Transport climate strategies in G20 – how ambitious are we?

From Ambition to Action: Decarbonising Transport

Daniel Bongardt

GIZ Headquarters Bonn
10 November 2017
NDC Ambition Cycle

<table>
<thead>
<tr>
<th>NDC SUB-MISSION (2025/30)</th>
<th>UNFCCC Facilitative dialogue</th>
<th>NDC SUB-MISSION (2030/35)</th>
<th>UNFCCC Global stocktake</th>
<th>NDC SUB-MISSION (2035/40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>2015</td>
<td>2016</td>
<td>2017</td>
<td>2018</td>
</tr>
<tr>
<td>2019</td>
<td>2020</td>
<td>2021</td>
<td>2022</td>
<td>2023</td>
</tr>
<tr>
<td>2024</td>
<td>2025</td>
<td>...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Preparing the groundwork
Developing & negotiating the NDC
Implementing the NDC
Transport sector planning

Source: GIZ, 2017
G20 is in the driver’s seat: 69% of transport GHG emissions.

CO₂ emissions from the transport sector 1990 – 2014

Source: Own illustration based on data from IEA
Main growth of transport CO₂ emissions in emerging economies

G20 per capita CO₂ emissions and change in the transport sector

Source: Authors’ figure based on data from IEA (2016) and World Bank (2017)
Transforming Transport is key to delivering on the Paris Agreement

Transport sector emissions: business-as-usual and required reductions under 2°C and 1.5°C scenarios

Note: Simplified illustration based on historic levels and projected 2050 levels. Individual scenarios are likely to peak around 2020 and then decrease emissions at higher rates afterwards.

Source: Authors’ figure, historic emissions based on data from IEA (2016), projections based on data from Gota et al. (n.d.).
NEW: G20 Stocktake on sectoral ambition

Towards Decarbonising Transport
A G20 Stocktake on Sectoral Ambition

Taking stock of G20 Sectoral Ambition

Development of gasoline prices in G20 countries 1995–2016

Source: Authors’ figure based on data from GIZ
GERMANY

Germany is the most populous country in Europe, with particularly dense urban clusters on its western borders. Germany lies on the Baltic and North Seas, and has a well-established network of navigable waterways. Despite its comparatively small size, the country has the 12th largest railway network and the 18th largest waterway system worldwide. Nevertheless, road transport is by far the most important mode of transport for passengers and freight, and its importance has increased in recent decades. High levels of local congestion and air pollution are an issue, particularly in select urban centres. Numerous cities have continuously failed to meet EU caps on airborne particulates.

Germany has set an absolute target for domestic transport sector emissions in 2030 of 95–98 Mt CO₂. Germany has implemented a number of measures to enhance energy efficiency and reduce the carbon content of fuels, but has done less to promote alternative modes of transport.

Source: 6th National Communication; GIZ World Factbook

POPULATION

81.7 mio people
POPULATION CURRENT IN 2015

1.1%
SHARE IN GLOBAL POPULATION IN 2015

URBANISATION

75.3% of total
URBAN POPULATION IN 2015

74.86%
G20 AVERAGE

53.86%
WORLD AVERAGE

7.868.538 people
POPULATION IN URBAN AREAS OF > 1 MIO (2015)

SHARE IN TOTAL POPULATION 2015

9.6%

MOBILITY

685 road motor vehicles per 1000 inhabitants
MOTORISATION RATE (2015)

1.090.566 mio passenger-km
PASSENGER TRANSPORT VOLUME* (2014)

506.589 mio tonne-km
FREIGHT TRANSPORT VOLUME** (2014)

Passenger-km per mode

Tonne-km per mode

* Includes road and rail transport, not non-motorised transport modes
** Includes road, rail and inland waterways, does not include pipelines or air transport

Sources: World Development Indicators, OECD

0.93 HDI*
HUMAN DEVELOPMENT INDEX* IN 2015

357.380 km²
TOTAL AREA (2016)

234.11 People/km²
POPULATION DENSITY (2015)
WORLD AVERAGE: 57

43,788 constant 2011 international $ (PPP)
GDP PER CAPITA (2015)

3,31%
SHARE IN GLOBAL GDP (2015)

Source: World Development Indicators, OECD

* The human development index is a value from zero to 1, with 1 representing the highest possible development according to the covered indicators

GDP PER CAPITA

WORLD AVERAGE: 14,725

G20 AVERAGE: 18,379

$ = 1000 $
Country Fact Sheet (Page 2)

**TOTAL EMISSIONS**

Germany's total CO₂ emissions from fuel combustion have decreased by 22% since 1990. Emissions in the transport sector increased up to 1999, decreased until 2009 and have been slowly growing since then. In 2015, emissions from transport were just below 1990 levels. Per capita emissions of the transport sector are almost exactly at the G20 average. Given current trends, transport sector emissions are projected to grow by as much as 44% by 2030 while also capturing a larger share of overall emissions. Road transport is by far the largest source of German transport sector emissions, with a 94% share, followed by rail, representing just 4% of emissions.

729.77 Mt CO₂
TOTAL CO₂ EMISSIONS FROM FUEL COMBUSTION (2015)

-22%
CHANGE IN TOTAL EMISSIONS (1990–2015)

8.93
G20 Average: 8.4
SHARE IN GLOBAL EMISSIONS (2015)

2.25%
1 CO₂ per capita

**TRANSPORT SECTOR EMISSIONS**

157.54 Mt CO₂
TOTAL GHG EMISSIONS IN THE TRANSPORT SECTOR (2015)

-0.7%
CHANGE IN TRANSPORT SECTOR EMISSIONS (1990–2015)

2015
G20 Average: 1.1

2030
G20 Average: 2.3

1 CO₂ per capita

**Transport emissions by subsector**

- Road: 93.8%
- Rail: 3.7%
- Domestic Navigation: 0.6%
- Domestic Aviation: 1.4%
- Pipeline: 0.4%
- Non-specified: 0.2%

**Historic and projected* emissions in the transport sector**

- Historic
- National target 2030 high value
- National target 2030 low value

* Projected emissions under business-as-usual scenario
Coal is still the dominant fuel source for power generation in Germany, representing 44% of the power mix (global average: 39%). Germany has a renewable energy law (EEG) that regulates access to renewables and provides incentives. The law used to set fixed feed-in tariffs for individual technologies over a 20-year period. In 2017 an auction system was rolled out for wind and biomass. Rooftop PV installations below 750 kW still receive a fixed feed-in tariff.

Existing targets for renewable electricity generation

- 2025: 40–45%
- 2035: 55–60%
- 2050: 80%

**450,100 gCO₂/kWh**

% of total electricity output

SHARE OF RENEWABLES IN ELECTRICITY PRODUCTION* (2014)

**11279 GWh**

ELECTRICITY USE IN TRANSPORT (2015)

SHARE IN TOTAL ELECTRICITY USE

* Including hydropower

Sources: IEA, Covenant of Mayors, World Development Indicators, RES LEGAL Europe

**Energy use in transport by fuel**

- Fuel oil: 0%
- Aviation Gasoline: 1.33%
- Biogas: 0.7%
- LPG: 1.1%
- Biogasoline: 1.3%
- Electricity: 1.8%
- Biodiesel: 3.2%
- Motor Gasoline: 32%
- Gas/Diesel: 59.3%

Year: 2015  Source: IEA

**Share of biofuels imported (2015)**

**42%**

**Biofuel supply and use**

- Production
- Exports
- Imports
- Use in Transport

- Gas/Diesel
- Biodiesel
- Biogasoline

Year: 2015  Source: IEA

**Market share of electric cars in the national market (2016)**

**0.73%**

**Share of new registrations in total EV stock (2016)**

**33.8%**

**Publicly accessible charge infrastructure (2016)**

- **16.550** SLOW CHARGE
- **1.403** FAST CHARGE
- **13.969** SLOW CHARGE G2O AVERAGE
- **13.295** FAST CHARGE G2O AVERAGE

**Share of electric cars in total passenger car stock (2016)**

**0.16%**

**Number of units**

Source: IEA EV Outlook 2017

**Transport climate strategies in G20**

15/11/2017
Country Fact Sheet (Page 4)

**AMBITION**

**NDC target**
See EU: committed to a 40% reduction in GHG emissions in 2030 compared to 1990.

**Transport related target**
No mention

**Transport related measures**
No mention

**Targets at national level**
- The National Climate Plan 2050 sets an absolute target for 2030 at 95–98 MtCO₂.
- The Energy Strategy from 2010 sets the target to reduce primary energy consumption in the transport sector by 10% by 2020 and 40% by 2050.
- The National Sustainability Strategy 2016 set targets to reduce primary energy consumption for passenger transport and freight by 15-20% by 2030 compared to 2005.
- The German government has also set the target of 1 million electric vehicles by 2020.


**TRADE-OFF’S**

**Sustainability of biofuels**
The EU Renewable Energy Directive establishes two sets of criteria to promote the sustainability of biofuels production:
- GHG emissions savings and land use requirements must be at least 50% (60%) for new installations in 2018, and
- biodiesel may not be produced on land that was converted from high carbon density conditions such as rainforests.

To demonstrate compliance with the EU sustainability criteria, biofuels need to be validated by national verification systems or by one of 20 voluntary schemes approved by the EC.

Source: OECD

**Subsidies**

**1 Billion euros**

**LEVEL OF FOSSIL FUEL SUBSIDIES IN THE TRANSPORT SECTOR (2014)**

Source: OECD

**IMPLEMENTATION**

**Mobility**

- National programmes to support shift to public transport
  - No measures at national level
- Measures to support low-carbon freight logistics
  - Public grants for transport hubs to support modal shift from road to rail and waterways
  - Subsidies for the expansion and re-activation of unused rail infrastructure
- National-level measures to support new mobility services
  - No measures at national level
- National measures to support non-motorized transport
  - National Cycling Plan 2020
  - National competition for measures to increase cycling, including delivery services
- Road charges
  - Toll for heavy goods vehicles (Federal Trunk Road Toll Act), depending on the pollutant class

**Energy**

- Energy/carbon emission standards LDV
  - EU CO₂ efficiency targets
  - Passenger cars: 95 g/km (2020)
  - Light commercial: 147 g/km (2020)
- Energy/carbon emission standards HDV
  - No standards
- Pricing instruments
  - Circulation tax partly based on CO₂
  - VAT discount for public transport
- Mandatory vehicle labelling
  - National implementation of the EU Car Labelling Directive 1999/94/EC
- Support mechanism for electric vehicles & charging infrastructure
  - Purchase rebates for EVs at the limit of 400,000 cars until 2020 or EUR 600 million. Ten-year circulation tax exemption, reduced to five years from 2021. Tax deduction for company cars. Differentiated plates for EVs, allowing for differentiated measures. 300 mio € Euro investment subsidy programme for charging infrastructure
- Support for other low-carbon fuels and propulsion systems
- Mandatory biofuel targets
  - The EU has a mandatory requirement of 10% renewable energy transport by 2020, with a cap of 7% for first generation biofuels. This also applies to Germany, which moved from mandated shares of biofuels to a mandatory reduction in GHG emissions of 4%, compared to the fossil fuel equivalent, which is scheduled to increase to 6% by 2020

Source: See national sources Germany
NDCs: Transport related targets and measures in the G20

Source: NDC and INDC submissions to the UNFCCC
Other strategies: Transport related national targets in the G20

Source: Own research, various documents
Ambitious GHG emission targets require comprehensive actions

Mobility transition: Avoid, shift, improve

Energy transition in transport: Fuels

Source: Martin Schmied, 2015
Stocktake of mobility transition – Greater ambition needed

Overview of existing mobility measures across G20 countries

<table>
<thead>
<tr>
<th></th>
<th>National programmes to support shift to public transport</th>
<th>Measures to support low-carbon freight logistics</th>
<th>National-level measures to support new mobility services</th>
<th>National measures to support non-motorised transport</th>
<th>Road charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>Australia</td>
<td>no</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
<td>no</td>
</tr>
<tr>
<td>Brazil</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Canada</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>China</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>EU</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
<td>no</td>
</tr>
<tr>
<td>France</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
<td>existing</td>
</tr>
<tr>
<td>Germany</td>
<td>no</td>
<td>no</td>
<td>existing</td>
<td>existing</td>
<td>existing</td>
</tr>
<tr>
<td>India</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Indonesia</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>existing</td>
<td>existing</td>
</tr>
<tr>
<td>Italy</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>Japan</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Korea, Rep.</td>
<td>existing</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Mexico</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>Russian Fed.</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>South Africa</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>existing</td>
<td>no</td>
</tr>
<tr>
<td>Turkey</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>UK</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
<td>existing</td>
<td>existing</td>
</tr>
<tr>
<td>United States</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

1. National programmes to support a shift to public transport
2. Measures supporting green logistics
3. National measures to support walking and cycling
4. Road charges and pricing at national level

Note: The existence of measures does not imply their adequacy. / Source: Agora Verkehrswende & GIZ
Stocktake of energy transition in transport – Greater ambition needed, too

Overview of existing energy measures across G20 countries

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>Australia</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>Brazil</td>
<td>existing</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>Canada</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>China</td>
<td>existing</td>
<td>existing</td>
<td>no</td>
<td>no</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>EU</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>France</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>Germany</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
<td>yes</td>
<td>existing</td>
<td>existing</td>
<td>existing</td>
</tr>
<tr>
<td>India</td>
<td>existing</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>no</td>
<td>existing</td>
</tr>
<tr>
<td>Indonesia</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Italy</td>
<td>existing</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>existing</td>
<td>existing</td>
</tr>
<tr>
<td>Japan</td>
<td>existing</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Korea, Rep.</td>
<td>existing</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Mexico</td>
<td>existing</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Russian Fed.</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>existing</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>South Africa</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Turkey</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>UK</td>
<td>existing</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>United States</td>
<td>existing</td>
<td>existing</td>
<td>yes</td>
<td>yes</td>
<td>existing</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

1. Fuel economy or emission standards
2. Pricing instruments (Taxes, ETS, subsidies)
3. Vehicle labelling
4. Support for EVs and charging infrastructure
5. Biofuel quotas
6. Support for other fuels

Note: The existence of measures does not imply their adequacy. Source: Agora Verkehrswende & GIZ
Main challenges: Fossil fuel subsidies, sustainability of biofuels, power sector link

Share of renewables in electricity output and targets for selected G20 members

Note: Only G20 members with targets expressed in share of renewable electricity output (including hydro) are shown. Source: REN21 (2017), World Bank (2017)
Conclusions:
Decarbonising transport is a global project.

More ambition and action is needed at the national level.

- Set clear targets for the transport sector.
- Strengthen and complement existing measures.
- Filling the policy gaps.
- Link to the energy sector.

Transport needs to move up on the international agenda.

- Expand collaboration between countries (even beyond G20) on efficiency and mobility solutions.
- G20 to engage in dialogue with industry.
Our Publications


Thank you!
daniel.bongardt@giz.de