



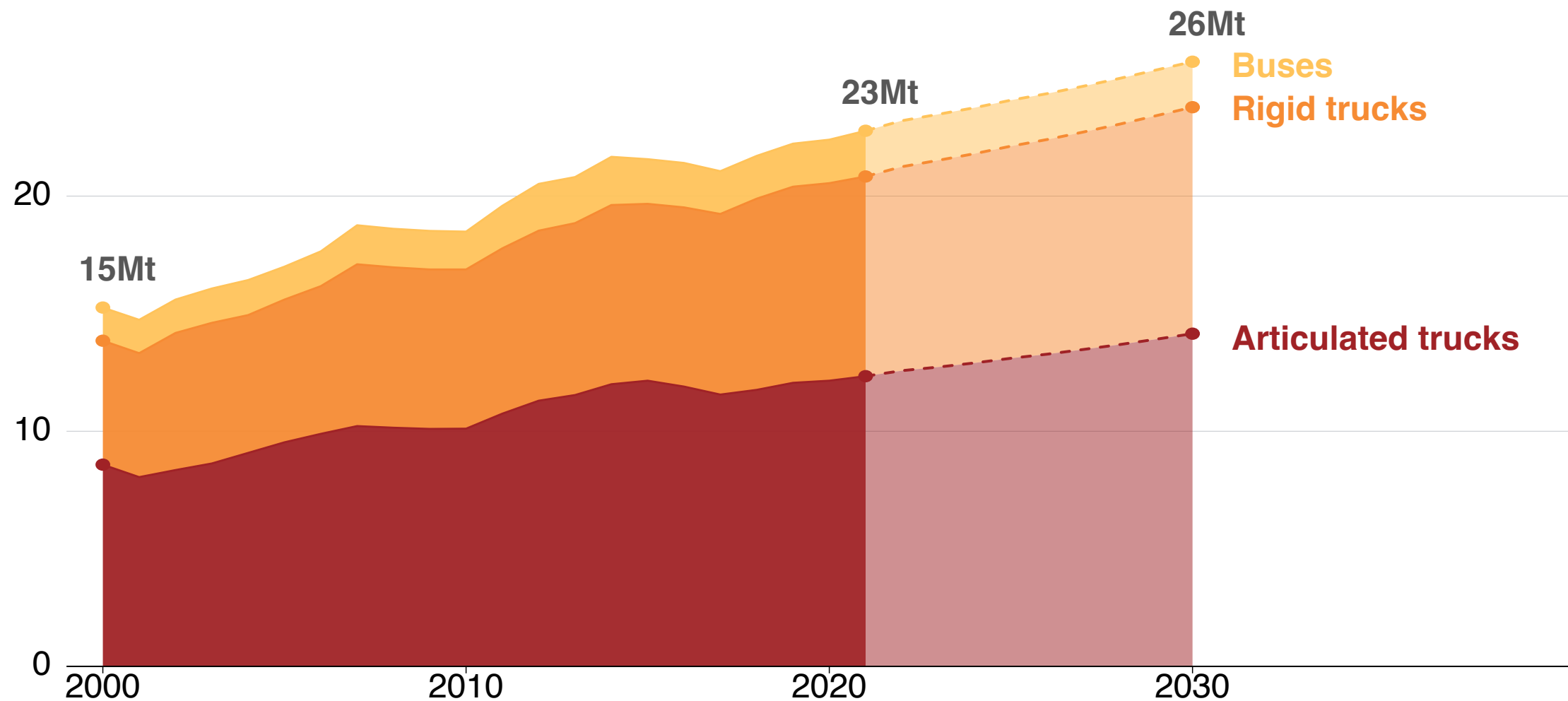
**Looking ahead:  
Australian heavy vehicles and emissions**

September 2022

I acknowledge the traditional custodians of the land where we meet today, the Wathaurong, Woiworung and Boonwurrung language groups of the Kulin Nations

## Emissions from heavy vehicles are forecast to rise between now and 2030

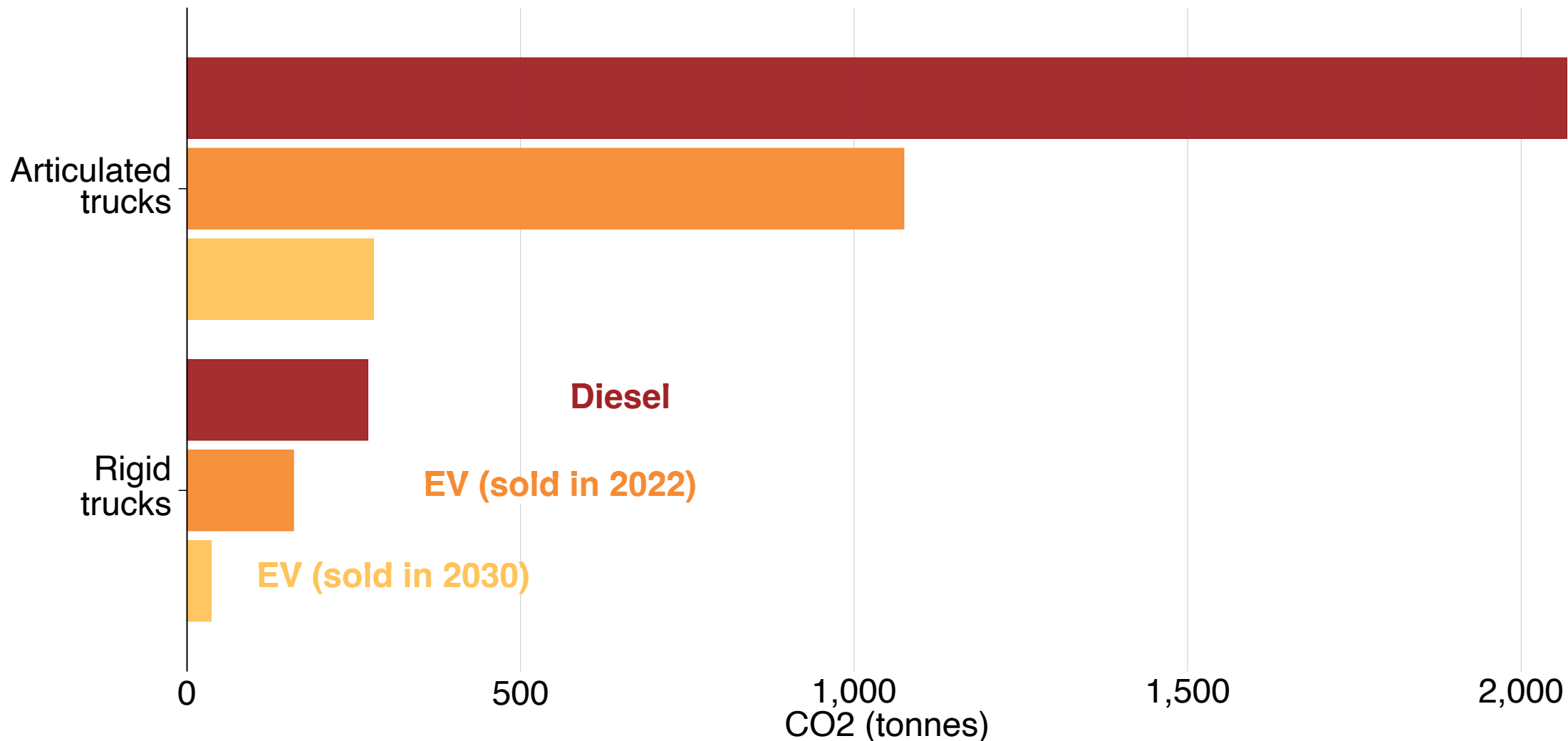
Annual greenhouse gas emissions (Mt, CO<sub>2</sub>-e) from heavy vehicles



Notes: CO<sub>2</sub>-e is the volume of carbon emissions with equivalent global-warming potential to the volume of greenhouse gases emitted by heavy vehicles. Forecasts are based on Grattan Institute analysis, using the Grattan model of the Australian heavy vehicle fleet. Source: DISER (2021) and the Grattan truck model (see Appendix A).

## Electric trucks produce significantly lower carbon emissions than diesel trucks

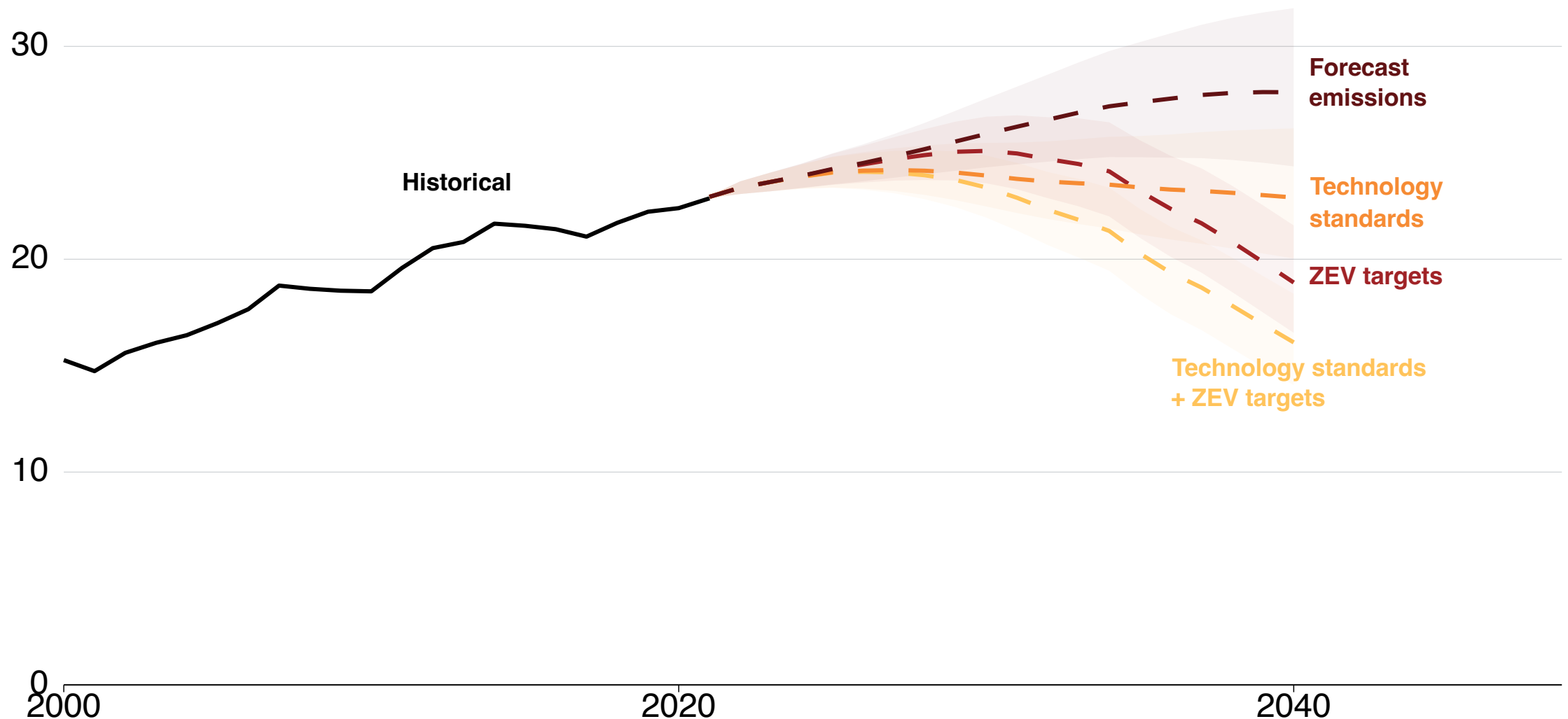
Estimated lifetime carbon emissions from a heavy vehicle



Notes: EV = electric vehicles. Based on average vehicle use and estimated fuel and electricity consumption. Emissions from electric vehicles are calculated using Australian Energy Market Operator (AEMO) 'step change' scenario for emissions intensity of the electricity grid. Does not include emissions from manufacture. 3  
Source: The Grattan truck model (see Appendix A).

# Carbon emissions from trucks could be reduced with tyre- and engine-specific standards in the near-term, and longer-term zero-emissions sales targets

Forecast carbon emissions from heavy vehicles under different policy scenarios (Mt)



Notes: ZEV = zero-emissions vehicle. Historical emissions from DISER (2021). Confidence intervals represent upper- and lower-bound estimates of future freight activity. Emissions from electricity generation to power ZEV are included. For diesel vehicles, upstream emissions (scope 2) are not included.

Sources: DISER (2021) and the Grattan truck model (see Appendix A).

1. Make it easier to buy and drive lower-emission trucks
  - Update width limits
  - Update mass limits
2. Reduce emissions from new diesel trucks
  - Engine and tyre standards
3. Support the transition to zero-emission trucks
  - Sales targets
  - Subsidies while there is a total cost of ownership gap

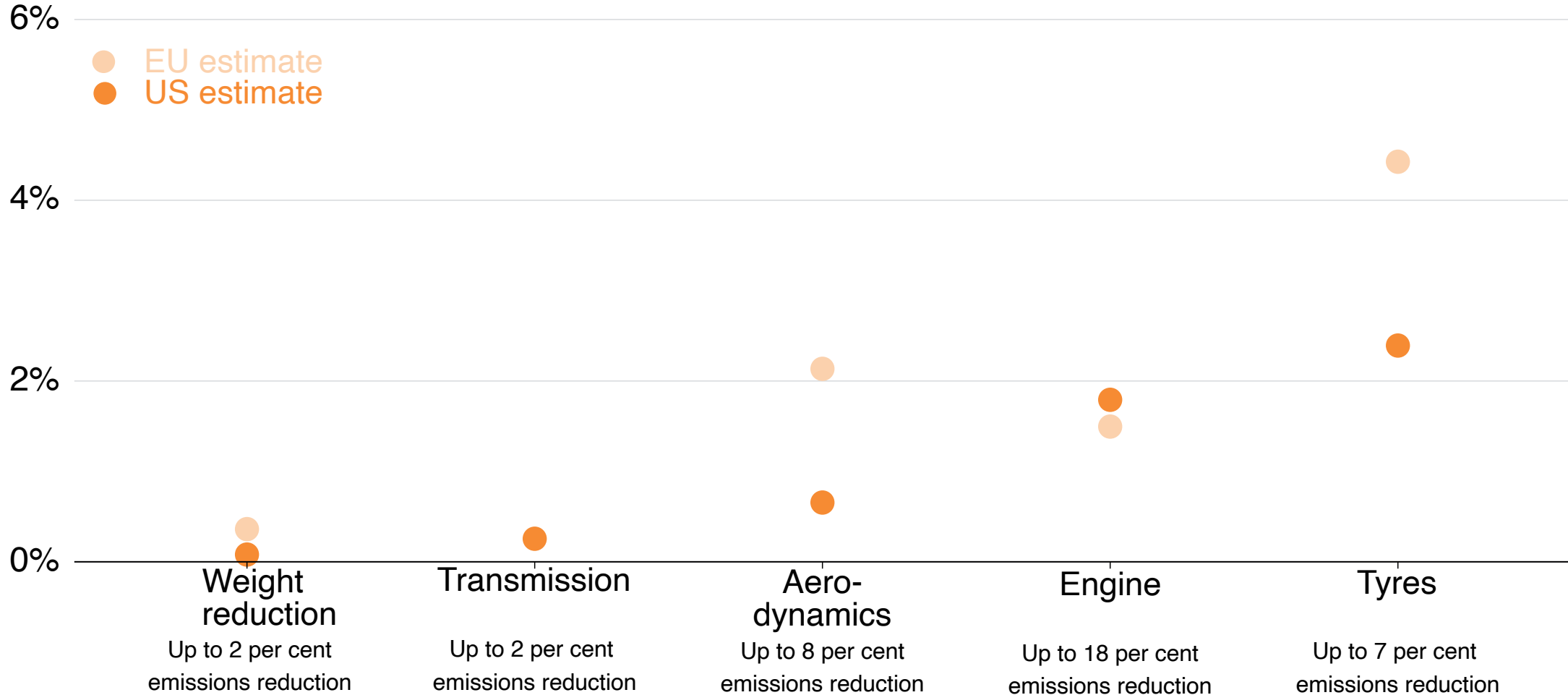


**Thank you**  
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September 2022

# Engine- and tyre-specific standards achieve more reductions in carbon emissions per dollar than other technologies

Estimated carbon-emission reductions for a cost of \$1,000 (per cent carbon dioxide reduction per kilometre)



Notes: EU and US estimated improvements, achievable by 2030, calculated for long-haul trailer trucks. Costs are based on carbon reductions achieved with investments of \$1,000. These costs are valid up to the total percentage gains possible. For example, \$1,000 spent on improved engine efficiency yields an average reduction in emissions just under 2 per cent; spending \$9,000 on improved engine efficiency will on average reduce carbon emissions by just under 18 per cent. Additional reductions beyond 18 per cent may be more expensive or not possible.

Source: the Grattan truck model (see Appendix A).

## Technology standards are simpler to implement than an emissions ceiling

Under an **emissions ceiling**, manufacturers can use a wide range of technologies:

- Engine technology (fuel efficiency)
- More aerodynamic cabins
- More aerodynamic trailers
- Rolling resistance of tyres
- Weight reduction
- Improved transmissions
- Hybrid technology
- More efficient accessories

But because there are many options, vehicle testing must be comprehensive and is **expensive**

Under **tyre- and engine-specific standards** manufacturers must improve these technologies:

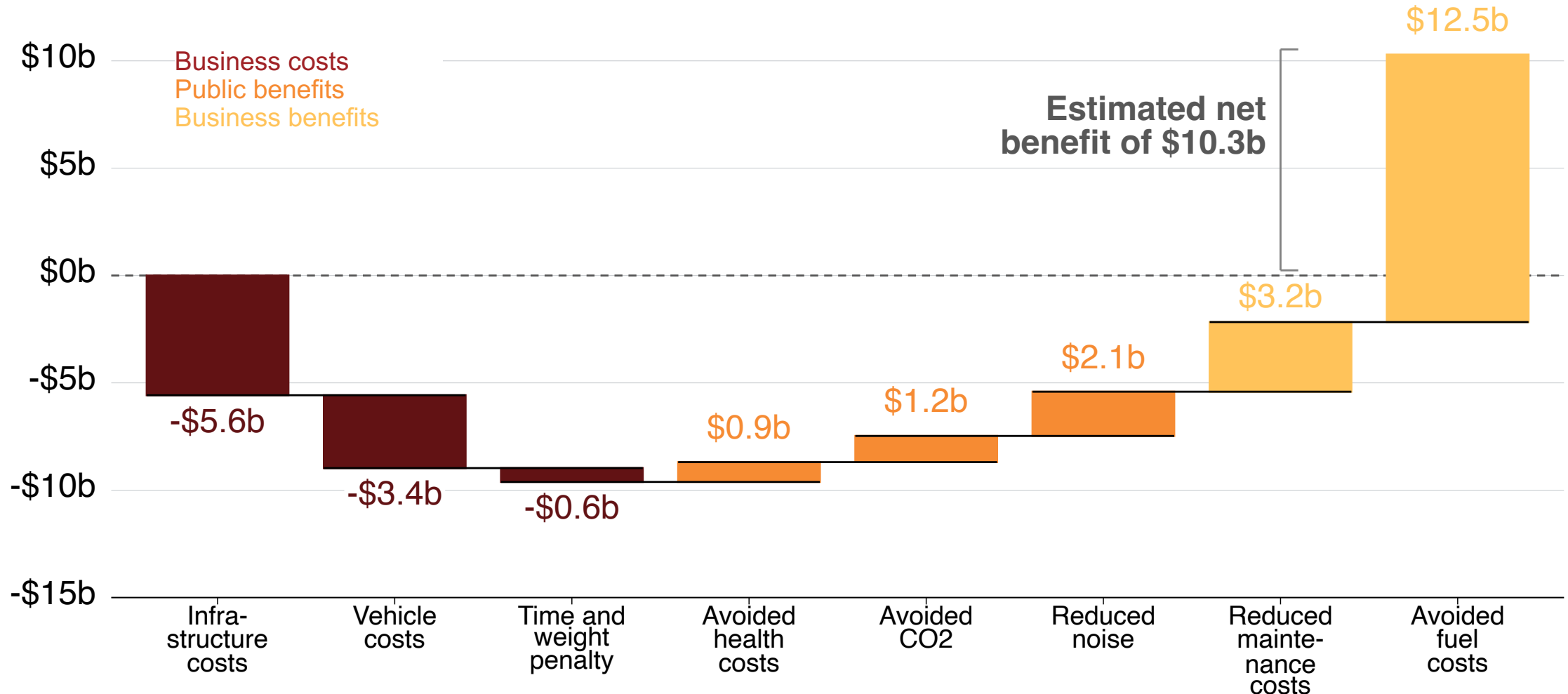
- Engine technology (fuel efficiency)
- More aerodynamic cabins
- More aerodynamic trailers
- Rolling resistance of tyres
- Weight reduction
- Improved transmissions
- Hybrid technology
- More efficient appliances

And testing is **far cheaper**, because it needs to cover only these technologies



# Businesses and the public would benefit from our proposed sales targets for zero-emissions trucks

Estimated costs and benefits between 2024 and 2040 of zero-emissions targets for heavy vehicles



Notes: Calculated using a 7 per cent discount rate. Assumes a diesel price of \$1.33/L, electricity price of \$0.15/kWh, and a cost of carbon of \$35/tonne. Diesel price excludes fuel excise tax or the heavy vehicle road-user charge. Maintenance costs includes AdBlue costs, lubricants, and oils. Infrastructure costs include vehicle-charging infrastructure. Time penalty assumes 1.5 per cent more zero-emissions trucks; weight penalty assumes 3 per cent more. Assumes Euro VI introduced in 2024. Source: the Grattan truck model (see Appendix A).

To reduce carbon emissions from diesel trucks, in 2024:

- Engine standards for new trucks targeting average fuel-efficiency improvements of 3 per cent per year.
- Tyre standards for new trucks, targeting average carbon reductions of 1 per cent per year.

To accelerate the transition to zero-emission trucks:

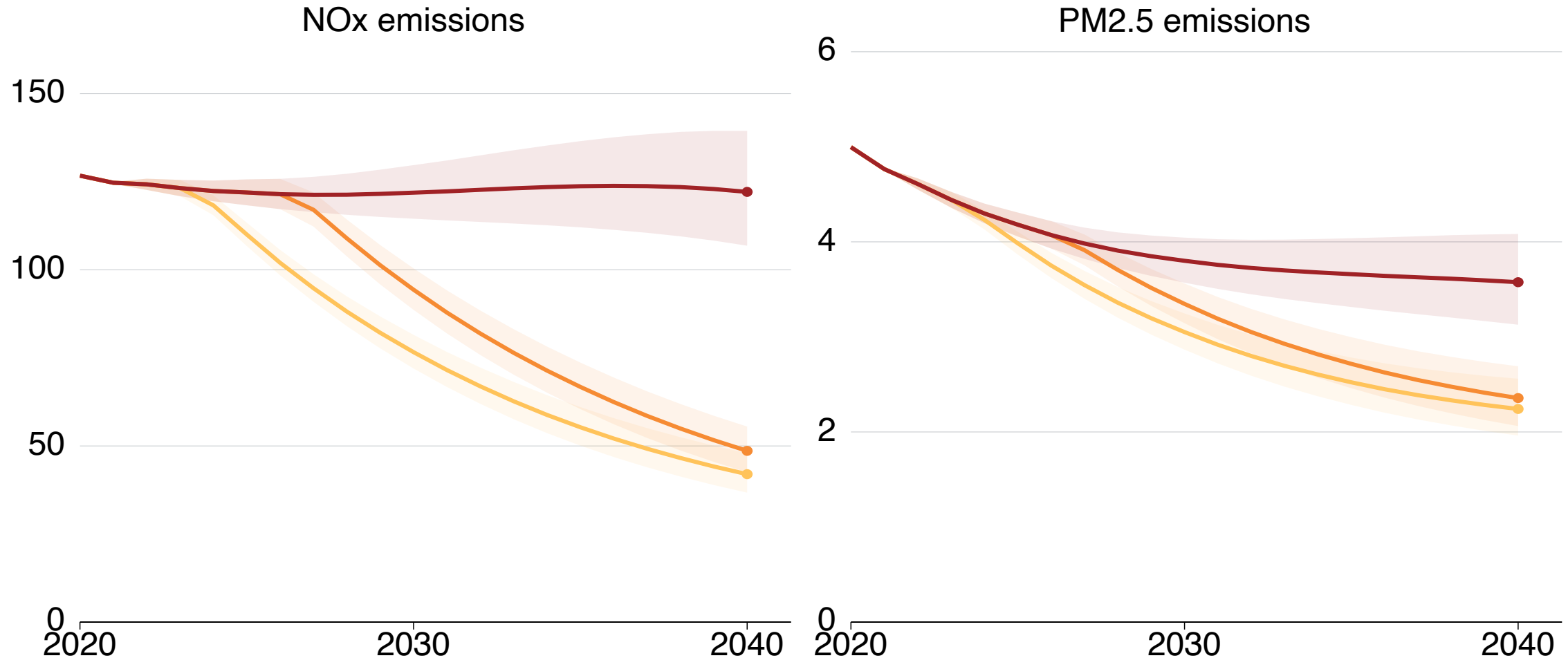
- Binding zero-emissions sales targets: 100 per cent for rigid trucks by 2040; 70 per cent for articulated
- Subsidise new zero-emission trucks with vouchers while they have a higher TCO than diesel trucks.

Regulatory updates, from 2023:

- Up to 2.6m width
- Increased mass on the steer axle subject to >375mm tyres
- Wide single tyres with low rolling-resistance on non-steer axles

# The sooner Euro-VI standards are introduced, the sooner dangerous exhaust-pipe pollutants will be reduced

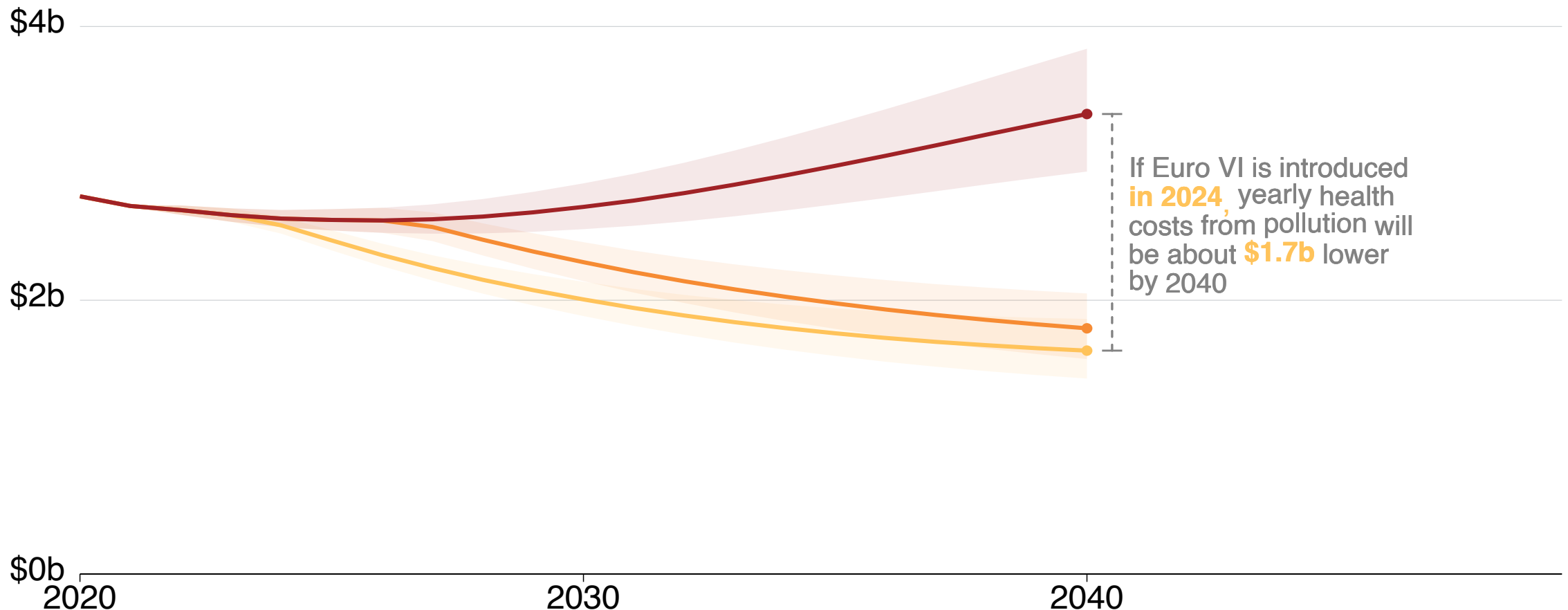
Annual pollution from heavy vehicles ('000 tonnes) if Euro-VI standards are: **not introduced**, **introduced in 2027**, **introduced in 2024**



Notes: Confidence intervals represent upper and lower bound estimates of future freight activity. Pollution estimates include exhaust emissions, tyre wear, and brake wear.  $PM_{2.5}$  estimates include secondary particulates formed from  $NO_x$  and  $SO_x$  emissions. Pollution from road dust and road wear is not included. 11  
Source: The Grattan truck model (see Appendix A).

# Euro-VI standards for heavy vehicles would reduce health costs by about \$1.7 billion a year by 2040

Yearly health costs from pollution if Euro-VI standards are: **not introduced**, **introduced in 2027**, **introduced in 2024**



Notes: Costs are not discounted. Confidence intervals are upper and lower bound estimates of future freight activity. Health costs are derived from estimates of NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>2.5</sub> (include secondary particulates), PM<sub>10</sub>, and VOC emissions. Pollution estimates include exhaust emissions, tyre wear, and brake wear.

Source: The Grattan truck model (see Appendix A).

The federal government should introduce Euro-VI standards from 2024.

All new heavy diesel vehicles should comply from 2025.

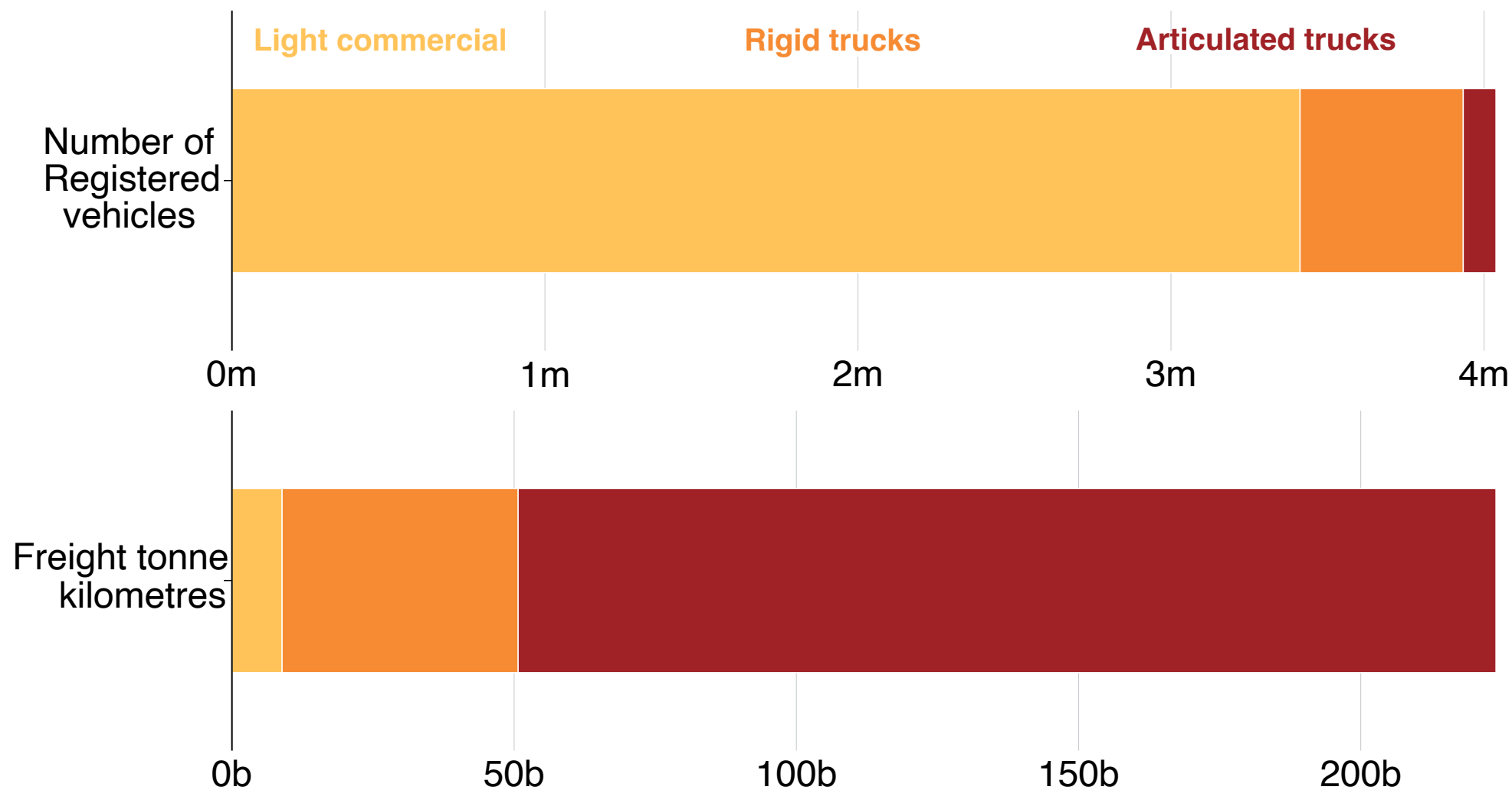
- The federal government should assess the costs and benefits of Euro-VII standards when they are announced.

To make it easier to buy cleaner trucks, regulations should be updated:

- To allow truck widths up to 2.6 metres from 2023.
- To allow trucks to carry up to 7 tonnes on their steer axle from 2023, as long as the truck is fitted with tyres that are at least 375mm wide.

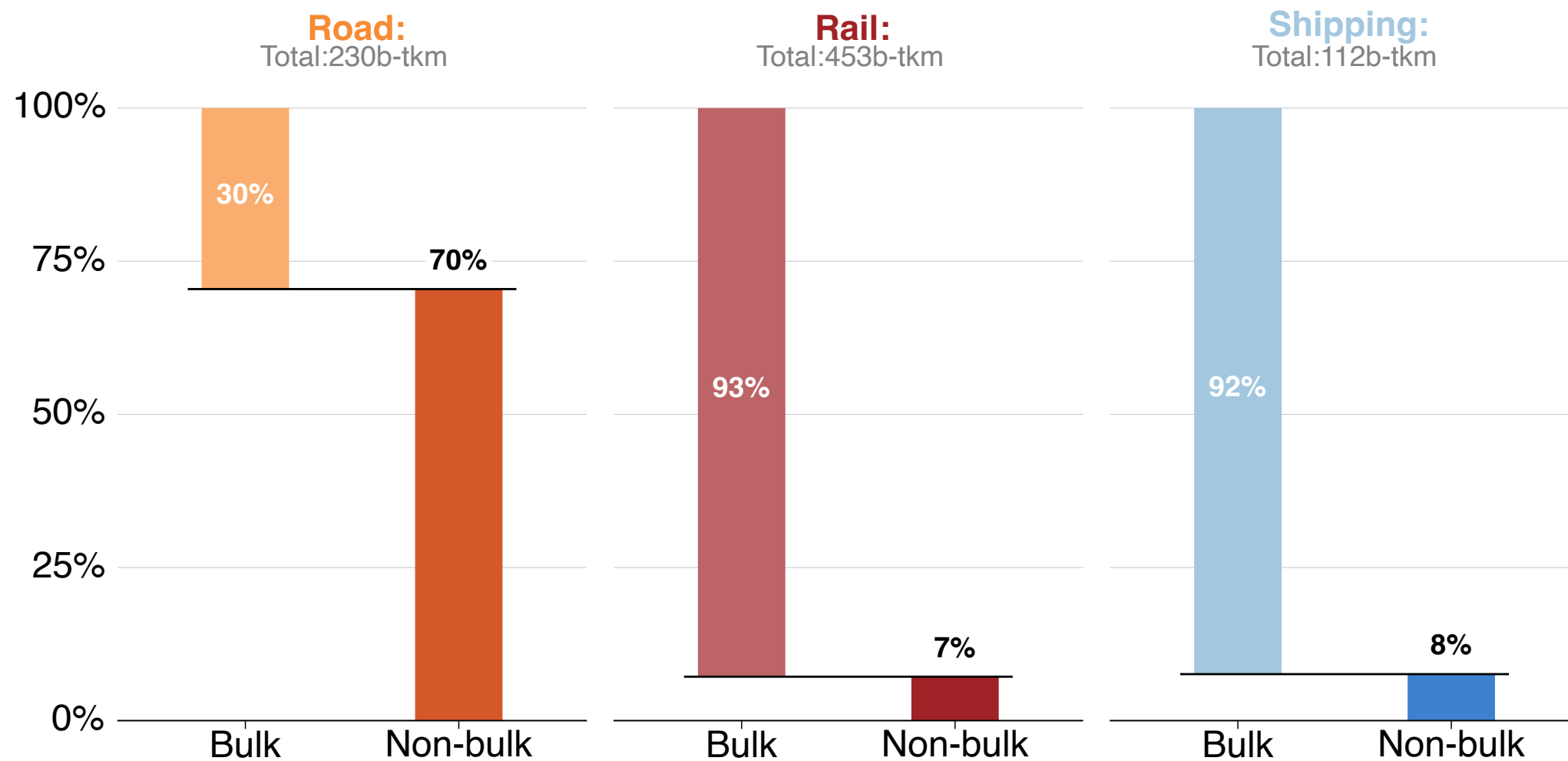
## High-productivity trucks do the lion's share of the work

Number of registered vehicles, and freight activity, by vehicle type



Note: Not all light commercial vehicles carry freight; results will understate the productivity of the share of light commercial vehicles that do carry freight.  
Source: ABS (2020).

## Road dominates the transport of non-bulk freight



Note: Domestic freight task only.  
Source: BITRE (2021a, pp. 80–81).