General scope of the socio-economic and environmental analysis

16 November 2021

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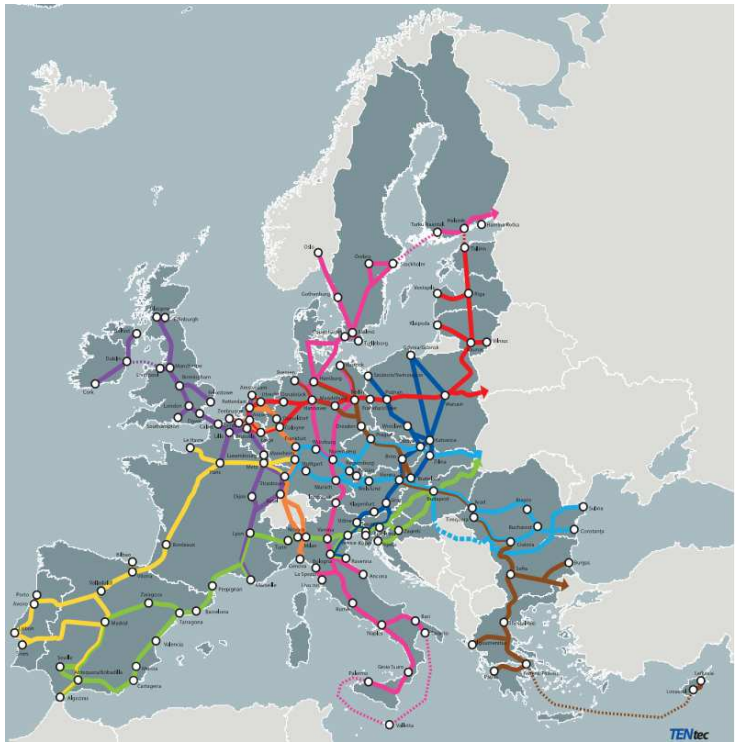
Today we will share some of the emerging findings from our socio-economic & environmental impact analysis

Our goal is to estimate the social, economic and environmental impact of the project recommendations.

The scope therefore encompasses assessments of the:

- Operational efficiency improvements due to the recommended shift from road to rail transport
- Related reduction of externality costs (e.g. pollution, CO_2, etc.)
- Investments required to enable these benefits
- Cost-benefit analysis
- Long-term GDP impact of these improvements



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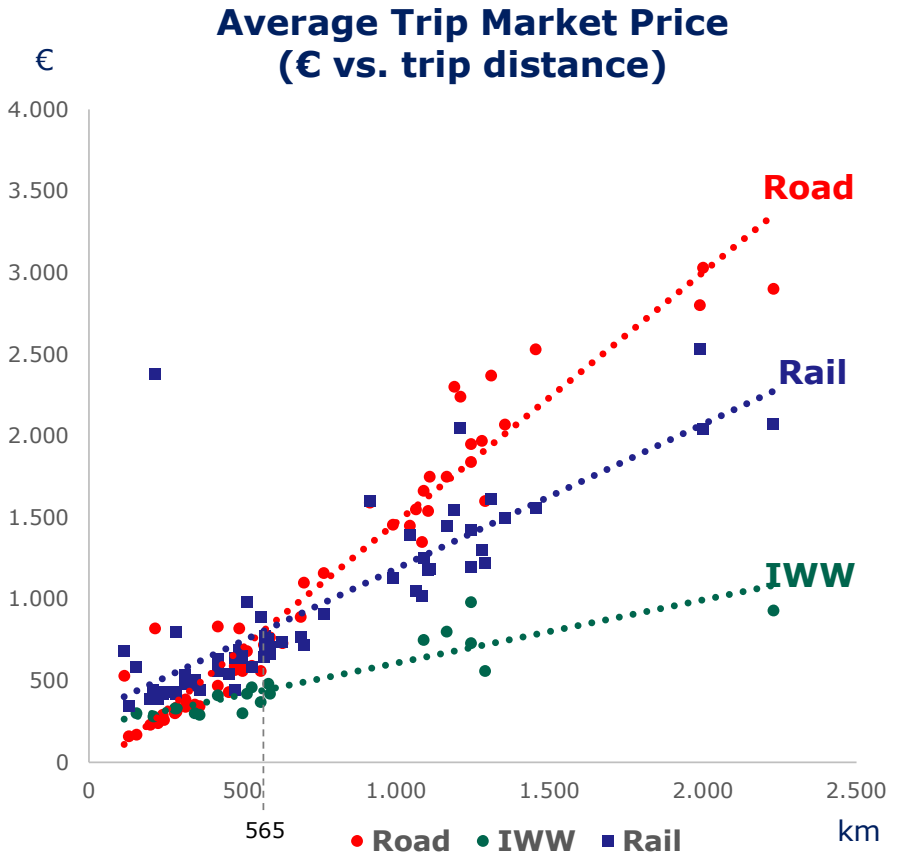
Rail can be a more efficient means of transport, but today's inefficiencies severely constrain its potential

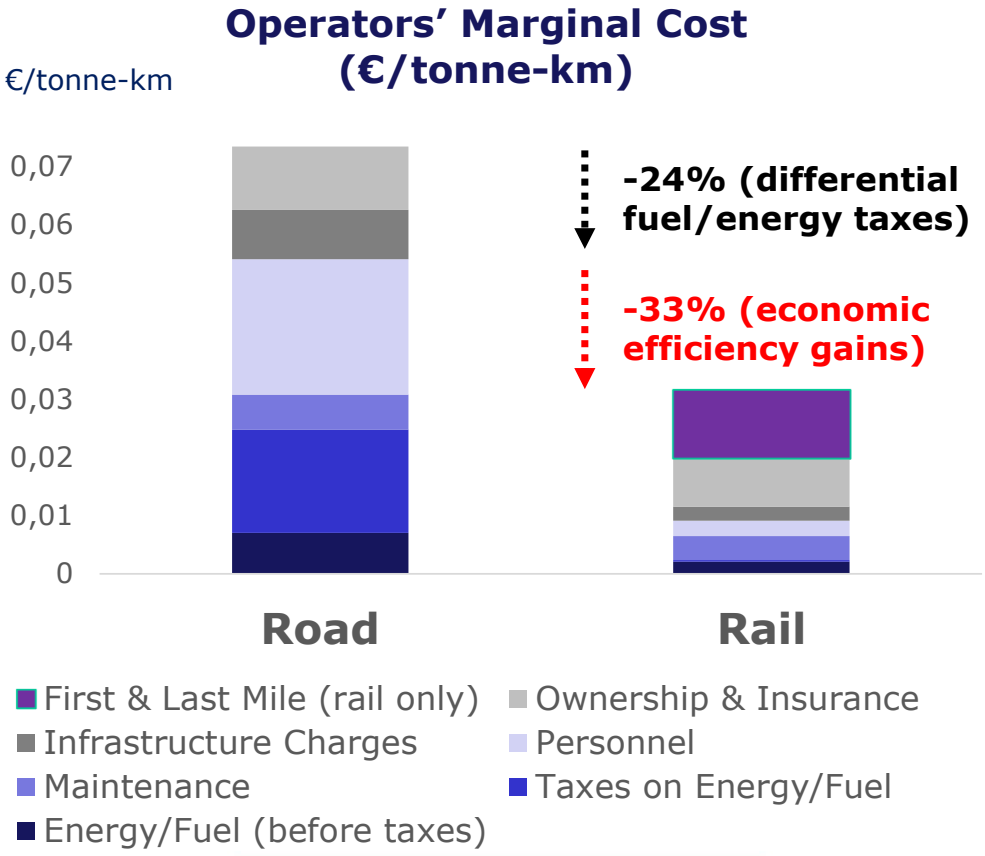
- The European road transport market is today fairly fragmented and reasonably competitive.
- Rail transport, conversely, is subject to numerous market and operational sources of inefficiency.
- In fact, even at today's prevalent prices, rail could be more cost-effective than road for trips over ~ 565 km…
- … Yet, due to today's inefficiencies, the use of rail transport is nowhere close to what this would suggest.
- In this context, our estimates assume that these inefficiencies will be addressed within the next decade.
- Importantly, our impact estimates do not yet incorporate improvements such as the +FURRT system, which would further strengthen railway's economic advantage



Operators' marginal rail transport cost per tonne-km is 57% lower than for road (33% without fuel/energy taxes)

Preliminary

- We build the cost bottom-up (i.e. by modelling each component) to find the operators' marginal cost.
- We find the road transport cost is ~ 1 €/truck-km.
- For trips over 300 km (whose average length is 645 km), rail marginal cost is 57% lower than road.
- This gain breaks down as follows:
  - 24% due to the lower tax applicable to electric power (for rail) vs. diesel (for trucks)
  - 33% reflecting economic efficiency gains
- Taxes are transfer payments, not economic costs, so they are excluded from economic benefits.



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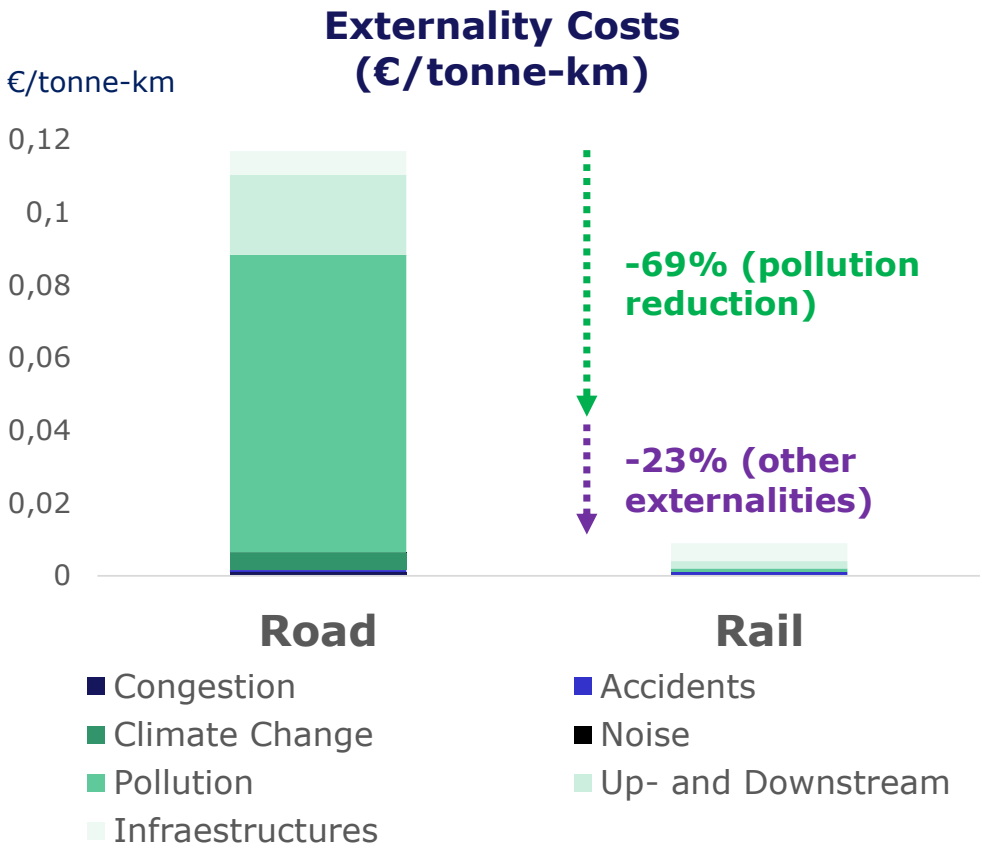
Furthermore, externality costs are 92% lower with rail than with road transport (69% due to pollution reduction alone)

Preliminary

- The impact of shifting cargo tonnes from road to rail is much larger in the area of externalities.
- We base our externality valuation on the European Commission's DG MOVE recommendations.
- Hence we assess that the road-to-rail shift would reduce the associated externality costs by 92%.
- This is mostly due to the impact of lower pollution, which alone would reduce externality costs by 69%.
- Road transport externalities are very costly: they amount to 295% of road's operators' marginal cost.
- Conversely, the externality cost of rail transport just amounts to a 37% of its operators' transport cost.



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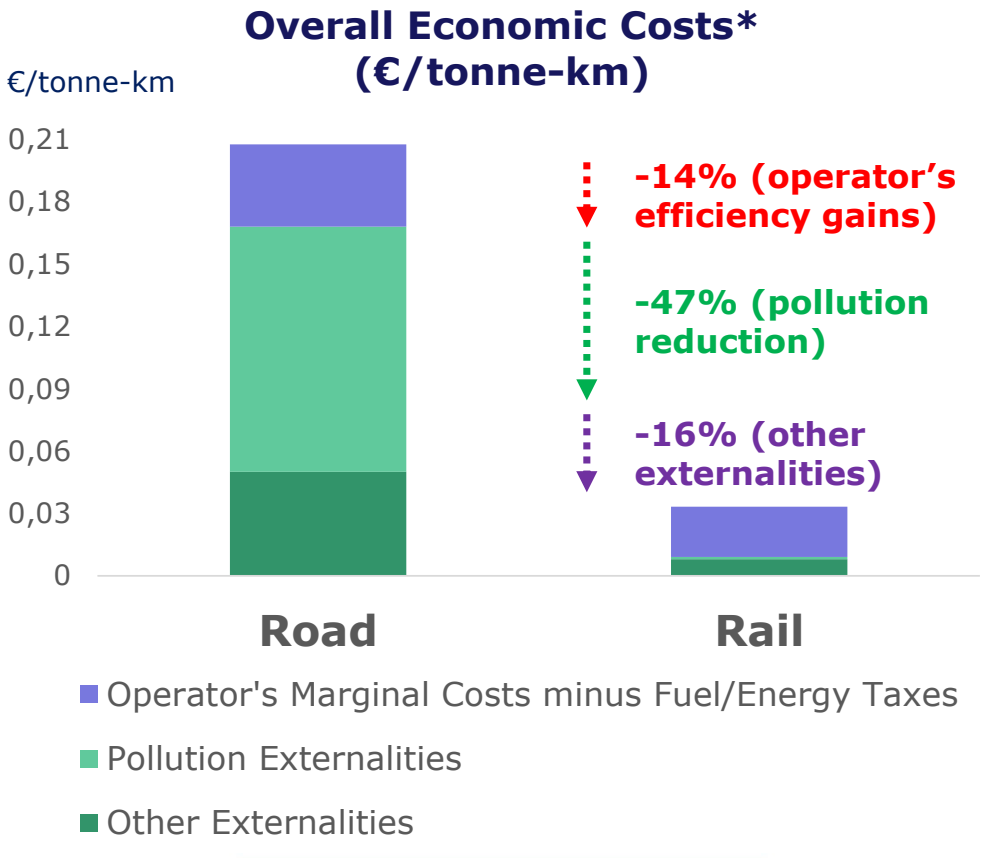
In sum, the shift from road to rail poses an opportunity to reduce the socio-economic cost per tonne-km by 77%

Preliminary

- We define economic cost as the sum of operator's + externality costs net of taxes and other transfers.
- We estimate the potential economic cost reduction as 77% of today's road transport's economic cost.
- This breaks down into:
  - 14% operator's economic efficiency gains
  - 47% pollution reduction impact
  - 16% other externalities (e.g. accidents, climate change, noise, congestion, etc.)
- Benefits per tonne-km, times the tonnes-km to shift from road to rail, equal annual economic benefits.

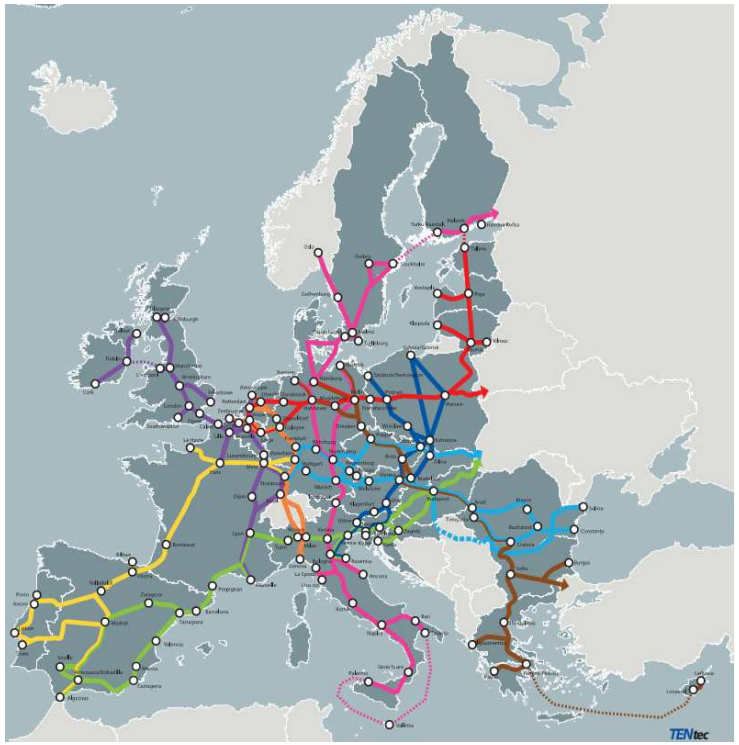


* Operator's + Externality costs net of taxes and other transfers

Building on these findings, our next steps aim to size the benefits per network segment in their various dimensions

Next steps include:

- Applying these benefits to the projected tonne-km shift from road to rail in order to size their magnitude segment by segment
- Estimating the long-term impact of these efficiency gains on Europe's GDP
- Comparing with the estimated investments required to compute Net Present Value, Benefit-Cost Ratio & Internal Rate of Return
- Analysing and documenting the results



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