How the global transport sector contributes to Climate Change.

THE TRANSPORT SECTOR
A major contributor to global anthropogenic CO₂ emissions

GLOBAL ANTHROPOGENIC EMISSIONS
≈ 38 GtCO₂

TRANSPORT EMISSIONS
≈ 8.8 GtCO₂

ROAD TRANSPORT EMISSIONS
≈ 6.5 GtCO₂

Legend:
- Rail
- Aviation
- Road
- Marine
- Heavy-Duty Vehicles
- Light-Duty Vehicles

Source: ICCT 2015

Agora Verkehrswende 04.12.2017
Transport is already part of Climate Action Plans

Next steps will be sectoral targets

Source: GIZ
Transport Plays Strong Role in NDCs, But More Ambition Needed

- Countries submitted Nationally Determined Contributions (NDCs) before COP21 in Paris to show planned climate action
- 75% of NDCs highlight transport as mitigation source
- BUT Strong focus on passenger transport
- Planned transport mitigation measures aim at cities
Greater ambition also needed at the national level

Overview of existing mobility and energy measures across G20 countries

<table>
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<tr>
<th>Country</th>
<th>National Programmes to Support Shift to Transport</th>
<th>Measures to Support Low-Carbon Logistics</th>
<th>Measures to Support New Mobility Services</th>
<th>Measures to Support Non-Motorised Transport</th>
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Federal Climate Protection Plan 2050: The Verkehrswende is an official goal of the Government.

For the first time ever the German transport sector has an own ambitious emission reduction target.

## Sector Goals for 2030

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

<table>
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<th>Sector</th>
<th>1990</th>
<th>2014</th>
<th>2030</th>
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<td>Energy</td>
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<td>358</td>
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Source: Süddeutsche Zeitung
German greenhouse gas emission reduction sector targets 2030 (Climate Action Plan 2050, November 2016)

<table>
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<tr>
<th>Sector</th>
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<th>2014*</th>
<th>2030* (reduct., comp. to 1990)</th>
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<td>Total</td>
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in million tonnes of CO2 equivalents

Data: Federal German Government

Agora Verkehrswende  04.12.2017
Core elements of the transport transformation

TRANSPORT TRANSFORMATION
This large-scale transformation will ensure that transport is carbon neutral by 2050.

MOBILITY TRANSITION
The transition to sustainable mobility will reduce energy consumption without limiting mobility.

+ ENERGY TRANSITION IN TRANSPORT
The transition to clean energy in the transport sector will cover remaining demand with carbon-neutral energy.
Transforming the transport sector is crucial for the success of the clean-energy transition.

Transforming transport requires decarbonisation and sustainable mobility.

Efficiency is the guiding principle of the transport transformation.

In cities, the mobility transition has already begun.

Rural areas also benefit from the mobility transition.

Driverless vehicles are ideal for shared use.
Carbon-neutral fuels can supplement wind and solar energy.

The freight sector needs an improved rail system and climate-neutral roads.

Power supply and transport benefit from sector coupling.

Rethinking the development and financing of transport infrastructure.

The transport transformation can strengthen German industry.

The transport transformation will be driven by its benefits to society.
Passenger transport: Reducing energy consumption by strengthening the mobility network and using digitalisation

The mobility network
- Public transport
  - Light rail
  - Subway
  - Tram
  - Bus
  - Taxi
- Non-motorised transport
  - Bicycle
  - Pedestrians
- Collaborative mobility
  - Carsharing
  - Ridesharing
  - Bikesharing

Digitalisation in transport – trends and potentials
- Automation
- Collaborative mobility
- Connectivity
- Reduction
- Fuel consumption
- Space consumption
- Vehicle stock
- Traffic accidents
- Cost of mobility
- Vehicle kilometers traveled
- Emissions

Authors’ figure

Agora Verkehrswende 04.12.2017
Freight transport: Reducing energy consumption through shifting from road to rail

Trains need 80 percent less energy than trucks but make up only 18 percent of German freight traffic

Authors’ figure based on UBA (2016g)
Companies taking action: Example DHL

Interim goals 2025:

• Increase the carbon efficiency of its own activities and those of its transport subcontractors by 50% compared to the 2007 baseline.

• Operate 70% of its own first and last mile services with clean pick-up and delivery solutions e.g. by bike and electric vehicle.

• More than 50% of sales will incorporate Green Solutions, making customers' supply chains greener.

• Train and certify 80% of its employees as GoGreen specialists by 2025, and actively involve them in its environmental and climate protection activities. Join with partners to plant one million trees every year.
GHG emissions and energy consumption of various combinations of powertrains and energy sources in 2020 (cars, well-to-wheel)

Figure based on JRC, EUCAR, CONCAWE (2014b), ILUC not included

Electric vehicles
1. Electricity in BEV (wind)
2. Electricity in BEV (EU mix)
3. Hydrogen in FCEV (wind)
4. Hydrogen in FCEV (reforming of natural gas)

Fossil fuels
5. Hybrid diesel (petroleum)
6. Hybrid gasoline (petroleum)
7. Diesel (petroleum)
8. Gasoline (petroleum)
9. Natural gas (CNG)

Biofuels and synthetic fuels
10. Biodiesel (rapeseed)
11. Ethanol (sugar beet, used in E10 blends)
12. Biomethane (maize)
13. Biomethane (municipal waste)
14. Syndiesel (B2L, waste wood)
15. Syndiesel (P2L, renewable electricity)
16. Synmethane (P2G, renewable electricity)
Amount of renewable energy required for various powertrain and fuel combinations (per 100 km)

- **15 kWh**: Battery electric vehicle + direct charging
- **31 kWh**: Fuel-cell vehicle + hydrogen
- **93 kWh**: Combustion engine vehicle + power-to-gas
- **103 kWh**: Combustion engine vehicle + power-to-liquid

Authors’ calculations and figure based on DLR, Ifeu, LBST, DFZ (2015), p. 15
Core options for the Energy Transition in Transportation (until 2050)

- **LDV**: BEV as benchmark
- **HDV**: Preferential technology open
- **Bus**: BEV as benchmark
- **Aviation**: Power-to-Liquid as alternative to Biokerosene
- **Maritime**: PtX indispensable
- **Rail**: Complete electrification

Source: INFRAS/Quantis 2015.
Ergebnisse Szenario A:
Entwicklung der Treibhausgasemissionen bis 2030

Im Szenario A werden die Minderungsziele des KSP für den Verkehr in Deutschland bis 2030 erreicht.

Minderung ggü. 1990 ca. 41%
Ergebnisse Szenario C: Minderungsbeiträge der Einzelmaßnahmen

Schätzung der Minderungen in Mio. t im Vergleich zu 1990.

- Dienstwagensteuer: 13
- Energiesteuer: 1
- Lkw-Maut: 8
- Pkw-Maut: 10
- Förderung Rad: 5
- Reform ÖV-Finanzierung: 4
- Tempolimit: 0,7
- Lebenswerte Innenstädte: 0,5
- Pkw-Effizienz: 4
- Lkw-Effizienz: 3
- Gap zum Ziel: 1
Comparing different ambition levels for EU-CO$_2$-Regulation

Contribution of EU-CO$_2$-Regulation for PC to Germany’s Climate Protection Plan 2050 in different scenarios

- Sz. D: 75% (50%, NTE) - 19.7 Mio. t CO$_2$ Emission Reduction, 31 Distance to Target
- Sz. C: 45% (20%, NTE) - 9.6 Mio. t CO$_2$ Emission Reduction, 41 Distance to Target
- Sz. B*: 30% (13%) - 3.0 Mio. t CO$_2$ Emission Reduction, 48 Distance to Target
- Sz. B: 30% - 0.7 Mio. t CO$_2$ Emission Reduction, 50 Distance to Target
- Sz. A: 20% - 51 Distance to Target
Conclusions

➢ Paris will fail without ambitious action on transport
➢ Countries like Germany and Brazil are key players to take action
➢ Sectoral targets and a clear roadmap are required to deliver an ambitious NDC
➢ Need for a holistic, integrated approach on local and national level
➢ Without a Energiewende you will not able to achieve a Verkehrswende

Download link: https://www.agora-verkehrswende.de/en/12-insights/

Thank you very much for your attention!

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

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