

Opportunities to decarbonise road freight

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BC-SMART webinar on “decarbonising trucking”
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Achieving sustainability in transport

Key pillars for decarbonisation

- ▶ Manage travel demand
 - Reduce trip distances
 - Shift modal choice towards energy efficient modes
 - Maximise the capacity utilisation of vehicles
- ▶ Enhance energy efficiency of vehicles
- ▶ Decarbonise energy vectors/fuels
- ▶ Minimise emissions beyond vehicle use and energy/fuel production
 - Vehicle manufacturing and infrastructure construction



+ Need to place this in the broader framework of the SDGs

- Importance of meeting multiple targets: co-benefits for safety, affordability, health/pollutant emission reduction, energy security, accessibility, connectivity, industrial development, economic growth, equity...

+ Also need in to place this in the broader context of major tech transitions

- Implications of technology learning: clearly visible for digital tech (linked to transport via connectivity and automation), electricity storage (batteries, and hence electrification), renewable energy

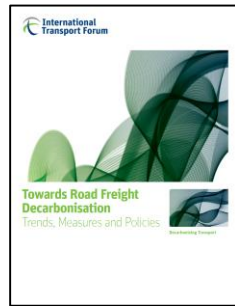
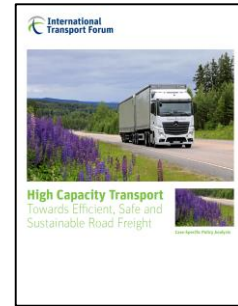
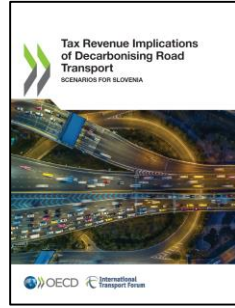
Managing travel demand

Key actions

- ▶ Regulate/modulate the cost of transport to reflect full impact for all modes
 - Eliminate fossil fuel subsidies, use fuel taxes and carbon pricing
 - Adopt pricing/charges and regulations sensitive to location, time and occupancy/capacity utilisation
- ▶ Enable the use of high capacity vehicles
- ▶ Foster physical compatibility, asset sharing & collaboration in logistics
- ▶ Foster the adoption of digital technologies for route optimisation and trip chaining
- ▶ Capitalise on the experience of green freight programmes
- ▶ Avoid urban sprawl and promote compact cities

Why is this helping manage freight transport demand?

- ▶ Cost pressure (greater penalties/tkm for small or empty vehicles)
- ▶ Reduced physical barriers
- ▶ Greater opportunities for larger shipments



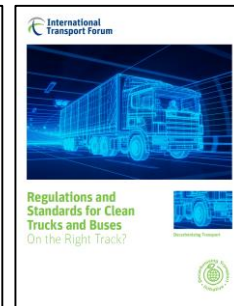
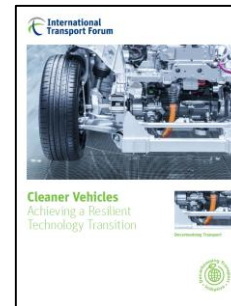
Enhancing energy efficiency of vehicles

Key actions

- ▶ Operational measures: regulate speed, periodical driver training
- ▶ Testing, standardisation to enable scale up of fuel-saving technologies
- ▶ Promotion of low- & zero-emission vehicles
 - › Fuel economy/tailpipe CO₂ regulations/standards
 - › Other regulations (embedded carbon, recycling and end-of-life, sustainability of supply chain of materials)
 - › Carbon taxes, differentiated taxation on vehicle purchase and road charges, based on environmental performance of vehicles
- ▶ Enabling EVs to become an asset rather than a liability to the electricity sector
 - › Smart grids, value capture from distributed energy storage on EVs, demand response
- ▶ Support/finance RD&D on innovative technologies

Why is this helping enhance energy efficiency?

- ▶ Reduced barriers, bridging the cost gap and direct impact of policies on increased market uptake/adoption
- ▶ Electric motors inherently more efficient than ICEs, electrification enables zero well-to-wheel physical flows and emissions: crucial to decouple emissions and economic growth
- + Vast technology transition, major opportunities for industrial development, along with major challenges



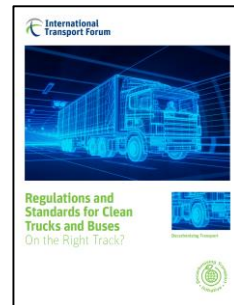
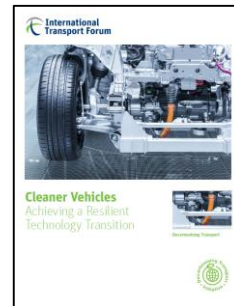
Decarbonising energy vectors/fuels

Key actions

- ▶ Develop criteria defining the sustainability of transport fuels/energy vectors, adopt minimum standards, promote good practices
- ▶ Promote the use of low- & zero-emission energy vectors with economic incentives and regulations
 - Give priority to the dispatching of electricity from renewable energy sources
 - Mandates or LCFS to support market deployment of energy vectors with a sound environmental profile
- ▶ Support the deployment of refuelling/charging infrastructure
- ▶ Support RD&D on innovative low- & zero-emission energy vectors

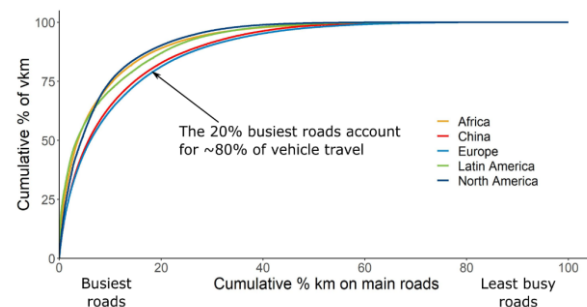
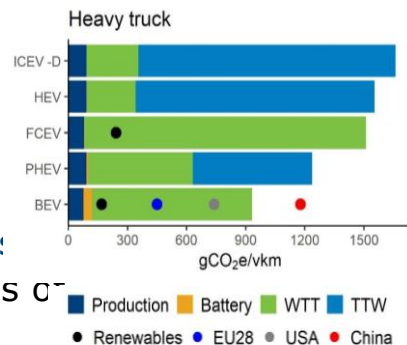
Why is this helping decarbonise energy vectors?

- ▶ Reduced barriers, bridging the cost gap and direct impact of policies on increased market uptake/adoption
 - ▶ Measures include electrification but are broader than electrification alone, well fit to have impact for long-distance modes
- + Fits with the broader context of the *energy transition* (e.g. renewables), with major opportunities for industrial development



Zoom on heavy duty road freight 1/2

- ▶ Electrification cuts emissions for cars and heavy-duty vehicles, with the high savings for battery electric vehicles
- ▶ BEVs are more than three times as efficient than ICE vehicles
- ▶ PHEVs with high electric driving share can realise similar well-to-wheel emissions cuts as BEV while reducing battery requirements, but they need high shares of all-electric driving
- ▶ High battery requirements and high power charging needs have held back electrification in the truck segment
 - Declining battery prices bring BEV trucks closer to cost parity with conventional technology
- ▶ Road freight activity concentrates on corridors, which can help limit investment needs for charging infrastructure
 - The TCO advantages of EVs (allowing room for a surcharge) + modularity in technology deployment also make electric road systems (ERS) an interesting option for these corridors (if vehicles are also deployed at scale)



Zoom on heavy duty road freight 2/2

- ▶ **Hydrogen** vehicles can come with fewer behavioural changes from consumers (refuelling times/habits, vehicle ranges) but they face other important challenges:
 - › at least twice less efficient vs. battery electric, even if more efficient (final energy) vs, ICE vehicles
 - › need for economies of scale to drive fuel cell costs down (requiring using fuel cells in other applications)
 - › primary forms of low-carbon energy (renewables, nuclear?) need to be available at very low cost
 - › complex handling (transportation and distribution) to small end-uses, path dependency
- ▶ **Biofuels:** easier to integrate with existing options, sustainability and scaling up are challenging
 - › WTW emissions differ widely across pathways
 - › Waste—based options best placed, but potential is limited; challenges in terms of cost-competitiveness for other pathways
- ▶ **Synfuels:** could be more sustainable, cost and scaling up are challenging
 - › large thermodynamic losses, large amounts of low-carbon energy needed
 - › DAC has low technology readiness

Low-carbon pathways to produce these fuels are likely better suited to sectors like shipping and aviation (where there is far less scope for direct electrification)

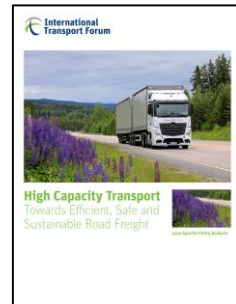
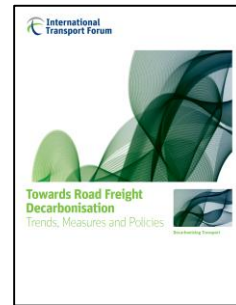
Minimising emissions beyond vehicle and fuel use

Key actions

- ▶ Minimise material need per unit of freight transport service (tkm)
 - Promote asset sharing in logistics
 - Discourage overbuilding of infrastructure
- ▶ Reward material efficiency in design, fabrication, use and end-of-life of vehicles and infrastructure
- ▶ Minimise energy and GHG emissions from vehicle and infrastructure construction

Why is this helping minimising emissions beyond vehicle use?

- ▶ Vehicle manufacturing and infrastructure construction are main sources of energy and emissions beyond vehicle use
- ▶ Asset sharing has impacts similar to management of travel demand in transport analogy
- ▶ Material efficiency has impacts similar to energy efficiency in the same analogy
- ▶ Consistent with 3R (reduce, reuse, recycle) paradigm for minimisation of waste and management of resource use



Making it happen

- ▶ Best to look for win-win solutions, providing multiple advantages
 - Not only climate change mitigation: co-benefits for safety, affordability, health/pollutant emission reduction, energy security, accessibility, connectivity, industrial development, economic growth...
- ▶ Need to account for a life-cycle perspective when looking at transport...
 - Need to ensure that action on transport is mirrored by action in other sector (power generation, construction industry...)
- ▶ ... and to look beyond transport
 - Major opportunities from synergies between transport-related technologies (e.g. EVs, electricity, possibly hydrogen) and other sectors
 - Look carefully at transitional risks, requiring adequate anticipation (and action): key examples are available within the transport & energy fields (decline in costs of batteries and renewable energy), but there are also other major disruptions unfolding (digital technologies)
 - A lot is happening in finance (market capitalisation of companies, expectations for changes)
- ▶ Seizing opportunities and reducing risks requires improved foresight to define a clear and up to date vision, plus significant policy (and voluntary) actions to make it happen

Actions undertaken by the ITF



Progress tracking

- Evaluate how current mitigation measures contribute to reducing transport CO₂.

In-depth sectoral reports

- Analyse in detail effective policies for decarbonising transport sub-sectors.

Focus studies

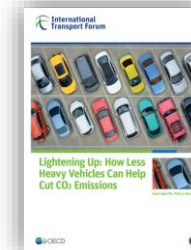
- Analyse specific decarbonisation issues (e.g. specific transport modes).

National pathways

- Help countries define pathways to meet their transport CO₂ reduction ambitions.

Policy dialogue

- Organise global dialogue on transport and climate change through roundtables, policy briefings and technical workshops etc.
- Act as a conduit for transport sector input to climate change negotiations.



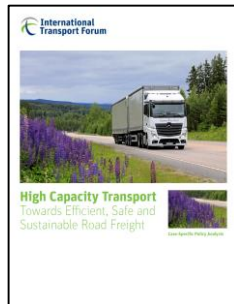
Thank you

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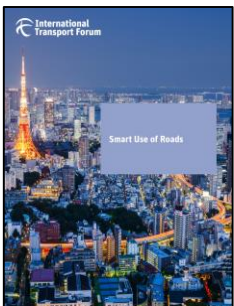
Publication links



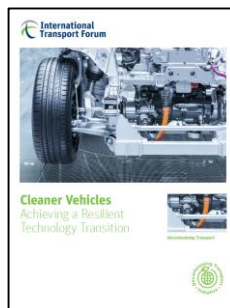
<https://www.itf-oecd.org/itf-transport-outlook-2021>



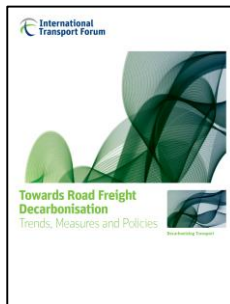
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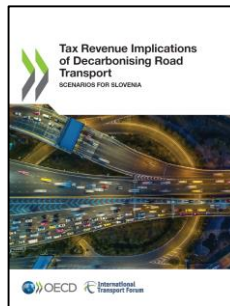
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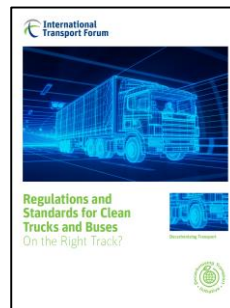
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<https://www.itf-oecd.org/regulations-and-standards-clean-trucks-and-buses>



<https://www.itf-oecd.org/how-urban-delivery-vehicles-can-boost-electric-mobility>