

### 1. Where to start:

Understanding transport energy use and the impact of modal choice

Transport: Session 1

Jacob Teter

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#### Understanding transport energy use

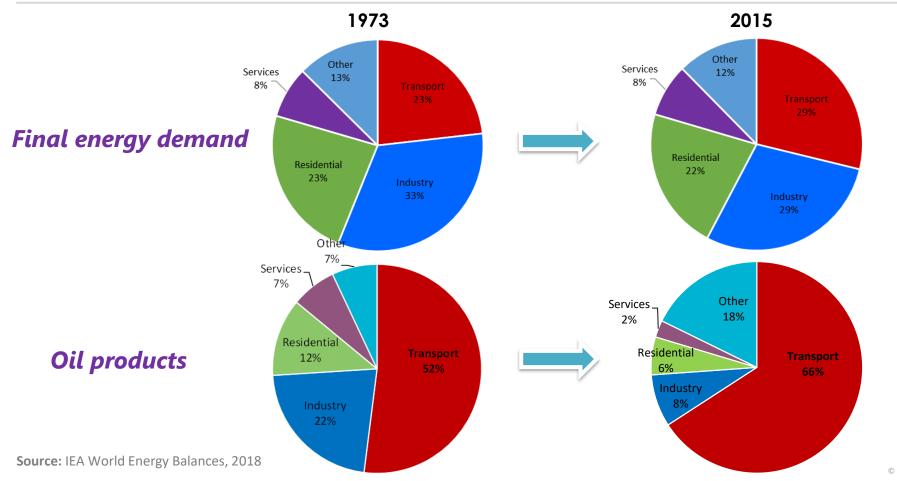


#### Jacob Teter - IEA

- Global and regional trends in transport energy consumption
  - Transport relies overwhelmingly on products of oil
  - Road transport modes account for the majority of transport energy use
  - The developing and emerging world is consuming more energy
  - Vast disparities remain in terms of average energy use per capita across countries
- Measurements matter, mode matters
  - Introduction to metrics of transport activity and useful services
  - Historic trends in useful activity
  - The impacts of modal choice on energy demand

#### **Energy Consumption in Transport – three decades of progress?**



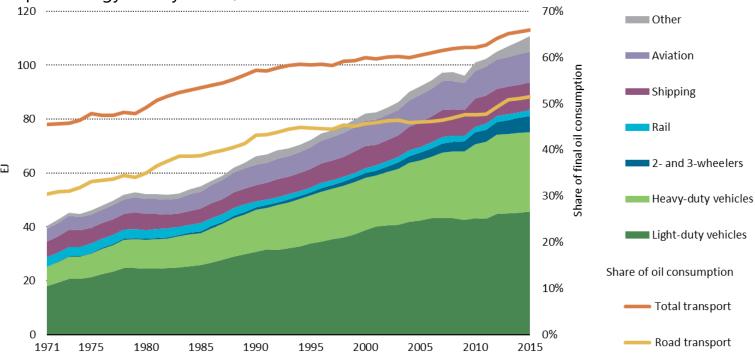


#### Energy Consumption in Transport – breakdown by mode





World transport energy use by mode, 1971-2015

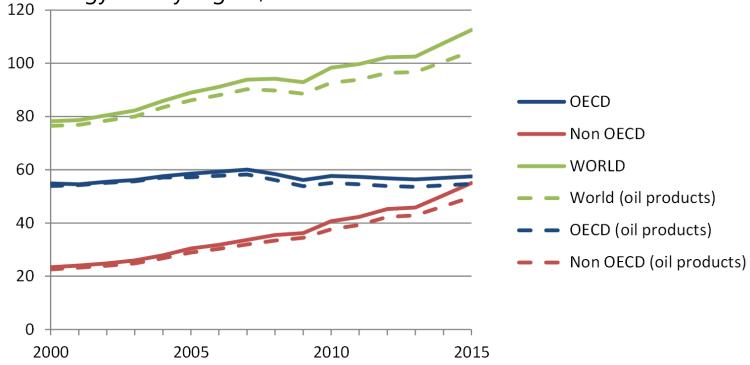


- Road transport modes account for most (about 75%-80%) of transport energy consumption.
- The share of road in total final energy use from oil products grew from 30% in 1971 to more than 50% in 2015.

#### Energy Consumption in Transport – breakdown by global region







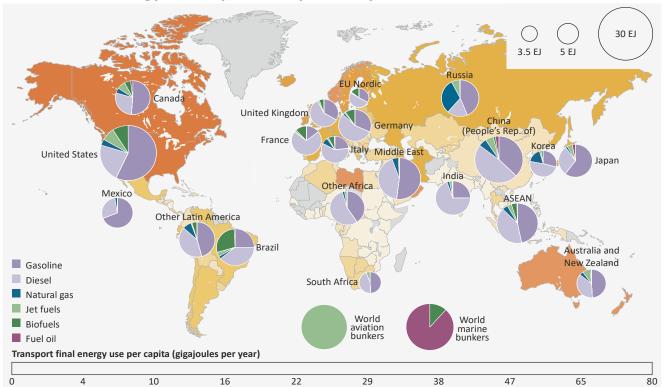
- Final energy demand from the transport sector demand grew by 44% between 2000 and 2015.
- The share of global energy demand among non-OECD countries increased from 30% to more than half.

#### Energy Consumption in Transport – breakdown by country and fuel





Per capita transport energy use by country and by fuel, 2015



The average national ratio of transport energy use per capita varies widely across countries

### Transport activity: how do we measure it?





Key parameters: vehicle-kilometres (vkm)

Number of vehicles × kilometres per vehicle

(Mileage) (Stock)

Vehicle kilometres (vkm)



#### Transport activity: what do we get out of it?





Key parameters: passenger-kilometres (pkm)

Vehicle kilometres x passengers per vehicle

(vkm) (Occupancy rate)

Passenger kilometres (pkm)



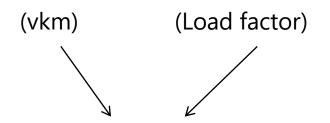
### Transport activity: what else do we get out of it?





Key parameters: tonne-kilometres (tkm)

Vehicle kilometres x tonnes per vehicle



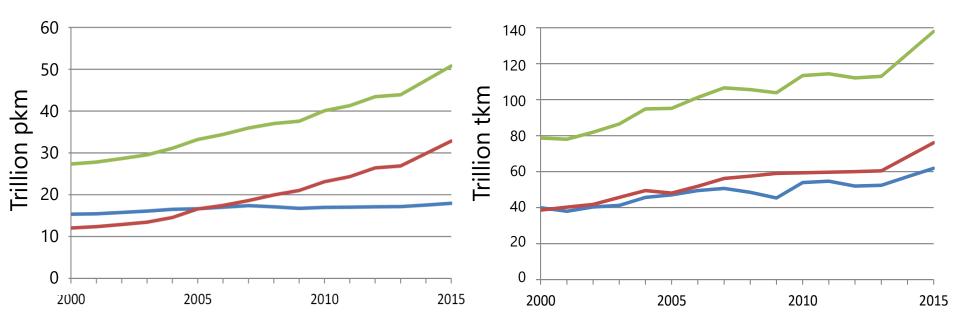
Tonne kilometres (tkm)



#### Transport activity: Travel growth



Passenger and freight transport by region, 2000-2015

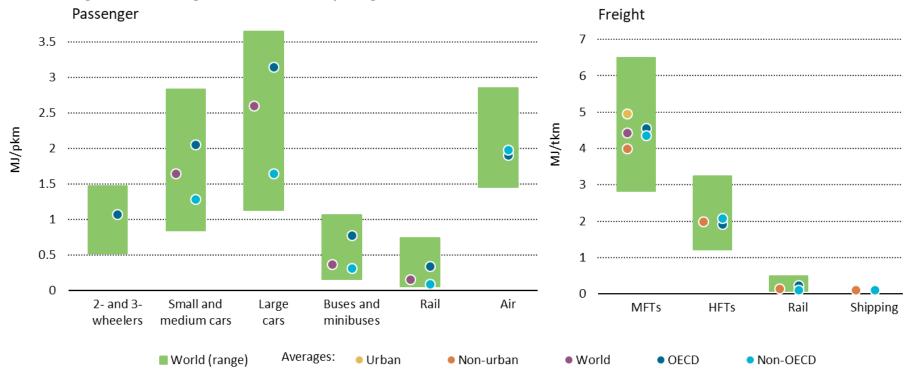


- Transport activity grew by 86% (pkm) and 75% (tkm) between 2000 and 2015.
- Growth in non-OECD countries is faster than in the OECD.

#### Transport activity: useful energy intensity, by mode



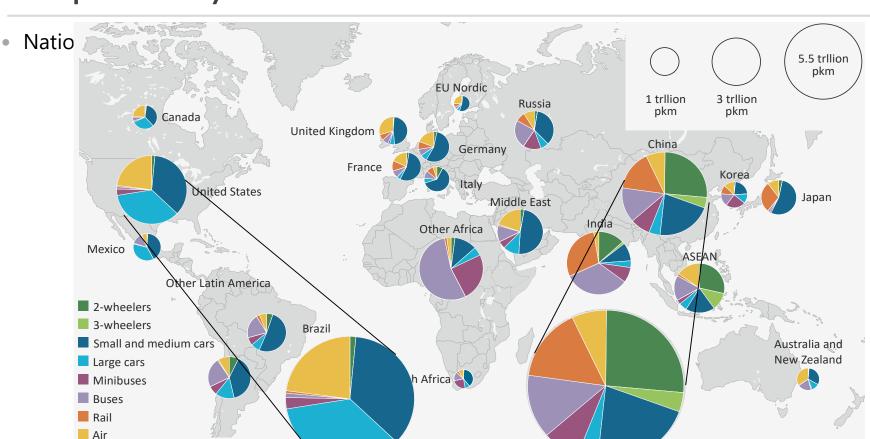
Passenger and freight transport by region, 2000-2015



- Air and light road passenger modes (cars) are more energy intensive than public transport.
- Light road freight is more energy intensive than large road vehicles, rail and shipping.

### Transport activity: mode matters





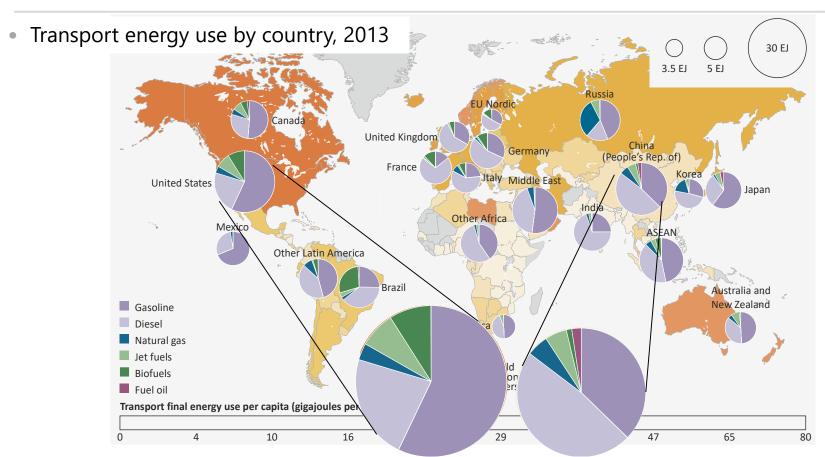
This map is without prejudice to the status of or sovereignty

the delineation of internationa Source: IEA Energy Technology Perspectives 2016 6.3 trillion

aries, and to the name of any territory, city or area. 9.3 trillion

#### Transport activity: mode matters → fuel use





This map is without prejudice to the status of or sovereignty over any territory, Source: IEA Energy Technology Perspectives 2016.

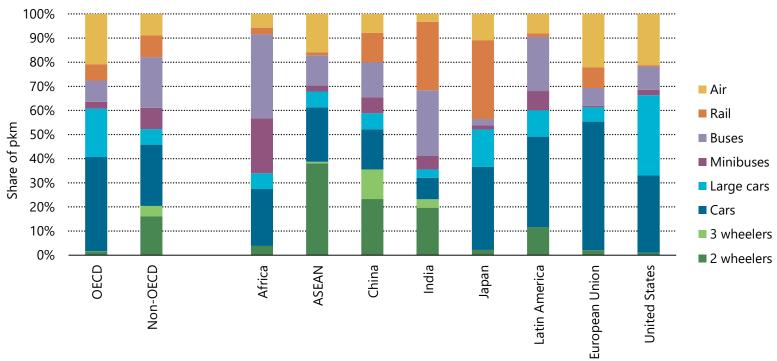
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#### Transport activity: mobility patterns vary



## Passenger travel by mode in selected countries, 2015

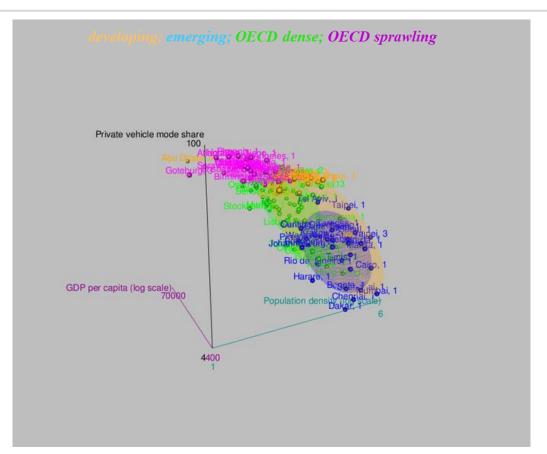


Modal split varies at the national and regional level

#### Transport activity: variation is even greater at a city level



- Modal split varies at a city level
- Patterns emerge when comparing modal shares in different cities



#### Key messages





- Transport is among the major energy-consuming sectors
- Transport relies overwhelmingly on oil products
- Large shares of oil products go to transport
- Oil is critical for energy security / energy exports
- Road modes are the major consumers of transport energy
- Energy intensity varies widely by mode
- Modal split varies widely, both among countries and cities



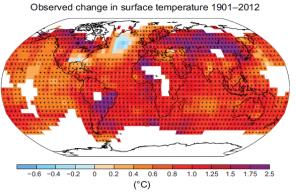
# **Negative Impacts of Transport**

#### Transport and Energy Policies: Why are they needed?













#### Implications of transport activities



#### **Negative externalities**

- Local air pollution: PM, NO<sub>x</sub>, SO<sub>x</sub>, O<sub>3</sub>, VOCs
- CO<sub>2</sub> emissions: 80% of total transport emissions from road transport emissions (1,800million tonnes out of 2,150 million tonnes in 2012 in Asia Pacific region)
- Road safety
- Access to mobility and growing inequality
- Noise pollution

#### Transport and Energy Policies: Why are they needed?





- To weaken negative impacts of transport activity on others (externalities)
  - Damage to the environment GHG, local pollutants
  - Health related issues Local pollutants, noise
  - Time loss Congestion / Queuing / Waiting
- To try to provide equal access to mobility
  - Basic principle that individual should be able to move freely
  - Social equity
- To have safe and secure trips reduce accidents



# Activity and Group discussion

- Quiz on transport, energy use, and emissions
- What are the main limitations of transport services, and other negative impacts, in the city and country where you live and work?



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