Decarbonizing long-haul trucks: importance and challenges

- Tractor-trailers are responsible for over half of the CO₂ emissions from road freight transport.

- Tractor-trailers long travel distances and heavier loads make them the hardest truck segment to decarbonize.

- Uncertainties around the total cost of operation of such tractor trailers, impacting their large-scale deployment.

Most challenging and most important segment to DECARBONIZE

Long travel distances
Heavy payloads
Highest emitting segment
Economic viability
Scope and objectives

1) Quantify and compare the TCO of electric and diesel long-haul tractor trailers in 7 European countries.

2) Assess the impact of policy measures on the TCO parity year of electric and diesel trucks
Methods

- Evaluate costs and TCO parity time relative to diesel trucks
- Comprehensive TCO assessment
  - Truck retail price
  - Diesel fuel costs
  - Maintenance
  - Taxes and levies
- Assess impact of policy interventions

Bottom-up approach to estimate truck retail price
- Battery
- Chassis
- E-Drive
- Auxiliaries
- Power electronics

Operational expenses (distance-dependent)
- Annual vehicle kilometers travelled
- Country-specific fuel and electricity prices
- Country-specific taxes and road tolls
Methods

Component direct manufacturing costs forecast between 2020-2030

Source: ICCT desk research and Ricardo Strategic Consulting U.S.
Electricity costs including overheads to account for infrastructure investment

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<tr>
<th>Year</th>
<th>Energy and network costs</th>
<th>Taxes</th>
<th>Overhead charges</th>
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EU Average

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France

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Germany

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Results: current policy interventions

- Battery-electric trucks operating in Germany, France, and the Netherlands achieve TCO parity today under current policy interventions implemented in these countries.

- Germany offers generous purchase incentives reaching €450,000 per truck. France offers €50,000 per truck and the Netherlands covers 40% of price difference with diesel trucks.

- 100% road tolls waiver for electric trucks in Germany.

- National CO₂ prices implemented in Germany including transport.
Results: fixed energy prices 2020-2030 (No Policies)

- Case of a long-haul tractor-trailer equipped with a battery large enough to cover 500 km on a single charge

- Battery-electric trucks can reach TCO parity with diesel trucks by the mid of the decade:
  - Higher energy efficiency
  - Lower energy costs (depends on diesel and electricity prices)
  - Lower maintenance costs
Results: impact of policy implications

Set of policy interventions

- Purchase incentives
- Emission Trading System for transport
- Reduce road tolls for electric trucks
- Addition of CO2 external costs to road tolls

Currently adopted policy measures

* Currently adopted policy measures
Takeaways

• From a first-user perspective, BETs can achieve TCO parity with diesel tractor-trailers during this decade without any additional policy support:
  
  o Electric trucks operating in Germany, France, and the Netherlands are already at TCO parity with diesel tractor-trailers.

• Regulatory support can reduce the cost gap between battery-electric and diesel tractor trucks:

  o Implement the Eurovignette directive into national law as expeditiously as possible
  o Extend the European Emissions Trading Systems (ETS) to include transport
  o Purchase premiums for trucks should be limited to incentivize the purchase of zero-emission trucks in the near term and exclude all combustion-powered truck
Questions

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