



27.1 Major Developments in 2017

The UN Climate Change Conference - November 2017 took place 6-17 November in Bonn, Germany. Chancellor Angela Merkel confirmed in her speech Germany's commitment to the national climate action plan 2050³⁶ and the goal to reach largely greenhouse gas neutrality in the mid of the century. For 2020, Germany faces the ambitious target of 40 % reduction related to 1990. This also played a central role in the forming of the new German government³⁷. In the contract of the renewed 'grand coalition' the role of Germany as a pioneer in climate protection and its commitment to the national, European and international climate goals for 2020, 2030 and 2050 is confirmed. The gap to the 2020-targets needs to be reduced and a law for the 2030-targets is envisaged³⁸. For transport and mobility, air pollution prevention is also an important topic here: incentives for low-emitting mobility, the support of car-sharing and alternative power trains, investments in electric mobility, amongst others hydrogen and fuels cells, as well as the support of battery cell production in Germany and the build-up of 100,000 charge points until 2020 is mentioned here.

27.1.1 New Policies

Meeting the EU air quality standards set in the Sixth Environment Action Programme of the European Community entitled "Environment 2010: Our Future, Our Choice" and in Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe³⁹ is a matter of ongoing discussion in Germany. Concentrations of ambient air with nitrogen dioxide (NO₂) have improved however still about 70 municipalities faced

³⁶ https://unfccc.int/files/focus/long-term_strategies/application/pdf/161114_climate_action_plan_2050_en_bf.pdf

³⁷ <https://www.bundesregierung.de/Content/DE/Rede/2017/11/2017-11-15-bk-cop23.html?nn=391850#Start>

³⁸ <https://www.mdr.de/nachrichten/politik/inland/download-koalitionsvertrag-quelle-spd-100-downloadFile.pdf>

³⁹ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2008.152.01.0001.01.ENG&toc=OJ.L:2008:152:TOC

threshold exceedances in 2017⁴⁰. Also particle concentrations were lower in 2017 in average compared to 2005-2016. However still about 87 % of all measurement stations in Germany are above the WHO target of exceeding 50 $\mu\text{g}/\text{m}^3$ at the utmost of three days per year (ibid.).

Therefore, in November 2017, the German Government and related Federal States and cities and municipalities agreed on a programme for better air quality in cities. The German Government issued an instant programme “Clean Air 2017-2020” which supports the following in the context of e-mobility amongst other items⁴¹:

- Electrification of urban commercial transport
- Electrification of taxis, rental cars, and car sharing vehicles
- Electrification of bus fleets in public transport
- Support of charging infrastructure related to the incentivised vehicles
- Improvement of electricity grid stability due to new charging infrastructure
- Built-up of low-cost infrastructure and mobile-metering charge points.

27.1.2 Legislation

In 2016, the federal regulation defining technical requirements for the installation and operation of public charging stations, the so-called “Ladesäulenverordnung (LSV)” entered into force. It transposes EU regulation into national law and supports an accelerated implementation of charging infrastructure. The central element of the regulation is the specification of standardised plugs and socket-outlets according to IEC 62196. Depending on charging power, type 2 (> 3.6 kW) or Combo 2 (>22 kW) connections are mandatory for new charging stations. In 2017, minimum payment standards have been set with the amendment of the charge point rules in 2017⁴² (Ladesäulenverordnung, LSV) securing the non-discriminating access to charging infrastructures⁴³.

In 2016, the “Umweltbonus⁴⁴”, a federal monetary purchase incentive programme for electric vehicles has started. Purchase of PEV is supported with 4,000 EUR for BEV and 3,000 EUR for PHEV (half of the amount is to be paid by the OEM). A budget of 600 million EUR has been provided to promote the purchase of at least

⁴⁰ <https://www.umweltbundesamt.de/presse/pressemitteilungen/luftqualitaet-2017-rueckgang-der>

⁴¹ https://www.bundesregierung.de/Webs/Breg/DE/Themen/Saubere-Luft/_node.html

⁴² https://www.umwelt-online.de/PDFBR/2017/0256_2D17.pdf

⁴³ <http://www.bmwi.de/Redaktion/DE/Dossier/elektromobilitaet.html>

⁴⁴ http://www.bafa.de/SharedDocs/Downloads/DE/Energie/emob_merkblatt_antrag.pdf?__blob=publicationFile&v=5

300,000 vehicles. The incentive will end when the budget has been spent, or latest of at the end of 2019.

Until February 2018, a total of 54,274 applications have been handed in which distributes among the vehicle categories as follows ⁴⁵:

- 31,312 for BEV
- 22,946 for PHEV
- 16 for FCEV

The subsidy is restricted to BEV, FCV or PHEV (CO₂ emission ≤ 50 g CO₂/km) listed by the Federal Office for Economic Affairs and Export Control ⁴⁶.

Requirements include:

- initial vehicle registration
- category M1, N1 or N2⁴⁷ vehicles (L-category vehicles are excluded)
- models with a net list price ≤ 60,000 EUR (basic version)

27.1.3 Tax Incentives

In November 2016, a law for the tax promotion for electric mobility entered into force. It extends the tax exemption for fully electric vehicles to ten years with retroactive application for vehicles registered after January 1, 2016. Vehicles converted to purely electric vehicles by technically appropriate, authorized means are included in the tax exemption⁴⁸.

Income tax law additionally promotes electric mobility. The benefit in kind in form of gratuitous charging at work, granted to employees by their employer, is exempted from income tax. Exemption is valid both for purely and hybrid electric vehicles. Charging infrastructure given to the employee for free may be taxed with a flat-rate tax of 25 %. The same tax rate may be applied for subsidies for charging infrastructure granted by employers.

⁴⁵ http://www.bafa.de/DE/Energie/Energieeffizienz/Elektromobilitaet/elektromobilitaet_node.html

⁴⁶ http://www.bafa.de/SharedDocs/Downloads/DE/Energie/emob_liste_foerderfaehige_fahrzeuge.pdf?__blob=publicationFile&v=8

⁴⁷ if covered by a category B driver's license

⁴⁸ http://www.bundesfinanzministerium.de/Content/DE/Gesetzestexte/Gesetze_Verordnungen/2016-11-16-G-stl-Foerderung-Elektromobilitaet.html

27.1.4 Automotive Industry

At the end of 2017, 29 PEV models were available from German manufacturers⁴⁹. The portfolio covers all segments from small cars to large sports utility vehicles and luxury cars. The majority of electric vehicles made in Germany are PHEV. Five BEV models were available in 2017. However, all German manufacturers announce battery electric vehicles for the future.

Furthermore, in 2017 Mercedes Benz presented its SUV with fuel cell plug-in hybrid technology as part of the IAA as a pre-production model. The GLC F-Cell is expected in the market in 2018. After BMW announced an electric offensive with twelve pure electric and 13 plug-in hybrid models by the year 2025, the German company also showed the SUV-Concept X7 iPerformance at the IAA, which will be presented in the coming year as a production model. Audi presented two concept vehicles with electric drives at the IAA 2017. The two showcars are an SUV coupe based on the e-tron Sportback concept with three electric motors and a luxury class concept with four electric motors and a range between 700 and 800 kilometers. VW announced an electrification offensive with the “Roadmap E”.

Besides the continuously growing portfolio of electric passenger cars, German manufacturers of light and heavy duty vehicles have visibly increased their activities concerning electric mobility. With his Brand Fuso, the Daimler Group improved the competitiveness of electric light trucks. The Fuso eCanter has been produced since July in a small series in the Portuguese plant Tramagal. MAN Truck and Bus has also started to produce its electric distribution-truck with a Range of a total of 200km in a small series. Apart from presenting new concepts, the largest producer of battery electric light duty vehicles in Germany, Streetscooter, reached the milestone of 1,000 produced units⁵⁰.

Daimler and Porsche announced investments in BEV production sites in Germany. Porsche expands its main factory in Stuttgart, while Daimler will produce its first EQ model in Bremen. Furthermore, Daimler plans to spread its BEV manufacturing onto its international production network. Volkswagen confirmed that its first battery production site will be built in Germany. The location and completion date have not yet been finally decided⁵¹.

⁴⁹ vda.de

⁵⁰ http://www.dpdhl.com/de/presse/pressemitteilungen/2016/deutsche_post_bundesumweltministerium_praesentieren_1000sten_streetscooter.html

⁵¹ <http://www.sueddeutsche.de/wirtschaft/volkswagen-vw-will-batteriefabrik-in-deutschland-bauen-1.3241880>

The automotive supplier ZF founded a new E-Mobility division to merge all its powertrain electrification activities. Bosch expanded its e-mobility activities by creating a sharing service for electric two wheelers. The station-based project is named “Coup” and started in Berlin with a fleet of 200 scooters.

27.2 HEVs, PHEVs and EVs on the Road

New car sales in 2017 have cumulated to 3.44 million. This corresponds to a 2.7 % year-on-year growth. BEV sales experienced a strong growth of 120 % year-on-year to 25,056; HEV sales increased by 76 % to 84,675; PHEV sales increased by 114 % year-on-year to 29,436. The widespread discussion of air pollution by diesel cars might have led to a 13 % decrease in sales compared to 2016, reaching a share of 38.8 %. Gasoline cars (57.8 %) still remain at a high level. The average CO₂ emission of the new car fleet increased by 0.5 g/km to 127.9 g/km compared to 2016.

As of January 1, 2018, 56.5 million motorised vehicles were on the road in Germany, including 46.5 million passenger cars, 117,000 L category vehicles, 4.2 million motor bikes, 5.2 million trucks and 79,000 buses. The stock of BEV amounted to 53,861, that of HEV to 236,710. This corresponds to a year-on-year growth of 58 % and 43 %, respectively. With 4,322 sold units the Renault Zoe was the most popular BEV in 2017. It is followed by the VW Golf (3,026) and the Smart Fortwo (2,987). The most popular PHEV were the Audi A3 e-Tron (4,454 sold units), the BMW 225xe Active Tourer (3,680 sold units), and the Mitsubishi Outlander PHEV (2,234 sold units⁵²).

Table 1: Distribution and sales of EVs, PHEVs and HEVs in 2017 (Data source: KBA, Kraftfahrtbundesamt)

Fleet Totals on 31 December 2017					
Vehicle Type	EVs	PHEVs	HEVs	FCVs	Total ⁵
2- and 3-Wheelers, Quadricycles ¹	9,305	2	260	0	4,372,978
Passenger Vehicles ²	53,861	44,419	192,291	325	46,474,594
Buses and Minibuses ³	183	1	361	15	79,438
Medium and Heavy Weight Trucks ⁴	11,813	9	122	2	3,031,139
Totals without bicycles	75,162	44,431	193,034	342	53,958,149

⁵² <http://eafo.eu/vehicle-statistics/m1>

2018 HEV TCP ANNUAL REPORT

Total Sales during 2017					
Vehicle Type	EVs	PHEVs	HEVs	FCVs	Total⁶
Passenger Vehicles ²	25,056	29,436	84,675	18	3,441,262

n.a. = not available

¹ UNECE categories L1-L7

² UNECE categories M1

³ UNECE categories M2-M3

⁴ UNECE categories N1-N3

⁵ Including non-electric vehicles

Table 2: Available vehicles and prices (Data source = OEM websites; all accessed in January 2018)

Market-Price Comparison of Selected PEVs in Germany	
Available Passenger Vehicles	Untaxed, Unsubsidized Sales Price (in EUR)
Renault Twizy 45	6,950 (plus 50 per month for battery rent)
Renault Twizy	7,650 (plus 50 per month for battery rent)
Citroen C-Zero	21,800
Peugeot iOn	21,800
Smart fortwo electric drive	21,940
Smart forfour electric drive	22,600
Citroen Berlingo Electric (L1)	24,978
Smart cabrio electric drive	25,200
Peugeot Partner Electric (L1)	25,335
Citroen Berlingo Electric (L2)	26,228
Peugeot Partner Electric (L2)	26,585
VW e-up!	26,900
VW e-load up!	27,495
Citroen E-Mehari (Courreges)	29,050
Kia Soul EV	29,490
Renault ZOE	30,100
Nissan Leaf (ZE1)	31,950
Hyundai IONIQ Elektro	33,300
Renault ZOE Z.E. 40 Battery	34,100
Nissan e-NV200 (L1/L2)	34,105
Ford Focus Electric	34,900
Renault Kangoo Z.E. 33	35,605
VW e-Golf	35,900
Renault Kangoo Maxi Z.E. 33	37,033

Market-Price Comparison of Selected PEVs in Germany	
Available Passenger Vehicles	Untaxed, Unsubsidized Sales Price (in EUR)
BMW i3 (94 Ah)	37,550
Nissan e-NV200 EVALIA	38,404
Opel Ampera-e	39,330
BMW i3s (94 Ah)	41,150
Nissan e-NV200 Combi	41,690
Tesla Model S 75D	69,019
Tesla Model X 75D	91,250
Tesla Model S 100D	105,320
Tesla Model X 100D	110,800
Tesla Model S P100D	144,670
Tesla Model X P100D	156,100

27.3 Charging Infrastructure or EVSE

As of June 2017, a total of 10,878 charging points were publicly available. Publicly available charging stations amount to 4,730⁵³. Most of the charging points enable 22 kW charging. About 566 charging points facilitate fast charging.

In November 2016, BMW, Daimler, Ford and Volkswagen with Audi and Porsche agreed to establish a high-powered charging network in Europe⁵⁴. The build-up started in 2017 and will eventually lead to a network of 400 350 kW DC ultra-fast chargers across Europe. The network will be equipped with the Combined Charging System (CCS) standard and is supposed to facilitate the BEV adoption across Europe.

The build-up of hydrogen infrastructure is slightly slower, but also advancing. The German alliance H2 Mobility by Air Liquide, Daimler, Linde, OMV, Shell and TOTAL has drawn a roadmap to build up 100 hydrogen fuel stations until 2018. Their target is to have up to 10 stations in the six biggest cities Hamburg, Berlin, Rhein-Ruhr area, Frankfurt, Stuttgart and Munich⁵⁵.

⁵³ <https://www.bdew.de/presse/presseinformationen/schon-10700-ladepunkte-deutschland/> and https://www.bdew.de/media/documents/PI_20171024_Anlage_Grafiken-Erhebung-Ladeinfrastruktur.pdf

⁵⁴ <http://media.daimler.com/marsMediaSite/en/instance/ko.xhtml?oid=14866747>

⁵⁵ <http://h2-mobility.de/>