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From	Martin Chow, Matt Elischer and Sophie Houston
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Subject	Heavy vehicle operating cost model update
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1. Project background and what we have been asked to do

The Transport and Infrastructure Council (the Council) has asked the National Transport Commission (NTC) to undertake a determination for heavy vehicle charges. The determination will require the NTC to undertake a comprehensive review of the Pay-As-You-GO (PAYGO) model for setting heavy vehicle charges and recommend a new set of heavy vehicle charges to the Council.

As part of its determination, the NTC examines the potential financial impact new heavy vehicle charges could have on different heavy vehicle operators. This requires the NTC to have a firm understanding of the operating costs of different heavy vehicles and how these costs vary depending on vehicle class and operating condition.

We have been engaged by the National Transport Commission (NTC) to update the inputs and parameters that feed into its existing heavy vehicle operating cost model (the existing model). The operating cost model calculates the total cost of operating a heavy vehicle for each of the 27 NTC heavy vehicle classes.

To develop updated inputs and assumptions, we have:

- developed updated inputs and assumptions based on publicly available sources; and
- confirmed the reasonableness of the inputs and assumptions through interviews (and one workshop) with industry.

Further, we have modified the model so that it can calculate operating costs under different scenarios. The model is currently set up to model:

- different levels of distance travelled and hour of operations; and
- high, medium and low scenarios for the following cost categories:
 - > capital costs;
 - > fuel costs;
 - > maintenance costs;
 - > tyre costs; and
 - > other costs.

The remainder of this memo describes how we have developed the updated inputs and parameters, including key information sources. We have also summarised the key changes we have made to the revised model when compared to the existing model.

2. Vehicle operating characteristics

Vehicle operating characteristics refers to:

- the annual distance travelled of a vehicle; and
- the hours a vehicle is in operation per year.

We did not identify any publicly available information that could be used to update assumptions in the existing model. Instead, we have tested the reasonableness of the existing assumptions during our stakeholder interviews. Feedback from stakeholders suggest that the existing assumptions are reasonable.

The figures in the existing model reflect the operations of the hire and reward sector, which tend to have a higher average distance travelled per year when compared to the industry as a whole. To this end, the model is also set up to calculate operating costs using average distance travelled data from the Survey of Motor Vehicle Use (SMVU) instead.

3. Labour costs

Labour costs are the most significant cost category for heavy vehicle operators. We discuss how we have updated labour cost assumptions and inputs in the model below

3.1 Weekly award wage

The previous model used the 2012 TWU driver awards as the primary source for weekly labour wages. This has been updated with the Fair Work agreements, which incorporate all amendments up to and including 31 October 2020.

We have sourced weekly award wages from three relevant Fair Work agreements, which are:

- Road Transport and Distribution Award 2020, which we have used for freight carrying vehicles travelling less than 100,000 km per year;
- Road Transport (Long Distance Operations) Award 2020, which we have used for freight carrying vehicles travelling more than 100,000 km per year; and
- Passenger Vehicle Transportation Award 2020, which we have used for buses.

Each reward has multiple pay grades. The pay grade a driver is entitled to varies depending on their responsibility and the characteristics of the heavy vehicle. In general, drivers of heavier vehicles have a higher pay grade, and so are paid more. We have reviewed the job description of the different pay grades and matched them to most appropriate NTC vehicle classes.

3.2 Assumptions from previous 2012 model

For each NTC vehicle class, the previous model made assumptions regarding:

- number of hours worked by a driver per week;
- amount of overtime at 1.5 and 2 times a driver's normal hour; and
- over the reward payment required to attract drivers where required.

These assumptions were tested during the interview process and was considered reasonable by stakeholders.

3.3 Other labour related costs

We identified additional labour costs categories that did not appear to have been included in the existing model. These cost categories and what we have assumed are summarised in the table below.

Table 1: other labour cost related assumptions

Cost category	Assumptions
Superannuation	10%, which reflects the rate which will commence on 1 July 2021.
Workers compensation	4.5%
Meal allowance	We have assumed that bus drivers are entitled to 1 meal per day and rigid and articulated drivers are entitled to 2 meals per day.
Leave loading	<p>We have assumed that drivers will accrue 25% (30.25% for long haul drivers) of leave loading. This comprises of:</p> <ul style="list-style-type: none"> 17.5% (22.75%) for annual leave loading based on the relevant Fair Work agreements; and an additional 7.5% leave loading to cover sick leave and public holidays etc¹.

4. Fuel related costs

Fuel related costs are the second or third largest cost category for heavy vehicle operators. To develop updated fuel costs, we have:

- updated fuel use per 100 km based on the most recent SMVU data;²
- sourced average diesel retail price from the Australian Institute of Petroleum website; and
- used the most recent fuel excise and road user charge as published on the Australian Taxation Office (ATO) website.

Feedback from stakeholders suggest that our fuel related cost assumptions were reasonable. Some stakeholders pointed out that we did not included the costs of AdBlue in our fuel cost estimate. To this end, we have included an additional cost of two cents per litre of diesel used to account for the cost of AdBlue.

5. Vehicle/capital related costs

Capital costs are the second or third largest cost categories for heavy vehicle operators. To developed updated vehicle/capital cost assumptions, we have:

- used market price, useful life and residual value information provided by Pickles, which is the largest auction house for second hand heavy vehicles and trailers in Australia; and
- updated the financing rate from 7.75% to 6% based on commercial rates for trucks available on financing website Savvy.

In addition, we have also added in two more vehicle/capital related costs there did not appear to have been included in the existing model. These are:

- stamp duty, which we have assumed to be 3% based on Freight Metrics³; and
- vehicle insurance, which we have assumed to be 3.15% based on Transport Industry Council guidelines.⁴

¹ This is based on 10 days for sick leave, 10 days for public holidays, and that are 260 (52*5) working days per year. This equates to a leave loading of 20/260, or around 7.5 %

² We have used values trended to 2019 with B-triple adjustments

³ For more information, please refer to:
<http://www.freightmetrics.com.au/Calculators%7CRoad/TruckOperatingCost/tabid/104/Default.aspx>

The model currently assumes that operators purchase and operate brand new heavy vehicles rather than use second-hand vehicles. However, many operators would likely purchase/operate second-hand or third-hand vehicles instead. There is likely to be a cost/performance trade-off between buying brand new and second/third hand vehicle. For example, a second-hand vehicle would likely have lower capital costs but is also likely to have higher operating costs, more down time for maintenance, and lower fuel efficiency.

It follows that it is unclear whether operating second/third hand heavy vehicles would lower the costs of doing business once other ongoing costs and performance of the vehicle is factored in. We would also expect that this varies by business as some businesses will prefer operating first-hand heavy vehicles whereas others prefer second or third hand vehicles.

Given the above, the model does not consider how costs would change if operators use second or third hand vehicles instead of a brand new vehicle. We also note that the model has low and high capital cost scenarios, which we expect will be sufficient to capture any variation in costs in different ownership approaches.

6. Maintenance costs

The updated model uses repair and maintenance costs from the Australian Transport Assessment and Planning (ATAP) guidelines, adjusted to 2020 values using Australian Bureau of Statistics data on the consumer price index. The ATAP guidelines provides repair and maintenance cost estimates for 12 heavy vehicle types, which do not all directly align with NTC vehicle classes.

To develop updated estimates for the 27 NTC vehicle classes, we have:

- matched the 12 ATAP vehicle types to the closest NTC vehicle class, eg, medium rigid was matched to a 2 axle rigid truck ($7\text{ t} < \text{GVM} \leq 12\text{ t}$);
- used cost relativities in the existing model to calculate maintenance costs for the remaining vehicles, eg, the existing model suggests that the maintenance costs for a 2 axle rigid truck ($4.5\text{ t} < \text{GVM} \leq 7\text{ t}$) is 13 % lower than a 2 axle rigid truck ($7\text{ t} < \text{GVM} \leq 12\text{ t}$); and
- assumed that maintenance costs for a bus would be similar a rigid vehicle with a similar GVM and number of axles, eg, 2 axle bus ($10\text{ t} < \text{GVM}$) is assumed to have the same maintenance costs as a 2 axle rigid truck ($12\text{ t} < \text{GVM}$).

7. Tyre costs

Freight Metrics's online cost calculator assumes that:

- a steering tyre would cost \$774 per tyre and have a useful life of 100,000 kilometres; and
- a drive/trailer tyre would cost \$700 per tyre and have a useful life of 160,000 kilometres.

Feedback from interviews suggested that a drive/trailer tyre would be lower than \$700 per tyre and that trailer tyres are generally cheaper than drive tyres. As such, we have assumed that the price of a drive tyre is \$550 and the price a trailer tyre is \$450 based on estimates provided by industry.

The Truck Industry Council also provided feedback that 2 axle rigid vehicles with a GVM below 12 tonnes and 2 axle buses with a GVM below 10 tonnes use different types of tyres. The Truck Industry Council provided suggested values and useful life for these three NTC vehicle classes, which have been incorporated into the updated model.

⁴ For example, refer to Transport Industry Council, *Rates and Costs Schedule 2018-2019 8 Tonne Rigid Vehicle (GVM)*, September 2018, p 7, available at https://www.business.vic.gov.au/_data/assets/pdf_file/0006/1290237/8-Tonne-Rigid-Vehicle-GVM-2018-2019.pdf

8. Registration charge

Registration charges are set by the NTC. We have calculated registration charges based on the current charges set out on the NTC's website.

9. Other costs

Other costs related to miscellaneous costs that are not covered in any of the categories above. Transport Industry Council suggests that other costs would be around \$5,000 for an operator in Victoria, comprising of:

- \$761.20 to cover permits and Transport Accident Commission (TAC) fees;
- \$400 to insurance goods in transit;
- \$474 for public liability insurance;
- \$559 for personal sickness and accident/income insurance; and
- \$2,838 for general business administration costs, covering costs such as accounting related costs, mobile phone and sundry business expenses.

On this basis, we initially assumed that other costs would be around \$5,000 per vehicle.

However, feedback from interviews and the workshop suggests that this estimate is likely to be too low. Stakeholders pointed out that:

- parking fees and training/compliance alone could cost several thousand per year;
- tolls and port access charges could also be significant cost items for operators; and
- new technology, such as the introduction of electronic work diaries, will also increase other costs incurred by operators.

We note that the size of many of these fees will vary significant from operator to operator. For example, the cost of parking could be significant for an urban operator but could be negligible for a rural operator. Similarly, not all operators operate on toll roads or access a port.

It follows that the size of 'other costs' are likely to vary significantly from operator to operator, and developing an estimate for a 'typical' operator will be difficult and highly assumption driven. That said, we expect that other costs are unlikely to be a significant cost category for operators. For simplicity, the model has assumed that other costs will range from \$10,000 to \$20,000 per vehicle.

10. Summary of key changes when compared to the existing model

This section sets out the key changes we have made to the existing model. We have used outputs for a six axle articulated truck to illustrate how each of the key cost category has changed – see table 2 below. Notably, for six axle articulated trucks:

- labour costs have increased significantly as it reflects the most recent award wages and includes costs previously not considered in the previous model;
- fuel costs have decreased because the pump price for diesel excluding fuel excise has declined;
- vehicle and capital costs have remained largely the same as the increase in market prices and inclusion of stamp duty have been largely offset by lower financing rates; and
- other costs have increased significantly, reflecting feedback from stakeholders.

As noted above, we have included several costs that were not included in the previous model, eg, superannuation, workers compensation and stamp duty. It follows that the outputs from the existing model and the revised model are not 'like-for-like' and so the outputs are not directly comparable.

Table 2: Comparison of annual cost of operating six axle articulated truck

Cost category	2012 model estimates	Revised model estimates	Key changes from previous model
Labour costs	119k	193k	<ul style="list-style-type: none"> The weekly wage has been updated to reflect 2020 award wages Inclusion of superannuation, workers compensation, leave loading and meal allowance
Fuel related costs	163k	129k	<ul style="list-style-type: none"> Fuel efficiency updated to reflect most recent ABS SMVU data Pump price excluding fuel excise has decreased (\$1.199 per litre to \$0.99 per litre) RUC has remained largely the same (\$0.255 to \$0.258 per litre) Inclusion of Adblue costs (\$0.02 per litre)
Vehicle/capital related costs	71k	74k	<ul style="list-style-type: none"> Related inputs updated to reflect information from truck sales websites and stakeholder feedback Financing rate reduced from 7.75% to 6 % Inclusion of stamp duty
Maintenance and tyre costs	60k	67k	<ul style="list-style-type: none"> Related inputs updated to reflect information from relevant guidelines and stakeholder feedback
Registration charge	5k	6k	<ul style="list-style-type: none"> Updated to reflect most recent registration charges
Other costs	5k	15k	<ul style="list-style-type: none"> Related inputs updated to reflect information from relevant guidelines and stakeholder feedback
Total costs	422k	484k	