Key outputs of IEA transport analysis in 2017
IEA-UIC railway handbook 2017

- 6th year of collaboration between UIC and IEA in releasing a statistical pocketbook on rail network, activity, energy consumption and CO₂ emissions

- Focus in 2017: urban and high speed rail

- Previous editions’ focused on:
  - Sustainability targets (2016)
  - Infrastructure (2014)
  - Energy mix (2013)

- Ongoing improvement of methodology and data consistency
Global overview – Energy and CO₂ emissions

CO₂ emissions in 2015

Final energy use in 2015

Rail accounts for 4.2% of transport GHG emissions and 1.9% of the energy use. This corresponds to 1% of total GHG emissions and 0.5% of energy use.
Global overview – Rail activity

Passenger rail travel increased by a factor 1.5 in 2000-2015, mostly in India and China
Passenger rail most significant in Eurasia

Freight rail also up almost 50% in 2000-2015, trend affected by economic developments
Most relevant in Canada/US, Russia & China

India: 1 trillion pkm (largest passenger demand) – 0.6 trillion tkm (2015)
The share of electricity in rail is increasing thanks to increased electrification of rail tracks (partly driven by the growth in high speed rail), but fossil fuels are still very relevant in the rail energy mix.
The share of HSR in total intercity rail activity is growing. China had no HSR in 2003 and now accounts for almost two thirds of the global HSR activity.
Energy and carbon intensity of passenger and freight trains is improving. 2015 increase for passenger rail due to strong growth of HSR in China (partly substituting intercity rail).
India has lower shares of energy use and CO₂ emissions from transport than the global average.

India also has higher shares of rail energy demand and CO₂ emissions.

India also experienced the strongest increase of rail activity amongst countries with significant rail use: pkm doubled and tkm grew by 2/3 between 2005 and 2015.
Focus on India – Rail energy and CO₂ emissions

Energy intensity

Final energy use in rail, 2015 (PJ)

Despite improving intensity and electrification, the strong coal intensity of India’s power mix did not lead to significant CO₂ intensity reductions in rail.
**Key findings on transport**

Transport accounts for 28% of global final energy demand and 24% of global carbon dioxide (CO₂) emissions from fuel combustion

In 2014, 2/3 of the final oil demand were used in transport

Decarbonising the sector requires:

- changing the nature and the structure of transport demand,
- major improvements in efficiency,
- and rapid transitions in the energy mix used to move people and goods.

Decarbonising long-distance transport modes – in particular aviation, heavy-duty road transport (i.e. trucking and buses) and shipping – is most challenging
WTW GHG emissions from transport are 89% lower in 2060 than in 2015 in the B2DS, while in the 2DS they decline by 54% over the same period. All modes must contribute to decarbonisation.
Measures to shift and to avoid passenger transport result in a 25%-27% reduction in passenger activity (passenger kilometres [pkm]) on cars by 2060, relative to the RTS.
High-speed rail in ETP 2017: relevance to tackle aviation emissions

Modal shift from aviation to HSR, RTS and B2DS

Ambitious shifts from aviation to HSR are needed to reduce GHG emissions of aviation.
Conclusions

• Rail is already amongst the most energy efficient transport modes

• All low-carbon IEA scenarios show significant increase in rail use: urban rail and high speed rail are the most dynamic areas for growth

• Meeting these scenarios requires a major shift from investments, from road infrastructure to rail, both in cites and for intercity transport, more than doubling what is expected to happen without new policies

• Electric trains are the most efficient: electrification should be prioritized in high frequency portions of networks

• The energy intensity of passenger and freight trains is improving, partly thanks to electrification, but the share of diesel is still significant, and fossil fuels still account for a major share of power generation (especially in India)

• Aligning rail with the objectives of the Paris Agreement means that the fossil fuel dependency in rail needs to be phased out
Thank you for your attention

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