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IRU vision for decarbonising commercial road transport leading up to 2050

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I. ANALYSIS

1. Context

There is a growing global momentum to address climate change as underlined most recently by the global Paris climate change targets, which came into effect in November 2016. The Paris agenda sets an ambitious global pathway to limit temperature change to 2°C and an aspirational target to strive to keep it below 1.5°C. This has translated into country and regional targets such as the EU target of an 80% emissions reduction by 2050 and China's target to peak CO₂ emissions by 2030. The US has also pledged an 80% reduction by 2050, but the continuity of this policy is unclear given the current administration's shift away from emissions reduction policies. The Paris goals also pledge to move to net zero emissions during the latter half of the century which for developed countries could mean already as of 2050.

Decarbonisation of transport is a strong theme through a number of the UN's Sustainable Development Goals and will be essential to their success. It is also the subject of a number of UN Conventions, namely the United Nations Framework Convention on Climate Change (UNFCCC).

Considering the effort required globally to meet this global ambition and in order to ensure the continued relevance and success of the industry, the road transport sector has an important role to play alongside other sectors and modes to reduce its CO₂ emissions. Over the past decades the road transport industry has already made significant progress in lowering pollutant and CO₂ emissions by investing in operational efficiency, energy efficient technologies and lower carbon fuels. For example, pollutant emissions have been reduced by 98% over the past 2 decades. Building on this, in 2009, IRU and its Members made a voluntary pledge to reduce CO₂ emissions by 30% by 2030 per t/km (from 2007 levels) in its ['30-by-30 Resolution'](#).

As an essential service sector, commercial road transport is the backbone of the global economy. Road freight transport is the most efficient form of on-land transport, it drives economic prosperity and it provides vital connectivity to peripheral regions. When considering overall road transport emissions, the largest share generally does not come from commercial road transport, but from the use of private cars. Therefore, logistics services and transport by bus and coach are inherently effective means to decarbonise the transport system by shifting away from individual mobility, independent of the vehicle or fuel used. For example, transporting the same number of passengers over a certain distance uses four times more fuel by car than by bus, therefore collective transport reduces both congestion and CO₂ emissions (UITP, 2015).

Nonetheless, the road transport industry is committed to take its responsibility and invest further in reducing its carbon footprint. Worldwide, all modes of transport account for 23% of CO₂ emissions (IEA, 2015). In addition, demand for transport

services is expected to increase by 135% for passenger transport and 230% for freight transport from 2015 to 2050 (primarily in non-OECD countries) (ITF, 2017).

The level of reduction possible depends on the region, the alternative fuels options and the financial capacity of governments and operators. Trends for decarbonising transport differ significantly by region with a range of different regional barriers. Institutional, legal and financial constraints are the key barriers holding back investment into infrastructure, vehicles and fuels. Nonetheless, there are a range of low-hanging fruit which are available and accessible globally today with favourable cost-benefit scenarios. Accordingly, these measures should be promoted by governments. These include driver training, high capacity vehicles, aerodynamic improvements, low-rolling resistance tires, load and routing optimisation, low-carbon fuels and a shift to collective transport.

Improved traffic and infrastructure management is also crucial to reducing CO₂ emissions. Without ensuring free-flowing traffic, the effectiveness of other decarbonisation measures will be undermined.

Commercial road transport operators have an inherent interest to reduce their fuel consumption as this accounts for 30% of their costs and thus CO₂ emissions. In addition, geopolitical instability and scarcity of oil is a significant threat to fuel availability and price stability and therefore an added reason to invest in finding alternative fuel solutions.

Not only is there a high level of fragmentation in the sector with SMEs making up the majority of operators, but profit margins for the industry are also very low. Therefore, fuel saving technologies and alternative fuels must be viable, not only in terms of technological readiness but also in terms of commercial feasibility. While some transport operators are willing to pilot mature technology, such as fully electric city buses, and thereby take financial risks, this must be accompanied by equivalent commitment from authorities in providing the necessary recharging and refuelling infrastructure.

Governments can also help by ensuring sufficient financial mechanisms exist in order to encourage fleet renewal. Ultimately, there should be a clear cost-benefit analysis to make sure that measures to decarbonise the road transport sector meet all the principles of sustainability – economic, social and environmental.

The road transport sector will likely look very different in 2050. The sector is prepared to do what is necessary to make progress towards decarbonising operations. Reaching the Paris targets will require significant technological developments as well as regulatory support and cross-modal and cross-sectoral commitment. There is currently no single solution as the wide array of different vehicle types, use cases and market segments calls for a myriad of solutions.

2. Five pillars of decarbonisation

Decarbonisation of road transport will rely on five key pillars - improvements to fuel efficiency through new vehicle technologies, wider uptake of alternative fuels, measures to improve logistics operations, eco-driver training and a shift from private car use to collective transport.

a) Vehicle technologies

Improving vehicle energy efficiency through the uptake and further development of new technologies will have a significant benefit on decarbonising road transport. While the possible CO₂ reductions and commercial viability differ per region and depend on the use case of the vehicle, the available technologies today with the highest benefit are low-rolling resistance tires, engine efficiency improvements, aerodynamics, waste-heat recovery and lightweighting. For example in the EU, where vehicles are already highly fuel efficient, a combination of these measures could help to further reduce vehicle CO₂ emissions by at least 15% (compared to 2010 levels) (Commercial Vehicle of the Future report (CVOF), 2016).

CO₂ emissions reduction standards are helping to ensure that new vehicles are equipped with fuel saving technologies in an increasing number of countries and regions. Legislation that increases the fuel efficiency of trucks is positive but it must also be in line with what is commercially viable for operators. Pushing alternatives before they have a business case could harm the wider economy by raising transport prices. Hesitancy to invest is also a result of uncertainties around future oil prices and economic growth. Nonetheless, mainstream penetration of these innovative technologies will be essential for further decarbonisation.

b) Alternative fuels

Reducing emissions to reach global targets will require much wider uptake of alternatively fuelled vehicles over the coming decades with an increasing amount of energy from renewable sources. Rather than there being one solution, a range of alternative fuels will be needed depending on the vehicle type, operation, mission and the region.

Feasibility of alternative fuels depends on price, range, load capacity and fuel energy density and content. While transport operators are committed to shifting to alternative fuels, a certain reliance on oil and natural gas as primary energy carriers will persist for long-haul transport for some time therefore further investment into improving internal combustion engines will be essential. Blending of low-carbon fuels (such as advanced gaseous and liquid biofuels) with conventional energy carriers will play an important role in the coming decades and there must be investment into their further development. Policies should adhere to the Well-to-Wheel methodology which reflects the energy source and which should encourage greater use of renewable energy.

LNG vehicles, and in the longer term hydrogen fuel cell vehicles (FCEV), currently offer the most promising alternative vehicle technology to diesel for long-haul operations. Further fuel infrastructure will remain the most important decisive factor to future success of such alternatives. A higher degree of hybridisation and electrification will also play an important role, but pure battery-electric vehicles (BEV) will be limited to urban and regional distribution due to the weight versus payload conflict. For urban and regional delivery cycles, as well as for buses, BEV will play a key role in improving air quality and decarbonising the transport system, provided the electricity is renewably sourced.

c) Operational measures

Road transport operators are voluntarily investing in many measures to boost operational efficiency and consequently achieve decarbonisation. Some regions are already leading the way in utilising many of these measures and despite different regional capabilities for investment, these measures can be globally cost-effective.

The use of high capacity vehicles (HCV) with greater length, volume and/ or weight than standard trucks offers significant opportunities for reducing CO₂ emissions. In the EU, two HCVs are capable of carrying the same load as three regular trucks while using less energy and reducing congestion. There are even more efficient models possible in countries such as Australia. The result is on average 17.5% less CO₂ emissions per tonne km (CVOF, 2016). This is a win-win measure for operators and the environment therefore there should be an enabling legislative framework.

Further optimisation of logistics and supply chain organisation will lead to additional CO₂ reductions. The most beneficial measures include improving load factor optimisation, digitalisation and more use of collaborative transport platforms which together could reduce CO₂ emissions by 10% (CVOF, 2016). Improving route optimisation through smarter use of Intelligent Transport Systems (ITS), reducing maximum driving speeds, relaxed delivery windows and carbon footprinting to track and reduce fuel consumption can also contribute. These cost-effective measures are low-hanging fruit which are leading to quick decarbonisation gains and should therefore be further encouraged.

d) Collective transport

Wider use of passenger transport should be promoted as a measure in itself to decarbonise road transport. In fact, a shift from private car use to collective transport is one of the most effective ways to decarbonise road transport. Commercial road passenger transport is the only mode that can compete with private car use in terms of offering a door-to-door service with a high degree of flexibility.

At the same time as reducing CO₂ emissions, this trend also helps in decreasing congestion and in increasing road safety and connectivity in and between communities.

With demand for passenger services set to double globally by 2050 (primarily in non-OECD countries), collective transport will play an important role in the shift away from car use in the developed world, and an even more crucial role in the developing world, where it is essential that the opportunity is taken to avoid the path dependency of private car use and invest rather in collective transport.

e) Driver behaviour

Eco-driver training is one of the most cost-effective measures and therefore low-hanging fruit to reduce fuel consumption. It is an action that can be easily implemented, for example via the IRU Academy, and should therefore be promoted globally as a quick win for decarbonisation.

By training drivers to change their behaviour and use driver assistance and ITS systems in an optimal manner, emissions reductions of 8% are possible (CVOF, 2016). Maintaining these reductions relies on incentivising drivers and ensuring regular follow up. Some companies and countries are leading the way but there is a lot more potential with a recent ITF expert survey indicating that uptake is below 50%.

II. IRU VISION

The future decarbonisation of the road transport sector calls for a holistic approach with implementation of these five pillars essential to making significant progress. Given the rate of technology change, the contribution potential of these measures will need to be reviewed continuously.

1. Road transport operators

IRU and its Members are fully committed to reducing their CO₂ emissions and striving as far as possible towards a low-carbon future. The commercial road transport sector takes its responsibility to drive further decarbonisation and will embrace this challenge by taking all the steps necessary to get there. The sector pledges to advance the sustainability of road transport by investing in vehicles with fuel efficient technologies, and boosting uptake of alternative and renewable fuels and new powertrain concepts, where alternative options are technologically and commercially viable. Transport operators also pledge to ensure higher levels of eco-driver training and further use of driver assistance and ITS systems, and continue to optimise operational measures.

These measures will help the sector continue the trend of reducing individual vehicle fuel consumption and thus CO₂ emissions. However, as a whole the sector faces a challenge as growing demand for transport services will increase the number of vehicles on the road and this will impact the overall level of CO₂ emissions. As commercial road transport is a service sector responding to demand, the challenge of growing demand will have to be tackled across all sectors that use transport services. Satisfying growing demand will require better rather than more transport.

Road transport operators cannot solve these issues nor meet the Paris targets alone therefore success will depend on an integrated approach across sectors and modes and strong cooperation between road transport stakeholders. The cost burden cannot be covered by transport operators alone, but by all parties of the supply chain and consumers.

2. Key road transport stakeholders

There is a shared responsibility to decarbonise between transport operators, manufacturers, vehicle parts suppliers, fuel suppliers and infrastructure managers. IRU calls on these key road transport stakeholders to play their part in driving decarbonisation.

- IRU calls on vehicle manufacturers to ensure that their products are equipped with the latest innovative fuel saving technologies and to ensure continuous development of future technologies to drive reductions beyond 15%.
- Fuel suppliers have an important part to play in ensuring a reduction of the carbon intensity of fuels and a shift to renewable fuel sources. Equally important to encourage behaviour change is the provision of a comprehensive network of refuelling and recharging infrastructure. These measures must be supported by facilitating legislation.
- IRU calls for further research and development into improving technology and the business case for new innovative solutions, such as hydrogen fuel cell vehicles for long-haul transport.
- Further CO₂ reductions will also depend on improved traffic and infrastructure management. Measures such as green-waves of traffic lights are essential to facilitate eco-driving.
- Awareness from transport buyers will also act as an incentive and an insurance for operators to invest in reducing their CO₂ emissions.

3. Decision-makers

Governments have an important role to play in setting out the future policy path to ensure investment certainty leading up to 2050. While legislation should be ambitious and guide the sector towards meeting the Paris goals, it should not be overly prescriptive and should afford industry the flexibility to define the measures to decarbonise in the best and most cost-effective way. Policies should also avoid imposing costs on transport operators because this could have the effect of slowing down fleet renewal and hampering the ability to invest. Modal shift policies could also result in pushing up the price of goods and services and ultimately harming the wider economy.

IRU calls on decision-makers to ensure an enabling legislative, business friendly environment for the decarbonisation of commercial road transport.

- Ensure regulatory stability, with a clear and realistic timeline for CO₂ emissions reduction, to encourage investment confidence by energy suppliers, vehicles manufacturers and operators.
- Promote the uptake of fuel saving technologies on new vehicles, so long as they are commercially viable.
- Foster real business incentives to facilitate the penetration of innovative transport technologies, best practices and eco-driver training.
- Ensure decarbonisation policies are founded on evidence based impact assessments and cost benefit analyses, taking into consideration best practices.
- Invest in the full roll-out of alternative fuels infrastructure – this will be a key precursor to the uptake of alternatively fuelled vehicles.
- Ensure funds from road-user charging are earmarked for further greening the commercial road transport sector.
- Promote the use of collective road transport as it is the fastest and cheapest way for society to reduce the carbon footprint of passenger transport. Collective road transport should be given priority status through dedicated bus lanes, routing control and optimisation. Intelligent traffic light management should also

give priority to collective transport. In addition, it should be ensured that urban vehicles access restrictions do not discourage the use of collective transport.

- Ensure further flexibility in weights and dimensions legislation in order to encourage the use of fuel saving technologies, and alternative fuels and alternative powertrain systems, which may otherwise diminish load capacity.
- Integrate eco-driver training into legislative driver training requirements.

Decarbonisation is of fundamental importance to the commercial road transport sector and reducing CO₂ emissions will be essential to its relevance as a player in the sustainable transport system of the future. Sustainability must be the guiding core principle of the sector in terms of economic viability, social acceptability and environmental responsibility.

The commercial road transport sector pledges to play its part in achieving the Paris goals by striving towards a low-carbon future. Deep decarbonisation will also require major technological developments to develop tomorrow's solutions, cross-sectoral commitment and support from decision-makers to enable industry to decarbonise in the most cost-effective way.

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