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# AUSTRALASIAN RAILWAY ASSOCIATION SUBMISSION

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To

Department of Industry

On

Energy Issues Paper



## THE ARA

The Australasian Railway Association (ARA) is a not-for-profit member-based association that represents rail throughout Australia, New Zealand and Indonesia. Our members include rail operators, track owners and managers, manufacturers, construction companies and other firms contributing to the rail sector. We contribute to the development of industry and government policies in an effort to ensure Australia's passenger and freight transport systems are well represented and will continue to provide improved services for Australia's growing population.

The ARA thanks the Department of Industry for the opportunity to provide this submission to the *Energy Issues Paper*. For further information regarding this submission, please contact Rhianne Jory, Associate Director via [rjory@ara.net.au](mailto:rjory@ara.net.au) or 02 6270 4504.

## FACTS AND FIGURES

- The Australian passenger rail sector currently provides 784.2 million journeys around Australia each year, more than seven times the journeys made ten years ago. That is more than 15 million journeys each week or 2 million journeys each day.
- Rail currently carries around 929 million tonnes of freight annually. That is an increase of more than 61.5% since 2003. More than half of the freight moved by rail is iron ore, follow by coal (one third), sugar, bauxite and construction products. General containerised freight traffic grew by almost 15% over the same period to over 21 million tonnes.
- Rail produces 40% less emissions than road transport<sup>1</sup>. In one year, the average passenger train reduces the same amount of emissions equivalent to planting 320 hectares of trees. The same goes for freight. In one year, a freight train travelling between Melbourne and Brisbane, reduces the same amount of carbon emissions equivalent to a household of 3 people going without electricity for 46 years.
- Rail travel is the safest form of land transport. It is eight times safer than road travel<sup>2</sup>.
- Rail reduces congestion:

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<sup>1</sup> Australasian Railway Association, Australian Rail Industry Report, 2012 - Per passenger kilometres

<sup>2</sup> Australasian Railway Association, Australian Rail Industry Report, 2012. Calculation based on the amount of accident costs created by road transport.

- The average passenger train can take 525 cars off the road. This is 3.2 million vehicle kilometres annually or 1000 trips from Sydney to Perth.
- The average freight train takes 110 trucks off the road. This reduces truck movements by around 49.7 million truck kilometres a year or 3100 times the distance between Sydney and New York.
- Every passenger journey taken by rail instead of road saves \$8.50 in congestion, safety and carbon pollution costs. In Sydney, for example, if 30% of people changed their travel to rail, \$1 billion a year could be saved.<sup>3</sup> The same goes for freight: if rail was to achieve a 40% share of the North-South Corridor along the east coast of Australia, the savings would reach around \$250m a year.<sup>4</sup>

## SECURITY OF ENERGY SUPPLIES

The International Energy Agency acknowledged for the first time, in its 2010 World Energy Outlook, that conventional production of crude oil peaked internationally in 2006 and that the returns to those levels would need to be met by new production from unconventional sources.<sup>5</sup> At the same time, the Agency also forecast that there is a continuing strong growth in demand for transport fuels.

In the recent report by ACIL Tasman, Australia faces a similar situation in its domestic supply and demand for transport fuels.<sup>6</sup> According to the firm, self-sufficiency in crude oil and other refinery feedstock will decline from 66% in 2009-2010 to around 27% in 2029-2030, leading to an increased dependence on imported transport fuels.<sup>7</sup> Since 1985, demand for petroleum products has risen significantly while production has fallen considerably. This trend is expected to continue to 2030.

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<sup>3</sup> Deloitte Access Economics, The True Value of Rail, 2010 - If rail absorbed 30% of the forecast increase in urban travel then congestion, safety and carbon emission costs could be reduced by around \$1 billion a year by 2025.

<sup>4</sup> Deloitte Access Economics, The True Value of Rail, 2010 - At 2010 value.

<sup>5</sup> International Energy Agency, 2010 World Energy Outlook, 2010

<sup>6</sup> ACIL Tasman, Railway Manufacturing Industry – A profile of the Railway Manufacturing Industry in Australia, 2011.

<sup>7</sup> Ibid.

In response to these potential risks, the Federal Department of Resources, Energy and Tourism has conducted the second National Energy Security Assessment (NESA) in late 2011. The study found that for liquid fuels, Australia's energy security is high for the short term but trending towards moderate in the long term.<sup>8</sup> NESA also went on to say that the assessment is subject to considerable uncertainty and depend on significant investment in supply infrastructure.<sup>9</sup> Several risk factors could potentially reduce affordability to low in the long term.

These findings have important implications for the rail industry as liquid fuel prices represent a major portion of rail operating costs.

Diesel is the second largest and fastest growing source of energy in Australia. It is likely to become the dominant source of energy over the next few years. Also, the industry's heavy reliance on diesel means that it has a substantial exposure to the volatility of imported fuel prices.

When making decisions about future investment and policies relating to the rail sector, it is important the Government consider this significant aspect of the industry. Even though, some parts of the passenger and freight rail networks in Australia are electrified and therefore provides an opportunity for the industry and Australia to reduce the dependence on imported fuels (diesel), a large part of the industry is still exposed to these risks.

Further enhancements to the rail networks can be carried out in a number of ways to decrease the industry's dependence on fuels. These enhancements include further electrification of the networks, replacing old locomotives with more energy-efficient ones and investment in low carbon fuels or usage of natural gas in railway operations.

With respect to further electrification, the current data for 2011-12 shows that 44 billion gross tonne kilometres of rail freight was transported by electric locomotives. This would require over 130 million litres of diesel per annum to transport using diesel locomotives. If the Governments (state and federal) invest further in the electrification of rail networks, the amount of freight carried will significantly increase while reducing the level of diesel consumption and dependency as well as lowering carbon emissions from the transport sector.

Details of other initiatives are outlined later in this submission.

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<sup>8</sup> Department of Resources, Energy and Tourism, Energy in Australia, 2011

<sup>9</sup> Ibid.

## GROWTH AND INVESTMENT

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The ARA and its members agreed with the Department that Australia's resources sector is in a period of significant growth and change. Such growth and change in the sector require support and continued investment from the Government. This also extends to sectors that are supporting the energy sector including the transport and infrastructure sectors.

At present, rail supports the transport of the majority of coal for power generation or export in Australia. It also provides many of the key materials required to transport natural gas, such as pipes, cement and diesel.

*"To give some perspective to the scale of the logistics associated with transporting 170 million tonnes of coal via rail, it is equivalent to filling 1.7 million coal wagons. End-to-end this number of wagons would stretch some 30,000 kilometres (long enough to stretch around the entire coastline of Australia)."<sup>10</sup>*

Further growth of coal and natural gas production is contingent on rail to support development and operation. Therefore it is paramount that future government policy decision and investment focus on the enhancement of port and rail infrastructure to transport thermal coal.

## ALTERNATIVE AND EMERGING ENERGY SOURCES AND TECHNOLOGY

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The ARA encourages the Government to promote energy efficiency in various industry sectors and invest in specific opportunities in different sector. For the transport industry, there are a number of activities that can help Australia decrease its dependence on fuels and increase its efficiency in energy usage. The activities are outlines below:

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<sup>10</sup> <http://www.ncc.gov.au/images/uploads/DERaQRAp-008.pdf>

## Modal shift from road to rail

Below are examples of modal schemes that have been implemented overseas and in Australia. The ARA recommends that the Government implement a scheme similar to the UK's Modal Shift Revenue Support Scheme or Victoria's Mode Shift Incentive Scheme on a larger scale at a national level. The scheme, if nationally implemented, will allow Australia to reduce its transport emissions significantly as more freight will be carried by a more environmentally-friendly and less energy-intensive rail instead of heavy road vehicles. The modal shift from road freight to rail freight will also lower the price of consumer goods and building materials and increase the competitiveness of agriculture and mining through energy efficient transport to ports/customers.

## UK

Domestic transport emissions make up nearly a quarter of UK emissions. The UK Government's goal is to substantially reduce domestic transport emissions by 2050. In the freight and logistics arena, the government is working collaboratively with the logistics industry in leading the drive to reduce emissions. There are a number of mechanisms currently in place to reduce the UK's domestic transport emissions. These mechanisms are as follows:

Logistics Carbon Reduction Scheme – this is a voluntary industry-led approach to reduce carbon emissions from road freight by recording and reporting reductions in carbon emissions. The scheme is free to join and open to all commercial vehicle operators. The scheme aims to reduce emissions by 8% by 2015.

Mode Shift Revenue Support (MSRS) Scheme – the MSRS supports modal shift from road to rail as this is not always commercially viable for the operator. The MSRS assists companies with the operating costs associated with running rail or inland water freight transport instead of road, where rail or inland waterway transport is more expensive. It is designed to facilitate and support modal shift, generating environmental and wider social benefits from reduced lorry journeys on Britain's roads. The scheme operates in two parts, namely:

- MSRS (Intermodal<sup>11</sup>) for the purchase of intermodal container movements by rail; and
- MSRS (Bulk and Waterways) for the purchase of other freight traffic movements by rail and all movements by inland waterway.

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<sup>11</sup> Intermodal freight transport involves the transportation of freight through multiple modes for a journey.

The MSRS is administered by the Department for Transport of the UK and relevant departments in Scotland and Wales. The MRSR has two subsets, namely:

- MSRS (Intermodal)

MSRS (Intermodal) is designed to support the movement of intermodal containers by rail in Great Britain. The scheme provides continued support for the sustainable deep-sea, short-sea and domestic intermodal container business that moves by rail. MSRS (Intermodal) is available to all traffic carried in standard intermodal units (containers, swapbodies or piggyback trailers) on railway infrastructure.

Please note that Victoria also has a similar scheme to the MSRS in place at present. The Victorian Government's \$10 million Mode Shift Incentive Scheme (MSIS) is designed to encourage the use of rail freight and relieve road congestion on regional roads and at the Port of Melbourne through a competitive funding framework. Six companies have received funding under the scheme committing to moving almost 50,000 containers or the equivalent of 65,000 truck trips into and out of the port of Melbourne by rail instead of road. More information on the MSIS is attached.

## Canada

### Carbon credits – Modal Shift Protocol and Western Climate Initiative

The Canadian Government's Modal Shift Protocol is a scheme to encourage greater movement of rail freight and modal shift by providing carbon credits for freight forwarders to switch from road to rail. In addition to providing fuel-efficient services and a GHG carbon calculator that enables customers to calculate the carbon savings from switching from road to rail, the customers are also eligible to receive offset credits which may be used to meet emission reduction goals, traded to other regulated emitters to help them achieve required reductions, or banked for future use.

The cap and trade schemes developing in Canada, particularly through the Western Climate Initiative (WCI), are used to support the Modal Shift Protocol. Railway customers can benefit from the carbon credits associated with shifting road freight traffic to rail by trading them to other companies. For example, in Quebec, companies whose GHG emissions are below their allocation or receive additional credits are able to sell their excess carbon credits to other companies on the carbon market.

The ARA suggests the Coalition to implement a scheme similar to the UK's Modal Shift Revenue Support Scheme or Victoria's Mode Shift Incentive Scheme on a larger scale at a national level. The scheme will allow Australia to reduce its transport emissions significantly as more freight will be carried by a more environmentally-friendly and less energy-intensive rail instead of heavy road vehicles.

## Replacing and/or repowering Australia's oldest locomotives

The average locomotive age across all segments in Australia is around 21 years. In the US it is 8 years and in the UK it is 11.5 years. Locomotive age has a significant bearing on fuel efficiency, as fleet age reflects the level of sophistication in engine technology used in the locomotives. The longer operating life of locomotives in Australia is primarily due to their high replacement costs as a result of unique specifications. It also reflects the previous government ownership of many operators, and resulting constraints on capital expenditure. This results in a very slow improvement in fuel efficiency, as the introduction of more efficient engine technology is mostly linked to the development and introduction of new locomotives.

There are approximately 200 locomotives over 40 years old that mainly service regional rail lines and support the transport of grain. The fluctuations in the grain harvest and the lack of any incentives to replace these locomotives has resulted in them continuing to operate. Repowering these locomotives with modern fuel and environmentally friendly engines would greatly reduce the emissions and provide enhanced productivity to this sector. This option is considered more economical as the cost of repowering is only around \$1million per locomotive.

The rail industry proposes that the Coalition, through the Emissions Reduction Fund, supports a ten-year program of repowering and/or replacing Australia's oldest locomotives. It would reduce emissions for various pollutants by 20-80% of each replaced locomotive (Carbon Dioxide emissions per locomotive by 20-30%, Nitrogen Oxide emissions per locomotive by 35-45%, Particulate Matter emissions per locomotive by 58-68%, and Carbon Monoxide emissions per locomotive by 70-80%). It will also create jobs in regional areas and is likely to contribute to improving the health of many Australians.

## Energy use management tools

Energy management tools can be added to new and existing trains to tell the driver how to best use fuel and reduce in-train forces. This tool has the potential to reduce energy use and carbon

emissions by over 20%. Additionally, energy management will make the trip smoother, which improves reliability and part lifespan. Automated approaches to energy use management have a demonstrated history of efficiency improvement in electricity-intensive industries such as smelting and refining. The technologies required for this opportunity could be further developed to support complete train automation, and have a strong export potential as there is likely to an increasing market around the world for these systems.

## Advanced braking systems

Electronically controlled pneumatic braking systems result in the synchronised braking of wagons, reducing the in-train forces, which improve lifespan and reduce the energy required to brake. Intelligent computer systems could also improve braking, and even allow individual control of each axle to minimise slip, increasing brake efficiency and lifetime. Improved braking technology also increases the safety of rail lines. Specifically, operational experience shows advanced braking systems leading to decreases in fuel consumption (over 5%) and reduced brake wear (over 20%) with wheel flats almost eliminated. Other positives include greater wagon availability and increased wagon life. Modern braking systems are also designed to be lighter, reducing the train's mass.

## Gaseous fuels - development and implementation of CNG or LNG locomotives and supporting infrastructure

Natural gas is cheap and abundant in Australia and some supply infrastructure currently exists. As a solution unique to the Australian environment, it has the multiplicative effect of stimulating local industry through new technologies while providing a global technology for an export market. Much of the required technology for rail applications already exists and the move to gaseous fuels will lower the industry's carbon footprint and reduce fuel costs. Concern over the impending energy security issues around oil-based fuels accelerates the drive for alternatives. Building on abundant gas reserves, new technologies will be developed that could be sold, along with the gaseous fuel itself, to the global rail market. The rail industry suggests that the coalition explores the possibility of introducing gaseous fuels as an alternative source of energy to power the locomotives and provide assistance to the industry to implement gaseous fuels where applicable.

## ENERGY EFFICIENCY

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With regards to how the government proposes to optimise the energy efficiency policy, the rail industry is supportive of a model that minimises unnecessary regulatory, reporting and compliance requirements. In particular, the industry supports an EEO Program that is directed towards those businesses that still need assistance in identifying ways to reduce energy costs, rather than focusing on corporations who have already embedded energy efficiency practices into business processes.

Current and future EEO policies should also link in with other government policies including the Emissions Reduction Fund.

## CONCLUSION

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In conclusion, the ARA applauds the Department of Industry for taking a positive forward to a more sustainable and energy-efficient future for Australia. The rail industry believes that with the right investment and support from the Government, rail can play a greater role in assisting the energy sector to prosper. Not only that, the industry is continuously looking for ways to be more energy efficient and have explored different initiatives in Australia and overseas. The examples outlined above are only small. There are many more opportunities that could be implemented that would enhance rail's superior environmental performance and decrease the transport sector's dependence on fuels. The rail industry would welcome an opportunity to discuss the key opportunities with the Department in the near future.