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The economic benefits of centralised coordination of the Hunter Valley coal supply chain

A report for the Hunter Valley Coal Chain Coordinator

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Executive summary

We have been engaged by the Hunter Valley Coal Chain Coordinator (HVCCC) to prepare a summary report of the benefits of centralised coordination of the Hunter Valley export coal supply chain, in support of its application for authorisation under section 88(1) of the *Competition and Consumer Act 2010 (Cth)* to continue undertaking the planning and coordination of the cooperative operation and alignment of the Hunter Valley export coal supply chain.

Overall, the coordinated activities of the HVCCC and its members have been effective at delivering benefits to the supply chain and the wider community, by fulfilling its aim of maximising throughput along the supply chain.

The benefits facilitated through independent governance and planning from centralised coordination of the Hunter Valley export coal supply chain include:

- reduced costs of inventory management through coal buyers' confidence in the reliability of the supply chain, allowing buyers to minimise inventory costs and contributing to the competitive advantage for Hunter Valley coal in the global market; and
- reduced staffing and IT costs, as coordinated planning allows individual supply chain members to reduce independent planning and scheduling staffing and the scope of independent IT systems.

The limited sharing of information by members through a centralised body provides a holistic understanding of the needs of the broader supply chain, which unlocks several key strategic capacity planning benefits, including:

- avoided maintenance and operating costs from optimising infrastructure, as supply chain members have improved visibility over the appropriate level of infrastructure required to service the export coal supply chain;
- improved supply chain efficiencies, as necessary coordination between members by way of the HVCCC facilitates the quicker adoption and sharing of best-practice processes, technologies, labour and management practices; and
- flow-on benefits from strategic planning to operations, as the limited sharing of information by members improves daily operations, thereby generating additional operational efficiencies.

Centralised coordination of the Hunter Valley coal supply chain's broader operations planning and schedule design provides a range of benefits, including:

- improving individual members' ability to respond to global market conditions, as the latest time to update Cargo Assembly Plans can be reduced with whole-of-supply-chain coordination;
- avoiding operating costs from increased efficiency in train and terminal use, with centralised coordination minimising the number of unnecessary train trips;
- optimising network capacity by coordinating individual members' maintenance scheduling in a manner that concurrently maximises maintenance opportunities and the movement of coal; and
- avoiding demurrage costs from reduced vessel queuing as a result of whole-of-supply-chain coordination.

The centralised, real-time, day-of-operations coordination of trains along the Hunter Valley rail network allows for the rescheduling of trains in response to delays with consideration of their urgency and impact on the downstream supply chain, which requires visibility and a focus on the imperatives of the supply chain as a whole.

In addition to these benefits, we expect the centralised coordination of the Hunter Valley export coal supply chain to result in a range of wider benefits accruing to the wider community, including:

- environmental benefits from supply chain optimisation and reduced rail trips;
- potentially improved safety outcomes through trip minimisation for a given coal throughput requirement;
- reduced the likelihood of high impact low probability events such as vessel grounding during periods of increased vessel queues, which can have catastrophic environmental, safety and economic consequences; and
- flow-on benefits to the wider Hunter and NSW economy as a consequence of the coordinated planning and investment across the supply chain.

It follows that in our opinion, the coordinated activities of the HVCCC and its members have delivered substantial benefits to the Hunter Valley export coal supply chain and the wider community.



1. Introduction

We have been engaged by the Hunter Valley Coal Chain Coordinator (HVCCC) to prepare a summary report of the benefits of centralised coordination of the Hunter Valley export coal supply chain (supply chain), in support of its application for authorisation under section 88(1) of the *Competition and Consumer Act 2010 (Cth)* to continue undertaking the planning and coordination of the cooperative operation and alignment of the Hunter Valley export coal supply chain.

This report has been developed based on information obtained through engagement between our project team and internal stakeholders, and our analysis of public information. This analysis was undertaken to support a project to update the HVCCC Strategic Plan conducted in late-2020 and early-2021. Through this engagement we developed a firm understanding of the activities of the HVCCC and analysed how those activities delivered benefits to the supply chain and wider community.

In the remainder of this report, we describe the key benefits that result from supply chain coordination in the Hunter Valley export coal supply chain. The report is structured as follows:

- in section 2, we discuss the strategic and planning benefits from supply chain coordination;
- in section 3, we set out the operational benefits from supply chain coordination; and
- in section 4, we explain the wider benefits of supply chain coordination that we expect to accrue to the community.



2. Strategic and planning benefits from supply chain coordination

In this section, we identify the key strategic and planning benefits that result from authorised supply chain coordination facilitated through the HVCCC for its individual members, including the benefits from:

- independent governance and planning; and
- strategic capacity planning.

2.1 Independent governance and planning benefits

A key benefit of the authorised conduct is the efficiencies generated from independent governance and centralised planning, as compared to the alternative uncoordinated planning arrangements that would likely result in the absence of authorisation.

Strategic planning confirms whether, from a whole of coal chain perspective, track and terminal contractual obligations and collective needs can be met and, if not, what initiatives are required to achieve the contracted throughput. Strategic planning also determines performance standards against which actual performance can be measured and reported.

Independence facilitates coordination between members of the supply chain through the HVCCC, to enhance buyer security and generate resource management efficiencies. Specifically, independent coordination of the coal supply chain to maximise total coal throughput and network efficiency as a single, interdependent system increases throughput over and above the outcomes that could be achieved through individual service providers each planning to maximise use of their own assets without consideration for the performance of the wider supply chain. Centralised planning also reduces the need for duplicate planning staff and systems costs across the supply chain.

2.1.1 Reduced costs of inventory management

Perceptions of independent, credible governance arrangements ensuring predictable supply processes provide coal buyers with confidence in the reliability of the supply chain, allowing buyers to minimise inventory holdings. This allows coal users to manage coal inventories in a manner that minimises the quantity of coal that is stockpiled at a user's site. This in turn contributes to the competitive advantage for Hunter Valley coal in the global market.

We estimate that perceptions of supply chain reliability could allow buyers to reduce inventory holdings by up to 30 per cent across a year. This is based on our understanding of the amount of coal needed for power generation by a typical Asian coal thermal generator, and the time required to transport coal from the Hunter Valley to typical international export locations.

2.1.2 Operational cost savings from reduced staffing levels

The centralised coordination of strategic capacity planning, operational planning and Live Run functions facilitated through the HVCCC reduces each supply chain member's need to maintain their own independent planning and scheduling staffing, resulting in improved decision quality with commensurate operational cost saving opportunities across members of the supply chain.

2.1.3 Operational cost savings from reduced IT systems

The independent technology systems that underpin strategic capacity planning, operational planning and Live Run functions maintained by the HVCCC allow members to reduce the scope of independent internal IT

systems, resulting in operational cost savings to members. An independent whole-of-supply-chain data environment that is adopted by members may also provide operational cost savings for members from avoided data disruptions.

2.2 Benefits from strategic capacity planning

The coordinated strategic capacity planning between members of the Hunter Valley export coal supply chain was an important reason for the establishment of the HVCCC. Coordinated strategic capacity planning generates significant benefits through the optimisation of interdependent infrastructure use and maintenance. Strategic capacity planning also helps optimise infrastructure investment, so that members make appropriate decisions about asset management and investment to ensure that supply chain capacity meets demand while maximising supply chain efficiency.

Key authorised coordination activities that generate strategic capacity planning benefits include:

- the preparation of an annual rolling 10-year Hunter Valley capacity master plan;
- the identification and coordination between supply chain members on capacity constraints affecting shared infrastructure; and
- the evaluation of whole-of-system infrastructure requirements at different points in the future.

In the past, the HVCCC's strategic capacity planning generated significant benefits from coordinating the efficient level and timing of key investments to unlock capacity constraints. It was integral for addressing delays at the port end of the supply chain, and so delivered significant benefits to the supply chain.

Given the trajectory of global coal demand and progress to decarbonisation, we expect the future benefits from strategic capacity planning will be centred around efficiently using existing infrastructure, rather than expansion of the capacity of the supply chain. Nevertheless, these efficiency benefits remain an important benefit from the HVCCC's activities.

Coordinated strategic planning also provides the industry with confidence that contracted capacity can be met from a whole of coal supply chain perspective, by identifying new/emerging constraints when assets approach end-of-life, and as specific loadpoints expand throughput.

The key benefits from coordinated strategic capacity planning between supply chain members facilitated through the HVCCC that we discuss in the remainder of this section include:

- avoided maintenance and operating costs from optimising shared infrastructure;
- improved supply chain efficiencies from coordination between members; and
- flow-on benefits from strategic planning to operations.

2.2.1 Avoided maintenance and operating costs from optimising shared infrastructure

Members of the supply chain coordinate a range of long-term strategic plans through the HVCCC, including the annual rolling 10-year capacity Master Plan, which gives individual supply chain members an indication of how many trains will be required to handle contracted coal throughput over the coming year and beyond.

This holistic view of the required trains to handle coal throughput allows train operators to understand the appropriate number of trains to service the Hunter Valley export coal supply chain, and to park or redeploy unneeded trains instead of incurring ongoing maintenance costs and unnecessary operating costs, eg, crews and fuel.

2.2.2 Improved supply chain efficiencies from coordination between members

Supply chain members' productivity is expected to increase over time through improvements in technology, labour practices and management as part of ordinary business innovation. However, coordination between

members facilitated through the HVCCC is expected to further enhance these productivity benefits, as members adopt and share emerging best practice processes, technologies, labour and management practices with one another, to achieve common supply chain objectives.

2.2.3 Strategic planning benefits to operations

A coordinated approach to long-term strategic capacity planning including providing a holistic view of estimated coal throughput and capacity constraints has flow-through benefits to members' annual operations planning and scheduling. We expect that the non-commercial strategic planning information shared by supply chain members through the HVCCC improves daily member operations, thereby generating additional operational efficiencies and benefits.

3. Operational benefits from supply chain coordination

In this section, we discuss the key operational and scheduling benefits from authorised supply chain coordination facilitated through the HVCCC for its members, including the benefits from:

- broader operations planning and schedule design; and
- day-of-operations coordination.

3.1 Operations planning and scheduling benefits

Supply chains that use shared and connected infrastructure owned by a range of individual operators benefit significantly from coordinating operations and scheduling, to maximise the use of existing infrastructure and avoid the need for duplicated investment. The coordinated operations planning and scheduling by members through the HVCCC unlocks a range of benefits for the broader supply chain.

Key authorised coordination activities that generate operations planning and scheduling benefits include:

- gaining a holistic view of coal throughput estimates on a range of timeframes through the HVCCC, including year ahead, 6-months ahead, 3-months ahead, month ahead, fortnight ahead and week ahead;
- integrating schedules from multiple producers, above rail operators and port operators, which enables proactive identification of risks (such as high asset utilisation) and provides the opportunity to develop appropriate strategies to minimise any potential impacts on throughput;
- adjusting schedules to flexibly respond to supply chain member requests and global market conditions;
- coordinating maintenance schedules to minimise supply chain outages; and
- assisting with schedule recovery following supply chain disruptions.

The key benefits from centrally coordinated operations planning and scheduling facilitated through the HVCCC that we discuss in the remainder of this section include:

- improving members' ability to respond to global market conditions;
- avoiding operating costs from increased efficiency in train, track and terminal use;
- optimising network capacity by coordinating members' maintenance scheduling in a manner that concurrently maximises maintenance opportunities and the movement of coal; and
- avoiding demurrage costs from reduced vessel queueing.

3.1.1 Improved ability to respond to global market conditions

Centralised supply chain coordination improves the ability for the supply chain to contemporaneously respond to global spot market conditions, by facilitating faster changes to supply chain movements to deliver the most profitable coal blends. In the absence of whole of supply chain coordination, the ability for members to unlock benefits from contemporaneous spot market conditions would be reduced.

For example, centralised supply chain coordination has the potential to reduce the latest time for Cargo Assembly Plans (CAPs) to be updated from up to 10 days before operation to one day before operation.

3.1.2 Avoided operating costs from increased efficiency in train, track and terminal usage

Advanced and responsive coordination of operations planning and scheduling between supply chain members facilitated through the HVCCC improves system-wide efficiency of train, track and terminal usage.

For example, coordination facilitated through the HVCCC can minimise the number of train trips by avoiding unnecessary trips and delays by:

- maintaining visibility of and managing conflicting train movements; and
- ensuring the optimal sequence of trains arriving at terminals.

We estimate that central coordinated operations planning and scheduling avoids up to 260 train movements per year.

3.1.3 Optimised network capacity from coordinated maintenance scheduling

Coordinated planned maintenance schedules across the supply chain facilitated through the HVCCC optimises network capacity, decreasing total maintenance costs and concurrently maximising maintenance opportunities and total coal throughput. In addition, maintaining and reporting supply chain performance standards helps to improve the maintenance performance standards of individual members' assets, increasing supply chain reliability.

We estimate that coordinated maintenance schedules facilitated through the HVCCC for its members reduces lost throughput due to maintenance by up to 3.2 million tonnes per annum.

3.1.4 Avoided demurrage costs from reduced vessel queueing

The HVCCC was originally established, at least in part, in response to excessive vessel queueing, which causes significant economic costs, safety and environmental risks.

In absence of whole-of-supply-chain coordination facilitated through the HVCCC, higher demurrage costs would be more likely to occur. In addition, demurrage days would be likely to be more significant during times of peak demand or unanticipated supply chain interruptions.

We estimate that the coordination facilitated through the HVCCC could decrease average demurrage days by up to 7.8 days per vessel. This is based on a comparison of average demurrage days in 2020 as against the lowest number of demurrage days prior to the establishment of the HVCCC, noting that there are many factors contributing to demurrage improvements over this time, particularly investment in infrastructure.

3.2 Day-of-operations coordination benefits

A coordinated whole-of-supply-chain approach to the real-time train movements facilitated by the HVCCC through the Live Run function ensures the smooth and efficient operation of the supply chain. Authorisation allows the real-time central coordination of four above rail operators' trains serving approximately 30 mines, three export terminals and domestic power stations, in addition to coordinating around a small number of non-coal freight trains.

The centralised, real-time, day-of-operations coordination of trains along the Hunter Valley rail network facilitated through the Live Run function reduces lost throughput, providing benefits for all supply chain members. We understand from discussions with the HVCCC that approximately one coal train travels along the network every 22 minutes, with the majority of trains being well over one kilometre long. Any delay to a train from its schedule has the potential to:

- disrupt other trains on the network, resulting in whole of network delays or lost throughput; or
- delay vessel loading, contributing to a larger vessel queue.

A particularly important benefit of centralised day-of-operations coordination facilitated through the Live Run function is rescheduling trains with consideration of their urgency and impact on the downstream supply chain, which requires visibility of the whole supply chain, particularly the progress of optimal cargo assembly

and planned vessel loading. In addition, coordination and timely communication between members in response to disruptive incidents results in a faster resolution of cancellations and replanning.

We estimate that the incremental benefits of centralised day of operations coordination facilitated through the HVCCC's Live Run function results in up to 687 fewer train cancellations per year.

4. Wider benefits from supply chain coordination

In addition to the strategic and operational benefits that we have discussed earlier in our report, there are a range of wider benefits that we expect to accrue to the community resulting from centralised coordination of the Hunter Valley coal supply chain, including:

- environmental benefits from supply chain optimisation and reduced rail trips;
- potentially improved safety outcomes through trip minimisation for a given coal throughput requirement;
- reduced likelihood of high impact low probability events such as vessel grounding during periods of increased vessel queues, which can have catastrophic environmental, safety and economic consequences; and
- flow-on benefits to the wider Hunter and NSW economy as a consequence of the coordinated planning and investment across the supply chain.

Consistent with the operations planning and scheduling benefits we identify, we expect that centralised coordination of the supply chain decreases the number of train trips to complete the cargoes needed to meet all vessels' requirements.

In addition to the environmental benefits from fewer train trips to service a given throughput requirement, the authorised supply chain coordination centralises information about the operations of trains, which is likely to improve safety outcomes through visibility of whole-of-supply-chain operations.

In the absence of the authorised centralised coordination of the supply chain, it is likely that vessel queues would increase. Larger vessel queues increase the likelihood of a high impact low probability event in the occurrence of a storm, such as vessels colliding or grounding. This can have catastrophic consequences for the environment and safety of crew members. If the event occurred such that it blocked access to the port, there would also be massive economic implications.

Coordinated planning and investment across the supply chain can provide wider benefits to the Hunter Valley and NSW economy. For example, the improved global competitiveness of Hunter Valley coal through a more resilient, predictable and lower-cost supply chain increases the demand for Hunter Valley coal, which requires additional personnel to service, thereby creating additional jobs in the Hunter Valley.

We expect that these benefits likely accrue to the wider community as a direct consequence of the authorised activities of the HVCCC and its members.





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