International Transport Forum Submission

Mitigation Work Programme's Second Global Dialogue

Pursuant to decision 4/CMA.4, the Second Global Dialogue of the Mitigation Work Programme will take place in Abu Dhabi from 15 to 16 October 2023, with **accelerating just energy transition in transport systems**, being the theme of discussion chosen by the co-chairs.

The International Transport Forum (ITF) is ideally situated to support and input into this dialogue as an intergovernmental organization of 66 countries, that are responsible for 73% of global transport emissions. The ITF acts as a think tank for transport policy across all transport modes and works to foster a deeper understanding of the role of transport in areas including environmental sustainability and climate change.

Below is ITF's input on the subtopics for discussion, drawn from publications and insights of the ITF Secretariat's research centre on what a Paris-aligned transition for the transport sector looks like. The positions outlined below do not represent the positions of our member countries.

(a) Deploying and shifting to collective and non-motorized modes of transport (rail, urban public transit, cycling, etc.);

Avoid and Shift policies in urban settings can contribute substantially to reducing transport demand and emissions without decreasing economic activity. Such measures will also enhance public health and the accessibility and liveability of places. Measures to manage rural, intercity and international transport demand are more limited in their scope and potential impact.

Avoid urban sprawl & shorten trip lengths

Governments must implement policies that decouple economic growth from increases in transport demand. This can be achieved via land-use measures that encourage compact, mixed-use developments that can be viably served by public and active transport. Designing cities with greater access to opportunities within a shorter distance could reduce trip lengths by 8 – 15% (depending on the region, in the context of a broader low-carbon policy package) compared to business-as-usual development, without reducing trips per capita to the same degree. In addition, digital access, such as teleworking, can reduce trips per capita, while people are still able to access work (1 – 4% reduction in trips per capita, depending on region). However, access to these services does vary by region and industry sector.

Over 70% of trips up to 1km in length are made by active modes, and for distances up to 2.5km, 85% are made by sustainable alternatives to the private car / motorbike. Improving the availability of opportunities in greater proximity can improve the viability of sustainable alternatives to the private car / motorbike.

Invest in public transport and active modes, support a multi modal network

Public transport will be at the heart of the sustainable transport system, but it must be appealing to users and not simply the mode of last resort. Authorities will need to invest in improved services and infrastructure to increase attractiveness, as well as integrated ticketing to improve convenience. Governments may need to take a leading role in facilitating, and potentially providing Mobility as a Service type solution that can reduce the time and money costs of multi-modality and increase its attractiveness.

On a life cycle bases, ICE buses could already emit 65% - 76% less CO_2 per passenger kilometre than a private car in an urban setting (based on a study in India). Investing in public transport fleets through

purchasing electric buses and electrifying rail, putting more people in low or zero emission modes, improves the emissions reducing potential of mode shift to public transport even further. On a lifecycle analysis basis, electric buses have lower CO_2 emissions than private motorised vehicles. Battery electric buses have at least 70% lower CO_2 emissions per passenger kilometre than private cars.

Promoting active mobility requires a mix of infrastructure investments, improvements in the quality of the mobility experience and information campaigns aimed at behavioural change. Improving road safety is necessary to deliver the shift to active mobility required to meet the goals of the Paris Agreement. Safe streets require above all, allocation of space to pedestrians and cyclists; control of motorized traffic at safe speeds; and urban road and street layouts and traffic management designed to facilitate accessibility on foot, prioritizing active mobility over motorized through traffic.

Design cities for people and charge private cars for the space they consume

Congestion in urban settings is one of the highest external costs due to private car use (EC, 2019). Additionally, much more space is given over to parking, to cater to the needs of car users while they are not using their cars. Urban authorities can tackle this imbalance through reducing the availability of parking space and introducing parking charges and cordon based congestion-charges for private cars entering the city. Furthermore, revenue raised through these charges can be re-invested in the sustainable transport network to improve its attractiveness.

Non-urban transport systems

Rural travel is typically more dispersed in nature, and covers longer distances, than urban travel. Intercity and international travel also tends to be much longer distances. These factors make demand management and mode shift more difficult to implement. For long haul passenger travel, there are few alternatives to air. Short haul international and intercity trips, however, (less than 500km) show potential for some mode shift because of the greater diversity of modes available. Measures supporting shifts away from these modes include investing in railway infrastructure, reliable bus networks, and roads. Other alternatives include increasing the cost of – or banning – carbon-intensive short-haul flights where a good quality rail connection exists. Such measures could also promote mode shift to railways, provided decent quality infrastructure is available.

Recognise strategic benefits of demand-focused measures

Demand measures can also serve to deliver other policy objectives. For example, measures that reduce car dependency in cities and improve public transport services, will make mobility more affordable and improve access to opportunities for citizens without access to private vehicles. Reducing congestion and the space used by individual motor traffic, helps make cities more livable, and safer by reducing the risk of traffic crashes and healthier by cutting down harmful air pollutants caused by road traffic.

(b) Energy and resource efficiency in the transport sector (design improvements, circular economy and material changes, vehicle vintage, carpooling, etc.);

Moving towards integrated circular economy principles for new vehicle technologies, such as electric vehicles, will be critical to meet broader climate and environmental and social governance ambitions. Life cycle assessments can guide investments in innovation to reduce emissions. Sustainable production of vehicles is vital to support the decarbonisation of the transport fleet, and measures to manage the end of life of these products are vital to meet broader climate and environmental ambitions. To ensure the integrity of this transition, action must be taken to ensure critical materials are produced, sourced, processed, transported, manufactured and recycled in a responsible and sustainable manner which minimizes environmental harm, respects human rights, and creates benefits for stakeholders along the supply chain (Global Battery Alliance). Governments can consider the co-benefits of promote the

recycling and reuse of materials at the end of life, for example the use of electric vehicle batteries for energy storage and the scrappage of ICE vehicles to incentivise the uptake of zero-emission technologies.

Meeting ambitious decarbonisation goals in line with the Paris agreement will require new technologies to be deployed at a historically unprecedented speed. Promoting an energy-efficient transport system and managing transport demand by promoting shifts to more energy-efficient modes is essential to help to reduce the required infrastructure needed. Promoting the shift to zero-emission vehicles and improving the fuel efficiency of new vehicles through policy measures such as fuel economy standards, can be highly effective mechanisms to reduce fuel consumption and improve the cost effectiveness of transport systems. Governments should develop effective regulations to measure and benchmark fuel efficiency improvements. Key to this is helping to support capacity building for countries without existing regulations and building off existing international regulations.

The dumping of inefficient used internal combustion engine vehicles not only represents a barrier to the decarbonisation of the transport sector, but also has significant health implications resulting from pollutants and reduced safety. Both exporting and importing governments should explore regulations to manage the trade in used vehicles, to ensure they are road-worthy, energy efficient, and align with decarbonisation trajectories. Similarly, international trade in second-hand zero-emission vehicles is emerging, and governments should explore actions to ensure that this is effectively regulated.

Ensuring financial and resource sustainability of the transport system is vital to enabling the long-term decarbonisation of the transport sector. Governments should consider actions to promote reduction of life cycle emissions from the transport fleet across production and end-of-life, energy efficiency, and taxation models that enable this. Capacity building and improving transparency about life-cycle emissions are important actions to embed whole-systems thinking in the transition. Additionally, inefficient fossil fuel subsidies encourage wasteful consumption, reduce our energy security, impede investment in clean energy sources and undermine efforts to deal with the threat of climate change. Governments should work to rationalize and where possible phase out fossil fuel subsidies. Similarly, due to the shift to electrification, governments will see a reduction in tax revenues from fuel taxes. Governments should look to reform their fuel taxes to ensure the long-term financial sustainability of revenue alongside the decarbonisation of the transport sector.

It is imperative that governments work with the private and energy sectors to invest in the enabling infrastructure for these transitions, taking account of the long-term needs of the transport sector as it decarbonises and reducing the need for further substantial infrastructure investment at a later date.

(c) <u>Electrification of vehicles (infrastructure, batteries and minerals);</u>

The transition to zero emission light duty vehicles is already underway and accelerating. For cars and vans, deployment is accelerating but is unevenly distributed across regions, signalling the need to support deployment of zero emission vehicles in emerging markets to avoid a two-tiered global car market (BNEF, 2022). Given the technological readiness of the light duty vehicle transition, government action should focus on enabling the mass deployment of these technologies across all regions, collaborating internationally to reduce supply chain bottlenecks. The transition to zero-emission medium and heavy duty vehicles is also getting underway. Buses are leading the way with 13.8% of buses sold in 2021 being zero emission. Trucks are lagging behind at 0.3%, but more zero-emission truck models are coming to market - signalling the beginning of this transition. The transition to electric vehicles is already displacing 1.5million barrels of oil per day – 3% of total road fuel demand (BNEF, 2023)

To accelerate the deployment of zero-emission vehicles in line with the goals of the Paris Agreement, Governments should:

- **Set Paris-aligned targets** for the deployment of electric vehicles, and where possible align these internationally to create economies of scale and drive down costs. Recent announcements

targeting 100% of new passenger cars being zero-emission by 2035 and 100% of new heavy duty vehicles by 2040 are important to help direct the vehicle market to meeting Paris-aligned targets. These targets should be delivered through **regulations (e.g. fuel efficiency standards) and mandates.**

- **Deploy incentives** at the early stages of the transition, to close the purchase cost gap between EVs and ICE vehicles. These are essential to overcome initial market risks when levels of demand are low. As the transition gains traction and the market matures, incentives should be prioritised for particularly challenging use cases (such as difficult to decarbonise modes such as heavy duty road freight) and market segments requiring additional support (such as lower income households and small businesses).
- **Ensure sufficient provision of charging infrastructure**. Take a network approach, including comprehensive standards and policy and process co-ordination across jurisdictions. The electricity grid will need reinforcing to support the rollout of charging infrastructure, which will also require cross-sectoral collaboration. Public roads authorities can also explore concession agreements with private entities to address the potential financial risk of low utilisation in the early stages of ZEV adoption. These agreements (e.g. for the design, financing, construction, operation and maintenance of public EV charging infrastructure) could be paired with road-pricing measures to finance the infrastructure, modified to target users of the infrastructure.
- **Align the shift to electrification with decarbonisation of the power sector**. Decarbonising the energy sector will require grid networks to be upgraded to support deployment of high shares of renewable energy, energy storage devices, and electric vehicle charging infrastructure. The necessary grid upgrades will require significant investment, and given the long lead times will require advanced and coordinated planning. Integrating transport and energy systems can provide great benefits: the electric vehicles fleet and smart chargers can represent an energy storage opportunity to support balancing, rather than burdening, power grids reliant on renewable energy.
- Where possible, governments should enable **mass procurement of zero-emission fleets**, which can help build market confidence in the transition, building economies of scale and driving down costs.

While the transition to clean transport technologies has been accelerating, progress is largely concentrated in advanced markets. This risks a two-track transition for clean technologies, where emerging markets are unable to benefit from wider benefits an accelerated transition can bring, and risks achieving our shared climate ambitions, including keeping 1.5°C within reach. There is a significant gap in the funding needed to adequately support the early phase of the zero emission vehicles transition in emerging economies in the next five years, thus far only 6.5% of estimated funding required has been delivered (ICCT, 2022). Governments should work with multilateral development banks, sovereign wealth funds, and the private sector to mobilise investment for emerging markets and developing economies to ensure they are able to decarbonise their transport sector alongside developed economies. Innovative funding methods should be explored to reduce the risk and substantial costs of initial investments, such as ZEV and battery leasing models, ZEV aggregation models, inclusion of ZEV purchases in sustainability-linked loans, and interest rate subventions.

Ensuring sufficient capacity to transition the vehicle fleet will depend on the timing and level of investments in mining, critical material production and manufacturing of clean energy technologies. Many of the key material supply chains needed for the production of electric vehicles are geographically concentrated in a relatively small number of countries, which poses possible supply chain risks. Governments and industry can reduce risks related to battery supply chains by helping to diversify production where possible. Other potential alternatives include strategic stockpiling of key materials, in a similar way to oil stocks today. Governments can also help to reduce the demand for new critical materials. Battery recycling industries can be promoted by designing for recycling from the outset and increasing data collection on battery chemistries as well as end-of-life traceability and collection. Some of the greatest opportunities to reduce demand for critical materials comes from promoting vehicle ‘right-sizing’ by disincentivizing large vehicles in vehicle fuel economy standards (ITF 2021).

(d) Shifting to low- or zero-carbon fuels (hydrogen, biofuels, biogas, e-fuels).

Where to deploy low or zero-carbon fuels:
Governments should pursue policies that support electrification, where commercially and technologically feasible, as electrification of transport technologies is the most energy and cost-efficient route to decarbonising vehicle fleets. Due to their energy efficiency, these technologies represent a reduction in CO2 emissions, even with the existing global energy mix which includes fossil fuels. Mass-electrification of road transportation is already underway.

Technologies should be compared on their potential long-term financial competitiveness without public subsidies. In particular, technologies should be assessed over a range of scenarios rather than only optimistic forecasts. For example, for heavy duty vehicles, recent analysis by (ITF, 2022) found that battery electric vehicles are likely to be cost-competitive in Europe (on a total-cost-of-ownership basis) in smaller vehicle segments before 2025 and larger segments around 2035 or earlier with financial incentives. Conversely, hydrogen fuel cell vehicles (FCEV) were found to have a much lower likelihood of being cost-competitive in the mass market in Europe (ITF, 2022) and could only outcompete other options in the long term with very ambitiously low hydrogen prices. Similar findings have been shown that BEVs outcompete FCEVs for mass market applications in the USA (ICCT, 2023b). However, there may well be applications in challenging applications where alternatives to electrification may be needed. To reduce emissions from difficult-to-electrify modes, scaling up the production of alternative low-carbon fuels is essential. Given the land use and cost challenges of the development of zero and low carbon fuels, the majority of these fuels should be prioritised for aviation and shipping. These fuels cost significantly more than fossil fuels and will take decades to scale up to commercial volumes.

Electrofuels (Efuels):
The carbon intensity of efuels (e.g. Hydrogen, Ammonia, eKerosene) and their potential to contribute towards Paris aligned goals, is highly dependent on that of the electricity used to produce them. This is due to the large amount of energy required to source their carbon feedstock (e.g. from direct air capture) and produce hydrogen (e.g. from water electrolysis). Therefore, to achieve emission reductions efuels must be manufactured using renewable energy as an input. The renewable energy demand is substantial – creating enough e-fuel to power an average airliner would require an array of solar panels of between 30-80 football pitches in size (ITF 2023).

E fuels are very expensive to produce and are not cost-competitive with fossil fuel counterparts. An ICCT study estimates that e fuels could cost more than 3 euros per liter at the pump in Europe in the 2030 time frame (ICCT, 2018). This means e-fuels are unlikely to be a viable technology for mass decarbonisation the road transport sector.

Biofuels:
Indirect land-use change, together with the electricity required for hydrogen production, greatly affect the fuels' carbon footprint. Production of biofuels should also be developed in ways that avoid compromising food production.

Between 2019 and 2022, biodiesel was consistently more expensive than conventional diesel, costing 55% and 27% more in USA and Europe, respectively (IEA, 2022b). The most significant costs of biodiesel are the costs of feedstocks, which only have marginal prospects for significant cost reductions in future given their technological maturity (Cazzola et al., 2023). Biomethane costs vary by region but were more than double that of fossil natural gas in Europe and North America in 2020. While there are some opportunities to reduce this cost gap with increasing scale of production, biomethane will face competing demands from difficult-to-decarbonise sectors other than road transport, such as shipping, aviation and heavy industry, which could lead to increasing prices and limited availability (IEA, 2020, Cazzola et al., 2023). Diesel e-fuel is expected to always cost significantly more than conventional diesel fuels and is unlikely to suit mass-market adoption in the road sector (ITF, 2023b).

References/ITF publications:

- ITF (2023) ITF Transport Outlook 2023
- ITF (2022) Implementing the ASEAN Fuel Economy Roadmap
- ITF (2023) Decarbonisation and the pricing of road transport
- Forthcoming ITF publication, New but used: The implications of the electric vehicle transition on second-hand vehicle flows in emerging markets
- ITF (2023) The Potential of E-fuels to Decarbonise Ships and Aircraft
- ITF (2023) forthcoming The Future Funding of Public Transport, Working Group Report
- ITF (2023) Decarbonising Transport in India: Learning from Life Cycle Assessment
- ITF (2022) Implementing the ASEAN Fuel Economy Roadmap
- ITF (2022) Mode Choice in Freight Transport
- ITF (2022) Cleaner Vehicles: Achieving a Resilient Technology Transition
- IEA (2022b) 'Biodiesel and diesel prices, 2019 to April 2022'. Available at: https://www.iea.org/data-and-statistics/charts/biodiesel-and-diesel-prices-2019-to-april-2022.
- BNEF (2023) 'Electric Vehicle Outlook 2023'. Available at: https://assets.bbhub.io/professional/sites/24/2431510_BNEFElectricVehicleOutlook2023_ExecSummary.pdf
- IEA (2020) 'Outlook for biogas and biomethane'. Available at: https://iea.blob.core.windows.net/assets/03aeb10c-c38c-4d10-bcec-de92e9ab815f/Outlook_for_biogas_and_biomethane.pdf.
- ICCT (2022) A Critical Review of ZEV Deployment in Emerging Markets. Available at: https://theicct.org/wp-content/uploads/2022/02/ZEV-EMDE-white-paper-A4-v3.pdf
- ICCT (2023b) 'Total Cost of Ownership of Alternative Powertrain Technologies for Class 8 Long-Haul Trucks in the United States'. Available at: https://theicct.org/publication/tco-alt-powertrain-long-haul-trucks-us-apr23/.
- Cazzola, P. et al. (2023) 'Research for TRAN Committee: Assessment of the potential of sustainable fuels in transport'. Available at: http://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2023)733103
- EC (2019) 'Handbook on the external costs of transport', European Commission, Directorate-General for Mobility and Transport, Essen, https://data.europa.eu/doi/10.2832/51388.

About the International Transport Forum

The International Transport Forum at the OECD is an intergovernmental organisation with 66 member countries. It acts as a think tank for transport policy and organises the Annual Summit of transport ministers. ITF is the only global body that covers all transport modes. The ITF is administratively integrated with the OECD, yet politically autonomous.

The ITF works for transport policies that improve peoples' lives. Our mission is to foster a deeper understanding of the role of transport in economic growth, environmental sustainability and social inclusion and to raise the public profile of transport policy.

The ITF organises global dialogue for better transport. We act as a platform for discussion and pre-negotiation of policy issues across all transport modes. We analyse trends, share knowledge and promote exchange among transport decision-makers and civil society. The ITF's Annual Summit is the

world’s largest gathering of transport ministers and the leading global platform for dialogue on transport policy.