



**BlueScope Steel (AIS) Pty Ltd**  
**Port Kembla Steelworks Renewables and Emissions Reduction Study**  
**LESSONS LEARNT REPORT #3**

**Project Details**

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*The views expressed herein are not necessarily the views of the Australian Government, and the Australian Government does not accept responsibility for any information or advice contained herein.*

**PROJECT OVERVIEW**

With the support of ARENA, as part of ARENA's Advancing Renewables Program, BlueScope is investigating the technical and economic feasibility of renewable energy and decarbonisation technology pathways that have the potential to decarbonise the steelmaking process at the Port Kembla Steel Works (PKSW).

Both Smart Carbon Usage (SCU) and Direct Carbon Avoidance (DCA) technologies are considered in identifying a set of Prioritised Options for further analysis, with the study looking to identify potential activities for further investigation. These activities might include research, technical development, demonstration trials and plant engineering design investigations.

As part of the project, BlueScope is looking to conduct trials to assess the risks of the pneumatic conveyance of biochar, mixed with pulverised coal, for injection into the blast furnace. Biochar from

renewable sources has the potential to replace some of the coal used within an integrated steelworks and thereby reduce Green House Gas (GHG) emissions.

## PROGRESS

We have procured all the biochar needed to conduct the plant trials to add up to 30% biochar to the coal that is pulverised, pneumatically conveyed and injected into the Blast Furnace. The trials are scheduled for February 2023. Lessons around biochar supply chain and characteristics are included in [Lessons Learnt#1](#) and [Lessons Learnt#2](#) reports.

We have completed the [Phase 1 Report – Port Kembla Steelworks Identification of Prioritised Options](#), where we have described a site-specific evaluation of potential emissions reduction opportunities at Port Kembla, an initial assessment of the technical feasibility of the identified opportunities, and a short list of prioritised options for further consideration. Lessons from the development of the Phase 1 Report are the focus of this Lessons Learnt report.

We are now working on the Phase 2 report, where we will report a comprehensive assessment of the Prioritised Options and potential decarbonisation pathways for the Port Kembla Steelworks, including results and findings from the pilot and plant trials of biochar.

## SUMMARY OF LESSONS LEARNT

This report focuses on the learnings acquired from the development and completion of the [Phase 1 Report – Port Kembla Steelworks Identification of Prioritised Options](#).

In particular, two significant lessons have been identified:

- Given the amount of qualitative information and data available on decarbonisation technologies that needed to be assessed, summarised and reviewed, more careful initial planning of anticipated workload would have assisted the completion of the report in a time-effective manner.
- Developing up-front a systematic method for capturing vast amounts of information and data on decarbonisation technologies facilitated the process of turning raw data into new explicit knowledge for further assessment and decision making.

## KEY LEARNINGS

**Lesson learnt No.1: Careful initial planning of workload required for knowledge sharing deliverables is necessary to meet the requirements in a time-effective manner**

**Category:** Workload planning for desktop investigations

**Objective:** The first phase of the ARENA-BlueScope project involved the completion of an independent, PKSW-centric evaluation of all potential emission reduction opportunities, including numerous Smart Carbon Usage (SCU) and Direct Carbon Avoidance (DCA) technologies. The evaluation was undertaken by BlueScope and the University of Wollongong (UOW). Key technical criteria that were relevant to PKSW were used in identifying a set of Prioritised Options. The evaluation was completed considering both short-medium and long-term opportunities, including the potentially transformative abatement impacts of alternate ironmaking and steelmaking processes utilising renewably sourced materials. This lesson is about the initial workload planning and the actual

effort required to reach a consolidated position on the potential emission reduction opportunities for PKSW.

**Detail:** The Qualitative Options Analysis approach adopted for the evaluation was designed to provide stakeholders with a listing of Prioritised Options, as well as a structured overview of the challenges to overcome and possible solutions required in adapting current PKSW manufacturing processes or adopting new SCU or DCA technologies. In order to complete the Information Reviews, a systematic and detailed description of each potential technology for PKSW was required. It turned out that there was a very significant amount of qualitative information and data that needed to be assessed, summarised and reviewed, prior to the evaluations and discussions undertaken via several workshops. In particular, the additional time required for the assembly of information/data was unexpected and therefore was not captured in the project's risk analysis.

**Conclusion:** Whilst the outcomes of the first phase of the project met stakeholder expectations, more careful planning of anticipated workload is required.

## **Lesson Learnt No.2: Comprehensive Information Reviews of available technologies provided the basis for high-quality outcomes specific to PKSW**

**Category:** High-quality information summaries of decarbonisation technologies

**Objective:** Detailed Information Reviews formed an essential part of the Phase 1 Report. Together with a set of agreed decision criteria that were applied systematically across each option, a granular literature review permitted the assembly of a Qualitative Options Analysis matrix of viable technologies for PKSW. This included an analysis of the fit of each technology in supporting the potential long-term pathways for emission reduction at PKSW. This is a lesson that positively reinforces how developing and using a systematic method of capturing large volumes of information and data facilitates the process of turning raw data into new explicit knowledge for further assessment and potentially, decision making.

**Detail:** Key up-to-date qualitative information on SCU and DCA technologies was assembled from various public domain sources (academic journal and conference papers, steel and engineering company papers, etc) for assessing potential options for PKSW. For this activity, a template was developed and approved, consisting of a) brief general process description; b) material inputs and outputs; c) overall abatement pathway; d) key performance indicators; e) maturity and requirements to implement; f) potential strengths and weaknesses; g) additional relevant descriptors comments. The use of this template facilitated a systematic, first-pass comparison or screening of each technology, using tools such as SWOT (Strengths-Weaknesses-Opportunities-Threats) or Fatal Flaws analyses, and ultimately, the possible ruling out of non-viable technologies for PKSW.

**Conclusion:** The high-quality Information Reviews provided the BlueScope-UOW team the foundational elements necessary to evaluate many decarbonisation technologies. Rather than a more generic global steel perspective, this allowed a more explicit listing of relevant Prioritised Options for decarbonisation, given PKSW's business conditions, operations and plant configuration.