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**Development of a global indicator framework for the Sustainable
Development Goals: Data collection and monitoring of indicator 9.1.2**

Monitoring Sustainable Development Goal Indicator 9.1.2 at the National Level

Transmitted by the Government of the Netherlands

I. Background

Statistics Netherlands, as Chair of the Working Party on Transport Statistics (WP.6), is interested in fostering collaboration with regards to monitoring the transport-related Sustainable Development Goal indicators. In this regard, it is happy to submit the annex of this document for consideration by WP.6 for the purposes of helping member States monitor indicator 9.1.2 on passenger and freight volumes.

Annex

Country Guidance for National Monitoring of Sustainable Development Goal Indicator 9.1.2

Modal Split Statistics for Passengers and Goods, with a Focus on Inland Modes

1. Objective of the Document

This guidance document is a resource for assisting all member States in the ECE region and beyond who wish to monitor Sustainable Development Goal indicator 9.1.2 on passenger and freight volumes at the national level, either in Voluntary National Reviews (VNRs) or on their National Reporting Platforms (NRPs). It has been noted (both by the secretariat and some member States) that there is little formal guidance on this indicator, that there are many different approaches taken by countries who show this indicator on their national reporting platforms, and that there remain many countries who have the necessary data available and a robust NRP in place yet do not monitor this indicator.

This document is not a set of formal recommendations. It aims to help countries consider all issues to be addressed when deciding how to monitor this indicator. A principal goal is to help countries find a monitoring solution that fits both their national circumstances and their data availability and allows them to compare against their peers. The document shows many relevant examples from countries and other international organisations; some are specific examples of monitoring this indicator at the national level, while others relate to tracking progress in sustainable transport or resilient infrastructure more generally. The document complements the collation of country interpretations of this indicator that is already available on the statistics wiki[1] of UNECE.

> ➢ Chapter 2 of this document gives details on the background to the Agenda 2030 indicator set, and how indicator 9.1.2 was chosen.
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> ➢ Chapter 3 discusses the overall interpretation of the indicator and varying definitions of success.
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> ➢ Chapter 4 explores which modes of transport should be included in measuring this indicator, and which others may be beneficial to consider depending on circumstances.
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> ➢ Chapter 5 discusses the scope of measurement of the indicator, in terms of measurement units, the residency versus territorial principle, and similar issues.
>
> ➢ Chapter 6 covers data sources for reporting this indicator, and how countries may wish to estimate data for reporting of this indicator when feasible (using vehicle-km to estimate passenger-km for example).
>
> ➢ Chapter 7 gives examples of additional indicators that countries have chosen to monitor this indicator, both in the context of resilient infrastructure and sustainable transport.
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> ➢ Chapter 8 discusses the importance of using official statistics whenever possible in monitoring this indicator (*to be considered).*
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> ➢ Chapter 9 has examples of data disaggregation that are particularly relevant for this indicator, focussing on the passenger side (*to be expanded).*
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> ➢ Chapter 10 concludes the document with advice to member States (*to be elaborated.)*

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[1] https://statswiki.unece.org/display/CESI9/Country+experiences+of+SDG+Indicator+9.1.2+Home

2. Introduction, Background and History of indicator development at global level

2.1: Indicator Process and Monitoring

The document *Transforming Our World: The 2030 Agenda for Sustainable Development*[2], which includes 17 Sustainable Development Goals and 169 associated targets, was agreed to in September 2015 in New York by heads of state and high-level representatives. The UN Statistical Commission[3] in 2017 reaffirmed this, and in addition stressed that "official statistics and data from national statistical systems constitute the basis needed for the global indicator framework."

2.2: Indicator 9.1.2 History

It is not exactly clear where indicator 9.1.2 in its current form was conceptualized. An indicator of "transport by air, road and rail (millions of passengers and ton-km and % population with access to all season road)" was proposed in the final report[4] of the Bureau of the United Nations Statistical Commission on the process of the development of an indicator framework for the goals and targets of the post-2015 development agenda. The second part of this became indicator 9.1.1. It is not clear where the motivation for inclusion of the passenger and freight volumes originated; whether it was seen as an important indicator of access to goods and services in the developing world; whether the split between these modes was considered important, or if increasing volumes of all transport modes was considered desirable. Nevertheless, it is important to have transport matters sufficiently represented within the monitoring process, given transport's facilitating role in enabling so many of the other goals[5], despite it not having its own stand-alone goal.

Indicator 9.1.2 is classified as a Tier 1 indicator[6], meaning that data are widely available and methodology guidance do exist. Yet there is both global data availability challenges (with even many advanced countries not always having passenger-km data available) and a guidance gap, which this document hopes to help address.

2.3: Monitoring of 9.1.2 at the Global Level

In 2017 the United Nations Statistics Division launched the Sustainable Development Goals Global Database. Initially, data for indicator 9.1.2 included only aviation data. These data were provided by the International Civil Aviation Organisation (ICAO), the custodian for this indicator as appointed by the Inter-Agency Expert Group on Sustainable Development Goal Indicators (IAEG-SDGs). In 2018 the situation was improved with addition of road and rail data from the World Transport Model of the International Transport Forum (ITF), and following ITF and UNECE collaboration some official statistics for inland modes were included in 2019. There are many ways that both data availability and detail could be further improved.

In addition to the data available in the UN Global Database, metadata (i.e. reporting guidance) for each indicator is available at https://unstats.un.org/sdgs/metadata/.

2.4: Monitoring of 9.1.2 at the National Level

The UNECE secretariat has so far collected examples from 17 member States, that have either responded with their interpretation of the indicator, or who already publish this indicator on their National Reporting Platforms. These have been collated and are available on the UNECE statistics wiki[7]. In addition to member States, the secretariat has also added the experiences of certain relevant international organisations, such as the United Nations Conference on Trade and Development (UNCTAD), who produce relevant maritime statistics on this indicator, and the European Commission, who have produced a report on monitoring the Sustainable Development Goals in the European Union[8].

3. Overall indicator interpretation and defining success

3.1: What to measure

The first point to consider for this indicator should be that, while it is only a single indicator in the list of indicators, passenger and freight monitoring need be considered separately. It is not particularly useful to attempt to combine both

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[2] https://sustainabledevelopment.un.org/post2015/transformingourworld/publication
[3] https://unstats.un.org/unsd/statcom/48th-session/documents/Report-on-the-48th-session-of-the-statistical-commission-E.pdf
[4] https://unstats.un.org/unsd/broaderprogress/pdf/technical%20report%20of%20the%20unsc%20bureau%20(final).pdf
[5] See for example Transport for Sustainable Development – The case of Inland Transport https://www.unece.org/index.php?id=40662.
[6] https://unstats.un.org/sdgs/files/Tier_Classification_of_SDG_Indicators_20_November_2019_web.pdf
[7] https://statswiki.unece.org/display/CESI9/National+Experiences+in+Monitoring+SDG+9.1.2
[8] https://ec.europa.eu/eurostat/documents/3217494/9940483/KS-02-19-165-EN-N.pdf/1965d8f5-4532-49f9-98ca-5334b0652820

passenger and freight monitoring into a single indicator. We can of course simply monitor traffic levels, in vehicle-km terms, with splits between passenger cars, buses and goods vehicles for example, or split train movements (or train-km) between goods trains and passenger trains (and the same can be done for inland water transport). But neither of these methods would give us a complete insight into how people or goods are moved in a country, hence the reason to split the analysis into two. This document sometimes divides sections between passenger and freight, and sometimes has sections that apply to both types of mobility.

The next question to pose is on what the indicator is trying to measure. Sustainable Development Goal 9 has an overall direction towards building (and maintaining) resilient infrastructure, promoting inclusive and sustainable industrialization and to foster innovation. Further, efficient transportation services are recognized as drivers of economic development.

Going down to the level of targets, target 9.1 strives to develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access to all. This target is then measured by indicator 9.1.2, in addition to indicator 9.1.1 as described above which concerns all-season road access in rural areas. While tracking transport volumes is by no means a perfect measure of resilient transport infrastructure, they can at least indicate whether current infrastructure is providing sufficient capacity.

In this discussion, while sustainable transport is not explicitly mentioned, efficient transportation services (mentioned in the goal) are one aspect of sustainable mobility, and the focus on affordable and equitable (transport) access for all (mentioned in the target) is another. Indeed, efficiency and universal access are two of the four pillars of sustainable transport as defined in the Sustainable Mobility for All[9] initiative. Of the other two, transport safety can be considered covered by target 3.6, whereas green/environmental aspects of transport do not have a dedicated target but are interlinked with indicator 9.1.2 (due to differing environmental impacts of each mode) in addition to targets 7.3 (energy efficiency), Goal 13 (climate action) etc. In most country cases where this indicator has been used for analytical purposes (for example in VNRs), sustainability criteria have been the focus rather than resilient infrastructure measurement.

Summary of What to Measure
➢ Countries should assess progress on passengers and freight volumes separately.
➢ Measuring resilient infrastructure in a transport context can be interpreted as assessing the suitability of current transport networks to adequately move passengers and goods, and if this can be maintained in the future. As such, passenger and freight volumes can at least indicate the present suitability of transport infrastructure. But these transport volumes also provide insights into sustainable transport.
➢ For resilient infrastructure monitoring (in line with Goal 9), additional indicators on use of each mode, quality of the network of each mode, or size of network for each mode compared to area or population density may be useful metrics for some countries.

3.2: Measuring Sustainable Transport

Taking these ideas forward, how does tracking passenger and freight volumes constitute measuring sustainable transport, or specifically efficient transport? A single catch-all interpretation of this indicator for all member States may not be possible, nor desirable. For some member States, increasing volumes may be considered a good thing in the short/medium term, given their current levels of development. On the passenger side, increasing volumes may indicate that people are richer, have more access to jobs and services (such as education and health), and have more leisure trips. Considering freight, greater quantities indicate increased purchasing power and are a signal of increased industrial and commercial activity.

However, in developed economies, having ever-increasing volumes of transport may not be considered desirable. Given already high (or at least adequate) transport volumes, would further increases be beneficial? Is there a level of transport/traffic above which the negative externalities (meaning any cost that is suffered by a third party as a result of the transport activity) of the transport outweigh the benefits to people or businesses? These externalities vary considerably across travel modes. Externalities to consider such as pollution (greenhouse gas emissions in addition to local pollutants), transport safety factors, issues of congestion (particularly in cities), and overall health impacts are not identical across transport modes, inland or otherwise.

These differing externalities are essentially why splitting volumes by transport mode could be a useful measure for transport planning and assessment purposes, depending on country circumstances. Modal split is not itself an indicator, but rather an assessment of how traffic volumes for different modes compare against each other. When considering the benefits of individual passenger modes, the sustainable mobility pillars subsequently outlined can be used, namely universal access, efficiency, safety and green mobility. It is worth noting that even within modes, externalities relating to each of these factors can vary considerably. For example, the emissions of passenger cars per passenger-km can vary

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[9] https://sum4all.org/.

considerably between a plug-in hybrid carrying four people and a petrol-only personal truck carrying one person; for goods transport one tonne of goods carried in a well-stacked modern heavy goods vehicle has a different impact than one tonne of goods split between two light vans.

Universal access (affordability)

While this is sometimes hard to quantify, affordability may consider the marginal cost of one passenger-km or tonne-km, both to the individual and to the public purse. The fixed cost of providing the infrastructure and governance necessary for this mode of transport to be possible in the first place could also be considered.

Efficiency

For both passenger and goods modal split, efficiency can refer to both the efficient use of transport fuels (related to environmental performance) and the use of dedicated transport space/infrastructure. Transport travel time and convenience may also be a consideration.

Safety

In terms of safety, modal split is interested in relative safety rates between modes in terms of fatalities per unit of transport measurement. Somewhat relatedly, any transport mode that can be considered to be replacing any potentially dangerous travel by another mode could be considered positive (see discussion of pipeline transport later in the document).

Green mobility

For both passengers and goods, environmental performance is affected both by the overall consumption of energy (and especially fossil fuels) in addition to the type of fuel/engine combination used by the transport equipment that would lead to local pollution.

Additional considerations

In addition to these core pillars of sustainable mobility, further considerations may be made. For example, does the government wish to encourage modes of transport that may have positive health benefits for the users, and thus be likely to result in future health savings?

Case study 1: Statistics Netherlands

In its latest progress report[10], Statistics Netherlands takes a holistic view of transport within the SDG framework, with interpretation of the core 9.1.2 indicator combined with some additional indicators.

1) The first indicators chosen highlight Netherlands' extensive inland transport infrastructure, with the remark that its network density (for many modes) on a network km per land area basis is highest or nearly highest in Europe. It also describes a network utilization rate (passengers per rail km and tonnes per road km) as being among the highest in Europe as well.

2) Moving onto the 9.1.2 indicator itself, Netherlands has chosen to measure passenger volumes against a denominator of GDP, and compared this against other European countries. Using GDP as a base in this way is an interesting approach, in that it normalizes transport volumes according to income. Hence in the ranking across European countries, the indicator interpretation seems to imply that greater transport volumes (per unit of GDP) are desirable. On the passenger side the Netherlands (perhaps surprisingly) ranks 23rd out of 28 European countries with available data. Why is this? It may be because many people in Netherlands live close to places of work, and walk and cycle short and medium distances much more than other countries. Is this an indicator of less resilient infrastructure or unsustainable transport? After this there is also an example of passenger modal split given as the proportion of passenger-km travelled by both passenger car and train, with rankings indicating that more train travel is considered beneficial

On the goods side, freight tonnes per unit of GDP is relatively higher, and thus Netherlands ranks 5th out of the available countries. Why is this? Netherlands is well known as a maritime hub, with Amsterdam and Rotterdam among the largest ports in Europe. Having this economic activity in the country could certainly be considered beneficial. But

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[10] https://www.sdgnederland.nl/wp-content/uploads/2019/06/SDG-Dutch-context-2019_web.pdf

without seeing a modal split, it is not possible to adequately assess the extent of any transport externalities on Dutch residents.

85.6 volume relative to GDP, index (2005=100) in 2016
[SDG 9.1.2] Passenger transport

23rd out of 28 in 2016

99.9 volume relative to GDP, index (2005=100) in 2016
[SDG 9.1.2] Freight transport

5th out of 28 in 2016

3) Additional indicators chosen in this report include the percentage of electric cars, the total km per capita travelled on a bicycle, the CO_2 emissions by domestic transport, CO_2 emissions by national air carriers, in addition to percentages of households experiencing noise caused by traffic and neighbours, and those satisfied with their commuting time.

A) The Netherlands report is also notable for separating various indicators between "resources and opportunities", "use", "outcomes" and "subjective assessment".
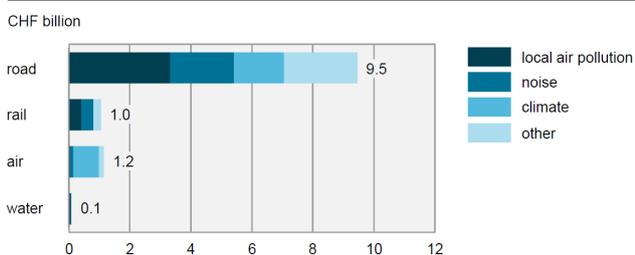
B) Under goal 11, Netherlands also provides a modal split for both distance covered of inland modes, including cycling and walking, and the number of journeys made by these modes. Presenting both is useful; while distance covered (passenger-km) is the typical modal split metric, journey numbers also provides a way of showing how many journeys, in particular short-distance journeys, are made by car (and thus could be replaced by walking, cycling or public transport.)

Country example: Quantifying public and private costs of different travel modes in Switzerland

Since 2010, the Swiss Federal Statistics Office has tracked the costs and funding of different transport modes in Switzerland. The analysis includes direct financial costs (to both the taxpayer and the transport user) and indirect costs, such as from transport accidents and impacts on health and the environment, which are also quantified in financial terms.

In this way, the various externalities of each transport mode can be compared, with further analysis on who is paying these costs possible. A graph from this report is shown below, indicating the external costs in CHF terms for each mode.

Environmental and health costs of transport, 2015

CHF billion

road	9.5
rail	1.0
air	1.2
water	0.1

Legend: local air pollution, noise, climate, other

The results shown in this report strongly highlight the reasons countries may wish to monitor modal split, given the different financial, health, security and environmental impacts of each mode.

Summary of How to Measure Sustainable Transport
- ✓ Country circumstances (levels of development, future priorities) will dictate whether total transport volumes, modal split or a combination of the two is best for national monitoring.
- ✓ While "low" passenger and freight volumes may indicate insufficient infrastructure development, ever-increasing volumes are not considered desirable for all countries.
- ✓ Modal split comparisons are typically conducted because some modes have greater negative externalities than others.
- ✓ Measuring sustainable transport can mean different things to different countries, but the four pillars of universal access, efficiency, safety and green mobility are a good place to start interpretation.
- ✓ Countries may wish to set implicit targets to increase the share in overall transport of certain modes over time, for example increasing public transport or rail freight.

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4. Transport Mode Coverage

4.1: Considerations Related to Aviation and Maritime

As noted above, the global reporting guidance for this indicator initially did not list modes of transport that should be included in reporting for this indicator. The guidance has since been updated[11] and now specifies aviation, road (split between passenger cars, buses and motorcycles) and rail on the passenger side, and aviation, road, rail and inland waterways on the freight side. Maritime data are mentioned as well for freight volumes, with the caveat that tonne data rather than tonne-km data are used due to its availability at the international level (via UNCTAD). Indeed, if part of the monitoring objective for this indicator is to track global access to goods and the proliferation of trade, then the most crucial mode to consider may be maritime transport, given its dominant role in international commerce.

For global monitoring of this indicator, it is clear that all modes with available data should be considered. International aviation and shipping accounted for 3.8% of CO_2 emissions from fuel combustion globally in 2016 (IEA[12]), and so any global transport analysis considering externalities would not be complete without them. On the national level, however, it is important to note that aviation and shipping energy consumption data only show where aeroplanes and ships are refuelled; they do not report the country residency of passengers on flights, nor do they identify the final country destination of imported raw materials or finished goods off a ship. There is no internationally agreed way of assigning these journeys (and thus fuel consumption, emissions and other externalities) to a specific country. This lack of country-specific information somewhat explains why these quantities are often excluded from international obligations (e.g. from the Kyoto Protocol). In addition, it can be argued that international shipping and aviation often lack feasible alternatives (although they may be avoidable), given the distances and travel times involved.

Countries should therefore decide if these international modes of transport are comparable with inland modes for their own domestic circumstances. The rest of this document, however, mainly focusses on tracking inland modes for national monitoring. Domestic aviation and domestic/coastal shipping are mentioned briefly, as inland transport modes provide alternatives to these in some cases, but the focus is on inland transport for simplicity.

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[11] https://unstats.un.org/sdgs/metadata/files/Metadata-09-01-02.pdf
[12] https://webstore.iea.org/download/direct/2373?fileName=CO2_Emissions_from_Fuel_Combustion_2018_Highlights.pdf

Case study: UNCTAD maritime efficiency/connectivity indicators.

As an international organisation with a strong focus on maritime trade and connectivity issues, the United Nations Conference on Trade and Development (UNCTAD) has multiple projects that are relevant for monitoring indicator 9.1.2[13]. As the focus of the data and analysis regarding UNCTAD's work on this indicator is focussed on maritime, modal split analysis is not appropriate.

Figure 1. Volume of international maritime cargo
(Billions of tons loaded)
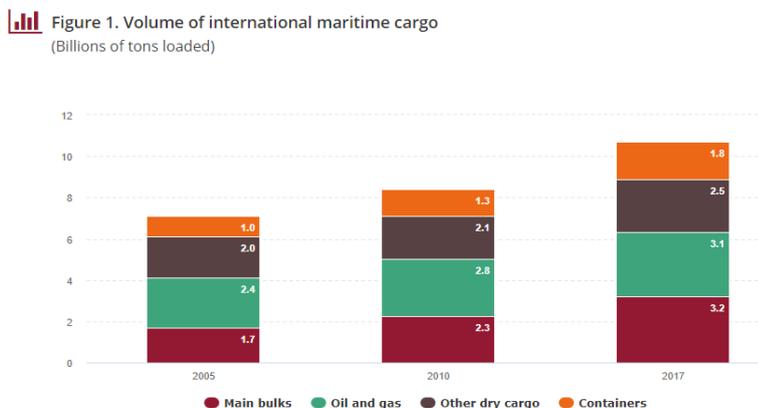
Source: UNCTAD (2018a), figure 1.1.

Instead, the page focusses on the breakdown of marine cargo between main bulks, oil and gas, other dry cargo and containers; on the split between developing economies, developed economies and transition economies, with the differences in goods unloaded versus good loaded noted (showing transition economies export more quantities than they import for example); and a regional split of unloaded and loaded goods (showing Asia dominating both).

Figure 3. Characteristics of maritime transport services, 2018
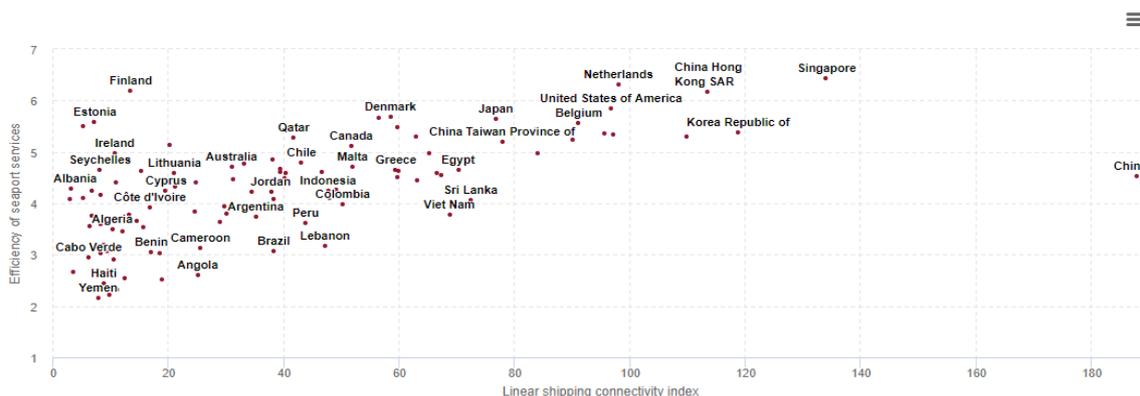
Source: Efficiency of seaport services is obtained from World Economic Forum (2018); linear shipping connectivity from UNCTAD (2019a).
Notes: The score for efficiency of seaport services ranges from one to seven. The linear shipping connectivity index takes the value of 100 for the maximum of 2004. For both variables, a higher value indicates a better result.

The analysis also looks at the maritime efficiency and connectivity of countries. In this way, UNCTAD make **quality, reliable, sustainable and resilient infrastructure** the focus, agreeing with target 9.1's aim. And this in turn leads into potential impacts of e.g. climate change and natural disasters on maritime transport infrastructure.

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[13] See https://sdgpulse.unctad.org/transport-infrastructure/ for a summary of the SDG monitoring framework of UNCTAD.

Summary of Considerations Related to Aviation and Maritime
- ✓ For national monitoring, it is logical (and possibly more analytically useful) to exclude international aviation and shipping from modal split comparisons. These values are however crucial to transport and environmental monitoring and thus may warrant separate indicators.
- ✓ If domestic, coastal or short sea shipping and domestic aviation are significant, and comparable data are available, countries may wish to include these in their national modal split frameworks, depending on their monitoring wishes.
- ✓ For resilient infrastructure monitoring in the maritime sector UNCTAD's port connectivity index combined with the World Economic Forum's efficiency of seaport services value shows characteristics of different countries' propensity for maritime connections.
- ✓ For sustainable transport monitoring of aviation at the national level: estimations of **residents**' flight pkm/emissions (if possible) may better account for actual aviation impacts of countries than simply passenger numbers or passenger-km measured to/from national airports.

4.2: Inland Passengers

On the passenger side, it is clear that road and rail need to be included for any meaningful passenger modal split analysis, given that these make up the majority (and typically the vast majority) of passenger-km in almost all countries and territories. On the road side however, the United Nations Global Database does not currently split different types of road transport (although such a split is in the definition provided in the metadata). As discussed above, modal split calculations are often performed due to considerations of externalities, and there are large differences between those of private passenger cars, taxis (whether private or shared), private coaches, scheduled buses, motorized two wheelers, bicycles, and other types of road journeys including informal public transport. In particular, the average environmental impact of one passenger-km in a single-occupancy petrol car will differ greatly from one passenger-km in a busy electric bus.

Thus, for making an assessment of the externalities of transport, providing at minimum both passenger car and bus data (either public transport bus data only or all bus and coach journeys) separately will be desirable for most countries, when data availability allows this. Additional categories for taxis, motorcycles, trams and metros (see box below), and other modes may be appropriate depending on national circumstances. Further, active modes such as cycling and walking can be considered when good data are available. Passenger-km for such modes are likely to be quite small; as noted in the Netherlands example above, a more useful indicator for these modes may be number of trips.

Tram and Metro statistics are not currently collated at the international level, despite being the principal mode of public transport in many cities. UNECE is (as of end-2019) exploring data availability with a pilot questionnaire, with a view to considering if passenger number and passenger-km data can be compiled in a useful way. One challenge in this is that of differing scopes when it comes to passenger numbers (often either ticket numbers or number of vehicle boardings) which could lead to inconsistencies across countries. This potential inconsistency should not affect passenger-km comparisons.

Finally, international aviation has been discussed above, but domestic aviation can also be included in "domestic" (rather than inland) modal split calculations. Whether this is a relevant element may depend on whether the journey distances, costs and time factors lead to a genuine choice or competition between the modes in the respective country.

Pan-European Cycling Master Plan

The Transport, Health and Environment Pan-European Programme (THE PEP) is a joint programme serviced by UNECE and the World Health Organization. One output of this has been the draft Pan-European Master Plan for Cycling Promotion[14], which includes a number of recommendations relating to the collection of cycling statistics, one of which is to collect the number of **passenger-km cycled per capita**. This is related to a key recommendation of the master plan to double the modal split of cycling by 2030.

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[14] https://thepep.unece.org/events/16th-meeting-pep-steering-committee Note that this is still a draft document as of November 2019

Case Study: Quantifying External Costs of Transport in the European Union

The European Commission currently tracks external transport costs (that is, quantifying in financial terms the externalities of transport that are currently unaccounted for)[15]. Of particular note is their latest estimates of each mode of transport with external costs calculated. These data suggest that external costs of motorcycles are the highest of any mode per passenger-km, due to high road safety, noise and local pollution externalities.

Like the Swiss:

Vehicle category	Total external costs	Average external costs
Passenger transport modes	**Billion €**	**€-cent/pkm**
Passenger car	565	12.0
Bus/coach	19	3.6
Motorcycle	41	24.5
High speed train	1	1.3
Electric passenger train	11	2.6
Diesel passenger train		3.9
Aircraft	48[a]	3.4
Light commercial vehicles	**Billion €**	**€-cent/vkm**
Light Commercial vehicle	118	24.7
Freight transport modes	**Billion €**	**€-cent/tkm**
Heavy Goods Vehicle	78	4.2
Electric freight train	5	1.1
Diesel freight train		1.8
IWT vessel	3	1.9
Maritime vessel	98[a]	0.7

case study, this example highlights the reason for conducting modal split analysis, while it also showcases the importance of including motorcycles in modal splits where possible, given this transport mode's high negative externalities.

Case Study: Belgium Indicators Platform Interpretation of 9.1.2

Transport de personnes en voiture - Belgique - évaluation de la tendance
pourcentage du trafic en personnes-km

— observations — projection — objectif 2030

The figure above shows Belgium passenger car passenger-km as a proportion of total passenger-km from 2000 to 2016, together with a business-as-usual projection (that this proportion stays broadly flat) and also with a target for reducing the passenger car proportion to 68% by 2030[16],.

Belgium's national-level monitoring of indicator 9.1.2 is a useful example; it is the only known national-level monitoring for this indicator that explicitly sets a target for reducing passenger car dependence. This target is ambitious considering the historical lack of change in the country. There is a similar target for freight, to reduce the modal share of road to 63%

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[15] See their latest report at https://ec.europa.eu/transport/themes/sustainable-transport/internalisation-transport-external-costs_en.
[16] https://www.indicators.be/fr/i/G09_FTR/Transport_de_marchises_par_la_route

(currently 73%) by 2030. Belgium specifies in its metadata that these numbers are based on the **territorial principle**, thus road data come from Eurostat's territorialized estimates rather than the country's own data.)

Summary: Inland Passengers

✓ All countries reporting this indicator on NRPs split traffic volumes between road and rail. This will likely be the minimum split necessary for a basic passenger modal split analysis.

✓ When data are available, splitting road between passenger cars and buses (together with trolley buses and trams where relevant) is logical given differing externalities, and allows the measuring of public transport (buses+trains) versus private transport (mainly passenger cars). This distinction is important for accessibility reasons, in addition to road safety and environmental concerns.

✓ If motorised two wheelers are a significant transport mode in the country, they should be included if relevant data are available.

✓ Cycling and walking are likely to be small in terms of passenger-km, but should have a bigger share for journeys made. Inclusion is particularly useful if short journey switching is a policy goal.

4.3: Inland freight

For freight movements, road is the mode used for the majority of domestic freight transport on a tonne-km basis in most countries (e.g. 32 out of 43 ECE member States with recent data, when including pipelines in the analysis). Further, it is the first and last form of transport in almost every multimodal transport journey, and therefore its inclusion is necessary for any meaningful measuring of inland freight transport. Rail transport varies significantly across countries as to whether it plays a negligible or significant role in freight transport. As (typically) the largest non-road mode, its inclusion is necessary too.

The main mode of inland freight transport that is not currently shown in the United Nations Global Database (but was added to the metadata description file in 2019) is inland water transport. Many countries do not have significant navigable inland waterways and even for those that do inland water transport operations may not be a large share of their freight transport. On a global level therefore, this mode does not play a significant role. On a national level, however, it often rivals or surpasses rail as the main non-road freight mode for countries with developed inland waterway networks, and reaches over 40% of total freight in some countries. Therefore, countries should include these data in their modal split when data are available.

Pipeline transport is sometimes not considered comparable to other transport modes, but countries may wish to consider that without pipeline transport many flammable oil and gas products would be transported in a more dangerous, likely more expensive, and less efficient way on road or rail networks. While data may be collected by energy statistics offices rather than transport statistics offices, these data may be included in modal split where relevant to country monitoring priorities.


Case Study: Switzerland tracking freight volumes for Goal 12 [17]

Switzerland uses indicator 9.1.2, specifically the modal split of overland (as opposed to inland) freight transport, as a complementary indicator to measure Goal 12 on sustainable consumption and production[18].
"The transport of goods is necessary for an economy to function properly and to supply the population, but it is also a source of pollution and of greenhouse gas emissions. It is possible to reduce this damage to the environment by increasing the share of goods transported by rail. A transfer of goods transport from road to rail is a step towards sustainable development."

Modal split in goods transport
Share of rail in total overland goods transport (rail and road)
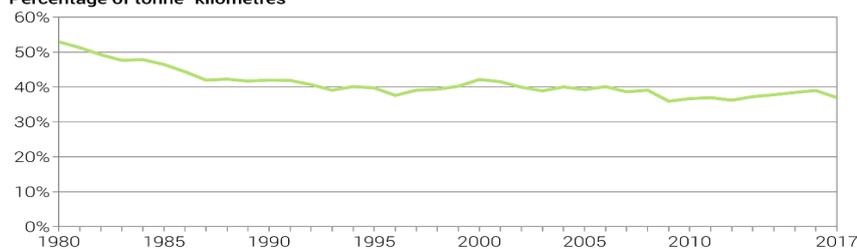
Sources: FSO – GTS, PT   © FSO 2019

The Swiss indicator page notes that these data are based on the territorial principle.

Domestic aviation is not a significant freight transport mode for most countries and may well often be connected to a longer international aviation segment. Countries may or may not include this depending on their national circumstances.

Finally, domestic shipping may represent a significant share of freight transport in many coastal countries and should be included when data are available and comparable.

Going further than what modes to include, there is increasing interest in intermodal transport (that is, multimodal freight transport using containers and similar units rather than handling goods directly). This type of transport can maximise the uptake of non-road transport modes while still allowing the fast and efficient delivery by road for the last part of transport. Statistics on intermodal transport are not yet fully developed at the international level, and countries may wish to propose their own indicators for intermodal transport. One such indicator calculated by the European Union is the containerisation rate for different modes of transport, but others such as the number of containers handled at key intermodal transport terminals may be useful as a complement to modal split analysis that allows an assessment of further non-road transport switching potential. Intermodal transport is thus a good example of where additional indicators may provide further national insights into sustainable mobility and resilient infrastructure.

Summary: Inland Freight
- ✓ All countries reporting the freight traffic volumes indicator currently include at least road and rail modal splits.
- ✓ Inland water transport, pipeline transport and domestic shipping may be included depending on country circumstances, transport policies and data availability. Domestic air freight is likely a small share of freight for most countries, but may be increasing and should be tracked where relevant given the externalities of air transport.
- ✓ As alluded to in the Swiss case study, freight modal split also has relevance to Goal 12 on sustainable production and consumption (in addition to others, e.g. road safety 3.6, energy efficiency 7.3 etc).
- ✓ While not possible to track within the core freight indicator, intermodal transport is a strong candidate for inclusion as an additional freight indicator.
- ✓ Going further, tracking modal split of specific distance classes allows even more precise policy goals to be measured, for example trying to increase rail and inland waterways use over medium distances.

5. Statistical scope of measurement

5.1: Units of measurement

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[17] https://www.bfs.admin.ch/bfs/en/home/statistics/sustainable-development/monet-2030/indikatoren/modal-split-freight-transport.html
[18]

This document has thus far assumed that passenger-km and tonne-km are the default units for modal split calculations, but this is worth exploring in further detail (cf. the Netherlands example with cycling and walking passenger-km and journeys). Different units may be appropriate depending on different policy goals.

5.2: Passenger numbers versus passenger-km

Passenger-km is the default unit of comparison between moving people in different modes of transport, as demonstrated by most countries with available data using this as their principal passenger split measure. Passenger-km allow inferences on emissions, pollution, cost, travel time and other measures to be accurately be made between modes, i.e. comparing CO_2 emissions per passenger-km. But under what conditions may passenger numbers (analogous with journey or trip numbers) be a useful (or more useful) way to compare modes?
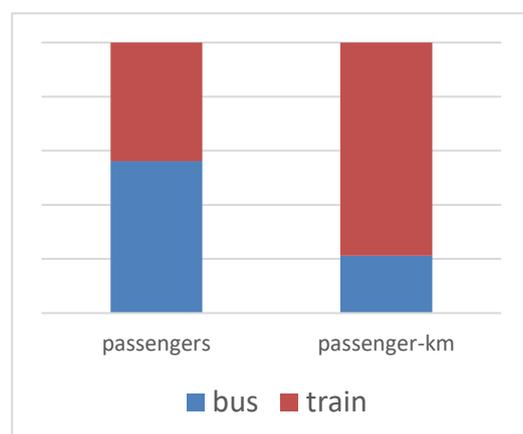

Figure 1: Swiss data for 2017 on differences between passenger numbers and passenger-km for rail versus buses

As shown in the Netherlands case study above, passenger numbers may be a useful metric when a particular policy focus is on short journeys, and the potential to shift these shorter journeys from passenger cars to biking and walking, for example. Further, passenger numbers also have increased value when looking at specifically urban public transport, where journey distances again may be small. Here, policy goals may be to encourage short distance commuters to change their passenger car journeys for public transport, either for shopping trips or commuting. Figure 1 compares passenger numbers and passenger-km for Switzerland in 2017 (from the UNECE database) for buses and trains. This highlights that depending on the measurement unit, different forms of public transport can appear to play a larger role. This divergence is primarily due to a mean Swiss rail journey length of 34 km vs a mean bus journey of just 7 km, a difference likely to be common across countries. Finally, it is also worth noting that passenger numbers can be easier to collect than passenger-km, certainly for public transport modes such as rail and bus journeys, as data may come directly from ticket information.

Summary: Passenger Units
➢ Passenger km can be the most useful modal comparison indicator when quality data are available, and in particular the road passenger-km is both split between passenger cars and other modes.
➢ Passenger numbers/journey numbers may be a useful alternative in the absence of passenger-km data to track national mobility, and may even be the preferred metric in certain contexts. These are particularly pertinent when comparing different types of public transport, and also for looking at the potential for shifting short journeys.

5.3: Tonnes versus tonne-km

Data for tonne-km are not available for all countries, although data are typically more available than for passenger-km in countries covered by Eurostat due to EU legislation mandating their collection. There are not many examples where a country has tonnage information without tonne-km as well (in the ECE region for example in 2015, 36 countries had road tonnes moved whereas 42 had a similar tonne-km figure. There was not a single country with tonnes data and not tonne-kms, a pattern repeated in the rail and inland water datasets). Nevertheless, tonnes moved are the logical proxy unit if available when tonne-km are not.

DENMARK EXAMPLE, using tonnes for freight (Placeholder; email sent to country 15/11/19)

Where tonnes may be considered a more appropriate unit for comparison purposes is when one mode dominates long-distance freight transport. In these cases, tonne-kms will obviously show high values for the mode conducting long distances. This is a relevant comparison when considering the fuel consumption and perhaps the greenhouse gas emission impacts of transport. It could also be argued, though, that this is not fully representing the freight modal split in the country, as it is not reflecting the externalities of the goods travelling by each mode. This is likely the case when comparing inland modes with maritime transport, where because of the distances involved tonne-km may be dominated by maritime transport, but it does not necessarily follow that maritime has the biggest safety, environmental, affordability impacts as other modes.

Tonnes transported by each mode can therefore provide a different insight into quantities being loaded and unloaded on each mode, and their corresponding costs (labour, time, loading and transport safety etc.).

> **Summary: Tonnes Versus Tonne-km**
> ➢ Tonne-km data (when available) are typically the most used indicator for modal split comparability, and data availability is typically good for road, rail and inland water transport, especially in Europe due to EU legislation.
> ➢ In cases when they are the only data, tonnes moved can be used as an acceptable proxy. Indeed, depending on the policy focus tonnes may actually be a better comparison in certain contexts.

5.4: Residency versus territory principle

The following remarks focus on the European context, because this is where the issue of territoriality versus residency is starkest (due to differing statistical legal acts for different modes) and also because the common market means that the differences in statistical scopes are likelier to result in larger discrepancies compared to other regions. In the United States, the road freight data are already compiled on a territorial basis. Knowing the practices of other ECE member States who are not in the EU would allow better assessments of how to proceed. Countries are welcome to provide examples on this. This discussion focusses on the differing scopes of freight travel, but these concepts also apply in the case of passenger transport, in particular to countries with a large number of cross-border daily commuters.

Data for transport measurement (like other areas of official statistics) can be collected under a number of different principles, but the two used most often are the residency principle and the territory principle. The residency principle covers activities conducted by the *population resident in a country*, regardless of where the activities take place. In the case of freight transport the population refers to the resident vehicle fleet (rather than people). The territory principle, by contrast, covers all activities occurring on the national territory, regardless of the residency of those conducting the activities.
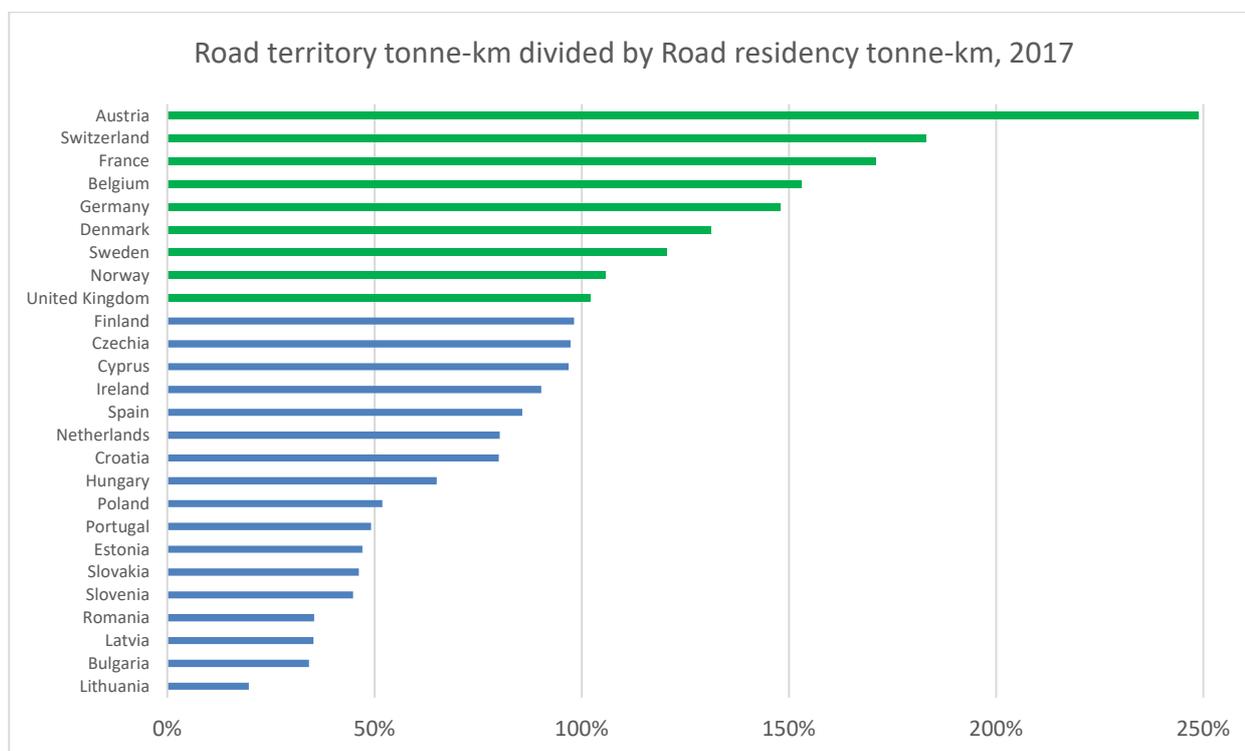

Figure 2: ratio of residency and territory road tonne-km figures. Source: Eurostat. A ratio above 100 means that more tonne-km are performed in the country by foreign vehicles than the country's fleet performs in other countries.

In European countries in particular (due to open Schengen borders and the common market) there can be sizable differences between these two concepts for road for some countries (see Austria and Lithuania for example[19]), due to foreign vehicles conducting international, cabotage and cross-transport journeys. Under EU legal acts, Eurostat road tonne-km are collated on the residency principle while rail and IWW tonne-km are collated on the territorial principle. In recent years (with data back to 2012) Eurostat have published estimated territorialised data for road tonne-km, with a longer time lag as data for all countries needs to be available. These estimates are based upon the microdata start and end points of road freight journeys and assumed route patterns. Further, some countries such as Austria and Switzerland produce their own calculations for territorialized figures.

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[19] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Freight_transport_statistics_-_modal_split#Data_sources

How should countries proceed in making a modal split comparison, given that different figures covering different concepts could be used? It should be noted that some countries produce territorialised road tonne-km figures as official statistics, whereas for others they do not carry this quality mark. For those that don't, Eurostat territorialised road figures are likely the most robust dataset to use, so that inland modal split is at least computed on the same basis.

Summary of residency versus territory principle
- For comparability reasons, freight data for road, rail and inland waterways should be compared on the same basis, whether residential or territorial, **if possible**.
- If a country makes their own territorial road freight values (either as official statistics or good quality estimates), then these would likely be the best source for national level comparisons, assuming that the rail and inland water data are also collected territorially (as is the EU case). It appears that not many European countries currently do this.
- For EU countries when no national road territory figure is available, using the Eurostat-calculated territory road data may be the best decision, despite the longer time lag in obtaining the territorialised data.
- If a country only has residency road data and territorial freight data, then using this information for the modal split comparison is still acceptable. Statistics offices should make this clear in metadata, and perhaps give an estimate of how much the residency figure is higher or lower than the theoretical territorial figure, if it is possible to do so.

5.5: Coverage

Relating to the territorial/residency issue, countries also need to decide if they wish to focus on the transport taking place in their country, by their own fleet, or only the movements of their resident fleet on their national territory. For transport planning purposes, each approach has its merit, depending again on what a country's priorities are. The following example of Norway's approach may be useful.

Case Study: Statistics Norway Domestic Freight Indicators

Statistics Norway currently compiles statistics on **domestic transport** of passengers and goods. The most updated time series, containing data for all modes of modes of transport (including pipeline) are available from 2010 onwards. The variables collected/estimated are:

1. Number of passengers (passengers transported between two locations *in Norway*, including drivers of passenger cars)
2. Passenger-kilometres
3. Tonnes of goods (gross weight of goods carried between two locations *in Norway*, including packaging but excluding the tare weight of transport units)
4. Tonne-kilometres

There are some differences in how passengers and tonnes are defined in the statistics for various transport modes, so having harmonised concepts in these areas is critical for the comparability and consistency of the indicators. Regarding the statistical scope, the Norwegian statistics is limited to transport between locations in Norway – regardless of the nationality of the transport vehicle. This concept is quite easy to implement and secures reasonable comparability between all the main modes of transport in Norway; Road, Rail, Short Sea and Air. In some cases, given Norway's geography, all of these modes could theoretically be competing for the same freight. Pipeline transport is a special case, since it is mainly used for transporting oil and gas from the Norwegian continental shelf to the mainland.

It is also worth noting the limits of the existing data in fully capturing externalities of all modes. Under Eurostat regulations, road tonne-km data *need* to be compiled for vehicles over 3.5 tonnes of load capacity or with a maximum permissible loaded weight of 6 tonnes. Yet this requirement is just a minimum reporting threshold and countries may thus decide on their own coverage thresholds, which does limit comparability across countries.

*Excerpt from Eurostat Freight Methodology 2016.*

For the first survey carried out by a country, it is often useful to include vehicles with a smaller payload than 3.5 tonnes (from 1 or 1.5 tonnes) in order to measure the amount of national transport performed by these small vehicles. Having measured the work of these small vehicles on the first survey, they can be excluded from future surveys if their work is only a small percentage of the total. Alternatively, the smaller vehicles might be included in a survey once every five years[20].

Regardless of the lack of comparability, the question again arises as to why we wish to measure modal split, and whether the road freight data being limited to larger vehicles is still sufficiently measuring the impacts of the road freight sector (even if it is capturing a strong majority of movements).

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[20] https://ec.europa.eu/eurostat/en/web/products-manuals-and-guidelines/-/KS-GQ-16-005

Case study: Netherlands work on Light Goods Vehicles

For some time, Statistics Netherlands has been aware that journeys in Light Duty Commercial Vehicles are increasing, both in raw numbers and as a proportion of certain metrics (tonne-km, vehicle-km, pollution etc). This reflects a variety of society changes, such as increasing internet purchases delivered at home and more food delivery companies, for example. Despite the increased importance of this sector, little data exist on the subject. Tonne-km data are either combined with heavy goods vehicles or not collected at all for most European countries. Estimates of tonnage transported are available for the Netherlands and show that they are indeed a small amount of total tonnes moved.
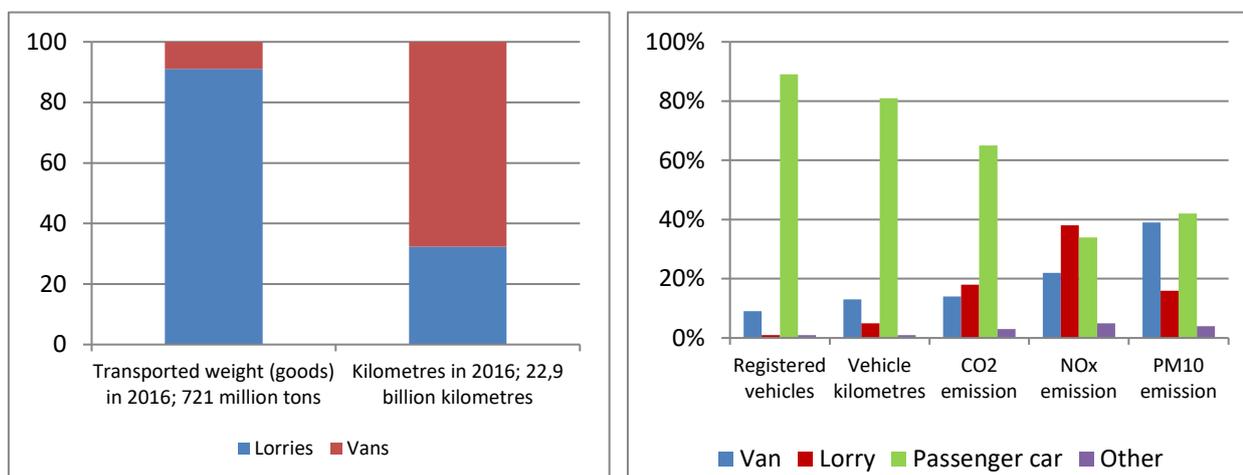
Despite their small share of total tonnes carried (due to their loads typically being small) they are a larger part of vehicle-km (due to increasing numbers of vehicles conducting large numbers of short journeys to multiple destinations) and thus have a correspondingly large share of various global and local emissions, not to mention traffic and safety concerns. This example shows the need to consider all factors of transport when considering indicators for monitoring of sustainable transport, and perhaps modal split does not give the complete picture on this.

Summary of coverage
➢ Specifically tracking national transport (between points in the national territory) can be a useful exercise to see modal share for strictly national journeys.
➢ Statisticians should consider how to monitor externalities that are not currently captured by a simple tonne-km modal split breakdown. For example, vehicle-km by type of vehicle can give indications of the impacts of light goods vehicles.
➢ An additional indicator for road congestion, for example, can show how well-utilized (or how overburdened) current infrastructure is. Belgium and Switzerland use this measurement.

6. Data Sources, Collection and Estimation

It is beyond the scope of this publication to give extensive details of how countries should produce each area of their transport statistics that feed in to 9.1.2 measurement. Instead, this chapter gives brief details about existing data production guidelines that other countries may wish to note and learn from. In addition, some discussion on what can be done when the requested data are not available is provided, with regards to either using a proxy indicator or making estimations. The chapter focuses on data collection and production methods. For comparable data definitions, the UNECE/ITF/Eurostat Glossary for Transport Statistics[21] should be referenced.

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[21] https://www.unece.org/fileadmin/DAM/trans/main/wp6/pdfdocs/Glossary_for_Transport_Statistics_EN.pdf

Summary: The Glossary for Transport Statistics

The Glossary has been published as a tripartite publication since 1994. Now on its fifth edition, it plays an important role in providing definitions of statistical terms for all modes of transport, from infrastructure, vehicles and traffic measurement, through to transport safety and energy consumption. The latest edition of the Glossary features new chapters dedicated to passenger mobility, the environmental impact of transport, and measuring intermodal transport. The Glossary's definitions have been updated to accurately reflect new transport developments and how data are collected across different transport modes. Starting in 2017, member States and other relevant organisations had the opportunity to provide new or revised definitions for consideration in the fifth edition of the Glossary (the fourth edition was published in 2009). It was a particular goal for the fifth edition to improve the global scope of the glossary, ensuring that definitions are relevant for countries in all regions and not just Europe. This was often achieved by adding explanations of different terminology from different regions. Harmonised statistics produced using the Glossary go some way to making data for indicator 9.1.2 more comparable across both transport modes and countries.

6.1: Data Production Methods

Passengers

There is currently a gap in methodology guidance for passenger numbers and passenger-km (the international statistical community may wish to address this in the future). This is related to a certain extent to the lack of regulation concerning road passenger-km at the EU level. While some countries produce road passenger-km directly from vehicle-km when available (by assuming an average vehicle occupancy, e.g. 1.6), others calculate passenger-km directly from travel surveys, by asking respondents to keep a diary of trips made and their distance.

Internationally, the Eurostat guidelines on Passenger Mobility Statistics is the principal reference document for passenger mobility surveys.[22] See below for the longstanding UK travel survey as an example of passenger-km data collection

Case study: National Travel Survey in England (UK)

The 2018 National Travel Survey (NTS) is the latest in a series of household surveys designed to provide a rich source of data on personal travel. It is part of a continuous survey that began in July 1988, following ad hoc surveys undertaken since the mid-1960s. The survey is primarily designed to track long-term development of trends; therefore, care should be taken when drawing conclusions from short-term changes. Firstly, face-to-face interviews are carried out with all members of the household to collect personal and household characteristics, along with information on all of the vehicles to which they have access. Each household member is then asked to record details of all their trips over a seven-day period in a travel diary (currently paper-based but a digital version is in development), allowing travel patterns to be linked with individual characteristics. The NTS covers travel by people in all age groups, including children. During 2018, 6,045 households in England participated fully in the survey by providing information via interview and completing a seven-day travel diary. An additional 666 households participated in the interviews where not all household members completed a diary. Although these cases cannot be used for trip-level analysis, their data is included in all analysis at household, individual and vehicle level.

From these results, total distances in miles by different modes, including the main road vehicle types and rail but also cycling and short walks, can be directly derived.

The results, methodology, quality report and various infographics can be found at
https://www.gov.uk/government/statistics/national-travel-survey-2018.

Freight

The principal international source for guidance on production of road freight statistics is Eurostat, with several complementary publications.

a) *Methodologies used in road freight transport in Member States, EFTA and Candidate countries;*
b) *Methodologies used in surveys of road freight transport in Member States, EFTA and Candidate countries* (2017);
c) *Road freight transport methodology* (2017 update).

As already noted, a specific description of how Eurostat territorialises the collected residency-based road freight data is also available on their website[23].

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[22] https://circabc.europa.eu/sd/a/94bf136b-4c6b-42bb-a979-
bc64a622cbf8/Passenger%20Mobility%20Guidelines%20July%202016.pdf

[23] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Freight_transport_statistics_-
_modal_split#Inland_freight_transport_performance_-_the_need_to_adjust_road_transport

6.2: Data proxies and estimation

Earlier in the document the debate over using tonnes versus tonne-km and passenger/journey numbers versus passenger-km focused on which indicator was more analytically useful. But if tonne-km and/or passenger-km are not available, then tonnage and passenger numbers would certainly be the natural back-up modal split indicators to calculate. Countries may also wish to consider estimation techniques when partial data are available, depending on their own assessments. There is always a balance to be struck between wanting to publish data that are useful and quality considerations, particularly when the label of official statistics is used.

Passengers

On the passenger side, without passenger-km or passenger numbers, any modal split comparison becomes difficult if not impossible. Looking at data from 2010 onwards, out of 56 ECE member States 44 had at least some passenger-km data (see the box below on data coverage for passenger-km, as some only cover public transport).

Without full passenger-km data countries may wish to consider alternative indicators other than modal split for monitoring transport issues. Even if passenger numbers or passenger-km are not available for all modes, indicative numbers for the principal forms of transport on their own may be useful to ascertain the range of transport options that people have. Knowing the number of people who have used the rail network at least once in the last year, the number of people with convenient public transport access (with links to monitoring indicator 11.2.1) or even the number with driver's licences (or that own cars) gives some insights into the current situation. Such information might also help data users to understand what may change as a result of certain policies in the future, especially when they are tracked over time consistently.

Passenger-km data (especially road passenger-km) typically come from travel surveys, and these are not conducted by all countries every year due to cost reasons. For those countries that only conduct these surveys sporadically (for example, every five years), the question arises as to how the statistics team may be able to extend forward and/or back estimates for other years. Possible methods for constructing annual data from these surveys depends on the transport mode. Public transport passenger-km may be derived from these travel surveys combined with ticket sales or other indicators of system use. It may be feasible to estimate private passenger car passenger-km for missing years through the use of either vehicle-km, Annual Average Daily Traffic (AADT) figures for a representative sample of roads, fuel consumption data or other means.

Example of Data Limitations of Passenger-Km Figures

Road passenger-km data for some countries, particularly those in Eastern Europe and the Commonwealth of Independent States, are available in the UNECE database, but seem unusually small when compared to rail or bus passenger-km numbers. For some countries, it is known that only "public" passenger-km numbers are reported, which means for passenger cars only taxi numbers. This is clearly only a small part of passenger car passenger-km, with the majority (and typically the vast majority) of car trips being conducted by private passenger car vehicles.

This situation makes passenger modal split comparisons less relevant, and countries should be careful to emphasise this coverage gap when sharing road passenger-km data. Nevertheless, data availability of this type can still be used to see how public transport modes (specifically buses and trains) compare in numbers against each other.

Freight

For ECE member States since 2010, 44 countries had tonnes carried by road and 49 had road tonne-km data for at least one year. When data are not available for tonne-km, it may be possible to use tonnage information for modal split comparisons (although countries with tonnage information seem to typically have tonne-km data as well). If tonnage information is also not available, countries may be able to infer their freight modal split by analysing vehicle-km of road vehicles split between passenger cars and lorries. Depending on the collection method this may not be possible, but pneumatic vehicle counters will typically detect the number of vehicle axles.

Without tonne-km or tonnes carried there is limited scope for understanding how goods are transported. Vehicle-km data for goods vehicles may be more available, and the trend over time in this indicator is certainly useful. Knowing the viability of non-road modes may provide a basic understanding of current volumes and potential for changes in the non-road freight share. Assessing the viability of non-road modes can be done using infrastructure and fleet information (lengths of rail lines, capacity of inland waterway vessels etc), together with other non-statistical metrics (legal frameworks, government priorities etc). Further, understanding volumes managed at and future investments in intermodal transport terminals will also provide insights into future potential freight movements.

Summary of Data Proxies and Estimation
- ✓ Passenger numbers and tonnes moved are logical proxies when passenger-km and tonne-km are not available.
- ✓ Indicative numbers of passengers on various modes (driver's licences, car registrations per 1000 residents, train journeys, bus passengers etc.) and their movement over time will give indications of how passenger modal split is evolving.
- ✓ Indicators for freight modal split may include infrastructure and vehicle fleet information for non-road modes, in addition to intermodal transport capacity.
- ✓ For both passengers and freight, AADT in key points can track how volumes change over time on the road side.

7. Additional indicators of resilient infrastructure and/or sustainable transport (examples)

This section will list examples of indicators that countries and organizations have already chosen as additional indicators in relation to national monitoring of transport, covering both the concept of resilient infrastructure, and any indicators for sustainable transport.

Placeholder: The Sustainable Mobility for All Initiative of the World Bank launched its Global Tracking Framework 2.0 in January 2020. See. https://sum4all.org/online-tool

Case Study: SITCIN

UNECE has led a United Nations Development Account project on "Sustainable Inland Transport Connectivity Indicators (SITCIN) since 2018, involving Georgia, Jordan, Kazakhstan, Paraguay and Serbia as pilot countries. The objective is to provide a tool for Landlocked Developing Countries to measure their degree of connectivity, both domestically and internationally, and involving both soft and hard infrastructure. This is to be done in a way that builds on existing indicator frameworks, for example using the World Bank's Ease of Doing Business Indicator, Linear Shipping Connectivity Index, Logistics performance Index etc. For each aspect of connectivity, a points-based system is used in order to score a country's level of connectivity, ranging from the country's accordance with international legal provisions on perishable foodstuffs, to efficiency at border crossings.

8. Use of Official Statistics, and considerations for additional data sources

9. Data disaggregation

One principle of the 2030 Agenda is that of no one being left behind, which leads to data disaggregation being an important consideration. Thus, it is encouraged to break down indicator progress by gender, urban/rural, age, those with disabilities etc whenever relevant and possible.

In the context of tracking modal split and indicator 9.1.2, these distinctions do not have much meaning on the freight side. From a passenger side however, these distinctions are relevant, and data do sometimes exist. Some examples:

1. Examining transport modes by gender is a useful breakdown but knowing both journey numbers and passenger-km by gender is even more revealing. For example, many surveys find that women travel smaller distances but actually account for more trips, possibly due to more escorting trips (as referenced in the UK example below), which tend to be shorter than commuting trips. Thus, gender breakdown can allow better targeting of specific transport policy tools.
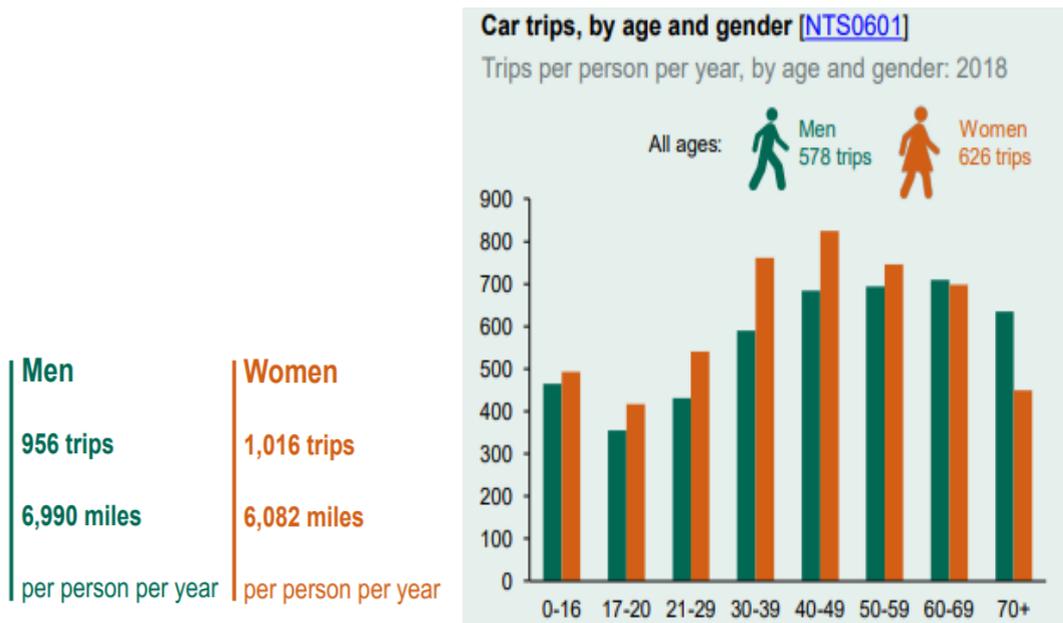
Figure 3: indicative numbers from UK travel survey 2018,
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/823068/national-travel-survey-2018.pdf

2.   Modal split data for people with a disability may or may not show important differences between those without disabilities. But low passenger numbers on e.g. the bus network for those with disabilities should not be considered evidence that those with disabilities wish to take less bus journeys than average, as this may be due to accessibility issues. The UK travel survey (referenced above) tracks the number of trips that those with disabilities undertake (and shows that those with disabilities made 40% less trips than the average of all adults), whereas other countries, cities and regions have specific accessibility indicators for public transport, e.g. the percentage of buses that offer access to wheelchair users *(example to come)*.

3.   While defining what exactly is urban is not always easy, modal split data for rural versus urban areas (or similar categories) can further help to show important differences and design relevant policies. A detailed example of this comes from the national travel survey of Germany, which allows modal split (based on trip numbers rather than passenger-km) shares for a detailed breakdown of region types.
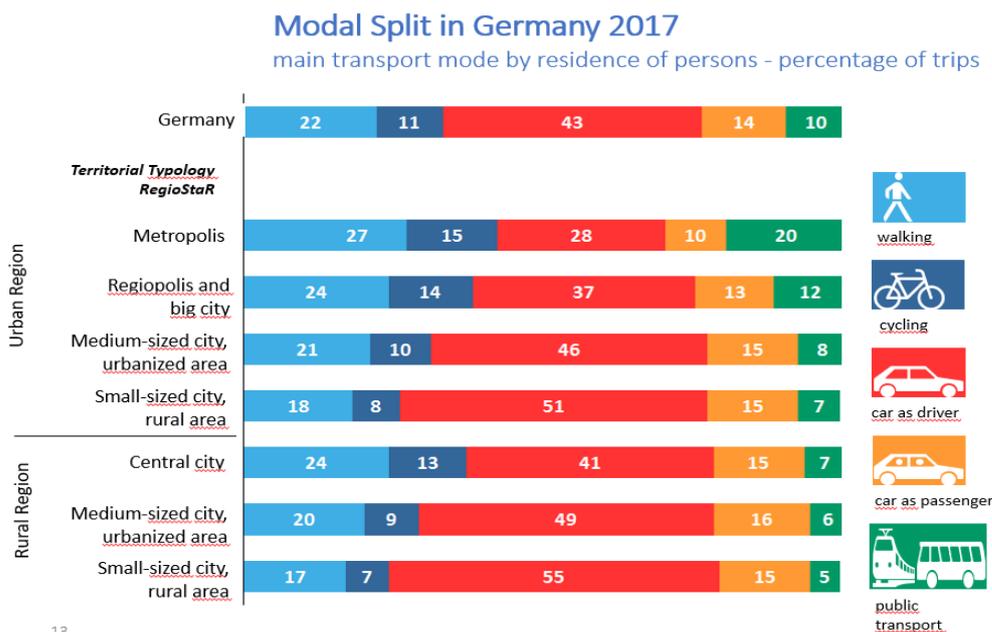

Figure 4: graph based on data from www.mobilitaet-in-deutschland.de

10. Conclusions and Advice

To come, based on the summary boxes. To be included: the web-common questionnaire data collection.

Annex

A. Further Reading

Eurostat passenger mobility guidelines are at https://circabc.europa.eu/sd/a/94bf136b-4c6b-42bb-a979-bc64a622cbf8/Passenger%20Mobility%20Guidelines%20July%202016.pdf. Provides many descriptions and recommendations in conducting National Travel Surveys.