the technological change effort has been focussed. Many downstream industries that rely mostly on electricity as their energy source have been able to switch to renewable sources. For the energy intensive downstream industries that rely on natural gas as their main energy source, there are often technical considerations that currently limit the ability to convert to electrically powered processes. For example, the heat treatment of thick steel sections cannot readily be carried out using an electrical heating process. In this case, research and development is required to find solutions.

Businesses at the very downstream end of the steel value chain, such as structural steel fabricators and roll formers, are working to improve their overall sustainability (including decarbonisation) by becoming certified to the Steel Sustainability Australia (SSA) program. The SSA program engages the entire steel value chain by certifying downstream steel businesses such as fabricators, roll formers, and reinforcing processors, and verifying upstream steel producers against best practice environmental, social and governance indicators aligned to the principles supporting the Green Building Council of Australia's Responsible Product Framework.

5. What other barriers to decarbonisation have your members raised?

The key barrier for SME members is the difficulty they have in gaining an understanding of the changing regulatory environment, and the additional reporting and disclosure requirements they need to meet. For example, the recently legislated Mandatory Climate-related Financial Disclosures. This not so much a barrier as a need for ongoing awareness raising. Therefore ongoing education and training, and the creation of data access for Scopes 1,2 and 3 emissions will be critical.

## General Questionnaire

6. In regards to decarbonisation across the steel sector:
    a. From your work with the steel industry, what metrics are critical when taking a decarbonisation investment decision?

The metrics are essentially the same as for any other business investment, with the added consideration of the expected carbon emission abatement that will result. The return on invested capital needs to be determined and prioritised against all the alternative investment opportunities available to the business.

    b. What data can you provide to indicate the scale/cost of inputs required to adopt decarbonisation technologies? (ie: electricity, hydrogen, gas etc.)

In the current market for steel, there are only a few examples of lower embodied carbon steel products being available, typically at a higher price point. Given the lack of data, it is not possible to state what price premium is associated with lower embodied carbon products. Therefore, in the case of switching from higher emission inputs to lower emission alternatives e.g. coal fired electricity vs. renewable electricity, or natural gas being replaced by renewable hydrogen, in order to remain internationally cost competitive the local steel producers are only likely to switch inputs when there is no associated operating cost penalty.

The steel producers are readily able to utilise low emission inputs at small scale, as they become commercially available. For example, switching from pure natural gas to a 5% hydrogen mixture, or by sourcing electricity from a range of sources including renewable generation.

    c. How much abatement can the steel sector expect to achieve (scope 1 and scope 2) and by when?

This question is best answered by reference to the public declarations made by the individual local steel producers as to when they expect to achieve carbon neutral status.

    d. What would accelerate the ability to adopt decarbonisation technologies?

The two key considerations for adoption of decarbonisation technologies are (i) that they are commercially proven at the required scale, and (ii) that the funding for investment in new manufacturing technologies is readily available. Government has a key role to play in the commercialisation aspect by continuing to support industry led R&D in this field, including pilot and scale-up efforts. Government is also supporting targeted investment in new manufacturing processes through vehicles such as ARENA, CEFC, and NRF.

e. What workforce training is required?
   - Does this differ by type of decarbonisation technology or industry?
   - Or will external capabilities be acquired?

With regard to decarbonisation of steel production processes, this can be resourced by undergraduate and post graduate trained scientists and engineers from 'traditional' disciplines such as industrial chemistry, materials engineering, civil engineering etc.

There is a growing need for additional people trained in the relatively new fields of sustainability management, life cycle analysis, and carbon accounting.

f. Will it be feasible to retrofit existing facilities, or would adaptation require new plant on green - or brownfield sites? This includes steelmakers (primary and secondary) and downstream rollers and fabricators.

For many existing facilities, such as those that utilise electrical power as their primary energy supply, significant decarbonisation can occur via switching to renewably generated electricity when this is available. Facilities that are reliant on natural gas as their primary energy supply should be able to use a proportion of alternative fuels such as hydrogen with minimal re-tooling. Wholesale conversion to alternative fuels may require significant brownfield investment. For ironmaking facilities that utilise coke derived from coal for reduction of iron ore, these will likely require very significant greenfield investment to enable the implementation of new ironmaking technologies such as direct reduced iron (DRI), electric smelting of DRI, and/or electric arc furnace melting of scrap.

7. What in your view, can industry do this decade to reduce its greenhouse gas emissions?

The short-term opportunities available for incremental reduction of greenhouse gas emissions are largely associated with (i) switching to renewable electrical energy supply, and (ii) increasing the proportion of scrap steel that is used in the steelmaking process.

For this to be optimised, the Commonwealth Government should use its existing powers under the Recycling and Waste Reduction Act 2020, to prohibit the export of unprocessed ferrous scrap, which is rapidly progressing across international jurisdictions as they move to protect their sovereign scrap resources.

8. Where do you see a role for government to enable your industry to decarbonise? For example, regulatory or other support?

Government legislation to support the banning of the export of unprocessed scrap steel would likely result in the increased availability of scrap for local steelmaking, with a resultant reduction in emissions intensity.

Continued support for the expeditious roll-out of renewable energy infrastructure will help to speed up the availability of renewable electricity for steelmaking processes.

Ensuring that imported fabricated steel products are being traded fairly is critical for the ongoing financial viability of the local steel value chain, which then allows for investment in decarbonisation.

Policy that calls for local content in significant government investments such as renewable energy infrastructure helps to encourage and underpin investment by the local steel industry in both decarbonisation technologies and state-of-the-art automation to ensure competitiveness.

Support to facilitate education and awareness programs across all industry cohort groups with regards to growing regulatory requirements in carbon accounting.