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## **Economic Commission for Europe**

### **Inland Transport Committee**

#### **Eighty-fifth session**

Geneva, 21-24 February 2023

Item 7 (e) (ii) of the provisional agenda

**Strategic Questions of a Horizontal and Cross-Sectoral Policy or**

**Regulatory Nature: Environment, climate change and transport -**

**Inland Transport Committee acting on climate change adaptation and mitigation**

### **Update on recent ForFITS activities**

#### **Note by the secretariat**

## **I. Internal ForFITS application**

### **A. ECE Environment Performance Review (EPR) of Azerbaijan**

1. The Environment Division of UNECE has initiated in 2021 an update of the Environment Performance Review (EPR) for Azerbaijan that was last reviewed in 2003 and 2011. The transport sector has a prominent role in this review initiated in 2021 and a ForFITS analysis for Azerbaijan has been performed as part of the transport chapter. This third edition of the EPR for Azerbaijan is expected to be launched in the second quarter of 2023.

2. As per usual practice, the ForFITS analysis looked at energy and climate impacts of transport activity. The International Transport Forum of the Organisation for Economic Co-operation and Development was performing a similar exercise in the country as part of their Decarbonizing Transport in Emerging Economies Project<sup>1</sup>.

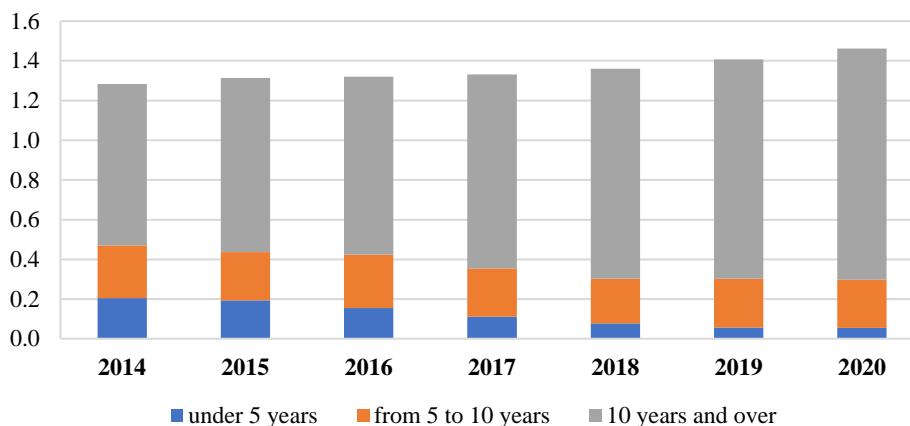
3. Close collaboration between the ForFITS activity and the work undertaken by the IUTF was performed, in order to mutualize resources, exchange available data and align some of the modelling inputs. The authors wish to thank the ITF for the fruitful collaboration for those forward looking activities in Azerbaijan.

4. Azerbaijan has a motorized vehicle fleet for road transport of about 1.5 million vehicles, dominated by light duty vehicles. The age distribution of the vehicle fleet shows the wide majority of vehicle are 10 years old or more, with a clear trend towards an ageing of the fleet between 2014 and 2020. (Figure 1).

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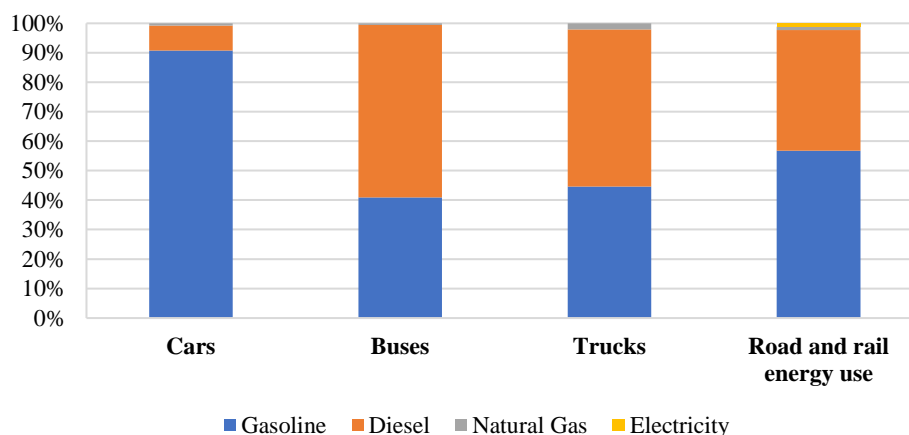
<sup>1</sup> <https://www.itf-oecd.org/dtee-azerbaijan>

Figure 1  
**Age distribution of the road vehicle fleet in Azerbaijan, 2014–2020, million**



5. Energy use data for the transport sector shows that Azerbaijan relies mostly on gasoline and diesel, with insignificant amounts of alternative fuels to power its transport sector. Light duty vehicles predominantly use gasoline whereas heavy duty vehicles use diesel fuel (Figure 2).

Figure 2  
**Road vehicle fleet and energy use split by energy type, 2020**



6. Azerbaijan, as a signatory to the COP26’s declaration on accelerating the transition to 100% zero emission cars and vans is setting a path towards electrification of the vehicle fleet. One of the main commitment of signatories to ZEVTC is to “As governments, we will work towards all sales of new cars and vans being zero emission by 2040 or earlier, or by no later than 2035 in leading markets”. The Accelerating to Zero coalition (A2Z) launched at COP27 will host the ZEV declaration in the future, and Azerbaijan remains as a signatory.

7. Given the non-legally binding nature of the A2Z declaration, in the reference scenario, electrification of the fleet remains low and a high share of electric vehicles in-line with the ambition of the A2Z declaration have been assumed for the Scenario Improve that simulates high powertrain technology shift and energy efficiency gains (Table 1)

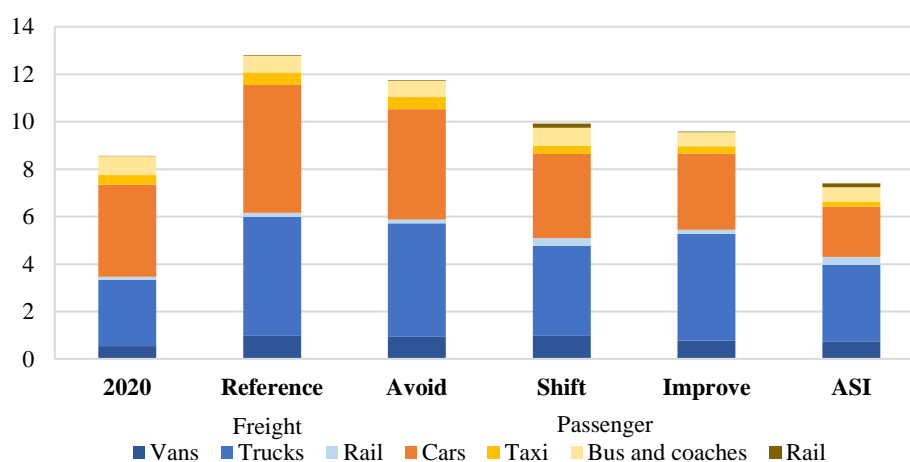
Table 1  
Assumptions in the Scenario Improve for advanced powertrain in the fleet

	Powertrain Group ( per cent of each technology in the fleet) 2050 Scenario Improve		
	Hybrids and Plug-ins	Battery electric	Overhead electric
Cars	20	40	
Buses and coaches	10	20	
Vans		20	
Trucks		10	
Rail			85

8. The Scenario ASI simulates the cumulative effect of the scenarios Avoid, Shift and Improve . This Scenario ASI shows the result of implementing these policies concurrently. It is important to note that the impact of combining the three scenarios is not the addition of the individual impacts. Indeed, impacts are not cumulative. For example, the impact on energy and emissions of shifting to mass transportation is decreased if the energy efficiency of individual modes drastically improves. As a result, the CO2 saved in the scenarios Shift and Improve separately is higher than when considering the Scenario ASI.

9. In the Scenario Reference, CO2 emissions from the transport sector are expected to increase by around 50% between 2020 and 2050. In the Scenario ASI, overall CO2 emissions are reduced by more than 40 per cent compared to the Scenario Reference in 2050, and decrease by around 10 per cent compared with 2020 (Figure 3).

Figure 3  
Well To Wheel CO<sub>2</sub> emissions by mode, all scenarios in 2050, MtCO<sub>2</sub>



10. Recommendations for the ForFITS analysis in Azerbaijan include to link fuel tax with the carbon content of the fuel given diesel prices in Azerbaijan do not reflect international energy market prices, to develop dedicated legal provisions on the import of low-CO2 used vehicles, given the ageing fleet and the high share of used vehicle imports and to apply the latest version of ECE vehicle regulations, as Azerbaijan is a contracting party to the 1958 and 1998 vehicle agreements.

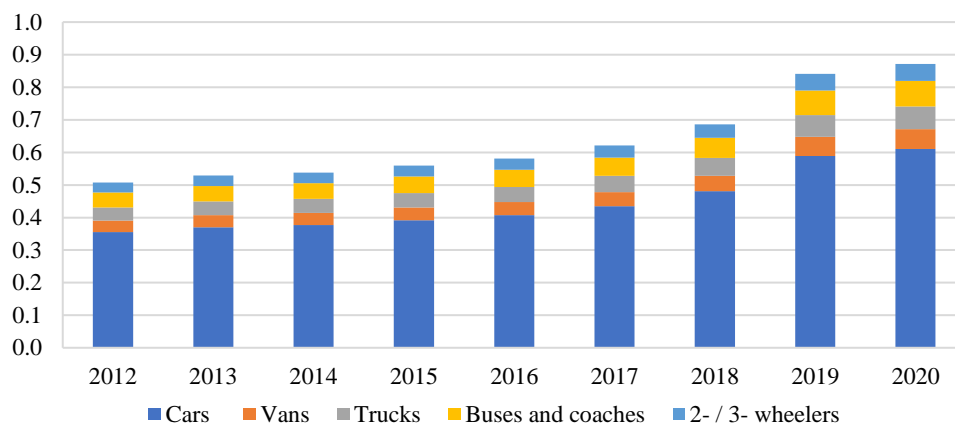
## B. ECE EPR of Armenia

11. Following the first edition in 2000, a second EPR in Armenia has been undertaken in the course of 2022 / 2023. A dedicated annex on Transport, energy and CO2 emissions outlook to 2050 has been developed using the ForFITS model. It focuses on well to wheel (WTW) CO2 emissions stemming from the transport sector in Armenia.

12. The ForFITS analysis include 5 scenarios looking at the 2050 time horizon. The scenario Reference includes default data on the expected evolution of fuel consumption characteristics by powertrain to reflect future improvements in vehicle technology and their associated costs. The scenario “Avoid” looks at demand management measure impact on energy use and GHG emissions. The scenario “Shift” analyses the impact of modal shift towards less carbon intensive modes of transport. The scenario “Improve” finally looks at the impact of improved energy efficiency and powertrain technology shifts towards lower carbon options and its impact on energy demand and GHG emissions. The final ASI scenario combines all Avoid, Shift and Improve measures.

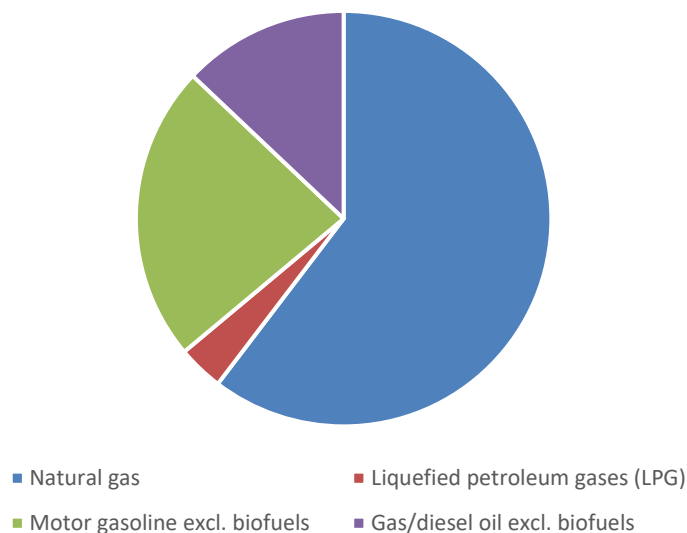
13. Armenia has a motorized vehicle fleet for road transport of about 0.6 million cars and 0.8 million when counting all road vehicles (cars, trucks, buses and powered 2-wheelers), according to the data collected by the consultant (Figure 4). The statistics provided tend to indicate that registrations database does not take vehicle deregistration, vehicle exports, scrapping into account, as fleet annual increase per vehicle type equals new registrations.

Figure 4  
Road vehicle fleet in Armenia, 2012–2020, million



14. The Armenian vehicle fleet is relying heavily on compressed natural gas to power its vehicles (Figure 5), because of better affordability of this energy type. Armenia has no production of natural gas in the country and relies on imports from neighbouring countries. To make sure natural gas are safe to use on open roads, ECE offers harmonized methodologies to test the safety of natural gas vehicles, whether as original equipment in new vehicles or as retrofit kits.

Figure 5  
Energy used in road transport in Armenia, 2019

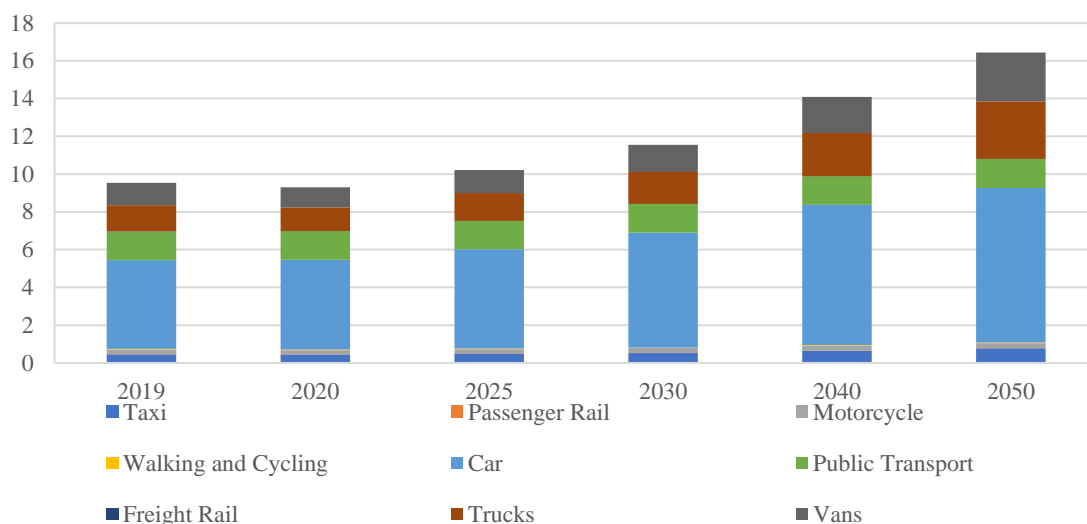


15. The Model has been calibrated to the extent possible for year 2019 and 2020 to match energy (gasoline, diesel, natural gas and electricity) used by the road and rail sectors, according to the IEA World Energy Balances<sup>2</sup>. Given how the COVID-19 pandemic has impacted global economy in 2020, year 2019 has been chosen as the baseline year for the projections.

16. In Scenario Reference, traffic activity is expected to grow by more than 60% between 2019 and 2050 (Figure 6)

Figure 6

**Traffic activity by mode under reference scenario, 2020–2050, Million vehicle.km/year**

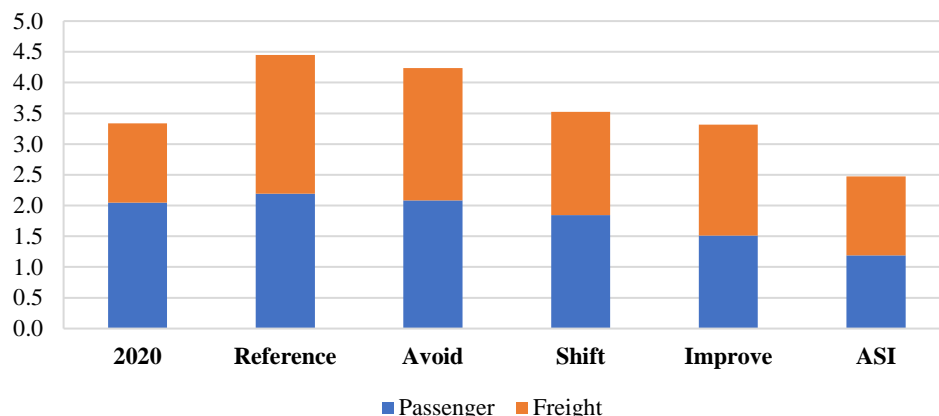


17. In the Scenario ASI, overall CO<sub>2</sub> emissions are reduced by more than 44 per cent compared to the Scenario Reference in 2050 and decrease by around 26 per cent compared with 2020 (Figure 7). The passenger transport sector is expected to contribute more to the GHG emissions reduction potential, with Freight emissions stagnating in Scenario ASI between 2020 and 2050. Freight sector is often seen as harder to abate than passenger, and in Armenia, it has a bigger growth potential than passenger transport (as Armenia population is not expected to grow significantly, a major driver of passenger transport demand).

18. Switching from road to rail in the freight sector has been identified as offering a higher potential than improving road freight efficiency and energy use of the road freight sector. For passenger transport, high potential to reduce emissions by improving fuel economy and switching to e-mobility would be as important as shifting towards more efficient modes of transport. Technical and financial policies all have a role to play to drive down GHG emissions from transport while still allowing free movements of goods and people.

<sup>2</sup> [www.iea.org/data-and-statistics/data-product/world-energy-balances](http://www.iea.org/data-and-statistics/data-product/world-energy-balances).

Figure 7  
**WTW CO<sub>2</sub> emissions by mode, all scenarios in 2050, MtCO<sub>2</sub>**



### C. Car Pooling / Car Sharing in Central Asia

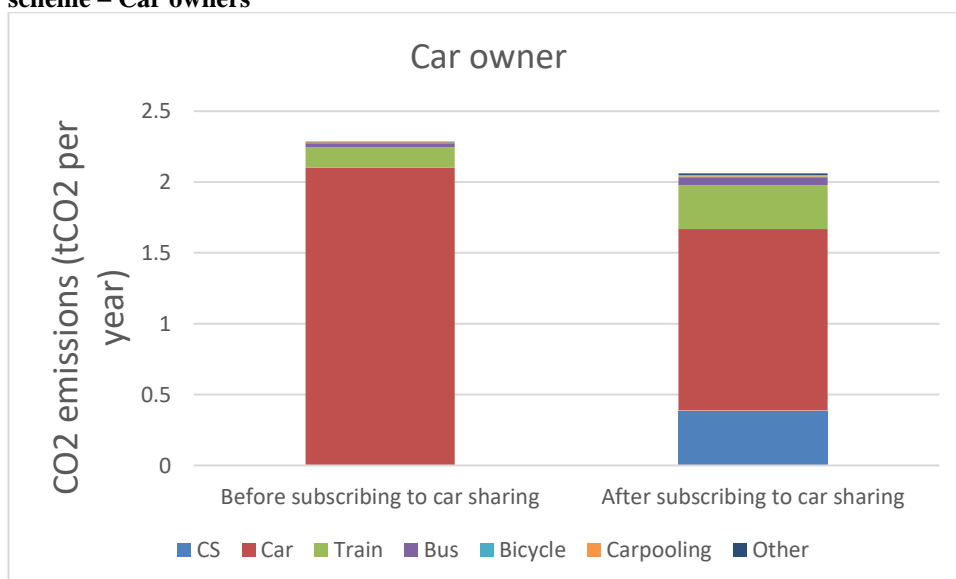
19. A ForFITS analysis has been developed for a project from the ECE transport division which is aiming at strengthening the capacity of Central Asian countries to develop sustainable urban mobility policy on car sharing and carpooling initiatives.

20. The project looks at both the national scale for Kazakhstan, Kyrgyzstan and Tajikistan and the urban level for the cities of Bishkek, Nur-Sultan and Dushanbe. Very limited data were collected for this project and activities are still on-going with local consultants to try and identify more data sources to fine-tune the deliverables.

21. The ForFITS analysis aims at quantifying the potential impact of car-sharing and carpooling schemes on GHG emissions. The analysis looked at the potential impact of car sharing and car-pooling scheme separately before putting forward recommendations for the target countries and cities.

22. Car Sharing schemes, predominantly deployed in cities or metropolitan areas, are expected to reduce annual transport related GHG emissions for car owners by around 20 % by decreasing the reliance on individual car trips (Figure 8), and in some occasions selling their individual car after subscribing to the car sharing scheme.

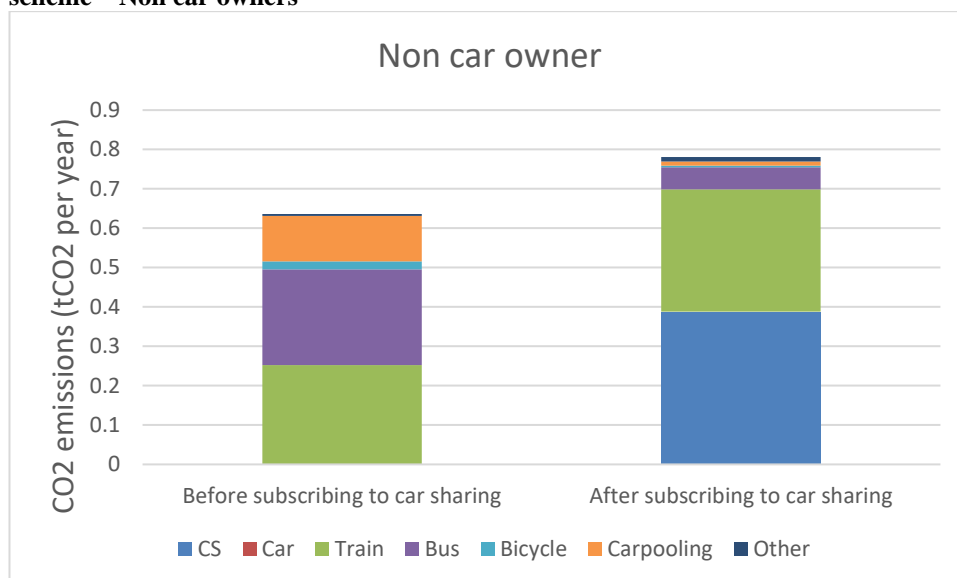
Figure 8  
**CO<sub>2</sub> emission from transportation of average household before and after subscribing to car sharing scheme – Car owners**



23. For non car-owners, the effect is expected to be the opposite, with access to car-sharing schemes increasing their annual GHG emissions for transport activities by around 20% (Figure 9). Indeed, a car sharing scheme would increase access to mobility services, and the shared would become the most carbon intensive mode of transport compared with modes used before subscribing to car sharing scheme.

Figure 9

**CO<sub>2</sub> emission from transportation of average household before and after subscribing to car sharing scheme – Non car owners**



24. Car-pooling schemes, more successfully used for long distance trips. Long distance car-pooling has been the most successful to date, with some companies developed globally to propose organized car-pooling, by putting drivers and passengers in contact through centralized websites. A recent study performed in 8 countries where the car-pooling company operate showed that car-pooling decreases CO<sub>2</sub> by 30% based on user survey and the alternative mode that would have been chosen if the car-pooling offer would not have been there.

25. Car sharing and car-pooling would yield higher CO<sub>2</sub> benefits in countries where individual car ownership is high and where car sharing /car-pooling schemes would replace individual car trips.

26. To maximize potential CO<sub>2</sub> emissions reduction benefit, car sharing schemes should preferably target car owners, or household that consider buying a car, in order to provide an incentive to sell (or not replace) or to avoid buying a car, that would yield the highest CO<sub>2</sub> emissions reduction. Car sharing schemes are more effective at reducing CO<sub>2</sub> emissions in cities, where alternative modes of transport are available.

27. Car-pooling schemes should first focus on long distance journeys, in between cities, given the higher incentives for both drivers and passengers, before getting deployed at urban scales.

## II. Outreach ForFITS activities

28. Following decision 35 from the 84th session of ITC, which "...supported the proposed approach in order to further develop ForFITS, sustain its use internally, develop partnerships with other modelling groups...", ForFITS has reached out to several stakeholders to increase joint activities in ForFITS related activities.

## **A. UNECE as host of the Transport Data Commons prototype**

29. With current policies in place, the transport sector's CO<sub>2</sub> emissions will grow almost 20% by 2050 according to the International Transport Forum Transport Outlook, and even more in developing countries. Many stakeholders working to mitigate greenhouse gas (GHG) emissions from transport need, use and collect such data but they are not available in a commonly known and accessible place.

30. Since May this year, UNECE and other key stakeholders forming the Transport Data Commons Initiative have been working to create an open data platform to share the existing data on CO<sub>2</sub> emissions in the transport sector. On 9 December 2022, UNECE was chosen by the initiative to host a prototype database to be developed by May 2023.

31. The database will be hosted under the umbrella of UNECE's For Future Inland Transport System (ForFITS), under which the ForFITS Model has been developed to foster sustainable transport policies.

32. Key features of the Transport Data Commons will include free, publicly available, centralized and transparent data access. The database is expected to include intuitive, state-of-the-art data visualization, with data imports and export capabilities, to benefit the whole transport community.

33. The initial focus will cover transport and climate change, but it may be expanded to air quality and road safety at a later stage.

34. In addition to UNECE, the Transport Data Commons gathers the Asian Development Bank (ADB), Climate Compatible Growth (CCG), European Bank for Reconstruction and Development (EBRD), FIA Foundation, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), German Credit Institute for Reconstruction (KfW), International Transport Forum (ITF), Institute for Transportation and Development Policy (ITDP), Institut für Energie- und Umweltforschung (IFEU), International Institute for Applied Systems Analysis (IIASA), the International Road Federation (IRF), MobilizeYourCity, University of California Davis, University of Oxford, Partnership on Sustainable, Low Carbon Transport (SLOCAT), and the World Bank.

## **B. UNECE as knowledge partner to the MobilizeYourCity partnership**

35. The MobiliseYourCity Partnership aims to empower 100 cities and 20 countries to improve urban mobility for their citizens and decarbonise transport to fight the global climate crisis. As part of these activities, the MobiliseYourCity Partnership offers methodologies and capacity building through communities of practice.

36. In particular, it has released the MobiliseYourCity Emissions Calculator which supports cities and countries project the GHG Impact of their sustainable urban mobility plans (SUMPs) and national urban mobility policies and investment programs (NUMPs). ForFITS has been invited to review and provide in-depth comments to the latest version of the MobiliseYourCity Emissions Calculator<sup>3</sup>.

37. Discussions are on-going for ForFITS to join the MobiliseYourCity Partnership as a knowledge partner together with a selected number of institutions based on the expert knowledge they can bring to the MobiliseYourCity Partnership. Existing knowledge partners include institutions such as UN Habitat or the Institute for Transportation and Development Policy (ITDP).

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<sup>3</sup> The MobiliseYourCity Emissions Calculator can be downloaded at :  
<https://www.mobiliseyourcity.net/mobiliseyourcity-emissions-calculator>