Four Key Supply Chains
Opportunities for Innovation
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Opportunities for Innovation

Section 1
Executive Summary
This document comprises an Executive Summary followed by the Report and Recommendations, detailed topic sections and appendices.

### Report

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Executive summary

Background

In November 2006 the NSW Government's Statement on Innovation identified the freight logistics industry* as significant and important to the State economy and having potential for boosting productivity through innovation. In January 2008 SAHA International delivered the Innovation in the NSW Freight Logistics Industry report to the Freight and Logistics Council of NSW (FALCONSW) providing an overview and the foundation for a series of innovation strategies and actions for the freight logistics industry. In August 2008 Portland Group and SAHA were appointed to identify in more detail the strategic drivers of efficiency and relevant issues, barriers and best practices for four specific supply chains.

Outcomes sought

Ultimately the project aims to assist industry in New South Wales to gain competitive advantage, efficiencies & improved bottom line performance, to achieve better access to inputs as well as to markets and to attract investment to expand the economy and create jobs. The project aims to provide practical economic benefits within a context of important social and environmental challenges.

Outputs

The outputs required are:

- Policy recommendations for how government should reduce mitigate and lighten regulations and associated costs and otherwise assist industry to achieve the desired outcomes for the NSW economy
- Action recommendations for industry
- Measures and benchmarks for industry to improve performance.

Project scope

The project addresses four important supply chain sectors in New South Wales; Food & Beverage, Heavy Construction Materials, Steel and Grain. These sectors were chosen for their significant shares of total freight and logistics activity in NSW, the importance of freight and logistics costs to their operations, and the potential for improvements to have positive impacts on the wider NSW economy.

Supply chain characteristics

Food & Beverage – Multiple, diverse and complex supply paths to very large numbers of customers. Logistics costs flow directly through to consumers in weekly grocery bills.

Heavy Construction Materials – Large tonnages of low-value materials present good opportunities for sea and rail transport, higher capacity trucks, and more night time deliveries.

Steel – Steel logistics are managed tightly by the two industry leaders. With high product weights steel can benefit strongly from higher capacity trucks and innovative rail wagon designs.

Grain – The grain industry is undergoing rapid change, especially in NSW which is a predominantly domestic market. Recent droughts and poor harvests have increased north-south grain movements from other States and reduced traditional export flows to ports.

* See Appendix II for definitions
Executive summary

Key Messages
This report focuses on ways to deliver significant annual freight and logistics to NSW without requiring major infrastructure spend.
Supply chain solutions are based on one or more of the following: policy/regulatory reform, better infrastructure or improved operational practices.
Infrastructure gaps are known drivers of freight and logistics costs and are being addressed by others. This project aims to make policy recommendations and facilitate industry advances that get more out of existing infrastructure.
Industry stakeholder input consistently identifies critical drivers of logistics costs in NSW; poor utilisation of both road and rail assets, failure to make full use of truck load capacity, and insufficient availability of competitive rail freight services.

Strategic benchmarks
A manageable number of strategic benchmarks are required to guide and report on performance improvements by industry. The selected benchmarks address the logistics cost drivers and sustainability issues. Targets are intended to set a goal for significant performance improvements over the next three years. Reporting should be done annually with each benchmark presented as a graph showing baseline, annual results and target.
Four Key Supply Chains
Opportunities for Innovation

Section 2
Report
Innovation in four key New South Wales freight and logistics supply chains

- In November 2006 the NSW Government's Statement on Innovation identified the freight logistics industry as significant and important to the State economy and having potential for boosting productivity through innovation.

- In January 2008 SAHA International delivered the *Innovation in the NSW Freight Logistics Industry* report to the Freight and Logistics Council of NSW (FALCONSW) providing the foundation for a series of innovation strategies and actions for the freight logistics industry.

- The SAHA report showed that freight and logistics in NSW operates in an increasingly challenging environment, relies on a number of key infrastructure gateways which are seriously capacity constrained, and faces significant barriers to innovation.

- Portland Group and SAHA were appointed in August 2008 to carry out the next phase of work – identifying in more detail the strategic drivers of efficiency and relevant issues, barriers and best practices for each of the following four major supply chains in New South Wales:

  - Food & Beverage
  - Heavy Construction Materials
  - Steel
  - Grain
This project has been designed to assist in the development evidence-based policy recommendations to enhance freight and logistics industry performance in NSW.

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<th>Industry stakeholder engagement and input</th>
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<td>Improvement opportunities</td>
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Industry fact base and hypothesis development

Logistics cost model

Strategic benchmarks

Food & Beverages | Construction Materials | Steel | Grain | Cross-sector |
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<tbody>
<tr>
<td>Linfox</td>
<td>Cement Australia</td>
<td>OneSteel</td>
<td>Grain Growers Association</td>
<td>Asciano (Pacific National)</td>
</tr>
<tr>
<td>Lion Nathan</td>
<td>Cemex</td>
<td>BlueScope Steel</td>
<td>GrainCorp</td>
<td>RailCorp</td>
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<tr>
<td>Arnott's</td>
<td>Boral</td>
<td></td>
<td>Allied Mills</td>
<td>Sydney Ports Corporation</td>
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<tr>
<td>Woolworths</td>
<td>Hanson Resources</td>
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<td>Shipping Australia Ltd</td>
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Some of the stakeholders consulted
The project aims to provide practical economic benefits – in a context of important social and environmental challenges

- Consumers want to see supply chain efficiencies accrue to them as **real reductions in the cost of living**
- Freight operators want **lower Government imposed costs**
- Freight operators want improved access to infrastructure and fewer delays in transit so their trucks, trains and handling facilities can be **more highly utilised**
- Commercial users of freight services want to **pay less** for reliable and timely deliveries

- **Reducing freight’s carbon footprint** is a priority to help reduce the transport sector’s significant contribution to national greenhouse gas emissions
- Improved **fuel efficiency, alternative fuels and alternative modes** will help reduce risks to cost and supply from our growing use of imported oil
- NSW consumers and businesses will increasingly depend on **quick, reliable and responsive transport services**
- NSW communities want **fewer trucks** on their roads – less visible and frequent presence of heavy vehicles on local roads and **less congested** commuter routes
- NSW communities want friendlier trucks – **lower noise levels and less smoke and smell** – and less intrusive industrial facilities

* See Appendix III
The four sectors chosen for analysis provide coverage of large parts of the NSW Freight & Logistics industry task

- The four supply chain sectors analysed by this project are significant to the NSW economy and incur substantial freight and logistics costs;
  - Food and Beverage
  - Construction Materials
  - Steel
  - Grain

- The SAHA Report showed that the Domestic Freight Task makes up 63% of NSW's total freight task by volume. The diagram to the right shows the major sectors contributing to the domestic freight task.

- Freight and logistics cost is an important part of total cost makeup for each of the chosen sectors

<table>
<thead>
<tr>
<th>Sector</th>
<th>Freight &amp; Logistics costs as a % of sector revenues *</th>
</tr>
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<tbody>
<tr>
<td>Food and Beverage</td>
<td>8 - 10%</td>
</tr>
<tr>
<td>Construction Materials</td>
<td>25 - 35%</td>
</tr>
<tr>
<td>Steel</td>
<td>5 - 8%</td>
</tr>
<tr>
<td>Grain</td>
<td>15 - 25%</td>
</tr>
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</table>

* Indicative only

NSW Domestic Freight Task Volume Flows

Sources:
NSW Ministry of Transport, Transport Data Centre; SAHA International analysis
Key Messages
This report recommends action to deliver significant annual freight and logistics benefits to NSW from four important supply chain sectors

- **NSW has the scale and locational advantages to be Australia’s pre-eminent freight and logistics centre, yet**
  - Some businesses locate elsewhere
  - NSW considerable demand is supplemented from a variety of markets
  - Some ports and airports are growing faster in other States, but from a considerably lower base

- **Challenges for freight and logistics in NSW include**
  - Providing a convincing cost benefit analysis which will demonstrate the State’s advantages
  - Accommodating difficult physical geography and natural infrastructure gaps around and within Sydney

- **Industry stakeholder input has consistently identified critical drivers of logistics costs in NSW; poor utilisation of both road and rail assets, failure to make full use of truck load capacity, and insufficient availability of competitive rail freight services**

- **Infrastructure gaps are known drivers of cost and are being addressed by others. This project aims to facilitate industry advances that get more out of existing infrastructure.**

- **We estimate that industry costs can be significantly reduced without major infrastructure spend**
NSW can be Australia's leading logistics centre given scale advantages over other regions

- Large population and a strong base in agriculture, manufacturing and commerce give NSW scale advantages over other Australian States in many freight and logistics activities. Everywhere in the world scale is a reliable driver of efficiency and low cost in logistics operations.
- BITRE estimate that NSW carries 34% of the Australian road freight task compared with no more than 21% by any other State *
- NSW's central position on the east coast, and the importance of its air and sea freight ports support, should give the State with unmatchable advantages as a national logistics hub, but Brisbane is growing faster and Melbourne is handling more container traffic than Sydney.

* Source: Bureau of Infrastructure, Transport and Regional Economics, Freight Measurement and Modelling in Australia, Report No 112
However, key benchmark costs show that Sydney is a higher cost capital city, with statewide implications.

Selected examples of Freight and Logistics cost drivers

Road transport charges at ports
$ per TEU imported or exported

- Sydney
- Melbourne
- Fremantle
- Brisbane
- Adelaide

Source: BITRE Waterline 44, 2007
TEU = Twenty foot shipping container

Typical warehouse lease costs
$ per square metre
For large modern Food and Beverage distribution facilities

- Sydney
- Melbourne
- Brisbane
- Perth
- Adelaide

Source: Retail chain

Illustrative truck delivery costs
$ per m³ of concrete supplied

- Sydney
- Perth
- Melbourne
- Adelaide
- Brisbane

Source: Leading concrete supplier

These examples for Sydney whilst not based on a comprehensive cost benefit analysis could impact decisions made by businesses to locate their operations in one state or another. Logistics costs in Sydney also have important impacts on exports from NSW regional areas and on the supply of food, consumer and industrial goods to regional areas.
The difficult geography of Sydney has contributed to freight transport blockages

Logistics costs are driven upwards in NSW by geography-specific operating challenges which include:

- The little acknowledged high cost of building roads and railways across the mountain ranges and rivers separating Sydney from the rest of the State
- There are limited possibilities for alternative routes across or around Sydney’s numerous waterways
- The “inside-out” layout of Sydney caused by its coastal location forcing port traffic to go in and out of the residential centres and for distribution facilities to be located in the west
- High land costs which are compatible with a populated large urban centre and limited expansion options for industrial facilities in inner Sydney

Sydney’s geography adds cost to local deliveries

- Sydney’s beach suburbs are a long way from the supply points for food and consumer goods because most large distribution centres cluster around the M4/M7 junction at Eastern Creek.
- With geographically limited main roads and water crossings available, the Northern Beaches, the CBD, the Eastern Suburbs and Sutherland Shire are the most time-consuming zones for delivery drivers
- Logistics operators had to establish secondary depots near the eastern suburbs or accept poor fleet utilisation as an added cost of doing business in Sydney
Industry stakeholder input has consistently identified critical drivers of logistics costs in NSW

<table>
<thead>
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<th>Logistics cost drivers</th>
<th>Descriptions and causes</th>
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<tr>
<td>Poor utilisation - road</td>
<td>Traffic congestion and loading delays stop trucks from doing extra round trips within allowed working hours and require more trucks and drivers to carry out the same logistics task</td>
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<td>Too much part-load or empty running, missed opportunities to carry backloads, are still occurring too frequently</td>
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<tr>
<td>Poor utilisation - rail</td>
<td>Rail operating delays and peak-hour curfews reduce the number of trips per week a train can make, lowering rail capacity and raising costs</td>
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</table>
| Load capacity of trucks     | Less load carried on each trip  
*Higher productivity vehicles* is the term the industry uses for trucks designed and approved to carry heavier loads and do fewer trips |
| Lack of modal choice        | On some corridors freight rail and coastal shipping capacity are limited or is simply not available or unreliable |
Asset utilisation and load capacity are critical drivers of performance in each of the four supply chains

Many industry stakeholders can identify where they would like to get more work out of their assets

Examples of utilisation opportunities

Freight train utilisation
Special-purpose rail wagons are typically $250,000 each so a single train with locomotives can represent up to $10 million in rolling assets.
A few NSW trains such as the Port Botany shuttles and the Kandos-Clyde cement train achieve 1 day turn-around cycles. Most freight trains carry only 2 or 3 loads a week due to transit and loading/unloading delays.
Given the high capital cost of rolling stock and locomotives, increasing the utilisation of freight trains will help to significantly reduce rail rates.

Higher productivity trucks have been available for many years but their use remains tightly restricted

Tri-axle B-doubles are today's productivity standard for Interstate highway haulage

Performance Based Standards (PBS) rules allow more advanced designs such as steerable quad-axles and B-Triples to carry higher payloads. Adoption of these is at a very early stage.
Advanced PBS designs promise productivity gains of over 25% to country operators moving bulk goods such as Grain, Meat and Wine. Such large rigs are not allowed into metro areas.
Throughout Australia the use of higher productivity trucks including semi-trailers, B-Doubles and B-Triples is restricted by Higher Mass Limits (HML) rules to certain permitted roads.
Productivity gains of as much as 15% are possible if two barriers are addressed:
1. More availability of complying trucks
2. More HML roads and easier access to them
NSW is regarded as having the a limited HML road network and the most cumbersome and costly HML application procedures in Australia, which appear to discourage operators from investment in higher productivity trucks.

OneSteel trucks on the F3
OneSteel delivers 400,000 tonnes of steel per year from Newcastle to Sydney. Rail capacity is unavaiable so it all goes by truck down the F3.
Ideally, each truck could make two trips a day, but delays on the F3 due to accidents, bushfires and increasing traffic congestion often limit trucks to one trip a day, halving utilisation.
During 2008 OneSteel's truck utilisation to Sydney has been halved on 25% of business days, up from only a few percent 5 years ago.
This project aims to facilitate industry advances that get more out of existing infrastructure

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<th>Logistics cost drivers</th>
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<th>Regulatory environment</th>
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<td>Poor utilisation - road</td>
<td>▪ Better scheduling</td>
<td>▪ Local site-specific curfews limit delivery options</td>
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<td>▪ Route optimisation</td>
<td>▪ Lack of information on congestion and delays</td>
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<td>▪ Real-time information</td>
<td>▪ Load consolidation</td>
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<td></td>
<td>▪ Load consolidation</td>
<td>▪ Freight matching systems</td>
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<tr>
<td>Poor utilisation - rail</td>
<td>▪ Sophisticated rail scheduling</td>
<td>▪ recommendations on Port Botany a bright spot</td>
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<td>Load capacity of trucks</td>
<td>&quot;Higher productivity vehicles&quot; that carry more freight</td>
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<tr>
<td></td>
<td>▪ B-Doubles</td>
<td>▪ New constraints coming in, eg. noise restrictions</td>
</tr>
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<td></td>
<td>▪ High cube, HML, PBS, B-Triples</td>
<td>▪ Limited HML network in NSW</td>
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<td></td>
<td>▪ Caution among Councils in approving &quot;last mile&quot; applications</td>
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<td>Lack of modal choice</td>
<td>▪ Inter-modal terminals and related road/rail solutions</td>
<td>▪ Focus on passenger rail</td>
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<td>▪ Roll-on roll-off and self-unloading vessels</td>
<td>▪ Risk-averse approach to rail regulation</td>
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<td>▪ Restrictions on foreign flagged ships and crews</td>
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Individual Sector Insights
Savings can be unlocked through government and industry actions to improve truck utilisation and introduce more flexible delivery options

**Sectoral context**

Perhaps more than any other sector of the economy, the Food & Beverage sector’s prosperity is driven by population. NSW has always been Australia’s largest consumer market, and is also home to many of Australia’s best-known Food & Beverage brands, such as Woolworths, Lion Nathan, Arnott’s and Kelloggs.

NSW’s sources of Food & Beverages have changed significantly over recent decades, and so have the products themselves and the channels to market. The Retail industry is now built around shopping centres where the majority of family groceries are bought at large full-service supermarkets. In contrast the Foodservice industry has fragmented into tens of thousands of cafés, restaurants, sandwich shops, caterers, bars, clubs and pubs.

Freight and Logistics for the sector is pulled in two directions – on the one hand seeking scale efficiencies and optimisation of deliveries at minimum cost for the large supermarket chains, and on the other hand trying to provide the best of service to thousands of smaller customers with specific needs and vital community roles in the Foodservice industry.

**Key messages and possible actions**

- The Food & Beverage sector worldwide is a driver of leading practices in freight and logistics, many of which are well established in this sophisticated industry in Australia.
- Further substantial savings as high as 5% of freight and logistics costs are achievable. Such savings represent a 0.5% cut in the price of groceries.
  - Higher-capacity trucks will cut both local and long-haul transport costs
  - Night-time deliveries and better industry collaboration are the keys to cutting final delivery costs
  - Some storage and handling costs can also be avoided
- Communities and industry are sensitive to changes in Food & Beverage logistics
  - Acceptance of larger trucks and night-time operations may be difficult to gain, especially when the apparent winners are large retail chains (Woolworths, Coles, etc). Freight operators also encounter difficulties obtaining approval for out of hours operations from local councils.
The number of items and vehicle trips multiplies remarkably towards the end of the supply chain

Food & Beverage volumes supplied in NSW each average week

- Factories (NSW or interstate)
- Suppliers' Distribution Centres (dozens in NSW)
- Retail Distribution Centres * (10 in NSW)
- Retail outlets * (1000's in NSW)
- Homes (millions in NSW)

- Full truckloads: 9,000 loads/week, 9,000 truck trips/week, some interstate
- Full pallets: 250,000 pallets/week, 9,500 truck trips/week
- Full cases: 14 million cases/week
- Items: 25,000 truck trips/week (incl trips direct from suppliers, bakeries, etc)
- 160 million items/week
- 3 – 10 million car trips/week

Sources: Industry data and project team analysis

- * Including Foodservice distributors and Foodservice outlets

- Congestion impacts
- Asset utilisation opportunities
Moving truck movements out of peak hours will reduce urban congestion and industry costs. However, noise and amenity issues need to be addressed

**Sectoral context**

Heavy construction materials are a commodity group that includes products such as coarse and fine aggregates (crushed rock and sand), cement, concrete, and asphalt.

Consumption is closely aligned with population growth and economic development, being an essential input to major infrastructure projects such as highways, tunnels and bridges.

In NSW the volume of heavy construction materials consumed is approximately 30 million tonnes per year (equating to 4.5 tonnes per capita). The industry is notable for the large volumes of product moved, only exceeded by the export coal industry.

The logistics task is dominated by truck movements. Transport by rail and coastal shipping takes place only on five specific routes.

**Key messages and possible actions**

- The heavy construction materials sector delivers very large tonnages into built-up areas
  - The large volumes and low value of delivered product makes the sector particularly sensitive to transport costs
  - Demand from the building industry for daytime deliveries forces most truck movements to occur during peak traffic congestion times

- Larger capacity trucks and more use of night time transport stand out as short-term savings opportunities
  - Some cement deliveries are already being done at night

- Most of Sydney’s nearby quarries will be exhausted within 5 years and future sources are over twice the distance away
  - New rail facilities are needed to minimise increasing road freight impacts and costs
Road transport dominates, with a small number of ships and trains bringing product from some more distant sources

**Heavy Construction Materials volumes supplied in NSW each average week**

- **NSW Quarries or cement plants**
  - Full ships, trains, and trucks
  - 615,000 tonnes/week
  - 4 ship deliveries (20,000t)
  - 17 train loads (30,000t)
  - 15,000 truckloads (565,000t)
  - per week

- **Batching plants and bulk material facilities (dozens in NSW)**
  - Full mixer trucks and dump trucks
  - 615,000 tonnes/week

- **Points of use (thousands in NSW)**
  - 20,000 concrete truckloads
  - 15,000 other truckloads
  - per week

Sources: Industry data and project team analysis

1. Bass Point (South Coast) aggregate and Tasmanian cement to Sydney
2. South Coast aggregate and Berrima and Kandos cement
Highly sophisticated logistics functions already exist in the Steel industry. Higher capacity trucks and more use of rail can provide further savings

**Sectoral context**

The Steel sector includes primary products (steel slab, plate, and coil) and secondary products such as bars, rods, beams, wire, and pipes.

Primary steel products are made from iron ore at "integrated" steel works like BlueScope’s Port Kembla plant or from recycled scrap in electric arc furnaces like OneSteel's Rooty Hill and Waratah operations.

Secondary processing is done at other sites which then feed distribution networks so each tonne of steel makes several transport moves from steelworks through to end use.

The NSW steel supply chain manages steady production outputs against significant variability in customer demand and imports.

The NSW steel sector generates $5 - 8 billion in revenue with freight and logistics costs representing under 5% of revenues

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**Key messages and possible actions**

- The two industry leaders BlueScope Steel and OneSteel manage their logistics tightly and work closely with specialised rail and road freight operators

- Further short-term savings can be gained from higher capacity trucks, innovative rail wagon designs and higher utilisation of existing steel trains
  - A key driver of savings is more efficient use of fewer trucks on approved roads
  - Some potential also exists to move more tonnage by rail through improving current rail services

- In the longer term the steel companies will shift large tonnages from road to rail as soon as added rail capacity and new services are available
  - New rail infrastructure is the only feasible way to get large tonnages of steel off the roads between Port Kembla, Newcastle and Sydney
Multiple steps in the steel supply chain mean that 6 million tonnes of production generates over 10 million tonnes of steel movements in NSW per year.
The Grain industry is experiencing rapid change bought about by the closure of the ‘single desk’ for wheat. Bulk rail freight is vital to the industry.

**Sectoral context**

The Australian Grain industry is at a historical turning point. In 2008 the Single Desk for export wheat sales was closed after more than 70 years of operation, and NSW's final 5-year grain rail operations agreement ran out.

Commercally, we are now in unknown territory, with new exporters entering the field, less commercial information circulating, and key grain rail operations currently out to tender in NSW.

Under continuing drought the last good harvest year for many NSW farmers was three years ago in 2005-06.

In an environment of global trading uncertainty with new local industry rules, unclear power relationships among industry players, and drought-diminished harvests in NSW many questions are being asked about future directions for the grain industry.

Among these are vital questions about future logistics arrangements, specifically regarding rail transport of grain in NSW.

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**Key messages and possible actions**

- Recent changes to wheat export governance offer new commercial options to growers but add to uncertainty for logistics providers.
- The NSW grain industry depends on road and rail for both grain movement and price setting.
  - Reliable rail services are essential for the 300 - 500 kilometre haul from farms to coastal ports and customers.
  - Bulk export supply chain costs play a vital pricing role for the entire grain industry, not just for exporters.
- Some trucking costs can be reduced but lower rail costs depend on better harvests and success with new rail operating arrangements.
  - Higher productivity trucks should be a good option for grain trucking operators.
  - This year practically all rail services have moved to "take or pay" arrangements to share among industry players the costs of maintaining sufficient rail capacity. The challenge is to provide direct returns to those who make investments to help cycle trains faster and deliver cost savings.
Grain supply chains operate in two steps; harvest flows from farm to up-country storage, then demand-driven deliveries from storage to customers

**Into storage**
4 - 12 million tonnes/year *

- Grower
- Harvest
- On-farm storage
- Truck
- Branch line silo
- Branch line train
- Sub Terminal
- Main line silo or site
- Off-rail silo
- Truck

**From storage to customer**
7 - 12 million tonnes/year *

- Container packer
- Train or Truck
- Containers to port
- Truck
- On-farm or Silo
- Truck
- To container packers
- Main line silo or Sub Terminal
- Train or Truck
- Domestic customers
- Unit train **
- Bulk export shipment
- Port terminal

**A good harvest year can be three times the tonnage of a poor harvest year. Poor harvests are supplemented by stock draw-down and shipments in from other states.** **about 5% to port by road**
Solutions
Multiple levels of regulations make it difficult for any one agency to drive freight and logistics policy and can exacerbate inefficiencies

### The policy context

- Multiple levels of Government can make it difficult for any one agency to guide policy in the area of freight and logistics
- Many industries operate at a national level but must deal with different State governments and numerous local government bodies to operate
- There are often inconsistencies across State and local boundaries which exacerbate inefficiency. A notable example of this is accreditation and load limits for road and rail freight operations.
- Within NSW these issues are compounded by the number of agencies at a State level involved in supply chain matters and the number of councils within the Sydney metropolitan area (over 30) compared to Brisbane (1)
- Local government decision making is poorly resourced and could be helped by, say, a shared services arrangement where councils can access specialised engineering expertise, funding where improved infrastructure is required or concerns about infrastructure damage arise and a more rigorous decision making and appeals process

### Commonwealth Government

- **Key agencies and bodies include**: Department of Infrastructure, Transport, Regional Development and Local Government, National Transport Commission, Australian Consumer and Competition Commission, Australian Rail Track Corporation, Infrastructure Australia
- **Key areas of responsibility include**: infrastructure investment, emissions standards, regulation harmonisation

### State Government

- **Key agencies and bodies include**: Ministry of Transport, RTA, Department of Planning, Department of Environment and Climate Change, RailCorp, NSW Maritime, Department of Premier and Cabinet, and Department of State and Regional Development
- **Key areas of responsibility include**: transport planning, licensing, network management, investment and maintenance, land use planning, and business and economic developments

### Local Government

- **Key agencies and bodies include**: over 30 local councils in the Sydney area, sub regional organisation of councils, key community groups
- **Key areas of responsibility include**: local transport planning, development application, road investment and maintenance
Finding ways to encourage road and rail users to shift their trips to utilise spare capacity on the networks is key to improving utilisation of both the equipment and our infrastructure.

Why improve asset utilisation?

Improving the use of mobile (e.g. trucks and trains) and fixed (roads and rail) assets can reduce the costs of distribution and result of beneficial social and environmental outcomes.

Achieving an extra trip per day per vehicle can reduce the fleet size required and any associated capital costs. Many of our major roads and rail corridors are only at capacity for 5 or 6 hours a day. Spreading the volume of traffic into periods of the day when there is spare capacity will both improve journey times and defer the need for additional infrastructure investment.

Out of hours operations
A number of companies in the food and beverage sector have a desire to increase the number of deliveries they make at night and other non peak periods. Land use planning and environmental regulations are vital for preserving urban amenity and protecting the community from noise and air pollution but can also restrict the use of new quiet vehicle technology now being used in many urban countries to reduce the impact of urban freight movements.

Access to freight facilities
New freight facilities should be developed in appropriate areas, but in some cases residential development has encroached on long established freight infrastructure. This reduces available operating hours and increases logistics costs.

Travel information and decision making
In many cases travel during peak periods is unavoidable, but efficiency gains can still be achieved by minimising travel times and distances. Technology can help freight companies and other road users make more informed choices about when to use the network.

What are the issues?

Congestion
Road congestion is not just a problem for personal travel, but also has a direct impact on logistics activities and increases the cost of goods and services. Congestion is also an issue for rail freight, as freight trains share capacity with passenger services. A range of actions can be taken to manage congestion without the need to build new infrastructure.
There is plenty of potential to make better use of off-peak capacity

**Possible ways to improve asset utilisation**

- Incentivise greater freight use of toll roads
- Provide freight access to high occupancy road lanes
- Identify the impact that noise regulations have on the industry and out of hours operations
- Examine the potential benefits of quiet vehicle technology and the role they might play in urban freight movements
- Provide information to help journey planning and enable freight operators and motorists to make more informed choices about when to use the network
- Help businesses adopt leading demand management practices

**Key Benefits**

**For Industry:**

- Lower fuel consumption
- More predictable arrival times – more consistent customer service
- Ability to utilise trucks more fully for more hours of each day
- Ability to spread distribution centre workload more evenly across day and night shifts

**For the Community:**

- Fewer vehicles on the road during rush hours
- Positive perception of improvement due to fewer visible large trucks
- Reduced interaction between cars and trucks

**Relevant Policy Areas**

- Planning
- Noise
- Road Management
- Infrastructure pricing
- State development
Improving the uptake of vehicles meeting Performance Based Standards and expanding the network for Higher Mass Limit vehicles can improve productivity

**Why address vehicle productivity?**

There are two aspects to improving road vehicle productivity:

- New vehicles can potentially carry more through altering their configuration or design whilst not increasing their load per axle under a set of performance based standards (PBS) i.e. higher capacity truck with no change to road impacts

- Existing vehicles in other States are already carrying heavier loads and there is potential to expand the Higher Mass Limits (HML) network in NSW where these vehicles can be fully loaded i.e. same trucks but increased impact on the road

Both can reduce the number of trips required between an origin and destination.

**Limited number of HML routes**

Higher Mass Limit vehicles are restricted to certain routes in NSW. There are a number of routes for key cargos (eg Grain, Construction Materials and Steel) where significant savings could be achieved if the load limit were increased.

**Infrastructure capability in NSW**

The NSW road and bridge network has not been designed to accommodate the higher axle loads allowed in Victoria. Infrastructure assessment and investment on key routes has commenced but must be prioritised against other projects.

The regional rail network and particularly the branch lines servicing the grain industry are currently not capable of higher axle loads without significantly reducing the speed of the trains or investing in new track and strengthened infrastructure.

**Despatch and receival facilities have limited capability**

Loading docks and other related infrastructure can also limit the uptake of higher productivity vehicles if they are too small or have restricted access points. This is more of an issue for existing or older facilities or where the facility owner wants to maximise returns from “front of house” at the expense of investing in sufficient space to support efficient “back room” operations.

**What are the issues?**

**Accreditation for PBS vehicles can be time consuming and complicated**

PBS vehicles need to be individually accredited by both the RTA and by the local council for the areas in which they wish to operate. The process can be time consuming and costly which places it beyond the means of many operators.
Higher Productivity Vehicles are a mature technology ready for wider usage

How to support increased vehicle productivity

- Improve the response times and assist with improved coordination between the agencies and councils responsible for accreditation of PBS vehicles
- Improve the knowledge and resources to address the growing number of applications for permission to introduce higher productivity vehicles
- Enlarge the HML network to key locations where the greatest benefits for higher mass limits can be achieved
- Encourage better coordination for design of new facilities to enable servicing by higher productivity vehicles

Key Benefits

For Industry:
- Reduced trips and fleet size
- Improved response times for applications
- Reduced operating costs
- Increased confidence in decisions to innovate and invest

For the Community:
- Potentially fewer vehicles through residential areas
- Potentially fewer vehicles during out of hours
- Positive perception of improvement due to fewer visible large trucks
- Lower transport costs – direct and indirect operating costs

Relevant Policy Areas

- Planning assessment and approvals
- Vehicle accreditation
- Coordination between State agencies and local government
- Driver Licensing and accreditation
- Road and bridge design
Optimising the use of lower cost modes such as rail and sea, where appropriate, can contribute to lower overall costs for the supply chain

Why optimise the use of rail and sea freight?

Rail and sea offer the potential to shift large volumes of cargo at significant cost reduction when scale and operational efficiency are achieved.

Rail and sea are significantly more fuel efficient, environmentally friendly and safe for high volumes and/or long distances than other modes – most notably road.

What are the issues?

Rail freight and coastal sea freight both tend to be sub-scale except on specific long distance routes such as Perth – East Coast. Lack of scale and service frequency reduces reliability for customers and leaves rail and sea stuck in an uncompetitive position despite their cost and environmental advantages.

Investment to increase capacity
The cost of additional infrastructure either for rail or to support coastal shipping is significant, lumpy and requires a long period to achieve payback. There is substantial community resistance to existing facilities and therefore limited opportunity for expansion without cost being incurred by the industry to reduce the impact on neighbouring communities.

Capacity
There is limited or no capacity for rail freight services through Sydney during peak periods which can limit the ability of rail to service time sensitive freight markets even though substantial capacity exists during evening and off-peak periods

Passenger Growth
Future capacity may become more constrained in off-peak hours as passenger services increase and consume freight paths. Limited resources are available to rigorously determine future demand and capacity.

Access to the networks
Capacity constraints are beginning to emerge off-network, at Inter-modal terminals and the capability to develop new terminals in suitable locations is extremely limited

Investment barriers
There is a high threshold for investment for both rail equipment and infrastructure and current operating parameters do not enable high utilisation of rolling stock.

Perception of poor value for money
Longer transit times, issues with reliability through the rail network and poor equipment utilisation have meant that rail has not been able to offer enough of a financial benefit to encourage further mode shift.
Rail and Sea freight require very long planning horizons and commitment to supporting fixed infrastructure with life measured in decades

<table>
<thead>
<tr>
<th>Ways to optimise the use of rail and sea</th>
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<tbody>
<tr>
<td>Improve the understanding of where rail capacity exists and how to utilise it for freight movements</td>
</tr>
<tr>
<td>Ensure there is sufficient planned capacity in sites and facilities loading and unloading rail and coastal operations i.e. terminals and ports that can receive bulk and RORO cargo</td>
</tr>
<tr>
<td>Expedite construction of planned Inter-modal terminals such as Sydney Ports’ Enfield facility</td>
</tr>
<tr>
<td>Work with the rail industry to enable improved transit times through metropolitan areas in order to achieve additional cycles</td>
</tr>
<tr>
<td>Recognise the value of sites that may be suitable for servicing rail to ensure future capacity and capability remains accessible</td>
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</tbody>
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<table>
<thead>
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<th>Key Benefits</th>
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<tr>
<td><strong>For Industry:</strong></td>
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<tr>
<td>Reduce costs – transport, fuel, labour, carbon</td>
</tr>
<tr>
<td>Ability to move large volumes over longer distances</td>
</tr>
<tr>
<td>Increased confidence in decisions to innovate and invest</td>
</tr>
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<td><strong>For the Community:</strong></td>
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<tr>
<td>Potentially fewer vehicles on the road</td>
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<tr>
<td>Lower emissions</td>
</tr>
<tr>
<td>Improved safety around high freight generating facilities</td>
</tr>
<tr>
<td>Lower cost of goods</td>
</tr>
<tr>
<td>Retention of non-road transport options for vital freight</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Relevant Policy Areas</th>
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</thead>
<tbody>
<tr>
<td>Rail</td>
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<tr>
<td>Inter-modal</td>
</tr>
<tr>
<td>Ports</td>
</tr>
<tr>
<td>Planning assessment and approvals</td>
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<td>Coordination between State agencies and local government</td>
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</table>
Improving fuel efficiency will help minimise the impact of climate change policies and has the potential to deliver cost savings.

**Why focus on improving fuel efficiency?**

Fuel consumption is a significant proportion of operating costs in transport. Eventually, all the additional costs associated with fuel price fluctuations will be passed onto the consumer.

The highly volatile nature of the oil market in recent months has placed additional burdens on the freight and logistics industry where many of the smaller operators were either unable or slow to pass on the higher costs.

The introduction of a carbon emissions pricing scheme will add additional cost to all supply chains, with the greatest impacts on road freight.

Improving fuel efficiency can deliver immediate benefits.

**What are the issues?**

Fuel consumption is a significant proportion of operating costs in transport, typically 15 - 25% of truck operating costs. The highly volatile nature of the oil market in recent months has provided a clear warning of the cost impacts should oil prices spike upwards again.

**Carbon emissions pricing scheme**

The national Carbon Pollution Reduction Scheme is likely to increase energy costs for transport operators. The extent to which this may increase the cost of living is still unknown.

**Investment in fleet – age, low barrier to entry**

Australia’s heavy vehicle fleet is many years older than in most other developed countries. Older trucks tend to be used for short city runs and the consequences include poor fuel consumption and emissions which may increase the impact of climate change policies and add investment challenges for industry.

**Lack of information at time of purchase**

While fuel efficiency standards and vehicle labelling schemes have been developed for cars, there are no comparable standards for heavy vehicles. Providing information and guidance to industry can improve vehicle purchasing decisions and improve efficiency.

**Industry best practices**

There are a range of measures which can help generate incremental improvements in fuel efficiency, ranging from fuel efficient tyres, aerodynamic features and information technology systems. While environmental best practice programs can play a legitimate role in explaining and promote the benefits of these measures, industry should take the lead in applying such measures and government should avoid ‘picking winners’.
Fuel efficiency innovations are receiving a great deal of attention and should be encouraged

**Ways to improve fuel efficiency**

- Improve the standard and techniques of driving in a fuel efficient manner
- Reduce the average age of the truck fleet and increase the number of trucks that are more fuel efficient
- Improve decision making around truck purchases to increase the average fuel efficiency of the fleet
- Encourage optimised body specifications, tyre selection and maintenance regimes used by truck owners to reduce fuel consumption
- Support fuel saving truck specification choices such as cab coolers which do not require the main engine to run

**Key Benefits**

**For Industry:**

- Reduce costs – fuel and future cost of carbon
- Improve competitiveness
- Perception of being more environmentally friendly
- Reduced exposure to fuel price volatility

**For the Community:**

- Lower emissions
- Lower cost of goods

**Relevant Policy Areas**

- Road registration for both vehicles and drivers
- Education and training
- Conservation and Climate Change
- Coordination with industry bodies
- Technical specifications which reduce fuel use
Longer term strategic issues need to be addressed to enable continued cost reductions and management as freight volumes continue to grow

Why focus on strategic issues?

The freight industry in NSW is highly fragmented with an imbalance of power between various players in key supply chains. Operating margins are tight and are keenly protected by those that can gain an advantage.

The industry, and in particular the four supply chains that have been studied, underpin a significant proportion of the economy and are major users of government infrastructure.

Freight in NSW has a low profile and there is limited demonstrated support of innovation especially in road freight.

Industry interacts with Government in a number of areas relating to freight and logistics but rarely regarding strategic issues.

What are the issues?

Alignment of agencies
There are multiple agencies that develop policy and regulation affecting freight related activities but the delineation is along modal and regional considerations rather than supply chains - making Government complex for industry to deal with. There is no lead agency or single point of contact for freight.

Changing shape of Sydney
Increased population in Sydney over coming decades is likely to increase the residential density around current freight facilities and reduce the opportunities to connect to key networks whilst the demand for goods which need to be transported grows.

Forward planning and innovation
Road freight is a growing industry in NSW and generates some of the largest road activity in the country. Other States are supporting research into modal and supply chain issues and may capture benefits more quickly than NSW.

Supply chain improvement and in particular freight transport and logistics have little or no profile in key State planning documents such as the State Plan or State Infrastructure Strategy which should provide long term guidance.

Lack of Clarity
There are currently few targets established around freight policy or objectives and it is difficult to measure success of policies relating to supply chain improvement.

Perception of the freight industry
The industry is sometimes viewed as necessary but not welcome by the communities which it services. There is a constant tension between serving the needs of the community and impacting on the community – it is difficult for either party to determine a balance.
Longer term strategic issues for NSW must be tackled now before they become even more difficult and costly to supply

**What can be improved**

- Increase engagement with industry on key issues for the future
- Facilitation and coordination between Government and industry to enable implementation of innovative ideas
- Target to reduce the lag time between international best practice standards and adoption in NSW
- Recognition of the importance of transport and logistics within key Government documents
- Include references to freight and supply chains in development of agency objectives and outcomes
- Distinguish the unique requirements of distribution activities in determining future land use planning strategies
- Cooperation between industry bodies and NSW Government to attract greater Commonwealth funding for Industry Development, innovation and infrastructure

**Key Benefits**

**For Industry:**

- Greater clarity on Government expectations
- Greater certainty surrounding investment decisions
- Fewer incidences of losing long-established operating locations to encroaching residential uses
- Reduced cost to introduce innovative ideas
- Increased investment into innovation and infrastructure

**For the Community:**

- Lower cost of goods
- Reduced impact on communities

**Relevant Policy Areas**

- Strategic infrastructure and land use planning
- Agency coordination
- Mode share targets
- Research and development
- State development
Four Key Supply Chains
Opportunities for Innovation

Section 3
Leading Practices and Strategic Benchmarks
Practical strategic benchmarks and targets relating to leading practice are required to provide an evidence base for policy development and to guide performance improvements by industry.
This section covers leading practices for the selected supply chains and recommended strategic benchmarks for ongoing use.

1. **Leading practices**
   - Role and value of leading practices
   - Practical application to industry sectors

2. **Strategic benchmarks**
   - Role of benchmarks
   - Selection criteria
   - Definitions and data sources
   - Baseline measures and targets
   - Data gathering and reporting
Leading practices are commonly used to assess an organisation's current capability against its competitors.

Spectrum of practices from Basic to Leading – not all companies should aspire to be "Leading"

<table>
<thead>
<tr>
<th>Supply Chain Processes</th>
<th>Basic</th>
<th>Progressive</th>
<th>Leading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Order management</td>
<td></td>
<td>Current Capability</td>
<td></td>
</tr>
<tr>
<td>2. Freight from suppliers</td>
<td></td>
<td>Current Capability</td>
<td></td>
</tr>
<tr>
<td>3. Distribution Centres</td>
<td></td>
<td>Current Capability</td>
<td></td>
</tr>
<tr>
<td>4. Deliveries to stores</td>
<td></td>
<td>Current Capability</td>
<td></td>
</tr>
</tbody>
</table>
Leading practices in food and beverage supply chains are widely shared and understood by industry. Industry leaders are well down the implementation path.

<table>
<thead>
<tr>
<th>Important supply chain activities</th>
<th>Basic practice examples</th>
<th>Progressive practice examples</th>
<th>Leading practice examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freight from suppliers to retail DCs</td>
<td>Managed by suppliers with delivery times arranged by phone/fax</td>
<td>Some consolidation through primary freight management, Deliveries scheduled into time slots</td>
<td>Automated product handling – Coca Cola, Extensive primary freight management with small orders consolidated during shipment</td>
</tr>
<tr>
<td>Distribution Centres</td>
<td>Manual receiving and putaway, Paper-based picking and despatch</td>
<td>System-directed paperless receiving, putaway and picking – most large manufacturers</td>
<td>Some automated handling, One-touch receiving, Voice-picking – Costa Logistics, Metcash</td>
</tr>
<tr>
<td>Deliveries to stores</td>
<td>Mixed fleet, Variable delivery sizes and runs, Manual load building – Foodservice suppliers</td>
<td>Standardised fleet and routes, Control over loads and schedules</td>
<td>Auto load building, Full trucks, Extensive use of Unit Load Devices like RPCs and Roll cages</td>
</tr>
</tbody>
</table>
Local exponents of world leading practices have succeeded in driving out costs from their supply chains

<table>
<thead>
<tr>
<th>No double handling</th>
<th>Simplicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arnott's take advantage of their market leadership in chocolate biscuits by &quot;drop shipping&quot; full truckloads direct from their Sydney factory to retailer DCs in other states. Each delivery is by a large B-double with no double-handling through an Arnott's DC.</td>
<td>Aldi disciplines its range to only 800 items compared with 25,000 or more in a Woolworths or Coles store. Aldi's small range and standardised packaging simplifies the entire logistics chain, as does the absence of promotional surges in demand for its merchandise.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connected technology</th>
<th>Scale</th>
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</thead>
<tbody>
<tr>
<td>Woolworth's is the only Australian retailer with automated reordering systems from store shelf back to suppliers. Automation allows Woolworths to manage its stocks and order quantities much more finely than manual methods, saving millions of dollars in inventories and operating costs.</td>
<td>Bevchain is a specialised liquor distribution business that adds scale to its base task of distributing Lion Nathan's Beer brands. Because Bevchain visits every liquor store and most pubs and clubs it can distribute wine, softdrinks and other liquor-related goods at highly competitive cost.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Continuous flow</th>
<th>Automation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa Logistics &quot;flows&quot; fresh produce through its DCs on a daily cycle leaving the building practically empty every night. Flow-through practices minimise waste of fresh produce and efficiently allocate short and excess supply to the most appropriate retail outlet.</td>
<td>No human hand needs to touch a case of Coca Cola until it arrives at the store shelf. Pallets are moved mechanically from bottling line to DC and DC to roller-bed truck for delivery to retailers. Woolworths continue the flow by cross-docking Coca Cola pallets directly to their stores.</td>
</tr>
</tbody>
</table>
Leading practices invariably exist at process level – in great detail – and are difficult to summarise meaningfully at industry level

### Leading practices commonly exist two levels below Industry level

<table>
<thead>
<tr>
<th>Level</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry or region</td>
<td>Leading economies</td>
</tr>
<tr>
<td>Business</td>
<td>Leading businesses</td>
</tr>
<tr>
<td>Activity</td>
<td>Leading practices</td>
</tr>
</tbody>
</table>

Focus of this project – strategic opportunities and policy recommendations

Hundreds of leading practices are documented for supply chains at this level
Recognised leading practices provide a large set of options from which smart businesses choose appropriate practices to strengthen their own capabilities.

Example - Leading store replenishment practices provide a range of appropriate choices for retailers, depending on their business needs.

<table>
<thead>
<tr>
<th>Element</th>
<th>Basic Practice</th>
<th>Progressive Practice</th>
<th>Leading Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store Replenishment</td>
<td>• DC replenishment and store replenishment systems operate independently</td>
<td>• DC has flowthrough replenishment capability</td>
<td>• DC has capability for stock pick, flow-through and cross-dock replenishment</td>
</tr>
<tr>
<td></td>
<td>• DC holds stocked inventory across multiple lines</td>
<td>• DC and store replenishment systems integrated</td>
<td>• Use of upstream consolidation center to permit case quantity cross-docking to stores</td>
</tr>
<tr>
<td></td>
<td>• Replenishment algorithm driven by store shipments and demand/lead-time variability</td>
<td>• Replenishment driven by actual and forecast demand. Seasonal profiles build stocks at appropriate time</td>
<td>• DC operates as trans-shipment center for specific product groups (e.g. fast moving bulk quantities, seasonal programs)</td>
</tr>
<tr>
<td></td>
<td>• Manual, low tech paper based ordering by phone or fax</td>
<td>• Full visibility of purchase orders &amp; stock levels across all channels</td>
<td>• Co-managed inventory for specialised product groups, supplier has visibility of DC stock</td>
</tr>
<tr>
<td></td>
<td>• Delivery and order accuracy information recorded but not used</td>
<td>• Electronic capture of supplier performance feeds replenishment algorithm</td>
<td>• Full E-commerce capability between DC and suppliers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Delivery and order accuracy information actively used by DC</td>
<td>• Delivery and order accuracy information available across the supply chain</td>
</tr>
</tbody>
</table>

(One of over 100 elements in a full supply chain practices listing)

Only a few retailers will have any need for ALL these leading practices, or the integrated supply chain capabilities to adopt them.
In each sector a small number of high impact leading practices stand out from stakeholder discussions and sector opportunity reviews.

### MOST RELEVANT LEADING PRACTICES BY SECTOR

**Food & Beverage**
- Better truck capacity utilisation
- More load consolidation
- Larger capacity trucks
- More night time deliveries

<table>
<thead>
<tr>
<th>Sector</th>
<th>Key opportunities</th>
<th>Vehicle design</th>
<th>Scheduling</th>
<th>Load levelling</th>
<th>Collaboration</th>
</tr>
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<tbody>
<tr>
<td>Food &amp; Beverage</td>
<td>Better truck capacity utilisation</td>
<td>PBS trucks for short and long hauls</td>
<td>Route optimisation tools</td>
<td>Enabling out-of-peak deliveries</td>
<td>Planning and scheduling to reduce peaks and maximise loads</td>
</tr>
<tr>
<td></td>
<td>More load consolidation</td>
<td></td>
<td>Drop shipping full truck loads (eg. Arnott’s)</td>
<td>Creating incentives for customers to shift demand out of peak times and order full loads (eg. Lion Nathan pricing model)</td>
<td>Primary freight as a load consolidation driver (eg. Woolworths, Coles)</td>
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<tr>
<td>Construction Materials</td>
<td>Larger capacity trucks</td>
<td>PBS trucks and trailers for quarry materials</td>
<td>Running unit trains on fixed fast cycles (eg. Cement Aust Kandos-Clyde)</td>
<td>Maximising out-of-peak deliveries</td>
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<td></td>
<td>More use of night time transport</td>
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<tr>
<td>Steel</td>
<td>Larger capacity trucks</td>
<td>PBS trucks</td>
<td>Advanced scheduling tools</td>
<td>Creating incentives for customers to shift demand out of peak times and order full loads</td>
<td>Web-based load matching tools</td>
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<td></td>
<td>Innovative rail wagon designs</td>
<td>Multi-purpose rail wagons (already in wide use)</td>
<td>Running unit trains on fixed fast cycles</td>
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<tr>
<td></td>
<td>Improving train cycle times</td>
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<tr>
<td>Grain</td>
<td>Improving train cycle times</td>
<td>PBS trucks</td>
<td>Running unit trains on fixed fast cycles (eg. Manildra)</td>
<td></td>
<td>Joint efforts to fix causes of loading delays</td>
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<td></td>
<td>Reducing loading and unloading delays for trucks and trains</td>
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### MOST RELEVANT LEADING PRACTICES FOR NSW

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<td></td>
<td>Innovative rail wagon designs</td>
<td>Multi-purpose rail wagons (already in wide use)</td>
<td>Running unit trains on fixed fast cycles</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improving train cycle times</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reducing loading and unloading delays for trucks and trains</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Larger capacity trucks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grain</td>
<td>Improving train cycle times</td>
<td>PBS trucks and trailers for country haulage</td>
<td>Running unit trains on fixed fast cycles (eg. Manildra)</td>
<td></td>
<td>Joint efforts to fix causes of loading delays</td>
</tr>
<tr>
<td></td>
<td>Reducing loading and unloading delays for trucks and trains</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Larger capacity trucks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Strategic benchmarks will be established as NSW-specific yardsticks to measure future improvements in supply chain performance

Strategic benchmarks operate at a level above the scorecard and process benchmarks commonly used by businesses

<table>
<thead>
<tr>
<th>Scope</th>
<th>Hierarchy</th>
<th>Illustrative example</th>
<th>Purpose</th>
<th>Measurement and Reporting frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry or region</td>
<td>Strategic benchmarks</td>
<td>% by rail</td>
<td>Show progress towards policy goals</td>
<td>Annually</td>
</tr>
<tr>
<td>Business</td>
<td>Scorecard benchmarks</td>
<td>Days of stock</td>
<td>Manage to budget</td>
<td>Monthly</td>
</tr>
<tr>
<td>Activity</td>
<td>Process Benchmarks</td>
<td>Tonnes per day</td>
<td>Drive site performance</td>
<td>Weekly</td>
</tr>
</tbody>
</table>
Strategic benchmarks must be simple, relevant and practical if they are to help deliver the required performance improvement outcomes

**Selection criteria for benchmarks**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarity</td>
<td>A good benchmark must be easily explained and understood, eg. % of goods on rail</td>
</tr>
<tr>
<td>Simplicity</td>
<td>Ideally should be a percentage or a whole number rather than a complex measure like Net Tonne Kilometres</td>
</tr>
<tr>
<td>Independence</td>
<td>Benchmarks should be decoupled from external variables (eg. costs) so should not involve dollar values</td>
</tr>
<tr>
<td>Availability</td>
<td>Ideally data should be published by reputable sources and not need any special data collection effort</td>
</tr>
<tr>
<td>Alignment with policies</td>
<td>Benchmarks should be strongly and directly influenced by proposed policies so they can clearly show degree of success of these policies</td>
</tr>
</tbody>
</table>

**Why reject a benchmark?**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too low level</td>
<td>Process or asset-level measures such as average fuel consumption of trucks</td>
</tr>
<tr>
<td>Unmeasurable</td>
<td>Some desirable benchmarks can be impractical to measure, eg. % of truck trips running empty</td>
</tr>
<tr>
<td>Too general</td>
<td>An example would be a statewide measure when what is needed is a focus on one important route or location</td>
</tr>
<tr>
<td>No comparables</td>
<td>No useful comparative data available from other jurisdictions</td>
</tr>
<tr>
<td>Unclear targets</td>
<td>No clear logic for setting an improvement target</td>
</tr>
</tbody>
</table>
Industry stakeholder input has consistently identified four cost drivers to which we have added sustainability as a critical consideration.

<table>
<thead>
<tr>
<th>Logistics cost drivers</th>
<th>Key issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor utilisation - road</td>
<td>Traffic congestion</td>
</tr>
<tr>
<td></td>
<td>Loading and unloading delays</td>
</tr>
<tr>
<td></td>
<td>Part-load or empty running</td>
</tr>
<tr>
<td>Poor utilisation - rail</td>
<td>Rail operating delays and peak-hour curfews</td>
</tr>
<tr>
<td>Load capacity of trucks</td>
<td>Approvals for higher-capacity trucks</td>
</tr>
<tr>
<td>Lack of modal choice</td>
<td>Freight rail capacity is not available or reliable on some corridors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sustainability</th>
<th>Key issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friendlier trucks</td>
<td>Fuel consumption</td>
</tr>
<tr>
<td></td>
<td>Emissions and noise</td>
</tr>
</tbody>
</table>
A manageable number of strategic benchmarks can address the cost drivers and sustainability issues

<table>
<thead>
<tr>
<th>Logistics cost drivers</th>
<th>Proposed benchmarks</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor utilisation - road</td>
<td>Average tonnes delivered per hour worked by a sample of heavy* bulk delivery trucks within the Sydney metropolitan area</td>
<td>Focus on effective speed of goods delivery and loading/unloading within the congested metro area</td>
</tr>
<tr>
<td></td>
<td>Average number of pallet spaces delivered per hour worked by a sample of heavy* Food &amp; Beverage delivery trucks within the Sydney metropolitan area</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of Food &amp; Beverage retail delivery locations with restrictions on night time deliveries (7 pm to 6 am)</td>
<td>Focuses attention on delivery time constraints</td>
</tr>
<tr>
<td>Poor utilisation - rail</td>
<td>Average actual net tonnes per train (Intermodal or Steel) operating between Melbourne, Sydney and Brisbane</td>
<td>Measures improvements in train length and capacity</td>
</tr>
<tr>
<td></td>
<td>Average actual Intermodal and Steel train transit time between Melbourne and Brisbane</td>
<td>Focuses on the critical east coast rail corridor through NSW</td>
</tr>
<tr>
<td>Load capacity of trucks</td>
<td>Number of PBS vehicles registered in NSW</td>
<td>Focuses on roll-out of PBS vehicles</td>
</tr>
<tr>
<td></td>
<td>% of Food &amp; Beverage retail store delivery locations with truck size restrictions</td>
<td>Fewer restrictions should encourage larger vehicles</td>
</tr>
<tr>
<td>Lack of modal choice</td>
<td>% TEU by rail to/from Port Botany</td>
<td>An established measure and target for modal share</td>
</tr>
<tr>
<td></td>
<td>Intermodal rail freight task between Sydney and Melbourne in million net tonne-kilometres</td>
<td>Rapid growth in tonnes carried by rail to adjacent state capitals will reflect increasing modal share</td>
</tr>
<tr>
<td></td>
<td>Intermodal rail freight task between Sydney and Brisbane in million net tonne-kilometres</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sustainability</th>
<th>Proposed benchmarks</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friendlier trucks</td>
<td>% of distance travelled by trucks using CNG, LNG, LPG, Biodiesel or Electric fuel</td>
<td>CNG, LNG, LPG and Biodiesel are key low-emissions alternative fuels</td>
</tr>
<tr>
<td></td>
<td>% of heavy* trucks registered in NSW and complying with ADR 80/02 (Euro 4 or better) emissions standards (ie. first registered after 1 January 2008)</td>
<td>Shows growth in proportion of &quot;friendlier&quot; trucks in the NSW fleet</td>
</tr>
<tr>
<td></td>
<td>% of heavy* trucks registered in NSW and complying with ADR 83 (ECE 51 equivalent) noise standards (ie. first registered after 1 January 2006)</td>
<td></td>
</tr>
</tbody>
</table>

* Trucks over 12 tonnes Gross Vehicle Mass - UNECE definition of "Heavy Goods Vehicle"
Only five of the proposed benchmarks (highlighted below) require data to be collected from industry operators

<table>
<thead>
<tr>
<th>Logistics cost drivers</th>
<th>Proposed benchmarks</th>
<th>Sources of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor utilisation - road</td>
<td>Average tonnes delivered per hour worked by a sample of heavy* bulk delivery trucks within the Sydney metropolitan area</td>
<td>Cemex, Cement Australia, Caltex, OneSteel</td>
</tr>
<tr>
<td></td>
<td>Average number of pallet spaces delivered per hour worked by a sample of heavy* Food &amp; Bev delivery trucks within the Sydney metropolitan area</td>
<td>Woolworths, Coles, Franklins, Aldi, Metcash</td>
</tr>
<tr>
<td></td>
<td>% of Food &amp; Beverage delivery locations with restrictions on night time deliveries (7 pm to 6 am)</td>
<td></td>
</tr>
<tr>
<td>Poor utilisation - rail</td>
<td>Average actual net tonnes per train (Intermodal or Steel) operating between Melbourne, Sydney and Brisbane</td>
<td>Pacific National, QR National</td>
</tr>
<tr>
<td>Load capacity of trucks</td>
<td>Number of PBS vehicles registered in NSW</td>
<td>Registration authorities</td>
</tr>
<tr>
<td>% of Food &amp; Beverage delivery locations with restrictions on truck size restrictions</td>
<td>Woolworths, Coles, Franklins, etc</td>
<td></td>
</tr>
<tr>
<td>Lack of modal choice</td>
<td>% of distance travelled by Articulated and Rigid trucks using CNG, LNG, LPG, Biodiesel, or Electric fuel</td>
<td>Apelbaum Consulting Group – NSW Transport Facts Table 3.1-3</td>
</tr>
<tr>
<td>Intermodal rail freight task between Sydney and Melbourne in million net tonne-kilometres</td>
<td>BITRE Australian Intercapital Rail Freight Performance Indicators - Information paper 62 Table A7</td>
<td></td>
</tr>
<tr>
<td>Intermodal rail freight task between Sydney and Brisbane in million net tonne-kilometres</td>
<td>BITRE Information paper 62 Table A1</td>
<td></td>
</tr>
<tr>
<td>Sustainability</td>
<td>Proposed benchmarks</td>
<td>Sources of data</td>
</tr>
<tr>
<td>Friendlier trucks</td>
<td>% of distance travelled by Articulated and Rigid trucks using CNG, LNG, LPG, Biodiesel, or Electric fuel</td>
<td>Apelbaum Consulting Group – NSW Transport Facts Table 3.1-3</td>
</tr>
<tr>
<td></td>
<td>% of heavy* trucks registered in NSW and complying with ADR 80/02 (Euro 4 or better) emissions standards (i.e. sold after 1 January 2008)</td>
<td>Australian Bureau of Statistics Motor Vehicle Census or ERG International (better data but payment required)</td>
</tr>
<tr>
<td></td>
<td>% of heavy* trucks registered in NSW and complying with ADR 83 (ECE 51 equivalent) noise standards (i.e. sold after 1 January 2006)</td>
<td></td>
</tr>
</tbody>
</table>

* Trucks over 12 tonnes Gross Vehicle Mass - UNECE definition of "Heavy Goods Vehicle"
Some baseline values are NSW-specific and others can usefully be compared across jurisdictions

<table>
<thead>
<tr>
<th>Logistics cost drivers</th>
<th>Proposed benchmarks</th>
<th>NSW baseline</th>
<th>QLD value</th>
<th>VIC value</th>
<th>Canada value</th>
<th>EU value</th>
<th>US value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor utilisation - road</td>
<td>Average tonnes delivered per hour worked by a sample of heavy* bulk metro delivery trucks</td>
<td>7.5</td>
<td>15.0</td>
<td>12.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Average number of pallet spaces delivered per hour worked by a sample of heavy* Food &amp; Bev metro delivery trucks</td>
<td>5.0</td>
<td>10.0</td>
<td>7.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of Food &amp; Beverage retail delivery locations with restrictions on night time deliveries (7 pm to 6 am)</td>
<td>53%</td>
<td>14%</td>
<td>42%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor utilisation - rail</td>
<td>Average actual net tonnes per train (Intermodal or Steel) operating between Melbourne, Sydney and Brisbane</td>
<td>tba</td>
<td>N/A</td>
<td>N/A</td>
<td>5,200 incl bulk</td>
<td>600</td>
<td>3,000 incl bulk</td>
</tr>
<tr>
<td></td>
<td>Average actual Intermodal and Steel train transit time between Melbourne and Brisbane</td>
<td>38.5 hrs</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Load capacity of trucks</td>
<td>Number of PBS vehicles registered in NSW</td>
<td>~10</td>
<td>30</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>% of Food &amp; Beverage retail store delivery locations with truck size restrictions</td>
<td>27%</td>
<td>10%</td>
<td>4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of modal choice</td>
<td>% TEU by rail to/from Port Botany</td>
<td>19%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Intermodal rail freight task between Sydney and Melbourne in million net tonne-kilometres</td>
<td>682</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Intermodal rail freight task between Sydney and Brisbane in million net tonne-kilometres</td>
<td>523</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Proposed benchmarks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friendlier trucks</td>
<td>% of distance travelled by Articulated and Rigid trucks using CNG, LNG, LPG, Biodiesel or Electric fuel (2005 data)</td>
<td>0.12%</td>
<td>~ 0.1% **</td>
<td>~ 0.1% **</td>
<td>~ 0</td>
<td>~ 3% Biodiesel</td>
<td>~ 0</td>
</tr>
<tr>
<td></td>
<td>% of heavy* trucks registered in NSW and complying with ADR 80/02 emissions standards (ie. sold after 1 Jan 2008)</td>
<td>5% **</td>
<td>6% **</td>
<td>5% **</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of heavy* trucks registered in NSW and complying with ADR 83 noise standards (ie. sold after 1 January 2006)</td>
<td>16% **</td>
<td>19% **</td>
<td>15% **</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Trucks over 12 tonnes Gross Vehicle Mass - UNECE definition of "Heavy Goods Vehicle"  
** Project team estimates
Proposed targets are intended to set a goal for significant performance improvements over the next three years

<table>
<thead>
<tr>
<th>Logistics cost drivers</th>
<th>Proposed benchmarks</th>
<th>NSW baseline</th>
<th>Target in 3 years</th>
<th>Target rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor utilisation - road</td>
<td>Average tonnes delivered per hour worked by a sample of heavy* bulk metro delivery trucks</td>
<td>7.5</td>
<td>10</td>
<td>Raise typical deliveries per day from 3 to 4 (Melbourne is 5)</td>
</tr>
<tr>
<td></td>
<td>Average number of pallet spaces delivered per hour worked by a sample of heavy* Food &amp; Bev metro delivery trucks</td>
<td>5.0</td>
<td>6.0</td>
<td>20% improvement</td>
</tr>
<tr>
<td></td>
<td>% of Food &amp; Beverage retail delivery locations with restrictions on night time deliveries (7 pm to 6 am)</td>
<td>53%</td>
<td>27%</td>
<td>Half of baseline but still significantly worse than Queensland</td>
</tr>
<tr>
<td>Poor utilisation - rail</td>
<td>Average actual net tonnes per train (Intermodal or Steel) operating between Melbourne, Sydney and Brisbane</td>
<td>1,200</td>
<td>1,500</td>
<td>25% improvement</td>
</tr>
<tr>
<td></td>
<td>Average actual Intermodal and Steel train transit time between Melbourne and Brisbane</td>
<td>38.5 hrs</td>
<td>29.5 hrs by 2015</td>
<td>ARTC target</td>
</tr>
<tr>
<td>Load capacity of trucks</td>
<td>Number of PBS vehicles registered in NSW</td>
<td>~10</td>
<td>500</td>
<td>0.5% of 100,000 Heavy Rigid and Prime Movers registered in NSW</td>
</tr>
<tr>
<td></td>
<td>% of Food &amp; Beverage retail store delivery locations with truck size restrictions</td>
<td>27%</td>
<td>14%</td>
<td>Half of baseline but still significantly worse than Queensland</td>
</tr>
<tr>
<td>Lack of modal choice</td>
<td>% TEU by rail to/from Port Botany</td>
<td>19%</td>
<td>40% by 2016</td>
<td>Established target understood by industry</td>
</tr>
<tr>
<td></td>
<td>Intermodal rail freight task between Sydney and Melbourne in million net tonne-kilometres</td>
<td>682</td>
<td>900</td>
<td>ARTC North-South Corridor Investment Outline Sep 07 – 10.0%/yr CAGR</td>
</tr>
<tr>
<td></td>
<td>Intermodal rail freight task between Sydney and Brisbane in million net tonne-kilometres</td>
<td>523</td>
<td>720</td>
<td>ARTC North-South Corridor Investment Outline Sep 07 – 11.5%/yr CAGR</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Proposed benchmarks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friendlier trucks</td>
<td>% of distance travelled by Articulated and Rigid trucks using CNG, LNG, LPG, Biodiesel or Electric</td>
<td>0.12%</td>
<td>2%</td>
<td>Buses were already at 1.6% in 2005</td>
</tr>
<tr>
<td></td>
<td>% of heavy* trucks registered in NSW and complying with ADR 80/02 emissions standards (ie. sold after 1 Jan 2008)</td>
<td>5% **</td>
<td>20%</td>
<td>About 5% of fleet sold new each year, and aim to retire more old trucks</td>
</tr>
<tr>
<td></td>
<td>% of heavy* trucks registered in NSW and complying with ADR 83 noise standards (ie. sold after 1 January 2006)</td>
<td>16% **</td>
<td>32%</td>
<td>About 5% of fleet sold new each year, and aim to retire more old trucks</td>
</tr>
</tbody>
</table>

* Trucks over 12 tonnes Gross Vehicle Mass - UNECE definition of “Heavy Goods Vehicle”
** Project team estimates

54
Data gathering should be conducted annually

<table>
<thead>
<tr>
<th>Proposed benchmarks</th>
<th>Data gathering method and source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average tonnes delivered per hour worked by a sample of heavy* bulk delivery trucks within the Sydney metropolitan area</td>
<td>Survey Fleet operators Cemex, Cement Australia, Hanson Resources, Caltex, OneSteel asking them to complete Table A attached</td>
</tr>
<tr>
<td>Average number of pallet spaces delivered per hour by a sample of heavy* Food &amp; Bev delivery trucks within the metropolitan area</td>
<td>Survey grocery retailers Woolworths, Coles, Franklins, Aldi and Metcash asking their Distribution or Logistics Managers to complete Table B attached</td>
</tr>
<tr>
<td>% of Food &amp; Beverage retail store delivery locations with restrictions on night time deliveries (7 pm to 6 am)</td>
<td>Survey grocery retailers Woolworths, Coles, Franklins, Aldi and Metcash asking their Distribution or Logistics Managers to complete Table C attached</td>
</tr>
<tr>
<td>% of Food &amp; Beverage retail delivery locations with truck size restrictions</td>
<td></td>
</tr>
<tr>
<td>Average actual net tonnes per train (Intermodal or Steel) operating between Melbourne, Sydney and Brisbane</td>
<td>Survey Pacific National and QR National asking them to complete Table D attached</td>
</tr>
<tr>
<td>Average actual Intermodal and Steel train transit time between Melbourne and Brisbane</td>
<td>Refer to Table A1 in latest Australian Intercapital Rail Freight Performance Indicators publication from BITRE at <a href="http://www.bitre.gov.au">www.bitre.gov.au</a></td>
</tr>
<tr>
<td>Intermodal rail freight task between Sydney and Melbourne in million net tonne-kilometres</td>
<td>Refer to Table A7 in latest Australian Intercapital Rail Freight Performance Indicators publication from BITRE at <a href="http://www.bitre.gov.au">www.bitre.gov.au</a></td>
</tr>
<tr>
<td>Intermodal rail freight task between Sydney and Brisbane in million net tonne-kilometres</td>
<td></td>
</tr>
<tr>
<td>Number of PBS vehicles registered in NSW</td>
<td>Request latest figure from the RTA’s Intelligent Access Program Manager</td>
</tr>
<tr>
<td>% TEU by rail to/from Port Botany</td>
<td>Refer to &quot;Rail&quot; section of latest Sydney Ports Corporation annual &quot;Logistics Review&quot; at <a href="http://www.sydneyports.com.au/corporation/publications/publications">www.sydneyports.com.au/corporation/publications/publications</a></td>
</tr>
<tr>
<td>% of distance travelled by Articulated and Rigid trucks using CNG, LNG, LPG, Biodiesel or Electric</td>
<td>Consult latest edition of Apelbaum Consulting Group’s annual “NSW Transport Facts” held by NSW MOT – Table 3.1-3 “Distance Travelled by Fuel Type and ADR”</td>
</tr>
<tr>
<td>% of heavy* trucks registered in NSW and complying with ADR 80/02 (Euro 4 or better) emissions standards (ie. sold after 1 Jan 2008)</td>
<td>Extract annual registration data by state for vehicle types Heavy Rigid and Prime Mover from latest release of Australian Bureau of Statistics publication 9309.0 Motor Vehicle Census, Australia at <a href="http://www.abs.gov.au">www.abs.gov.au</a> (search for 9309.0) Alternatively, for more detailed data, contact ERG at <a href="http://www.erginternational.com.au">www.erginternational.com.au</a></td>
</tr>
<tr>
<td>% of heavy* trucks registered in NSW and complying with ADR 83 (ECE 51 equivalent) noise standards (ie. sold after 1 January 2006)</td>
<td></td>
</tr>
</tbody>
</table>

* Trucks over 12 tonnes Gross Vehicle Mass - UNECE definition of "Heavy Goods Vehicle"
Reporting should be done annually with each benchmark presented as a graph showing baseline, annual results and target.

**Illustrative reporting example**

% TEU by rail to/from Port Botany

**Explanation**

Calculated from the number of TEUs (Twenty Foot Equivalent Unit containers) carried by rail to/from Port Botany and the total number of TEUs handled through Port Botany in each financial year.

**Commentary** (optional)

Actual volume handled by rail has increased steadily for the past 5 years, but not as fast as total port volume has increased, causing a slight decline in % by rail.

% TEU by rail to/from Port Botany

Indicative target (aiming for 40% by 2016)

Actual performance
Table A – Bulk truck delivery data

Average tonnes delivered per hour worked by a sample of heavy* bulk delivery trucks within the Sydney metropolitan area

<table>
<thead>
<tr>
<th>Metro city</th>
<th>Average number of deliveries per day</th>
<th>Average tonnes per delivery</th>
<th>Average hours worked per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melbourne</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bris/Adel/Perth</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For reference: 2008 data

<table>
<thead>
<tr>
<th>Metro city</th>
<th>Average number of deliveries per day</th>
<th>Average tonnes per delivery</th>
<th>Average hours worked per day</th>
<th>Calculated tonnes per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney</td>
<td>3</td>
<td>30</td>
<td>12</td>
<td>7.5</td>
</tr>
<tr>
<td>Melbourne</td>
<td>5</td>
<td>30</td>
<td>12</td>
<td>12.5</td>
</tr>
<tr>
<td>Bris/Adel/Perth</td>
<td>6</td>
<td>30</td>
<td>12</td>
<td>15</td>
</tr>
</tbody>
</table>

* Trucks over 12 tonnes Gross Vehicle Mass - UNECE definition of "Heavy Goods Vehicle"
## Table B – Food and Beverage truck delivery data

### Average number of pallet spaces delivered per hour by a sample of heavy* Food & Beverage delivery trucks within the metropolitan area

<table>
<thead>
<tr>
<th>Metro city</th>
<th>Total number of pallet spaces delivered</th>
<th>Total hours worked by fleet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melbourne</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bris/Adel/Perth</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Data request – Table B

For reference: 2008 data

<table>
<thead>
<tr>
<th>Metro city</th>
<th>Total number of pallet spaces delivered</th>
<th>Total hours worked by fleet</th>
<th>Calculated pallet spaces per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney</td>
<td>40/day</td>
<td>8/day</td>
<td>5.0</td>
</tr>
<tr>
<td>Melbourne</td>
<td>60/day</td>
<td>8/day</td>
<td>7.5</td>
</tr>
<tr>
<td>Bris/Adel/Perth</td>
<td>80/day</td>
<td>8/day</td>
<td>10.0</td>
</tr>
</tbody>
</table>

* Trucks over 12 tonnes Gross Vehicle Mass - UNECE definition of "Heavy Goods Vehicle"

Estimates based on indicative numbers provided by Woolworths
## Table C – Retail store delivery restrictions

### Data request – Table C

<table>
<thead>
<tr>
<th>State</th>
<th>% of stores serviced with delivery time allotted restrictions</th>
<th>% of stores serviced with vehicle restriction (unable to accommodate standard 22 pallet vehicle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QLD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### For reference: 2008 data

<table>
<thead>
<tr>
<th>State</th>
<th>% of stores serviced with delivery time allotted restrictions</th>
<th>% of stores serviced with vehicle restriction (unable to accommodate standard 22 pallet vehicle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>53%</td>
<td>27%</td>
</tr>
<tr>
<td>VIC</td>
<td>42%</td>
<td>4%</td>
</tr>
<tr>
<td>QLD</td>
<td>14%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Numbers provided by Woolworths
### Table D – Tonnes per interstate train (general freight, not bulk)

**Average actual net tonnes per train (Intermodal or Steel) operating between Melbourne, Sydney and Brisbane**

<table>
<thead>
<tr>
<th>Operating corridors</th>
<th>Average tonnes per train (Intermodal or Steel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney – Brisbane</td>
<td></td>
</tr>
<tr>
<td>Sydney – Melbourne</td>
<td></td>
</tr>
<tr>
<td>Melbourne – Brisbane</td>
<td></td>
</tr>
</tbody>
</table>

**Data request – Table D**

**For reference: 2008 data**

<table>
<thead>
<tr>
<th>Operating corridors</th>
<th>Average tonnes per Intermodal and Steel train</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney – Brisbane</td>
<td></td>
</tr>
<tr>
<td>Sydney – Melbourne</td>
<td></td>
</tr>
<tr>
<td>Melbourne – Brisbane</td>
<td></td>
</tr>
</tbody>
</table>

Average of numbers provided by Pacific National and QR National
Four Key Supply Chains
Opportunities for Innovation

Section 4
Food and Beverage Sector
The Food & Beverage industry plays a major role in the NSW economy supported by extensive Freight & Logistics activities

- Perhaps more than any other sector of the economy, the Food & Beverage sector’s prosperity is driven by population. NSW has always been Australia’s largest consumer market, and is also home to many of Australia’s best-known Food & Beverage brands, such as Woolworths, Lion Nathan, Arnott’s and Kelloggs.

- Many decades ago NSW was largely able to feed itself and export surplus food products. Now NSW is a net importer of some food products such as fresh fruit and vegetables from Queensland, Victoria and even New Zealand and the USA. Shipments out have also risen as NSW is a major exporter of processed and packaged foods to other states and overseas markets.

- NSW’s sources of Food & Beverages have changed significantly over recent decades, and so have the products themselves and the channels to market. The Retail industry is now built around shopping centres where the majority of family groceries are bought at large full-service supermarkets. In contrast the Foodservice industry has fragmented into tens of thousands of cafés, restaurants, sandwich shops, caterers, bars, clubs and pubs.

- Freight and Logistics costs are estimated to make up 8% – 10% of consumer spend on Food & Beverages

- Freight and Logistics for the sector is pulled in two directions – on the one hand seeking scale efficiencies and optimisation of deliveries at minimum cost for the large supermarket chains, and on the other hand trying to provide the best of service to thousands of smaller customers with specific needs and vital community roles in the Foodservice industry.

What are the key challenges facing the NSW Food & Beverage industry supply chains ... and what is the best role for government?
Food & Beverage logistics is exceptionally diverse and specialised. Attractive efficiency opportunities are up against difficult implementation challenges

- The Food & Beverage sector worldwide is a driver of leading practices in freight and logistics, some of which offer opportunities for this sophisticated industry in NSW.
  - The Food & Beverage industry manages the daily cycle of food supply to millions of consumers by specialising into sub-supply chains for dry packaged goods, chilled and frozen, fresh daily, and liquor, and by using different delivery models to large and small outlets.
  - Leading practices such as electronic information sharing are well known but not yet fully adopted

- Substantial savings as high as 6% of freight and logistics costs are achievable. Such savings represent a 0.5% cut in the price of groceries.
  - Higher-capacity trucks will cut both local and long-haul transport costs
  - Night-time deliveries to highly congested localities and better collaborative scheduling can significantly cut transport operating costs
  - Some storage and handling costs can also be avoided

- Barriers to change will require special attention in Food & Beverage logistics due to community sensitivity and competitive dynamics in the industry.
  - Food & Beverage delivery trucks are highly visible to other road users and local communities. Acceptance of larger trucks and extended operating hours can be difficult to gain, especially when the apparent winners are large retail chains (Woolworths, Coles, etc).
NSW is the largest food & beverage consuming state, one of the largest manufacturing states, and a significant exporter and interstate shipper.

- NSW's large population and its geographic location between the other east coast states make it pivotal to Food & Beverage distribution throughout the country.
- NSW farmers produce high crop values (in a good harvest year) and are second to Queensland in livestock. NSW leads in food manufacturing.
- Food & Beverages exports are a significant proportion of air and seafreight tonnages.
- NSW roads and rail lines carry large volumes of trans-shipments where goods moving between Queensland and most other states cross NSW.

**Typical Australian Food Sales by Volume**

- NSW 31%
- SEQ 16%
- VIC 27%
- WA 9%
- SA 8%
- TAS 2%
- NQ 5%
- NT 2%

**Agricultural Commodities**

- Gross Value Produced 2005-06 (A$ billion)

**Food, Beverage & Tobacco**

- Manufacturing Value Added 2004-05 (A$ billion)

Food and Beverage trade shipments comprise:

- 25% of airfreight exports from Sydney
- 13% of containerised seafreight exports from Port Botany

Sources: Sydney Ports and ABS/MarTrade

**Source:** ABS 7503.0
Industry structure is complex, with thousands of large and small companies from farmers to multi-national corporations and local café owners.
The FoodMap report prepared for the Department of Agriculture, Fisheries and Forestry in 2006 details food and beverage distribution channels.

FoodMap also identifies the key food and beverage categories and how they can be grouped from the logistics perspective.

Source: FoodMap: A comparative analysis of Australian food distribution channels
Food and beverage logistics volumes are usually measured in pallets and cartons rather than tonnes because handling units are critical to food distribution

<table>
<thead>
<tr>
<th>Truckloads</th>
<th>Pallets</th>
<th>Cartons, Cases and RPCs</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>A rigid truck has 6 to 16 pallet spaces</td>
<td>Pallets are 1.17 m square, stacked 1.0 to 1.8 m high</td>
<td>The basic food &amp; beverage handling unit, usually kept under 16 kg in weight</td>
<td>Units of retail sale, on average 12 to a case, but there can be up to 400 small items like chocolate bars in some cases</td>
</tr>
<tr>
<td>A semi-trailer 22 or 24 pallet spaces</td>
<td>They typically carry 50 – 100 cases or RPCs and weigh up to and sometimes over 1 tonne</td>
<td>Includes cardboard boxes, milk crates, bread trays and Returnable Plastic Containers</td>
<td></td>
</tr>
<tr>
<td>A large B-double (as pictured above) has 34 to 36 pallet spaces</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

"Warehouses" traditionally held stock whereas today's "Distribution Centres" move goods to customers

- Food & beverage Distribution Centres (DCs) are designed around different order picking tasks
  - Manufacturer DCs pick mostly pallets and some cases
  - Retailer DCs focus on case picking and some item picking
- "Drop shipping" avoids Manufacturer DC costs by shipping full truck loads direct from factories to Retailer DCs
- Cross docking minimises DC costs by moving goods directly from an inbound truck to an outbound truck with minimal handling effort

Most retail shops are now supplied from DCs rather than direct from factories

- More than 90% of Food & Beverage volumes are delivered by large trucks out of centralised DCs because this supply chain model has proven substantially cheaper to operate
- Factory delivery models like the Arnott's red truck are now a thing of the past
- Direct-to-Store Delivery ("DSD") survives for a specialised few percent of fresh daily products – newspapers, bread, milk, some fish, deli items, some chicken
Consumer goods supply chains move products from a small number of factories to millions of homes.
The number of items and vehicle trips multiplies remarkably towards the end of the supply chain

Food & Beverage volumes supplied in NSW each average week

- **Factories (NSW or interstate)**
  - Full truckloads
  - 9,000 loads/week
  - 9,000 truck trips/week, some interstate

- **Suppliers' Distribution Centres** (dozens in NSW)
  - Full truckloads
  - 250,000 pallets/week
  - 9,500 truck trips/week

- **Retail Distribution Centres** *
  - (10 in NSW)
  - Full pallets
  - 14 million cases/week

- **Retail outlets** *
  - (1000's in NSW)
  - Full cases
  - 25,000 truck trips/week (incl trips direct from suppliers, bakeries, etc)

- **Homes (millions in NSW)**
  - Items
  - 160 million items/week
  - 3 – 10 million car trips/week

**Sources:**
Industry data and project team analysis

* Including Foodservice distributors and Foodservice outlets

**Opportunities:**
- Congestion impacts
- Asset utilisation opportunities
The NSW Food & Beverage industry is a major interstate shipper, a leading exporter by air and an important user of seafreight.

### Inbound

<table>
<thead>
<tr>
<th>Mode</th>
<th>Tonnes/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air – import</td>
<td>15,000</td>
</tr>
<tr>
<td>Sea – import</td>
<td>1,200,000</td>
</tr>
<tr>
<td>From interstate</td>
<td>2,700,000</td>
</tr>
</tbody>
</table>

6% of airfreight imports

15% of containerised imports (93,000 TEUs)

### Production

<table>
<thead>
<tr>
<th>Source</th>
<th>Tonnes/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW producers</td>
<td>8,000,000</td>
</tr>
</tbody>
</table>

### Consumption

<table>
<thead>
<tr>
<th>Source</th>
<th>Tonnes/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW demand</td>
<td>7,200,000</td>
</tr>
</tbody>
</table>

### Outbound

<table>
<thead>
<tr>
<th>Mode</th>
<th>Tonnes/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air – export</td>
<td>27,000</td>
</tr>
<tr>
<td>Sea – export</td>
<td>640,000</td>
</tr>
<tr>
<td>To interstate</td>
<td>4,000,000</td>
</tr>
</tbody>
</table>

25% of airfreight exports

13% of containerised exports (44,000 TEUs)

Sources: Sydney Ports, ABS/MariTrade, industry data and project team analysis.
For consumption, six distinct Food & Beverage supply chains work in parallel

- **Dry foods & soft drinks**
  - Factories (NSW or interstate)
  - Suppliers' Distribution Centres
  - Retail Distribution Centres
  - Retail shops, cafes, restaurants, canteens, pubs and vending

- **Fresh fruit and vegetables**
  - Fresh daily

- **Chilled & frozen dairy, meat, ice cream, juice, etc**
  - Cold chain long shelf life

- **Chilled milk, seafood, deli, chicken**
  - Cold chain short life

- **Fresh bread**
  - Fresh daily

- **Beer, wine, RTDs & spirits**
  - Heavy weight - Direct to store

Sources:
Industry information and project team analysis
Dry goods and liquor together make up the largest component of volume and have the lowest unit costs

<table>
<thead>
<tr>
<th>Factories (NSW or interstate)</th>
<th>Suppliers' Distribution Centres</th>
<th>Retail Distribution Centres</th>
<th>Retail shops, cafes, restaurants, canteens, pubs and vending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry foods &amp; soft drinks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh fruit and vegetables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chilled &amp; frozen dairy, meat, ice cream, etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chilled milk, seafood, deli, chicken</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh bread</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beer, wine RTDs &amp; spirits</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume Million cases/week</th>
<th>Logistics cost $/case</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>$3.10</td>
</tr>
<tr>
<td>2.6</td>
<td>$4.80</td>
</tr>
<tr>
<td>2.8</td>
<td>$4.20</td>
</tr>
<tr>
<td>1.5</td>
<td>$5.10</td>
</tr>
<tr>
<td>0.3</td>
<td>$5.00</td>
</tr>
<tr>
<td>1.6</td>
<td>$3.30</td>
</tr>
<tr>
<td>14.0</td>
<td>$3.90</td>
</tr>
</tbody>
</table>

Sources: Industry data and project team analysis

Note: Data is for Food & Beverages supplied to NSW consumer outlets
Excludes exports and volumes shipped interstate
Delivery to outlets is the biggest component of logistics costs for consumption

Sources: Industry data and project team analysis

Note: Data is for Food & Beverages supplied to NSW consumer outlets

<table>
<thead>
<tr>
<th>Products</th>
<th>Freight from source</th>
<th>Freight to retail DCs</th>
<th>Retail Distribution Centres</th>
<th>Freight to consumer outlets</th>
<th>Total NSW consumption logistics costs/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry foods &amp; soft drinks</td>
<td>$610 m</td>
<td>$630 m</td>
<td></td>
<td></td>
<td>$2,800 m</td>
</tr>
<tr>
<td>Fresh fruit and vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chilled &amp; frozen dairy, meat, ice cream, juice, etc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chilled milk, seafood, deli, chicken</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh bread</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beer, wine RTDs &amp; spirits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- Freight costs are broken down into:
  - Goods coming from Factories (NSW or interstate)
  - Goods coming from Suppliers' Distribution Centres
  - Goods coming to Retail Distribution Centres
  - Goods being delivered to Retail shops, cafes, restaurants, canteens, pubs and vending

- Total cost estimates are based on industry data and project team analysis.
- Note: Data is for Food & Beverages supplied to NSW consumer outlets.
Shipments in and out of NSW add another $480 million per year to Food & Beverage logistics spend

Spend "Within NSW" is taken as:
- All transport costs directly to/from ports
- 50% of interstate freight costs (other 50% sits with source or destination state)
- Despatching or receiving Distribution Centre costs

Notes:
1. Excludes cost of stevedoring, shipping, airfreight, AQIS, Customs, etc as beyond the scope of this project
2. Information is not available to support more detailed estimates of logistics spend moving Food & Beverages to importers and from exporters other than the immediate "deliver to/from port" leg. Total import and export logistics spend is certain to be significantly greater than shown here.

Sources: Sydney Ports, ABS/MariTrade, industry data and project team analysis
The adoption of industry-standard barcodes in the 1980s began a quarter-century of transformation in Food & Beverage supply chain efficiency

<table>
<thead>
<tr>
<th>Era</th>
<th>Key changes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980’s</td>
<td>Barcodes</td>
<td>Enabling product scanning throughout the supply chain, facilitating significant reduction of paper based manual processes, including distribution center (DC) operations and cash register check out.</td>
</tr>
<tr>
<td>1990’s</td>
<td>Electronic Data Interchange (EDI)</td>
<td>The exchange of documents in standardised electronic form, between organisations, in an automated manner. This leads to faster transfer of data, far fewer errors, less time wasted on exception-handling, and hence a more streamlined business process.</td>
</tr>
<tr>
<td>1990’s</td>
<td>Reduction of Direct to Store Deliveries (DSD)</td>
<td>Grocery retailers take control of this freight component to stores, requiring suppliers to deliver to the retail DC’s instead and combining freight from many other suppliers. This significantly increased store delivery efficiencies as many inefficient small store deliveries are removed. Arnott’s was notably impacted and had to discard its iconic fleet of red delivery trucks.</td>
</tr>
<tr>
<td>2000’s</td>
<td>Primary freight – factory gate pricing</td>
<td>A logical next step after reducing DSD. Grocery retailers take over the inbound freight into their DC’s and leverage their transportation assets to collect goods from many of their suppliers consolidating loads and enabling greater efficiencies across their network.</td>
</tr>
<tr>
<td>2000’s</td>
<td>Consolidation of retailers’ distribution network</td>
<td>The reduction in numbers of grocery retailers’ distribution centers throughout Australia, to enable improved transportation and DC utilisation. Several new highly automated DC’s were built to achieve productivity gains. The new network caused many FMCG suppliers to rethink and redesign their own network.</td>
</tr>
<tr>
<td>2000’s</td>
<td>Improved Materials Handling Equipment (MHE)</td>
<td>Introduction of a range of improved handling devices to reduce handling costs along the supply chain. Examples are rollcages instead of pallets, allowing easy movement of trolleys through DC’s onto trucks and all the way to store shelves. Other examples are returnable plastic crates for fruit and vegetables and shelf ready packaging for supermarket shelves reducing unpacking activities and carton waste.</td>
</tr>
<tr>
<td>2000’s</td>
<td>Collaborative Planning Forecasting &amp; Replenishment</td>
<td>Close (electronic) collaboration between retailers and suppliers, using real Point of Sale data to derive forecasts and plan replenishment and shipment of products to stores. Often large suppliers will have some of their own staff on the retailer’s premises to develop sales forecasts and understand promotional impact, and then electronically send forecast data back to the suppliers.</td>
</tr>
</tbody>
</table>
Leading practices in food and beverage supply chains are now widely shared and understood. Industry leaders are well down the implementation path

<table>
<thead>
<tr>
<th>Supply chain activity</th>
<th>Basic practice examples</th>
<th>Progressive practice examples</th>
<th>Leading practice examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordering and inventory management</td>
<td>Manual orders by phone/fax</td>
<td>Electronic transmission of orders using EDI</td>
<td>Fully automated store orders and DC orders – Woolworths</td>
</tr>
<tr>
<td></td>
<td>Manual stock management</td>
<td>System-directed stocktakes</td>
<td></td>
</tr>
<tr>
<td>Freight from suppliers to retail DCs</td>
<td>Managed by suppliers with delivery times arranged by phone/fax</td>
<td>Some consolidation through primary freight management</td>
<td>Automated handling – Coca Cola</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deliveries scheduled into time slots</td>
<td>Extensive primary freight management with small orders consolidated during shipment</td>
</tr>
<tr>
<td>Distribution Centres</td>
<td>Manual receiving and putaway</td>
<td>System-directed paperless receiving, putaway and picking – most large manufacturers</td>
<td>Some automated handling</td>
</tr>
<tr>
<td></td>
<td>Paper-based picking and despatch</td>
<td></td>
<td>One-touch receiving</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Voice-picking – Metcash</td>
</tr>
<tr>
<td>Deliveries to stores</td>
<td>Mixed fleet</td>
<td>Standardised fleet and routes</td>
<td>Auto load building</td>
</tr>
<tr>
<td></td>
<td>Variable delivery sizes and runs</td>
<td></td>
<td>Full trucks</td>
</tr>
<tr>
<td></td>
<td>Manual load building</td>
<td>Control over loads and schedules</td>
<td>Extensive use of Unit Load Devices like RPCs and Roll cages</td>
</tr>
<tr>
<td></td>
<td>– Foodservice suppliers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

77
Fundamental industry issues and complexities contribute to logistics costs and improvement challenges

<table>
<thead>
<tr>
<th>Industry issues</th>
<th>Logistics cost impacts</th>
<th>Improvement challenges</th>
</tr>
</thead>
</table>
| Diversity and fragmentation among suppliers and at the retail and foodservice end of the supply chain | ▪ Thousands of small delivery points, often in old commercial centres with poor access or close to local residents concerned about traffic and noise impacts  
   ▪ Lack of efficient scale for everybody except the largest retailers and suppliers  
   ▪ Long tail of partly loaded small trucks despite efforts to consolidate freight into full truck loads  
   ▪ Painfully slow progress with adoption of carton-level barcodes which simplify receiving at DCs and stores  
   ▪ High cost and complexity of efforts to collaborate with trading partners and simplify logistics | ▪ Support for "scale plays" such as freight consolidation  
   ▪ Shorter transit times and less delay time at delivery points to improve truck utilisation  
   ▪ Encouragement to industry bodies such as GS1* who promote standardised information sharing  
   ▪ Practical information sharing tools suitable for large and small businesses                                                                                                                                   |
| Commercial power imbalance between large and small players                      | ▪ Efficiency initiatives by large players such as "Primary Freight" can perversely add costs to suppliers by reducing their control over shipments both inbound and outbound  
   ▪ Smaller more frequent "demand driven" just in time orders tend to further fragment deliveries and increase costs for small players  
   ▪ Large transport companies like Toll and Linfox should be able to offer end-to-end cost reduction deals optimising supply chain activities, but few such arrangements are observed to exist. Simple time-limited contracts for basic trucking services are the norm. | ▪ Consider total supply chain costs in commercial arrangements, not just the advantage to one player  
   ▪ Encourage shared risk/reward arrangements, longer-term contracts, different commercial structures and other approaches which tend to drive long-term effort and investment from all supply chain partners to improve logistics performance. |
Notable freight and logistics efficiencies in NSW can be gained in the short and medium term prior to the advent of new road and rail infrastructure

- Substantial dollar savings as high as 6% of freight and logistics costs are estimated to be achievable from operational efficiencies *
  - Such savings represent a 0.5% cut in the price of groceries to NSW consumers
  - Logistics savings can be expected to be passed directly on to consumers because the industry is sufficiently competitive

- The key driver of savings is more efficient use of fewer trucks. The biggest savings are estimated to come from:
  - Use of fewer larger-capacity trucks with higher payloads, both for interstate and other long hauls and for local deliveries
  - Easing restrictions on night-time deliveries to certain Sydney metro areas, primarily those close to the CBD or accessed by heavily congested roads.
  - Fewer truck trips made possible by improvements in truck utilisation, especially on busy and congested roads around Sydney. Utilisation improvements strongly depend on innovative technologies, more open exchange of scheduling information, and willingness to collaborate across commercial boundaries to increase average turnaround and space usage on trucks.

* No fuel efficiency benefits have been counted due to uncertainty about future fuel prices
Major opportunity areas and drivers of efficiency are clear

<table>
<thead>
<tr>
<th>Opportunity areas</th>
<th>Drivers of logistics efficiency and cost reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer trucks</td>
<td>Access for Higher Productivity Vehicles to more long haul and local routes</td>
</tr>
<tr>
<td></td>
<td>Larger capacity truck and trailer designs</td>
</tr>
<tr>
<td>Cheaper modes</td>
<td>More rail/sea/Intermodal can be used and freight rail blockages can be overcome</td>
</tr>
<tr>
<td>Higher asset utilisation</td>
<td>Productive time can be increased by reducing load/unload delays</td>
</tr>
<tr>
<td></td>
<td>New industry collaboration tools can help identify backhaul opportunities</td>
</tr>
<tr>
<td></td>
<td>Average truck/trailer fill can be increased</td>
</tr>
<tr>
<td></td>
<td>Road congestion can be avoided and delays can be reduced</td>
</tr>
<tr>
<td></td>
<td>Extended hours operation (night time pick ups and deliveries)</td>
</tr>
<tr>
<td>Improved truck efficiency / sustainability</td>
<td>Alternate fuels (LNG and CNG) when they become cheaper</td>
</tr>
<tr>
<td></td>
<td>Fuel efficiency and trailer design standards and incentives</td>
</tr>
<tr>
<td></td>
<td>Support for specific technologies such as auxiliary power units and quiet trucks</td>
</tr>
<tr>
<td></td>
<td>Driver training in fuel efficient driving techniques</td>
</tr>
</tbody>
</table>
The Food & Beverage industry in NSW is sufficiently competitive that cost savings are highly likely to flow to consumers, especially the buyers of basic foods

Industry competitiveness in NSW
- NSW has more major retail grocery operators than other states. Franklins only operates in NSW and Aldi acts as the leading price-setter for basic foods. Aldi has more stores in NSW than any other state.
- Indicative numbers of large format grocery stores in NSW are Woolworths 230, Coles 220, Franklins 78, Aldi 60, plus about 700 other medium-sized grocery stores supplied by Metcash. In addition there are about 2,000 convenience stores and 4,000 small food stores in NSW.
- The ACCC Inquiry into the competitiveness of retail prices for standard groceries* found that "Most grocery retailers and suppliers compete to deliver value on price and quality. Price competition is the strongest on key value items. This is not surprising as the prices of these items are most likely to influence where consumers shop. Price competition is also intense for the types of products stocked by ALDI, indicating the dynamic effect that ALDI has had on the grocery sector in Australia."

Grocery logistics costs and price effects
- Cost savings from better truck utilisation and higher productivity vehicles will be well understood throughout the industry and we expect retailers will pressure suppliers to pass on such savings in the wholesale prices charged by suppliers.
- Aldi operates a unique business model designed to strictly minimise its logistics costs and pass the benefits on to consumers. Aldi requires its suppliers to conform to its own packaging and handling formats which minimise costs throughout the supply chain. We are confident that any logistics cost savings captured by Aldi will be passed on and will help pull down the price of basic foods at both Aldi and its competitors.
- Other food and beverage retailers will accrue logistics savings across both basic and higher priced goods. There will be less competitive pressure to pass on logistics savings on higher priced goods such as branded and specialty food items and goods bought in convenience stores. Logistics costs are a smaller percentage of price for these more discretionary purchases.

* See App VI for reference details
There are a number of other recognised issues in the Food and Beverage sector that should be addressed to gain efficiencies

<table>
<thead>
<tr>
<th>Opportunity areas</th>
<th>Issues raised by industry stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail capacity</td>
<td>Key rail corridors have limited capacity for freight leading to poor service levels, especially Sydney to Brisbane</td>
</tr>
<tr>
<td>Road bottlenecks</td>
<td>Important missing links around Sydney are the M7 to F3 gap, the M4 East, the M5 East tunnel bottleneck and a westward connection from Port Botany to the M4</td>
</tr>
<tr>
<td>Limited truck access</td>
<td>Too many roads, bridges, tunnels and dock awnings cannot accommodate standard 4.6 metre high trailers, and many retail delivery docks are too tight to allow entry by standard rigid trucks and semi-trailers</td>
</tr>
<tr>
<td>Driver shortage</td>
<td>An aging workforce is causing driver shortages. But there are significant barriers to entry for young drivers and women including the industry not being viewed as a viable career path, long time delays to qualify for an articulated driver licence, and high insurance costs for young drivers in large rigs.</td>
</tr>
<tr>
<td>Operational constraints</td>
<td>Very large numbers of Food &amp; Beverage customers expect time-critical deliveries every working day often adding to traffic congestion at peak hours. There are many delivery constraints at customer level which make the logistics task more complex and difficult – council-imposed time restrictions, refusal by stores to accept deliveries outside certain hours, small-sized delivery docks, etc. These present opportunities for change which can help reduce both congestion and industry costs. Industry can make progress on some of these issues independent of government actions.</td>
</tr>
<tr>
<td>Higher Productivity Vehicles (HPV)</td>
<td>More access and clarity is needed to allow HML trucks to be used on main highways and into Sydney distribution centres. PBS truck designs offer large potential benefits for short-haul use as well as high-tonnage country runs.</td>
</tr>
<tr>
<td>Low density markets</td>
<td>Food &amp; Beverage suppliers face special cost challenges supplying low density markets like much of NSW west of the Great Dividing Range. Community distribution depots for use by competing suppliers of bread, milk, foodservice items, etc would lower costs if the Competition issues can be overcome.</td>
</tr>
</tbody>
</table>
Solutions need proactive effort by both government and industry players

<table>
<thead>
<tr>
<th>Areas for action</th>
<th>Industry</th>
<th>Government</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify specific regulatory constraints and communicate to government</td>
<td>Address regulatory roadblocks and issues highlighted by industry</td>
<td>Create awareness of the importance of freight logistics to the NSW economy and support the industry through Planning decisions which assure future operation of key logistics facilities and routes</td>
</tr>
<tr>
<td>Collaborate with industry partners and perhaps with competitors to exploit efficiency opportunities without waiting for regulatory changes</td>
<td></td>
<td>Provide a channel of communication for industry to air areas of concern</td>
</tr>
<tr>
<td>Put pressure on customers and industry operators to free up delivery times and other managerial constraints that do not depend on government action</td>
<td></td>
<td>Facilitate trials of key initiatives such as night-time deliveries, working closely with industry</td>
</tr>
<tr>
<td>Consider ways to drive demand changes through financial incentives such as extra service charges for deliveries at peak times of day, week or month</td>
<td></td>
<td>Identify, promote and support industry best practice solutions</td>
</tr>
<tr>
<td>Push ahead with adoption of proven information tools and technologies like GS1</td>
<td></td>
<td>Support education and training initiatives such as specialised skills training for heavy vehicle drivers</td>
</tr>
<tr>
<td>Identify barriers slowing the uptake and use of Higher Productivity Vehicles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Four Key Supply Chains
Opportunities for Innovation

Section 5
Heavy Construction Materials Sector
The Heavy Construction Materials supply chain in NSW moves high volumes of material to meet demand from the building and construction industries including major infrastructure projects.

- The Heavy Construction Materials industry includes products such as coarse and fine aggregates (crushed rock and sand which is either natural or recycled), cement, concrete, asphalt and demolition materials. Consumption is closely aligned with population growth and economic development, being an essential input to residential, commercial, industrial developments, and major infrastructure projects such as highways, tunnels and bridges.

- In NSW, heavy construction materials represent approximately 30 million tonnes (equating to 4.5 tonnes per capita). The industry is particularly sensitive to transport costs which equate to about 30 - 40% of industry revenues.

- The total construction industry (of which heavy construction materials are a part) is a major contributor to the NSW economy; it accounted for 8.3% of NSW Industry Value Added in 2007/08, and recorded the second highest growth rate (6.9%) of all industries in the State (source: DSRD)

- The bulk of freight movement of heavy construction materials takes place via road transport. Transport by rail and coastal shipping takes place on a number of specific routes.

- The industry has always sought rock and sand quarry sites close to points of use. Suitable quarries close to Sydney are nearing the end of their lives. Within five years most quarry materials will have to be brought from more distant sources.
Opportunities exist today to assist the efficiencies of the heavy construction materials sector. Strategic action is also required to address the future environment.

- The heavy construction materials sector has unique characteristics that set it apart from other supply chains:
  - The large volumes and low value of delivered product makes the sector sensitive to changes in the supply chain, particular to changes in transport costs.
  - The average product movement distance to Sydney users is ~50 km which is double the normal distance in other state capitals.
  - Demand from the building industry for daytime deliveries forces most truck movements to occur during peak traffic congestion times.

- Opportunities exist today to improve efficiencies in the sector:
  - The clear opportunities are for larger capacity trucks, more use of night time transport and improvements in truck utilisation. Truck utilisation is mostly directly improved by reducing total time required per run. Consistent time savings cut operating costs and the number of trucks and drivers required.
  - These opportunities are of greatest benefit in the Sydney area where volumes are highest, transport distances are long, congestion is greatest and truck utilisation can be most improved.

- There are also future strategic issues for Sydney that require immediate attention. Action is needed now to plan for coming changes that will have major transport implications for the sector:
  - Estimates of 1% population growth per year in the greater Sydney area over the next 40 years will place further demands on already strained supply chains.
  - Most of Sydney’s nearby quarries such as Penrith Lakes and Kurnell will be exhausted within 5 years and future quarries are over twice the distance away, with a significant impact on the sector’s transport task (this affects key issues such as road safety and sustainability).
  - Limited rail capacity and infrastructure exists to provide an alternative to greater road freight impacts and costs. Prompt action is required to address the rail capacity issues.
NSW consumes 30 million tonnes of heavy construction materials each year. Most of this product is quarried and processed locally.

- Volumes of heavy construction materials vary based on economic cycles, seasonal fluctuations, and the timing of major infrastructure projects such as motorways and tunnels.
- The industry tries to locate quarries as close as possible to the end points of use. In recent years Sydney’s heavy construction materials have largely come from nearby sites such as Penrith Lakes and Kurnell.
- The sector tends to be vertically integrated with a small number of key players owning the key assets throughout the supply chain.
- Raw materials mostly come from quarries – coarse & fine aggregate and sand – or from cement manufacturing plants. The sector's outputs are primarily concrete, asphalt, and road base products.
- Each year the supply chain moves 27 millions tonnes of aggregate and 3 million tonnes of cement from supply sources to strategically located batching plants and bulk terminals throughout NSW from which final deliveries are made by truck to the point of use.
The industry structure is simple with several large companies providing the output for the sector.

- Quarries provide 95% of the raw material volumes of all heavy construction materials in NSW. The top 5 companies are Boral, Hanson, Cemex, Rocla, and Adelaide Brighton who account for about 70% of total volume.

- In Australia, the cement market is dominated by 4 companies: Boral, Cement Australia, ICL, and Adelaide Brighton. Boral and Cement Australia are the major cement producers in NSW with combined production of 3 million tonnes per year. Cement manufacturing occurs at regionally based plants and cement is transported in bulk to metro locations using rail or ship.

- The concrete market has four major companies (Boral, Cemex, Hanson, and Hytec). Due to the short shelf life of concrete, each company’s batching plants are strategically located to service a radius of ~15km. There are a number of smaller concrete companies, particularly in regional areas where the barriers to entry are relatively low.

- The asphalt market is dominated by four major players: Boral, Works Infrastructure, State Asphalt, and Pioneer Road Surfaces. Only a few asphalt plants are required in NSW because the product is suitable for extended transport.

- The major consumers of heavy construction materials include large infrastructure projects such as road, rail, bridges, and tunnels, commercial and industrial building construction, and residential construction.

NSW market share of quarry aggregates
Total of ~27 million tonnes per year
The scope of heavy construction materials includes sand, aggregate (both natural and recycled), cement, concrete, asphalt, and other base inputs (fly ash, bitumen, etc)

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Picture</th>
<th>million tonnes pa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse aggregate</td>
<td>Quarryed rock that is 5-40mm in diameter: suitable for concrete and asphalt production, drainage &amp; filter around pipes, and rail ballast</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>Fine/sand aggregate</td>
<td>Quarryed rock and minerals that is &lt;5mm in diameter. Sand is a naturally occurring granular material composed of finely divided rock and mineral particles. Sand is a principle component of concrete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cement</td>
<td>Cement is a powdery substance made from mixing materials such as limestone, shale, calcium sulphate, and calcium carbonate. Concrete is formed when cement is mixed with water, aggregate, and sand</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Concrete</td>
<td>Concrete is typically composed by mixing aggregate, sand and cement, plus minor additives fly ash, water, and chemical admixtures</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Asphalt</td>
<td>Asphalt is a composite material commonly used for construction of pavements and highways. It consists of asphalt binder, coarse and fine aggregate mixed together then laid down in layers and compacted</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Fly ash, slag, bitumen, other</td>
<td>Fly ash is one of the residues generated when coal is burned in power stations. Slag is the by-product of smelting ore to produce metals and primarily comes from steelworks in Port Kembla. Both are commonly used to supplement cement in concrete production. Bitumen is an oil refining product used as a binder for asphalt</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
The majority of Sydney’s heavy construction materials are sourced within a 120km radius of Sydney.

- The consumption of heavy construction materials is concentrated in areas of high population density, making quarries close to Sydney an important resource. In recent years, Sydney has managed to source most of its heavy construction materials from nearby the Sydney region.

- Trucks from quarries such as Penrith Lakes, Kulnura, Peats Ridge, Albion Park, Hartley, Maroota, Kurnell and Bass Point have transported the majority of heavy construction materials to Sydney.

- Boral’s Dunmore quarry uses rail to transport quarried materials to its St Peters and Enfield rail bulk handling facilities, running approximately 10 trips per week.

- Hanson runs a ship from Bass Point to Blackwattle Bay 2 - 3 times per week carrying up to 3,500 tonnes per load.

- Cement is manufactured at Kandos, Berrima, Maldon, and Tasmania which all lie outside the Sydney region. It is transported to metropolitan bulk handling facilities via road, rail or ship.
Heavy Construction Materials supply chains move products from quarries to thousands of construction sites throughout NSW.

- **NSW quarries or cement plants**: Full truckloads
- **Batching plants and bulk material facilities** (dozens in NSW): Full truckloads
- **Points of use** (thousands in NSW): Concrete mixer trucks

Full ship and train loads

Industry & Investment

NSW Government
Road transport dominates, with a small number of ships and trains bringing product from some more distant sources.

**Heavy Construction Materials volumes supplied in NSW each average week**

- **NSW Quarries or cement plants**
  - Full ships, trains, and trucks
  - 615,000 tonnes/week
  - 5 ship deliveries¹ (20,000t)
  - 22 train loads² (50,000t)
  - 15,000 truckloads (545,000t)
  - per week

- **Batching plants and bulk material facilities** (dozens in NSW)
  - Full mixer trucks and dump trucks
  - 615,000 tonnes/week

- **Points of use** (thousands in NSW)
  - 20,000 concrete truckloads
  - 15,000 other truckloads
  - per week

Note: Return trips not included in calculation

Sources: Industry data and project team analysis

1. Bass Point (South Coast) aggregate and Tasmanian cement to Sydney and Newcastle
2. South Coast aggregate and Berrima and Kandos cement

Note: Return trips not included in calculation
Heavy Construction Materials comprise three primary product groups. Raw materials are delivered either to batching plants or directly to points of use.

<table>
<thead>
<tr>
<th>Raw materials volume</th>
<th>NSW Quarries</th>
<th>Bulk Terminals</th>
<th>Sources: Industry data and project team analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>volume tonnes/week</td>
<td>Aggregate</td>
<td>Cement</td>
<td>Bulk truck</td>
</tr>
<tr>
<td></td>
<td>510,000</td>
<td>50,000</td>
<td>Bulk truck</td>
</tr>
<tr>
<td></td>
<td>Cement</td>
<td>Other (fly ash, bitumen)</td>
<td>Other (fly ash, bitumen)</td>
</tr>
<tr>
<td></td>
<td>55,000</td>
<td></td>
<td>Bulk truck</td>
</tr>
<tr>
<td>615,000 Tonnes/wk</td>
<td>70,000 tonnes/wk</td>
<td>70,000 tonnes/wk</td>
<td>615,000 tonnes/wk</td>
</tr>
</tbody>
</table>
The Heavy Construction Materials sector produces four major outputs, all delivered by truck.

**NSW quarries or bulk facilities**

- **Aggregate**
- **Cement**
- **Other (fly ash, bitumen)**

**End use volume**

- **Road base, landfill** 165,000
- **Concrete** 315,000
- **Asphalt** 135,000
- **Bagged materials** 1,500

**Sources:** Industry data and project team analysis

* Pre-cast concrete may incur some additional truck movements.
Concrete batching plants are strategically located to serve customers within a half-hour radius due to the fast setting time of concrete

- Construction sites require concrete delivery in the early part of the day to ensure they can complete concrete pours in daylight hours. This results in the demand for concrete starting early at 6am, peaking at 9-10am, and tapering off after 1pm.
- At batching plants, aggregate, cement, and water are mixed together to form concrete, a product that has limited shelf life before it sets.
- Concrete batching plants have been constructed in strategic locations, each servicing a radius of ~15km in metropolitan areas.
- Most batching plants have limited on-site storage capacity, and can satisfy only approximately 1-3 hours of concrete demand in metropolitan areas. Therefore, the supply of aggregate and cement to batching plants must closely foreshadow the output demand for concrete.
- Increasing commercial and residential population densities around some batching plants limits the potential for capacity expansion and restricts the allowed hours of operation.

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Indicative illustration showing a spread of batching plant locations in the Sydney region

Key:
- B Batching plant

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NSW Government
Industry & Investment

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95
The demand for concrete peaks during the morning traffic congestion times, reducing delivery capacity and forcing late deliveries.

Source: Stakeholder interviews
Opportunities exist today that can improve the efficiencies of the sector

- The short and medium term opportunities are for;
  - Larger capacity trucks (increasing the payload) for bulk transport of aggregates and possibly demolition materials. Aggregates including sand are by far the greatest opportunity area.
  - More use of night time transport
  - Improvements in truck utilisation. Truck utilisation is mostly directly improved by reducing total time required per run. Consistent time savings cut operating costs and the number of trucks and drivers required

- These opportunities are of greatest benefit in the Sydney area where volumes are highest, congestion is greatest and truck utilisation can be most improved
### Opportunity areas and drivers of efficiency are becoming clear

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<th>Opportunity areas</th>
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<td>Access for Higher Productivity Vehicles to more routes</td>
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<td>Larger capacity truck and trailer designs – PBS, HML</td>
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<td><strong>Higher asset utilisation</strong></td>
<td>Productive time can be increased by reducing load/unload delays</td>
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<tr>
<td></td>
<td>Road congestion delays can be reduced</td>
</tr>
<tr>
<td></td>
<td>Rail wagon and loco utilisation can be increased</td>
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<td></td>
<td>Extended hours operation (night time pick ups and deliveries)</td>
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<td><strong>Improved truck efficiency / sustainability</strong></td>
<td>Alternate fuels (LNG and CNG) when they become cheaper</td>
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<td></td>
<td>Fuel efficiency and trailer design standards and incentives</td>
</tr>
<tr>
<td></td>
<td>Driver training in fuel efficient driving techniques</td>
</tr>
</tbody>
</table>
Supply of concrete is the largest cost component of the sector driven by product volumes and demand for site delivery during peak congestion times.

**NSW Heavy Construction Materials Supply Chain Costs**

<table>
<thead>
<tr>
<th>Source</th>
<th>Cost (Yearly)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road base, landfill, etc</td>
<td>$100m</td>
</tr>
<tr>
<td>Concrete</td>
<td>$435m</td>
</tr>
<tr>
<td>Asphalt</td>
<td>$180m</td>
</tr>
<tr>
<td>Bagged materials</td>
<td>$1m</td>
</tr>
</tbody>
</table>

**NSW Quarries**
- Aggregate: Train/Ship -> Truck ($55m)
- Cement: Train/Ship -> Truck ($10m)
- Other (fly ash, bitumen): Train/Ship -> Truck ($410m)

**Total NSW Logistics Cost per Year**
- $715m

Sources: Industry data and project team analysis
There are also future strategic issues for Sydney that require immediate attention. Action is needed now to plan for coming changes that will have major transport implications for the sector.

- Estimates of 1% population growth per year in the greater Sydney area over the next 40 years will place further demands on already strained supply chains.
- Most of Sydney’s nearby quarries will be exhausted within 5 years and future quarries are over twice the distance away, with a significant impact on the sector's transport task.
- Limited rail capacity and infrastructure exists to provide an alternative to greater road freight impacts and costs. Prompt action is required to address the rail capacity and infrastructure issues.
Sydney’s quarries are approaching exhaustion and firms are moving outside of the Sydney region to locations such as Lynwood and Marulan

- The Penrith Lakes quarries are expected to close within 6 years meaning alternative quarries are needed to satisfy future demand
- Lynwood and Marulan quarries have been given Planning Consent as the key replacements, however these quarries are situated approximately 150km from the Sydney CBD, adding significantly to the transport task
- Boral plans to run trains from Marulan to their bulk handling facilities at Enfield and St Peters
- Cemex is working on the development of a rail spur to feed a bulk materials facility in Rooty Hill. However constraints on rail capacity and a complicated negotiation and approval process is expected to significantly delay progress of this infrastructure. Therefore Cemex may need to rely on road transport from Lynwood in to the Sydney region
- One company’s analysis indicates it will have to use twice the number of trucks working two shifts when its aggregate source shifts from nearby Sydney to Lynwood/Marulan
Only Boral’s Enfield & St Peters terminals are currently positioned on the rail network to receive deliveries from the Marulan and Lynwood quarries.

- Boral currently operates rail terminals at St Peters and Enfield. St Peters is supplied from south coast quarries but could also be supplied from Marulan.
- Boral’s Enfield terminal is well placed to take deliveries from Marulan because it is served by the dedicated freight line to open in 2009 along the Southern Corridor.
- Pacific National and Cemex have developed proposals for new bulk terminals at St Mary’s and Rooty Hill.
- Both proposed sites are on the Western Corridor which is a shared passenger/freight route experiencing increasing demands for passenger services. Capacity for additional freight movements is likely to be increasingly limited after 2012.
- Post the closure of Kurnell, fine sand will need to come from more distant sources. Stockton is one of these, but is unlikely to be efficient due to the rail bottleneck in the Hunter Valley.

Map courtesy of RailCorp
There are a number of other recognised issues in the heavy construction materials sector that could be addressed to gain efficiencies

<table>
<thead>
<tr>
<th>Opportunity areas</th>
<th>Issues raised by industry stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail and road capacity</td>
<td>Key rail corridors have limited capacity, there is sub-optimal rolling stock (wagon) capacity, passenger services have priority, and the M7 to F3 link is required</td>
</tr>
<tr>
<td>Driver shortage</td>
<td>An aging workforce causes driver shortages. There are several barriers to entry including the industry not being viewed as a viable career path, excessive licensing lead time, and high insurance costs for young drivers</td>
</tr>
<tr>
<td>Planning transparency and consistency</td>
<td>Inconsistent and prolonged development approval applications and uncertainty in the future of key points of infrastructure result in increased risk for private investment</td>
</tr>
<tr>
<td>Higher Productivity Vehicles (HPV)</td>
<td>More access and greater clarity on the HML network. Increased number of operational PBS vehicles and streamlining of weight limits between states</td>
</tr>
<tr>
<td>Intermodal terminals</td>
<td>There is limited planning for intermodal terminals within the Sydney metropolitan area that are essential to transfer heavy construction materials from sea and rail to road for site delivery</td>
</tr>
<tr>
<td>Concrete batching storage</td>
<td>Restricted delivery hours and limited storage capacity at concrete batching plants add largely to the delivery freight task</td>
</tr>
<tr>
<td>Regulated workforce</td>
<td>Some owner-driver delivery contracts for concrete are complicated by goodwill provisions which may need a long renegotiation effort before efficiency benefits can be achieved</td>
</tr>
<tr>
<td>Congestion and operational efficiency</td>
<td>Solutions are required to ease congestion and operational in-efficiencies in metropolitan NSW. Solutions include longer hours of operation per day, increased night time operations, and a review of noise pollution limits</td>
</tr>
<tr>
<td>Population growth</td>
<td>An increasing population and growing footprint now surrounds many quarries and batching plants that were once removed from residential areas, adding constraints to their operations and transport corridors</td>
</tr>
</tbody>
</table>
Solutions need proactive effort by both government and industry players

<table>
<thead>
<tr>
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<tr>
<td>Identify, education and promote industry best practice solutions</td>
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<tr>
<td>Support education and training initiatives such as specialised skills training for heavy vehicle drivers</td>
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Four Key Supply Chains
Opportunities for Innovation

Section 6
Steel Sector
Steel makers in NSW contribute strongly to the economy. The steel freight and logistics task involves multiple steps using road, rail and sea

- The steel sector includes primary products (steel slab, plate, and coil) and secondary products such as bars, rods, beams, wire, and pipes.

- Primary steel products are made from iron ore at "integrated" steelworks like BlueScope's Port Kembla plant or from recycled scrap in electric arc furnaces like OneSteel's Rooty Hill and Waratah operations. Secondary processing is done at other sites which then feed distribution networks so each tonne of steel makes several transport moves from steelworks through to end use.

- Steel is an economically important input to the manufacturing and construction sectors. While the demand for steel products changes with the level of economic activity, steelmaking is most efficient when producing relatively constant volumes. The NSW steel supply chain has to manage steady production outputs against significant variability in customer demand and imports.

- The NSW steel sector generates over $6 billion in revenue with freight and logistics costs representing under 5% of revenues

- The NSW steel freight task is shared between road and rail transport. Rail transport is used for many interstate steel movements, while exports and high tonnage interstate shipments to Victoria are by sea.
Steel freight and logistics is already tightly managed. There are some short-term savings opportunities and further potential benefits in the long term

- The two industry leaders BlueScope Steel and OneSteel manage their logistics tightly and work closely with selected rail and road freight operators. Steel freight is highly specialised.
  - Steel is a dense product whose freight is always limited by weight rather than cubic volume factors. Safety concerns are paramount and are addressed through comprehensive load restraint practices and special training for drivers and loaders.
  - High tonnages of steel move on a few specific corridors such as Port Kembla to Sydney, Newcastle to Sydney and Sydney to Brisbane

- Freight and logistics efficiencies in NSW can be gained in the short term by use of higher capacity trucks, innovative rail wagon designs and higher utilisation of existing steel trains
  - A key driver of savings is more efficient use of higher load capacity trucks on approved roads
  - Some potential also exists to move more tonnage by rail through improving the availability and service performance of current rail operations

- In the longer term the steel companies will shift large tonnages from road to rail as soon as added rail capacity and new services are available
  - New rail infrastructure is the only feasible way to get large tonnages of steel off the roads between Port Kembla, Newcastle and Sydney
The steel industry has a strong presence in NSW producing the majority of steel consumed in Australia.

- Each year in NSW, steel making produces 6 million tonnes of primary output. This production is largely for Australia-wide consumption, and NSW is by far the largest steelmaking state in Australia.
- BlueScope Steel's Port Kembla works produces 5.1 million tonnes per year of steel from iron ore. Scrap steel and primary output from South Australia is used by OneSteel to produce 0.9 million tonnes per year of steel from their Sydney and Newcastle electric arc furnaces.
- More than half of the primary steel produced is bulk transported by road, rail, and ship to interstate or overseas conversion mills and users. The remainder is shipped to destinations within NSW.
- Each year conversion mills in NSW receive 3 million tonnes of primary steel for secondary processing. Conversion mills produce end user products such as bars, pipes, beams, rods, wire.
- An extensive distribution network distributes and resells secondary steel products and imported steel products to steel fabricators, manufacturers, the construction industry and commercial users.
Industry structure is simple with two large companies dominant in steel making and distribution

- Steel making requires a major investment in capital equipment and in Australia is dominated by BlueScope and OneSteel. While some direct competition exists between these businesses, there are a number of market segments that both companies service separately. BlueScope business tends to focus on primary output products such as slab, plate and coil. OneSteel business tends to focus on secondary products such as pipe, tube, rod, bar, and wire.

- BlueScope’s primary activities:
  - Large scale integrated steel making at Port Kembla
  - Secondary processing specialising in sheet and Colorbond
  - Steel distribution, especially of BlueScope products

- OneSteel's primary activities:
  - Scrap collection and recycling
  - Steel making, using raw materials from scrap and primary output from South Australia, at Sydney’s Rooty Hill and Newcastle’s Waratah plants
  - Secondary processing specialising in rod, bar, pipe, and wire
  - Steel distribution
Steel supply chains involve multiple steps moving heavy or lengthy loads at each step

Sources: Industry data and project team analysis
Multiple steps in the supply chain mean that 6 million tonnes of production generates over 10 million tonnes of steel movements in NSW per year.

**Steel Flow Paths**

- **Raw materials**
  - Scrap (1 mtpa), coal, iron ore

- **Steel Making**
  - 6.0 mtpa

- **Conversion mills**
  - 3.0 mtpa

- **Interstate & Export**
  - 2.5 mtpa

- **Distribution**
  - 2 mtpa

- **Interstate & Import**
  - 1.5 mtpa

- **Export**
  - 1.5 mtpa

- **Import & Interstate**
  - 0.5 mtpa

- **Points of use**
  - Rail, Sea, Road

**Sources:** Industry data and project team analysis

mtpa = million tonnes per year

Distribution of steel to end-users is not included because it is a highly fragmented activity and sometimes combined with loads of other industrial goods.
A substantial 4.1 million tonnes of steel movements are between Newcastle, Sydney and Port Kembla – mostly on road.

<table>
<thead>
<tr>
<th></th>
<th>Road</th>
<th>Rail</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within Ncl, Syd, PtK</td>
<td>1,250</td>
<td>140</td>
<td>1,390</td>
</tr>
<tr>
<td>Between centres</td>
<td>1,620</td>
<td>1,010</td>
<td>3,630</td>
</tr>
<tr>
<td>Regional NSW</td>
<td>130</td>
<td></td>
<td>80</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>3,000</td>
<td>1,150</td>
<td>5,100</td>
</tr>
</tbody>
</table>

Sources: Industry data and project team analysis
NSW is a net steel exporter despatching over 6 million tonnes per year to interstate and overseas users

<table>
<thead>
<tr>
<th></th>
<th>Road</th>
<th>Rail</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through NSW</td>
<td>130</td>
<td>210</td>
<td>340</td>
</tr>
</tbody>
</table>

Queensland (thousands tonnes)

<table>
<thead>
<tr>
<th></th>
<th>Road</th>
<th>Rail</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>To QLD</td>
<td>250</td>
<td>770</td>
<td>1,020</td>
</tr>
<tr>
<td>From QLD</td>
<td>40</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>Sub Total</td>
<td>290</td>
<td>770</td>
<td>1,060</td>
</tr>
</tbody>
</table>

WA/SA/NT/TAS (thousands tonnes)

<table>
<thead>
<tr>
<th></th>
<th>Road</th>
<th>Rail</th>
<th>Sea</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>To WA/SA/NT/TAS</td>
<td>95</td>
<td>770</td>
<td>60</td>
<td>925</td>
</tr>
</tbody>
</table>

Export (thousands tonnes)

<table>
<thead>
<tr>
<th></th>
<th>Sea</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export</td>
<td>2,070</td>
<td>2,070</td>
</tr>
</tbody>
</table>

Sources: Industry data and project team analysis
Road transport is favoured for NSW domestic steel movements, while rail is favoured for longer distances.

<table>
<thead>
<tr>
<th>Corridor</th>
<th>Road</th>
<th>Rail</th>
<th>Sea</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within NSW</td>
<td>3,000</td>
<td>1,150</td>
<td></td>
<td>4,150</td>
</tr>
<tr>
<td>NSW to/from Victoria</td>
<td>370</td>
<td>440</td>
<td>980</td>
<td>1,790</td>
</tr>
<tr>
<td>NSW to/from Queensland</td>
<td>285</td>
<td>765</td>
<td>10</td>
<td>1,060</td>
</tr>
<tr>
<td>NSW to WA/SA/NT/TAS</td>
<td>95</td>
<td>770</td>
<td>60</td>
<td>925</td>
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<td>210</td>
<td></td>
<td>340</td>
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<tr>
<td>Export</td>
<td></td>
<td></td>
<td>2,070</td>
<td>2,070</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>3,880</td>
<td>3,335</td>
<td>3,120</td>
<td>10,335</td>
</tr>
</tbody>
</table>

Sources: Industry data and project team analysis
Rail corridors into Sydney are particularly constrained to the north and west where OneSteel would like to use more rail freight.

OneSteel may expect a long wait for better freight access to the Northern and Western corridors.

BlueScope Steel faces access challenges on the Illawarra corridor but their Villawood processing site is well placed to use the new Southern Sydney Freight Line and the line to Port Botany.
Safe load restraint and payload maximisation are key in steel transport, leading to innovative vehicle designs

- Historically, rail and road transport of steel has used basic flatbed trucks and rail wagons most suitable for carrying one type of product on each trip.
- Safety requirements demand that all heavy products are supported and strongly restrained to prevent any load movement.
- Recent design innovation has seen multi-purpose trailer and wagon designs allowing for more flexible loading. New designs allow each flatbed trailer or rail wagon to share cargo space with multiple products improving space utilisation. Truck, trailer and wagon designs can carry multiple steel product types with the load safely restrained. This greatly improves ability to handle varying orders and access backhauling opportunities.
Opportunities exist today that can improve the efficiencies of the sector

<table>
<thead>
<tr>
<th>Opportunity areas</th>
<th>Drivers of logistics efficiency and cost reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer trucks</td>
<td>Access for High Mass Vehicles (HMVs) to more routes</td>
</tr>
<tr>
<td></td>
<td>Larger capacity truck and trailer designs</td>
</tr>
<tr>
<td>Cheaper modes</td>
<td>More rail/sea/Intermodal can be used and freight rail blockages can be overcome</td>
</tr>
<tr>
<td>Higher asset utilisation</td>
<td>Productive time can be increased</td>
</tr>
<tr>
<td></td>
<td>Time running empty can be reduced</td>
</tr>
<tr>
<td></td>
<td>Road congestion delays can be reduced</td>
</tr>
<tr>
<td></td>
<td>Rail wagon and loco utilisation can be increased</td>
</tr>
<tr>
<td></td>
<td>Extended hours operation (night time pick ups and deliveries)</td>
</tr>
<tr>
<td>Improved truck efficiency / sustainability</td>
<td>Alternate fuels (LNG and CNG) when they become cheaper</td>
</tr>
<tr>
<td></td>
<td>Fuel efficiency and trailer design standards and incentives</td>
</tr>
<tr>
<td></td>
<td>Driver training in fuel efficient driving techniques</td>
</tr>
</tbody>
</table>

Sources: Industry data and project team analysis
There are a number of other recognised issues in the steel sector that could be addressed to gain efficiencies

<table>
<thead>
<tr>
<th>Opportunity areas</th>
<th>Issues raised by industry stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail and road capacity</td>
<td>Key rail corridors have limited capacity (esp. the Illawarra and Northern corridors), there is sub-optimal rolling stock (carriages) capacity, and passenger services have priority, and the M7 to F3 link is required</td>
</tr>
<tr>
<td>Driver shortage</td>
<td>An aging workforce causes driver shortages. There are several barriers to entry including the industry not being viewed as a viable career path, excessive licensing lead time, and high insurance costs for young drivers</td>
</tr>
<tr>
<td>Planning transparency and consistency</td>
<td>Inconsistent and prolonged development approval applications and uncertainty in the future of key points of infrastructure results in increased risk for private investment</td>
</tr>
<tr>
<td>Higher Productivity Vehicles (HPV)</td>
<td>More access and greater clarity on the HML network. Increased number of operational PBS vehicles and streamlining of weight limits between states</td>
</tr>
<tr>
<td>Work planning</td>
<td>Increase the transparency in the supply for trade partners to more closely understand and respond to requirements</td>
</tr>
<tr>
<td>Congestion and operational efficiency</td>
<td>Solutions are required to ease congestion and operational in-efficiencies in metropolitan NSW. Solutions include longer hours of operation per day, access to bus lanes and increased night time operations, and a review of noise pollution limits</td>
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Solutions need proactive effort by both government and industry players

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The Way Forward

**Areas for action**

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Four Key Supply Chains
Opportunities for Innovation

Section 7
Grain Sector
The Australian Grain industry is facing new challenges this year, especially in NSW

- The Australian Grain industry is at a historical turning point. Wheat is the dominant grain and sets the tone for the whole supply chain because wheat is the major logistics task. In 2008 the Single Desk for export wheat sales was closed after more than 70 years of operation, and NSW's final 5-year grain rail operations agreement ran out. Commercially, we are now in unknown territory, with new exporters entering the field, less commercial information circulating, and key grain rail operations about to go out to tender in NSW.

- Meanwhile on the world stage, along with most other commodities, wheat prices have dropped from recent highs but fundamentals suggest that Australia's food exports will again command scarcity prices in the near future. World prices play a key role in setting our domestic grain prices and determining industry returns.

- WA and SA have been able to build their grain industries around a simple export supply chain structure because their domestic markets are small. In contrast NSW is Australia's largest domestic grain market and has multiple customers, intense trading activity and many paths to market. Export is one of these paths and is most active after good harvest years.

- The last good harvest year for NSW farmers was three years ago in 2005-06.

- In an environment of global trading uncertainty with new local industry rules, unclear power relationships among industry players, and drought-diminished harvests in NSW, many questions are being asked about future directions for the grain industry. Among these are some vital questions about future logistics arrangements, specifically regarding rail transport of grain in NSW.

What are the key challenges facing the NSW Grain industry supply chains ... and what is the best role for government?
Rail freight is vital to the industry and new operating arrangements should stabilise with good harvests. High-capacity trucks for country use offer some savings

- Recent changes to wheat export governance offer new commercial options to growers but add to uncertainty for logistics providers who are already suffering from two consecutive bad harvest years
  - Growers have new choices and many may respond by using on-farm storage to sell opportunistically
  - Grain storage and handling companies and road and rail freight operators are uncertain how to manage the new industry environment and may be inclined to price extra risk into their rates

- The NSW grain industry depends on road and rail for both grain movement and price setting
  - The NSW grain industry uses trucks to service farms and smaller domestic customers but cannot prosper without reliable rail services because distances of 300 - 500 kilometres from farms to coastal ports and customers exclude any possibility of using road transport for the big long hauls
  - Bulk export supply chain costs determine domestic grain prices relative to world prices. Accordingly supply chain costs (road and rail) play a vital pricing role for the entire grain industry, not just for exporters

- Some trucking costs can be reduced but rail costs depend on better harvests and success with new rail operating arrangements
  - Country trucking operators serving the grain trade should be able to cut their costs by 10 - 15% by introducing higher capacity trucks designed to Performance Based Standards for use on Higher Mass Limits (HML) roads. The challenge is to make HML a practical option for grain trucking operators
  - This year practically all rail services have moved to "take or pay" arrangements where the user pays a fixed annual fee for each train, regardless of whether the train is used or not. This approach shares among industry players the costs of maintaining sufficient rail capacity. The challenge is to provide direct returns to site operators who make investments that help each train cycle faster and deliver more tonnes
GrainCorp is the major player in NSW grain trading and bulk grain storage and handling operations. Manildra is the largest domestic grain customer in NSW.

Grain Industry Participants and Flows

**Financial - trading flows**
- **Major local traders**
  - GrainCorp
  - AWB, ABA, ABB
- **Multinationals**
  - Cargill
  - Glencore
  - etc
- **Small local traders**
  - Numerous, many with export licences

**Supply Chain - physical flows**
- **Storage and Handling**
  - GrainCorp
  - AWB, ABA, ABB
  - Container packers
- **Transport operators**
  - Pacific National (rail)
  - El Zorro (rail)
  - Patrick (containers by rail)
  - Numerous trucking firms
- **Export port facilities**

**Customers**
- Overseas buyers
- Domestic millers
  - Manildra
  - Allied Mills
  - George Weston
- Domestic feed lotters, large and small

**Grain Growers**
- Many small farmers
- Large individual farmers
- A few corporate players
  - Many with on-farm grain storage
NSW grain production areas are broadly described by two regions and four Agroecological zones (AEZs)

### Northern cropping region
The northern region takes in central and southern Qld through to northern NSW down as far as the Dubbo region.

Significant rainfall in this northern region falls in the summer months, allowing for dryland summer crop production.

#### Grain crops grown in the northern region
- Winter crops — Wheat, barley, oats, chickpeas, triticale, faba beans, lupins, field peas, canola, millet/panicum, safflower, linseed
- Summer crops — Sorghum, sunflowers, maize, mungbeans, soybeans, cotton, peanut.

### Southern cropping region
The southern region stretches from central NSW (south of Dubbo) through to Victoria, Tasmania and South Australia and the southwest corner of Western Australia.

The rainfall pattern ranges from uniform in central NSW through to winter dominant in Victoria, Tasmania, SA and WA.

This is a vast region of the country with a Temperate climate of balanced rainfall or a Mediterranean climate of dry summers and comparatively reliable winter rainfall lending itself to winter crop production.

#### Grain crops grown in the southern region
- Winter crops – Wheat, barley, oats, triticale, cereal rye, lupins, field peas, canola, chickpeas, faba beans, vetch, lentils, safflower
- Summer crops – Irrigated rice, maize

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Source: Australian Grain Magazine
Wheat is the dominant grain grown in Australia – its harvest cycle starts in October and ends in January

- Wheat is a winter crop. The annual wheat harvest cycle peaks in November and December and is generally over by the New Year
  - The annual wheat harvest cycle commences in central Queensland as early as August, but does not gather pace until around late October when harvesting in southern Queensland gets underway
  - This southward trend continues with northern New South Wales next in line from early November, followed soon after by southern NSW, with the state concluding its harvesting around mid-December
  - The Victorian and South Australian harvests commence around mid-November and are generally concluded in January
  - On the West Coast, the harvest starts up North (Geraldton) around mid-November and concludes down south (Esperance) into January
- Typically by the end of November, roughly 40% of Australia’s entire wheat crop is stored in the central storage system which provides controlled hygiene with minimum pesticide use despite hot and humid harvest conditions in Australia
- This figure traditionally rose near 90% by the New Year, which meant that close to 50% of Australia’s wheat was deposited into the central storage system in the month of December when local prices typically soften the most
- Following deregulation of the export wheat market this year, many growers will be using on-farm storage or "warehousing" services to hold their grain, waiting to see where they can sell and deliver grain at the highest price, domestic or export

Source: Grain industry information
Grain cropping density in NSW is highest on the western slopes of the Great Dividing Range, especially in areas with reliable rainfall.

Source: ABS

Percent of Statistical Area Cropped

Source: ABS
Major up-country grain handling sites are run by GrainCorp, AWB and ABA. GrainCorp runs bulk export facilities at Port Kembla and Newcastle.
Dryland crops depend on rainfall. NSW grain farmers have already suffered two consecutive bad years, and this year is also looking poor for Southern regions.
ABARE's September 2008 Crop Report, confirmed on 5th November 2008 projects a return to good wheat production this year.

In September ABARE was upbeat...

"The majority of New South Wales winter cropping regions received below average autumn rainfall. This meant many winter crops were dry sown or not sown during the optimal planting window, as growers waited for rain.

Widespread rainfall in early June provided the moisture for the completion of intended cropping programs. However, below average winter rainfall in southern and central New South Wales will result in yield penalties, particularly for later sown crops.

Widespread rainfall in the first week of September arrived just in time for many moisture stressed crops. However, lack of subsoil moisture, particularly in the southern and central regions, means further spring rainfall will be critical for crops to reach production forecasts."

By October southern regions look grim

This year's crop is some wheat farmers' final hope

Asa Wahlquist, rural writer | October 13, 2008

Ron Storey, of Australian Crop Forecasters, says this year's wheat crop is "a mixed bag".

"North of Dubbo, northern NSW, Queensland are good; south of there, and all the way though Victoria and South Australia, (they) are struggling and Western Australia is pretty good," Storey says.

But for farmers in the southern Riverina, the rains failed. "They have had a very, very poor year again, and that is three years in a row for those guys," he says.

Source: The Australian 13 October 08
Domestic demand for food, feed and seed is safeguarded by stocks and by supplies from other states. Exports surge in good production years.

Illustrative

NSW Wheat Disposal
million tonnes/year

Exports
Domestic feed (animals)
Domestic food (human)
Seed


NSW Grains Disposal
million tonnes/year

Exports
(mostly Wheat, some Barley)
Domestic feed (predominantly Coarse grains)
Domestic food
Seed


Source: ABARE Crop Report June 08
Grain supply chains operate in two steps; harvest flows from farm to up-country storage, then demand-driven deliveries from storage to customers.

**Into storage**
4 - 12 million tonnes/year *

- Grower
  - Harvest
    - On-farm storage
      - Truck
        - Branch line silo
          - Branch line train
            - Sub Terminal
              - Main line silo or site
                - Truck
                  - Off-rail silo

**From storage to customer**
7 - 12 million tonnes/year *

- Truck
  - On-farm or Silo
    - Main line silo or Sub Terminal
      - Truck
        - To container packers
          - Container packer
            - Train or Truck
              - Containers to port
                - Container packers
                  - Truck
                    - Main line silo or Sub Terminal
                      - Truck
                        - To container packers
                          - Container packer
                            - Train or Truck
                              - Domestic customers
                                - Train or Truck
                                  - Bulk export shipment
                                    - Port terminal
                                      - Train or Truck
                                        - Off-rail silo
                                          - Truck
                                            - To container packers
                                              - Container packer
                                                - Train or Truck
                                                  - Domestic customers
                                                    - Train or Truck
                                                      - Bulk export shipment
                                                        - Port terminal
                                                          - Train or Truck
                                                            - Off-rail silo
                                                              - Truck
                                                                - To container packers
                                                                  - Container packer
                                                                    - Train or Truck
                                                                      - Domestic customers
                                                                        - Train or Truck
                                                                          - Bulk export shipment
                                                                            - Port terminal
                                                                              ** about 5% to port by road

* A good harvest year can be three times the tonnage of a poor harvest year. Poor harvests are supplemented by stock draw-down and shipments in from other states.
Long distances to NSW ports and users mean bulk grain should be transferred into main line trains for economical delivery

Only about 5% of NSW grain is in areas such as the Liverpool Plains or Harden/Cootamundra which are just close enough to ports for road transport to be feasible and not excessively costly compared with rail.

Given the promise of a good harvest in Northern regions this year an additional 500,000 tonnes may seek road transport to Newcastle Port because coal trains take up most of the available capacity and paths into Newcastle.
The NSW rail network comprises 5 Classes according to allowable load and speed.

### Classes

<table>
<thead>
<tr>
<th>Classes</th>
<th>Description</th>
<th>Capacity</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>Main lines</td>
<td>Heavy loads at speeds to 100 km/h and more</td>
<td>Passenger &amp; freight</td>
</tr>
<tr>
<td>3</td>
<td>Branch lines</td>
<td>Light axle loads up to 80 km/h, heavier loads at slower speeds</td>
<td>Mostly freight</td>
</tr>
<tr>
<td>4 - 5</td>
<td>Restricted lines</td>
<td>Partly loaded trains with light locomotives travelling at low speeds</td>
<td>Grain 95%+</td>
</tr>
</tbody>
</table>

Note - Classes do not correlate to line colours on map.

The Grain sector is practically the only remaining user of the 1,000 km of "Restricted" rail lines. These lines were built to lightweight "pioneer" standards in the 19th century and are costly to operate and maintain.

Source: Map courtesy of Ministry of Transport

Legend:
- ARTC Leased Network
- Country Regional Network Operational Lines
- R-Lines (Restricted)
- Country Regional Network Non-Operational Lines
- RailCorp
- Private / Non-NSW

Sydney
Port Kembla
Newcastle
The GIAC report of 2004 recommended treating the Restricted lines in three groups:

<table>
<thead>
<tr>
<th>Group</th>
<th>GIAC recommendation</th>
<th>Group tonnes/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Upgrade to reasonable operating standard</td>
<td>580,000</td>
</tr>
<tr>
<td>2</td>
<td>Assess further then allocate to Group 1 or 3</td>
<td>630,000</td>
</tr>
<tr>
<td>3</td>
<td>Unlikely to justify retention – upgrade roads instead</td>
<td>110,000</td>
</tr>
</tbody>
</table>

Source: Report on Rail/Road Options for Grain Logistics, Grain Infrastructure Advisory Committee, January 2004

X – Services were suspended on these four lines in 2005

Source: Map courtesy of Ministry of Transport
The industry is awaiting this year’s harvest flows and the changes that should accompany renewed income and new commercial opportunities.

- NSW has a grain harvest potential of over 8 million tonnes this year.
- NSW will have potential grain exports of just over 3 million tonnes, most of which will be exported through GrainCorp’s Newcastle Terminal because northern regions have had the best rain.

**New arrangements for rail operations**
- GrainCorp have hired 11 trains and AWB 4 trains on a ‘take or pay’ basis to service their NSW and Victorian domestic and export customers.
- Manildra, Westons and Inghams have hired 'take or pay' trains to service the domestic task in NSW.
- The NSW Government will be seeking Expressions of Interest to take ownership of 4 ‘branchline trains’ next year and operate them on the restricted branchline network.
- Most export rail capacity in NSW has been secured by GrainCorp and AWB, with 4 ‘branchline trains’ up for tender shortly.
- Export grain rail movements into Newcastle face scheduling difficulties and delays because they compete for rail paths with the far greater numbers of export coal rail movements.

**New arrangements for grain logistics**
- All grain markets are now deregulated in NSW and 19 licenses to export bulk wheat have been issued to grain companies including GrainCorp, AWB and ABB Grain.
- Grain exporters will need to secure their export grain transport via rail and port from GrainCorp or AWB.
- Apart from major domestic customers like Manildra, Allied Mills and George Weston who have ready access to rail infrastructure, most domestic customers will receive their grain supplies by road transport.
- Most domestic customers will seek to secure their grain supplies from growers directly off farm, which requires movement by truck.
The grain industry has seen a decade of efforts to reduce supply chain costs

Past commercial and infrastructure initiatives

Introduced competition in rail services
- GrainCorp and AWB entered rail operations on NSW network, 2000 - 2001
- AWB built a fleet of grain wagons to increase capacity of the rolling stock fleet

Improved efficiencies in upcountry storage and handling
- GrainCorp closed over 100 smaller silos consolidating operations to larger sites
- AWB and ABA built 12 super sites in NSW, 2001 - 2004
- Super sites and larger silos are permanently staffed and receive grain 24/7 during harvest

Upgraded export terminals
- Modern Port Kembla terminal built in 1989
- AWB/ABA built new Melbourne export terminal in 2000
- Newcastle automation upgrades in early 2000s

Collaboration in export grain logistics management
- GrainCorp and AWB established Export Grain Logistics to capture efficiencies through joint management and reduce costs - 2005

Numerous reviews of grain logistics have been conducted
- New South Wales Farmers Association - Road Rail Taskforce, 2002
- Grain Growers Association – Grains Industry Review, 2002
- NSW Grain Infrastructure Advisory Committee (GIAC) – Report on Rail/Road Grain Logistics Options, 2004
- Australian Railway Association – Management of Export Grain Rail Systems, 2005
- ALC - Infrastructure Action Plan, 2006
- Single Vision (GRDC) – National Grains Transport Infrastructure Strategy *

In addition, the Industry has made representations to Government about the parlous state of the grain supply chain and the need for investment
- Prime Minister’s Infrastructure Taskforce, 2005
- House of Representatives Standing Committee on Transport and Regional Services - The Great Freight Task: Is Australia’s transport network up to the challenge? 2007
- NSW Grain Freight Task Force review currently being undertaken by DITRDLG

* See App VI for references
However, it must be understood that supply chains, however important in delivering product, are subsidiary to trading and finance in the Grain industry

- Export grain markets are now deregulated
- At least 19 grain trading houses have been given approval to export bulk wheat from Australia
- The export market has traditionally been a market of last resort, in that the domestic market will seek to price and secure sufficient grain stocks to ensure it can meet its short to medium term requirements
- Growers will delay their marketing decisions to seek higher prices in the local domestic market before they commit large tonnages to the export market, which attracts higher supply chain costs. Holding grain back for storage poses some risk to grain quality if storage is not expertly managed.
Commercial operators find it hard to justify maintaining supply chain capacity through the years of lean harvests so 'take or pay' arrangements have emerged.

Until the late 1990s grain supply chain costs were subsidised and smoothed on behalf of growers:
- Over many decades the grain industry and government built costly networks of fixed assets – silos, rail lines and port terminals.
- The operating cost of these assets was averaged through good and lean harvest years.
- The privatisation of industry assets over the past decade presents big issues to owners seeking to maintain their return on assets when their income plummets during lean harvest years, especially if the owner is a publicly listed company.

The last few years have seen a significant shift in some supply chain cost drivers:
- Growth in cheap on-farm storage technologies has opened up new commercial options for growers to avoid using the bulk grain supply chain.
- On-farm storage can be beneficial in reducing the peak harvest volumes the supply chain must handle, and therefore the number of assets required.
- With expiry of the Service Obligations in November 2007 trains can now be freely relocated to match demand, which should improve rail asset utilisation.
- The move to "take or pay" trains has been made to share rail asset utilisation risks among industry players.

As a result, future grain rail costs will vary with harvest volume.
NSW grain logistics prices for exporters are expected to rise significantly following recent poor harvests and the introduction of 'take or pay' trains.

Export grain supply chain
Average prices – 2003 *

Export grain supply chain
Average prices – 2008-09

* Note regarding 2003 prices
- These prices do not capture losses made by supply chain operators in poor years
- These prices do not reflect opportunity costs in the chain caused by inefficiencies or delays, eg. ships failing survey

Sources: NSW Grains Export Sector Sd&D 2004, AWB web-site 2008
Short-term logistics opportunities are to get the most out of 'take or pay' grain trains and to introduce larger grain trucks for use on country roads.

<table>
<thead>
<tr>
<th>Opportunity areas</th>
<th>Drivers of logistics efficiency and cost reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer trucks</td>
<td>Access for Higher Productivity Vehicles to more up-country HML routes (may require bridge strengthening and other road improvement investments)</td>
</tr>
<tr>
<td></td>
<td>Larger capacity truck and trailer designs to PBS, eg. quad-axle rigs</td>
</tr>
<tr>
<td>Cheaper modes</td>
<td>Work required to minimise volume shifts from rail to road due to rail capacity limits such as pathing constraints into Newcastle</td>
</tr>
<tr>
<td>Higher asset utilisation</td>
<td>Productive time for both trucks and trains can be increased by investing in improved infrastructure to reduce load/unload delays at storage sites and customer receival facilities</td>
</tr>
<tr>
<td></td>
<td>Increasing speed of trains and flexibility of crewing arrangements will speed up train cycle times and improve utilisation</td>
</tr>
<tr>
<td></td>
<td>Branch line train capacity can be improved and double-handling of grain reduced by increasing permissible axle loading on key &quot;Restricted&quot; lines</td>
</tr>
<tr>
<td>Improved truck efficiency / sustainability</td>
<td>Fuel efficiency and trailer design standards and incentives, largely through replacing oldest trucks with latest designs</td>
</tr>
<tr>
<td></td>
<td>Driver training in fuel efficient driving techniques</td>
</tr>
</tbody>
</table>
Improvements to the grain supply chain depend on industry players taking the initiative as governments clarify the regulatory environment

<table>
<thead>
<tr>
<th>Areas for action</th>
<th>Industry</th>
<th>Government</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribute to the NSW Grain Freight Review Task Force which will report in May 2009, and adopt its recommendations</td>
<td>Support the NSW Grain Freight Review Task Force which will report in May 2009, and implement its recommendations</td>
<td>Commit to a stable future funding and operating plan for the Restricted lines</td>
</tr>
<tr>
<td>Identify barriers and opportunities for Higher Performance Vehicles</td>
<td></td>
<td>Ease the rail safety compliance and cost burden on Restricted line operations</td>
</tr>
<tr>
<td>Identify specific regulatory constraints and communicate to government</td>
<td></td>
<td>Address other regulatory roadblocks and issues highlighted by industry</td>
</tr>
<tr>
<td>Exploit the new industry environment to provide competitive supply chain services for grain growers and customers</td>
<td></td>
<td>Provide critical infrastructure to support the industry, particularly rail links and country roads</td>
</tr>
<tr>
<td>Invest in operational efficiency improvements such as faster load/unload equipment at storage and handling sites</td>
<td></td>
<td>Adopt PBS consistent with other leading States</td>
</tr>
</tbody>
</table>
Four Key Supply Chains
Opportunities for Innovation

Appendices
## Appendices

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Appendix I
Industry stakeholder inputs and Regional initiatives
Industry stakeholders interviewed individually

<table>
<thead>
<tr>
<th>Food &amp; Beverage</th>
<th>Construction Materials</th>
<th>Steel</th>
<th>Grain</th>
<th>Cross-sector</th>
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<tbody>
<tr>
<td>Linfox</td>
<td>Australian Native Landscapes</td>
<td>OneSteel</td>
<td>Grain Growers Association</td>
<td>Asciano (Pacific National)</td>
</tr>
<tr>
<td>Lion Nathan</td>
<td>Cement Australia</td>
<td>BlueScope Steel</td>
<td>Manildra</td>
<td>Port Kembla Port Corporation</td>
</tr>
<tr>
<td>Costa Logistics</td>
<td>Cement, Concrete &amp; Aggregates Australia</td>
<td>Leighton Holdings</td>
<td>GrainCorp</td>
<td>Ministry of Transport, Freight Department</td>
</tr>
<tr>
<td>Sydney Markets Limited</td>
<td>Pacific National – Bulk Division</td>
<td>Pacific National – Steel Division</td>
<td>Allied Mills</td>
<td>RailCorp</td>
</tr>
<tr>
<td>Arnott’s</td>
<td>Cemex – Premixed Concrete</td>
<td></td>
<td></td>
<td>Sydney Ports Corporation</td>
</tr>
<tr>
<td>Nestlé</td>
<td>Cemex – Aggregates</td>
<td></td>
<td></td>
<td>Department of Planning</td>
</tr>
<tr>
<td>Woolworths</td>
<td>Boral Construction Materials</td>
<td></td>
<td></td>
<td>Shipping Australia Ltd</td>
</tr>
<tr>
<td>Pardy &amp; Sons</td>
<td>Hanson Resources</td>
<td></td>
<td></td>
<td>TradeGate</td>
</tr>
<tr>
<td>Antico Fruit &amp; Vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian Food &amp; Grocery Council</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Metcash</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parmalat</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Valuable input was also received from Regional stakeholders

The majority view from participants in regional meetings can be summarised in the following six points;

1. There is urgent need for national consistency of road transport regulations; transporting from Queensland through NSW to Victoria requires compliance with three differing sets of rules and regulations

2. The NSW RTA’s rules do not yet acknowledge the advanced technical performance of new quieter, higher mass carrying trucks, with lower axle loads, that cause less damage to roads; this hampers industry’s investment in new technology

3. Rail infrastructure needs to be upgraded and maintained, and policies developed to enable commercial viability of rail operators

4. Communication with and collaboration among businesses and stakeholders in the key regional supply chains can be improved through information sharing, networking, clustering and shared facilities (Note that city-based food distributors support this call for efficient sharing of facilities in low-density regional areas)

5. There is need for better access to major ports, as well as to improved intermodal and staging facilities.

6. The image of the logistics industry needs to be better projected in terms of its importance to the economy; the industry’s growth and modernization needs to be publicized to attract and retain people

7. More training is needed to meet the industry’s future workforce needs, and to update and improve skills.
NSW Regional Business Growth Plans include many logistics industry opportunities which have been under development for some time

- **Australian Capital region** - major logistics business park proposals in Goulburn
- **Central Coast region** – warehousing and logistics operations due to centrality of the region in main transport corridor. Supplier Park to Woolworths distribution centre at Warnervale
- **Central West region** – logistics and manufacturing sector growth around distribution hubs (e.g. Parkes Transport Hub). Commonwealth Government currently undertaking a Central West Transport Needs Study
- **Hunter region** – locating port-related industry on land beside Port of Newcastle. Transport and logistics industry developments (e.g. Freight Hub at Beresfield). Undertaking a Freight Hub Employment Lands Study at Beresfield. Newcastle Airport Masterplan developed to identify the framework for airport development over the next 20 years
- **Illawarra region** – logistics and port related industries linked to expansion of Port Kembla. A challenge for the region is the alignment of freight transport links southward with business growth opportunities.
- **Murray region** – transport and logistics hub development (in particular Albury)
- **Northern Rivers region** – development of industrial estates in the Richmond Valley LGA – provision of fully serviced industrial land close to rail infrastructure can provide a focus for the attraction of ‘feeder’ industries and enterprises. Development of Richmond Valley industrial lands will assist in the attraction of business investments. It will provide access to the Port of Brisbane and other functional rail/road/sea freight export links, and related services
- **Orana region** – Dubbo as regional hub, including air services and road transport
- **Riverina region** – strong logistical and transport hub developments around Wagga Wagga and Griffith. There are a number of transport and logistics hub initiatives under consideration in the Riverina, including: relocation of the rail freight yards at Griffith, further development of Bomen Industrial Park to include intermodal transport facilities.
Appendix II
Supply Chain concepts
The following definitions relating to the freight logistics industry are as used in the SAHA report *Innovation in the NSW Freight Logistics Industry*

- The US Department of Transport has defined logistics as:
  “the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements”

- In 2001 The Bureau of Transport Economics defined logistics as:
  “the activities required for the movement and handling of goods and materials, from inputs through production to consumers and waste disposal”

- This BTRE definition was adopted by the Australian Logistics Industry Strategy in 2002 and later the National Industry Data Steering Committee

- Perhaps the most succinct definition of freight logistics is that suggested by the Industry Steering Committee of the Freight Transport Logistics Industry Action Group, simply – “everything to do with freight”

- Even the term for the freight logistics industry itself sees many variations, such as:
  - Transport & Logistics (T&L)
  - Value Chain Management
  - Supply Chain Management
A useful definition of Supply Chain Management

“The Supply Chain encompasses all activities associated with the flow and transformation of goods from the design stage, through to the end user and back as well as the associated information flows. Supply Chain Management is the integration of these activities through improved supply chain relationships, to achieve a competitive advantage.”

A Supply Chain extends from your customer’s customer to your supplier’s supplier and spans an entire product’s lifecycle...
A compatible definition of Logistics

The term "Logistics" in the business world refers to the processes of acquisition, storage, transportation and delivery of goods along the supply chain, and the associated information flows.

The usual scope of Logistics is the two stages of the supply chain where the main activities are storage, handling and freight.
Supply chain best practice can be summarised as alignment of strategy, structures, functions and operations with customer needs.

**What you want to achieve**
- Differentiate in cost effectiveness and customer service levels in getting product to customers

**What it will look like**
- The platform or operating model
- The products and value proposition
- The network

**How you will get there**
- Integrated planning
- Organisation, capabilities and the culture
- Process structure and management
- Performance management
- Technology
External companies typically set a customer driven strategy and then optimise for costs and inventory.

“We started with a product availability target based on what world class supermarkets deliver. Now we have to achieve this at the lowest possible cost and inventory”

Large Grocery Supplier

“Our philosophy is to consistently deliver on the customer promise, while continuing to drive costs down and operating with the least possible inventory”

International Computer Manufacturer

“We set a strategy to win market share through superior supply chain performance and now the task is to achieve that at the optimum cost and inventory”

Large Steel Manufacturer
Reducing costs while maintaining service levels can be achieved through addressing efficiencies in the supply chain.

The aim of the project is a reduction in costs through policy changes.

Enhancing service levels without increasing costs or inventory can be done by moving the curve up through e.g.:
- optimising the supply chain network
- improving supply chain planning methods
- segmenting the supply chain offering
"Lean" and "Agile" are distinct approaches which suit different supply chain environments.

“Lean” works best in high volume, low variety and predictable environments.

“Agility” is needed in less predictable environments where the demand for variety is high.
Agility – a definition

The ability to respond rapidly to unpredictable changes in demand

Agility is not a single company concept, it extends from one end of the supply chain to the other

**lean** : “having no surplus flesh or bulk”

**agile** : “quick in movement : nimble”
Lean is only one of four major supply chain operating strategies.

Supply characteristics:
- Long lead-time
- Short lead-time

Demand characteristics:
- Predictable
- Unpredictable

Plan and execute (Lean)

Delayed configuration (postponement)

Continuous replenishment

React and execute (Agile)
A Lean strategy typically suits a limited number of high volume products

- Lean strategy:
  - Make to forecast
  - Low priority in production schedule
  - Focus on efficiency
  - Seek economies of scale

- Agile strategy:
  - Forecast for capacity, execute to demand
  - Make to order
  - High priority in production schedule
  - Hold inventory in generic form

**The Pareto Distribution**

- 80% of total demand
- 20% of products

---

**THE PARETO DISTRIBUTION**
In cases where strategic inventories can be used as a decoupling point, Lean may be the right strategy to replenish inventory.

- Forecast at generic level
- Economic batch quantities
- Maximise efficiencies

Strategic Inventory

- Demand driven
- Localised configuration
- Maximise effectiveness
Real-world complexities require more sophisticated supply chains

Forecast Driven
Less uncertainty due to enrichment of undistorted data

Order Driven

Material de-coupling point

Push

Factory

Assembler

Finished goods Stock

Retailer

Pull

Market sales

Information de-coupling point

Direct market sales information

Source: Mason-Jones & Towill
Hybrid supply chain strategies are commonly used

<table>
<thead>
<tr>
<th>Variety/Variability</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

- **Low Volume, Low Variety/Variability**:
  - Demand-driven replenishment
  - Local, EOQ-based inventory

- **Low Volume, High Variety/Variability**:
  - Configure to order
  - Centralise inventory

- **High Volume, Low Variety/Variability**:
  - Hold generic inventory
  - Separate base and surge demand

- **High Volume, High Variety/Variability**:
  - Make and ship to forecast
  - Seek economies of scale
Appendix III
Small Business Initiatives
## Actions for small businesses

<table>
<thead>
<tr>
<th>Opportunity area</th>
<th>Example actions required from small business</th>
<th>How small businesses can drive action</th>
<th>How Government may help</th>
</tr>
</thead>
</table>
| Better asset utilisation               | ▪ Suggest collaborative approaches to industry issues  
▪ Identify and action opportunities for better truck utilisation  
▪ Operators - participate in journey planner and freight matching trials  
▪ Customers – find ways to accept deliveries at night | ▪ Ask what would have to change for your trucks or your supplier’s trucks to make 1 more trip each day (or week), and go discuss how to make these changes with your customers or suppliers, in a collaborative way  
▪ Seek help from Government and Industry Associations to get others to work with you on ways to reduce the cost of delays and empty running | ▪ Support collaboration initiatives  
▪ Facilitate clustering and networking among small logistics businesses  
▪ Help roll out low-cost tools for journey planning and freight matching  
▪ Publish real-time congestion information |
| Higher productivity trucks              | ▪ Push for approval of Higher Productivity Vehicles  
▪ Make more use of Inter-modal | ▪ Enrol your large customers and truck suppliers to support HPV applications  
▪ Look for local opportunities to work with rail and Inter-modal operators | ▪ Streamline and speed up approval processes  
▪ Expedite increased terminal capacity and new terminals |
| Optimise use of rail and sea freight    | ▪ Seek ways to retire oldest trucks  
▪ Make higher truck standards part of transport contracts  
▪ Encourage driver training | ▪ Find smart ways to make fleet renewal part of the deal for major contracts  
▪ Require drivers to do annual training | ▪ Provide incentives for fleet renewal  
▪ Provide driver training courses |
| Improved fuel efficiency                | ▪ Benchmark performance with peers  
▪ Adopt leading practices  
▪ Promote successful innovations and achievements | ▪ Set up a "peer group" with other small business operators, either by local area or by industry/customers, and start benchmarking processes and sharing best practices | ▪ Provide benchmarking facilitators  
▪ Resource and encourage education and innovation  
▪ Promote successes |

## Strategic actions

- Provide benchmarking facilitators
- Resource and encourage education and innovation
- Promote successes
Appendix IV
Sustainability in Freight Logistics
Important sustainability improvements in freight logistics can be made by tackling four zones of change

<table>
<thead>
<tr>
<th>Zone</th>
<th>Intent</th>
<th>Examples of actions to be taken</th>
</tr>
</thead>
</table>
| 1    | Move less stuff around | - Manage demand to actively reduce transport volumes  
- Localise – source and supply more stuff closer to points of use  
- Plan for better land use with co-location of key industries and logistics activities |
| 2    | Consolidate the moving stuff into fewer shipments | - Optimise freight networks to consolidate loads and exploit backhaul opportunities  
- Develop industry solutions that combine many items into single deliveries |
| 3    | Use less energy to move shipments | - Change modes – use sea or rail in place of road or air  
- Seek scale on trunk routes – larger ships, longer trains and bigger trucks  
- Retire old and inefficient trucks and locomotives  
- Apply energy saving technologies such as hybrids that use regenerative braking |
| 4    | Get transport energy from more sustainable and cleaner sources | - Electrify freight rail, especially where electricity comes from non-fossil fuel generation  
- Adopt LNG, CNG or biodiesel in place of oil-derived diesel |
The combined impact of sustainability improvements over a decade or two could reduce diesel fuel demands for freight logistics far below current levels.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Intent</th>
<th>Actions to be taken</th>
<th>Big savings start in . . .</th>
<th>Possible scale of national savings</th>
</tr>
</thead>
</table>
| 1    | Move less stuff around | • Manage demand  
     • Localise  
     • Plan for better land use | 1 year  
     3 years  
     10 years | 10 – 30% * |
| 2    | Consolidate the moving stuff into fewer shipments | • Optimise freight networks  
     • Develop industry solutions | 1 year  
     3 years | 10 – 15% |
| 3    | Use less energy to move shipments | • Change modes  
     • Seek scale  
     • Retire old assets  
     • Apply energy saving technologies | 3 years  
     5 years  
     5 years  
     10 years | 20 – 40% |
| 4    | Get transport energy from more sustainable and cleaner sources | • Electrify freight rail  
     • Adopt LNG, CNG or biodiesel | 15 years  
     5 years | 30 – 50% |

Total 20-year reduction in diesel demand from today’s baseline | 40 – 80%

* Assuming no major changes in economic activity
Increasing the modal share of rail is a vital investment in medium and long term freight performance and sustainability

**Rail freight is much more efficient**
- Even allowing for road connections at each end, rail freight can use less than half as much diesel fuel as road freight to move goods between capital cities.
- Rail’s advantage grows with consistent heavy loads and longer distances which is why we see the majority of freight to Perth going by rail.
- As well as the fuel use and emissions advantages of rail, labour requirements are far lower which helps with the demographic challenge we face getting a new generation of truck drivers to do the long interstate runs.
- Except for the few people living close to main rail corridors the impacts of freight rail on communities are generally better because one train carries the equivalent of up to 20 B-doubles or 30 semi-trailers, thus significantly reducing road traffic and improving safety.

**In future rail freight can be powered by clean electricity**
- Where there is sufficient rail traffic electricity becomes an economic source of power. We see this on practically all suburban rail systems in the world and some freight railways such as those across Russia, Europe and China.
- Electric locomotives are several times more efficient than diesel because less energy is lost as heat and useful amounts of energy can be recovered from regenerative braking of heavily loaded trains.
- Electric traction allows rail operations and costs to be largely independent of fluctuations in oil markets.
- Electrified rail in Australia is likely to be on the East Coast rather than the long hauls from Parkes to Perth and up to Darwin. The long haul lines carry double-stacked containers which exceed the height of standard overhead catenary electrification. Furthermore their traffic density is unlikely to cost-justify electrification.
- We can expect electricity to be increasingly provided from sustainable sources such as wind, wave, solar and geothermal over coming decades which will further reduce emissions by a substantial amount.
- Analysis of the potential for electrically powered freight transport can be found in *Transport Revolutions – Moving People and Freight Without Oil* – see Appendix VI for reference.
Alternative fuels are an important opportunity area for road freight in Australia

**Alternative fuels for trucks**

- Australia's long distance geography and lack of scale outside a few important trunk routes will maintain our dependence on road freight even with maximised use of sea and rail freight.
- For road trucks there is no likely feasible alternative to diesel engines. Fortunately diesel engines can run on biodiesel sourced from crops, animal by-products, or potentially from algae. Diesel engines can also be converted or manufactured to run on gas.
- Australia is exceptionally lucky with its resources of Natural Gas and Coal Seam Methane which provide us with long term transport fuel security even under the worst scenarios of oil shortage.
- Gas is best suited to "back-to-base" operations where gas refuelling stations can be easily set up. Bus fleets all over the world (including most Australian cities) have bought gas-fuelled buses and run them successfully. A few gas trucks are being trialled in Australia by Boral, Murray Goulburn and others. The purchase price of gas trucks and buses is 5 - 10% higher than diesel equivalents but running costs are lower.
- Details of future fuel sources and the relative merits and impacts of various alternative fuels in Australia can be found in the CSIRO's *Fuel for Thought* report and the NRMA's *Jamison Group* report – see Appendix VI for references.

**Other truck efficiency opportunities**

- Electric hybrid drivetrains similar to the Prius are being tested in Europe for smaller-size stop-start trucks such as courier vehicles but the battery requirements for heavy vehicles are costly and hybrids offer few benefits for longer-distance use.
- Another technical option for stop-start applications like courier, mail and garbage trucks is the hydraulic hybrid drivetrain. Hydraulic hybrids are currently being user-tested by UPS and others in the USA and Canada.
- It is hard to see the cost and complexity of a hybrid truck drivetrain stacking up against gas in the Australian market.
- Large trucks have already benefited from decades of engineering effort to improve efficiency. There are few big gains left to make. Further small refinements can be achieved through attention to aerodynamics, auxiliary power, rolling resistance and other energy drains, and by simply driving at lower speeds – which extends journey time.
- The biggest short-term efficiency opportunity in Australia should come from retiring the oldest members of our exceptionally old truck fleet and replacing them with larger modern high-efficiency low-emissions trucks.
The proposed Carbon Pollution Reduction Scheme (CPRS) will raise some costs for freight logistics

Carbon Trading Scheme Design

- The Government’s CPRS Green Paper was issued in July 2008 seeking submissions for a White Paper to be issued in late 2008 which will provide more details on the design of the CPRS scheme. For the transport sector the intent is to require fuel refiners to buy pollution permits and pass on the costs to fuel users. The price of fuel will rise according to the price of carbon, which may be capped in the early years of the scheme.

Fuel price impacts

- Based on international carbon price experience and Treasury modelling, initial carbon prices are expected to be in the range $20 - $30/tonne CO$_2$-e, which will increase fuel prices by 6 - 9 cents/litre, raising road freight rates by typically 0.8 - 1.2%.
- The Government’s Green Paper proposes a transition arrangement for at least one year where heavy vehicle road users (but not rail or seafreight operators) will have fuel taxes reduced by the cost of the CPRS. This proposal clearly imposes a temporary cost penalty on rail and sea relative to road.
- ARTC modelling* suggests that the temporary cost penalty may cause a 3% to 5% reduction in rail freight volume on shorter hauls such Sydney-Melbourne or Sydney-Brisbane, based on a high-range carbon cost of $50/tonne which would raise fuel price by 14 cents per litre.

Secondary cost impacts

- In any case diesel fuel prices during 2008 ranged from as high as $1.80 per litre down to $1.20 per litre so it is clear that international oil price and exchange rate movements are able to completely swamp the impact of the CPRS.

Longer term impacts

- The CPRS will also raise the price of electricity and gas by around 10% and will have small flow-on effects through the costs of all other inputs to the freight logistics industry.
- The total effect of the CPRS on freight logistics can be approximated as 95% fuel price and 5% secondary costs, and the fuel price impact will not hit road freight operators until at least one year into the scheme, i.e. after 2011.
- In the longer term (from 2016 onwards) carbon price should rise steadily and the CPRS will favour efficient low-emissions operations including sea and rail freight, but the day-to-day cost differences may still be small enough to be less visible than global commodity price and exchange rate effects.

* See reference in App VI
Appendix V
Policy context for Freight Logistics in NSW
It is important to understand actions others are currently taking to improve supply chain efficiency – co-ordinated planning and policy making is vital

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Document/Policy</th>
<th>Relevance</th>
<th>Implications</th>
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</table>
| NSW Air and Sea Freight Council / DSRD | Innovation in the NSW Freight Logistics Industry | High | ▪ Research on innovation within the NSW freight logistics industry  
▪ In conjunction with NSW Air and Sea Freight Councils, recommended extensive list of further actions which could be taken to enhance innovation |
| NSW Sea Freight Council | Sydney’s Intermodal System (2007) | Med | ▪ Identified need for major intermodal terminals for southern and western Sydney and a recommended model for development and management  
▪ Argued for government leadership and vision in the development of an intermodal network |
▪ Recommended infrastructure improvements, development of a strategic rail freight policy, additional empty container park capacity, land banking for future intermodal facilities and engagement with empty container park operators and shipping companies |
▪ Identified opportunities for enhancing supply chain efficiency through improved port terminal management, staging activities, empty contain management and changes in hours of operations |
It is important to understand actions others are currently taking to improve supply chain efficiency – co-ordinated planning and policy making is vital

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<th>Organisation</th>
<th>Document/Policy</th>
<th>Relevance</th>
<th>Implications</th>
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<tbody>
<tr>
<td>NSW Sea Freight Council</td>
<td>NSW Import Export Container Mapping Study (2004)</td>
<td>Low</td>
<td>• Survey of container ODs, highlighting the need for greater co-ordination of the container management process to enhance supply chain efficiency</td>
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<tr>
<td>NSW Sea Freight Council</td>
<td>Regional Intermodal Terminals – Indicators for Sustainability (2004)</td>
<td>Low</td>
<td>• Study to identify key attributes of economically viable intermodal freight terminals</td>
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<tr>
<td></td>
<td>Australia’s Supply Chains – Fixing the Blockages (2008)</td>
<td>High</td>
<td>• Recommendations across a range of areas including safety, investment, regulatory reform, people, energy and environment, innovation and technology and leadership</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>• Identification of infrastructure priority areas to improve supply chain efficiency and specific supply chain blockages requiring attention</td>
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</table>
It is important to understand actions others are currently taking to improve supply chain efficiency – co-ordinated planning and policy making is vital

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<tr>
<th>Organisation</th>
<th>Document/Policy</th>
<th>Relevance</th>
<th>Implications</th>
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</table>
| IPART                         | Reforming Port Botany’s links with inland transport- Review of the interface between the land transport industries and the stevedores at Port Botany (2008) | Med       | • Wide ranging review of interface between stevedores and land transport operators at Port Botany covering fees/penalties charged by stevedores, costs of services, relative road rail charges and reliability and potential improvements which could result from institutional change  
  • Recommended 18 improvements to efficiency at Port Botany, including use of a market based pricing mechanism (auctioning system) to allocating vehicle booking slots |
| NSW Government                | Response to IPART Report on Reforming Port Botany’s Links with Land Transport (2008) | Med       | • Outline of two phased plan to implement number of recommendations from the IPART report  
  • First phase will involve Sydney Ports taking an active role in facilitating improvements in efficiency focusing on proving the market with better information on system performance, setting new service standards and key performance indicators and introduction of a peak pricing mechanism. Second phase will be implemented if first phase is not successful and will involve direct Government intervention to address issues that cannot be addressed by industry |
| National Transport Commission | National Transport Policy Framework – A new beginning                        | High      | • Report setting out strategic priorities for improving performance of national supply chains. Report argues for a shift away from focus on individual modes and traditional policy fixation on developing new infrastructure, and a move towards co-ordinated policy focusing on supply chains and smarter use of existing infrastructure  
  • Pilot national supply chain research projects being currently being implemented (includes Grain supply chains) |
Appendix VI

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Appendix VII

Glossary
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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>RTA</td>
<td>Roads and Traffic Authority (NSW)</td>
<td>ADR</td>
<td>Australian Design Rules</td>
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<td>NTC</td>
<td>National Transport Commission</td>
<td>POEO</td>
<td>Protection of the Environment Operations Act</td>
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<tr>
<td>HML</td>
<td>Higher Mass Limits</td>
<td>CRC</td>
<td>Cooperative Research Centre</td>
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<tr>
<td>HMV</td>
<td>Higher Mass Vehicles</td>
<td>LNG</td>
<td>Liquified Natural Gas</td>
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<tr>
<td>PBS</td>
<td>Performance Based Standards</td>
<td>CNG</td>
<td>Compressed Natural Gas</td>
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<tr>
<td>IAP</td>
<td>Intelligent Access Program</td>
<td>TEU</td>
<td>Twenty Foot Equivalent Unit</td>
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<tr>
<td>HPV</td>
<td>Higher Productivity Vehicle</td>
<td>DC</td>
<td>Distribution Centre</td>
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<tr>
<td>SEPP</td>
<td>State Environment Planning Policy</td>
<td>CAGR</td>
<td>Compound Average Growth Rate</td>
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<tr>
<td>LEP</td>
<td>Local Environmental Plan</td>
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<tr>
<td>DA</td>
<td>Development Approval</td>
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