
Transforming Transportation to secure tomorrow’s mobility.

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Agora Verkehrswende – Transforming Transportation

Who we are.

- Initiative by Stiftung Mercator and European Climate Foundation
- Independent Think Tank and high-level Council of Agora
- Mission: Scenarios, Discourse and Strategies for the Decarbonisation of Transport until 2050
- Focus: starting with national land-based transport in Germany in an European context
Dieselstraße in Berlin: A Symbol for the Transport Transformation in Germany?
In the past 25 years the Transport Sector in Germany could not contribute to CO₂ Emission Reductions.

Relative Development of Greenhouse Gas Emissions for different Sectors since 1990
For the first time ever the German transport sector has an own ambitious emission reduction target.

Federal Climate Protection Plan 2050: The Verkehrswende is an official goal of the Government.

National Sectoral Climate Protection Goals

Emission reduction since 1990 and plan for the next 14 years (in mio. tons of CO₂)

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Energy</th>
<th>Building</th>
<th>Transport</th>
<th>Industry</th>
<th>Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1248</td>
<td>446</td>
<td>209</td>
<td>163</td>
<td>283</td>
<td>88</td>
</tr>
<tr>
<td>2014</td>
<td>902</td>
<td>358</td>
<td>119</td>
<td>160</td>
<td>181</td>
<td>72</td>
</tr>
<tr>
<td>2030</td>
<td>543–562</td>
<td>175–183</td>
<td>70–72</td>
<td>95–98</td>
<td>140–143</td>
<td>58–61</td>
</tr>
</tbody>
</table>

Source: Agora Verkehrswende
The ‘Verkehrswende 2050’ will be enabled by the Mobility Transition and the Energy Transition in Transport.

**VERKEHRSWENDE**
The Verkehrswende enables the German transport sector to be carbon neutral by 2050.

**MOBILITÄTSWENDE**
The Mobility Transition reduces the energy consumption of the German transport sector based on Avoid, Shift and Improve.

**ENERGIEWENDE IM VERKEHR**
The Energy Transition in Transport covers the remaining energy demand of the German transport sector with renewable energy.

Source: Agora Verkehrswende.
The Mobility Transition has already started in cities around the world...

- The interlinked public transport is the backbone of urban transport.
- Private transport becomes more public, public transport becomes more private.
- Fewer cars leave more space for other land use.
- Walking and cycling comes with high benefits for the city at lowest costs.
- Sustainable urban transport policy receives more political support.
If we would have planned our apartments, like we did with cities...
“Traffic Tetris”: huge challenges lead to rapid innovation.
Agora Network Urban Transport Transformation

- VDA | Verbund der Automobilindustrie
- VCD | Mobilität für Menschen
- adfc
- BMW
- moovel
- DStGB | Deutscher Städte- und Gemeindebund
- USC | Umwelt Bundesamt
- VCD | Verkehrsclub Deutschland
- bcs | Bundesverband CarSharing
- giz | Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
- Deutsche Post DHL
The Mobility Alliance

- Public Transport
  - Suburban train
  - Underground
  - Tram
  - Bus
  - Taxi

- Non-motorised Transport
  - Bicycle
  - Pedestrians

- Collaborative Mobility
  - Carsharing
  - Ridesharing
  - Bikesharing

Source: Agora Verkehrswende
Autonomous Vehicles are ideal for shared use.
Even a Small Number of Driverless Cars Can Increase Traffic.

Usage forms and possible effects of vehicle automatisation

- **Shared use**
  - Autonomous vehicles are used in car-sharing and ridesharing fleets. Car occupancy increases.

- **Multimodal use**
  - Autonomous fleets complement public and non-motorised transport.
  - ↓ Vehicle kilometres traveled
  - ↓ Vehicle ownership
  - ↓ Space consumption
  - ↓ Emissions

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  - ↑ Vehicle ownership
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- **Private ownership**
  - Autonomous vehicles are used more frequently and over longer distances. Car occupancy decreases.
  - ↑ Vehicle kilometres traveled
  - ↑ Vehicle ownership
  - ↑ Space consumption
  - ↑ Emissions

Source: Agora Verkehrswende
Autonomous vehicles will have to be shared vehicles.

Scenarios for monomodal and multimodal usage of autonomous vehicles

**Business-as-Usual Scenario**
- 20th Century Technology
- Through 2050, we continue to use vehicles with internal combustion engines at an increased rate, and use transit and shared vehicles at the current rate, as population and income grow over time.

**2 Revolutions (2R) Scenario**
- Electrification + Automation
- We embrace more technology. Electric vehicles become common by 2030, and automated electric vehicles become dominant by 2040. However, we continue our current embrace of single-occupancy vehicles, with even more car travel than in the BALI.

**3 Revolutions (3R) Scenario**
- Electrification + Automation + Sharing
- We take the embrace of technology in the 2R scenario and then maximize the use of shared vehicle trips. By 2030, there is widespread ride sharing. Increased transit performance—with on-demand availability—and strengthened infrastructure for walking and cycling, allowing maximum energy efficiency.

**Number of Vehicles on the Road by 2050**
- **2.1 billion**
- **2.1 billion**
- **0.5 billion**

**CO₂ Emissions by 2050**
- **4,600 megatonnes**
- **1,700 megatonnes**
- **700 megatonnes**

Source: ITDP, UC Davis
Electrification is key to an energy transition in transport.
Renewable energy from sun and wind replaces fossil fuels.

**Options for the „post fossil“ future of transport**

- **Internal Combustion Engine**
  - Liquid or gaseous Bio Fuels
  - Liquid or Gaseous Power Generated Fuels (PtX)

- **Energy Transition in Transport**

- **Electromobility** (incl. PHEV, REEX and Trolley Trucks)

- **Alternative Propulsion**
  - Fuel Cell Vehicles with renewably generated Hydrogen

Source: Figure by INFRAS
The direct use of Electricity in LDV is the option with the lowest cost of decarbonisation for the national economy.

Accumulated Difference Costs for Technology Options 2050 compared to BAU.

Source: Öko-Institut, INFRAS, DVGW, im Auftrag UBA
20 Cities only account for 40% of the EV Sales worldwide.

These Cities represent 3% of the population and 8% of annual vehicles sales.

Emission impossible! – Mission possible?
Depends on the right Policy Mix!

Foto: iStockphoto, Dragan Smilkovic
The relevance of the Post-2020 CO₂-Regulation for LDV for the Climate Protection Goals for Transport in Germany 2030

- The KOM proposal reduces CO₂ from LDV only by 3,5 Mio. t.
- With the KOM proposal the distance to target 2030 remains 45 Mio. t CO₂
- With more ambitious targets the reduction may reach 10 to 20 mio. t.

Source: Agora Verkehrswende (2018), p. 6
GHG Emission Reduction
Scenario „User Costs & TDM“ (Avoid & Sift)

Emission Reduction in Mio. t CO₂

Source: Agora Verkehrswende based on the research of Öko-Institut, not published yet.
Process steps for the production of hydrogen, PtG-methane and PtL-fuels from renewable energies

Source: Agora Verkehrswende
Thank you very much for your attention!

Comments or Questions? – Please do not hesitate to contact me:

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