

Germany

Key Issues

- + With regard to electricity, Germany has a relatively well developed market. However, there are serious issues as regards infrastructure bottlenecks within the country. These lead to significant loop flows through the networks of neighbouring countries (especially Poland and the Czech Republic). This development has been reinforced by the sharp increase in power generation from renewable energy sources in Germany. The potential challenges arising from such an increase need to be addressed, in particular to prevent obstacles to integration with neighbouring markets. Therefore Germany should continue working together with its neighbours with a view to identifying appropriate solutions to the problems. In particular, congestion management and transparency provisions for access to the network for the cross-border exchange of electricity should be introduced and national transmission capacity in the north-south direction reinforced, particularly in the light of offshore expansion plans and the integration of onshore renewables from wind and solar. Germany should also finalise its implementation of the European target model for electricity markets by 2014 on all of its borders.
- + With regard to gas, Germany should assess the correlation between gas and electricity demand, notably during cold weather periods. Infrastructure improvements are needed, as recommended by the Council¹, to address internal bottlenecks in the south, limiting north-south gas flows, and constraints in the network preventing gas from underground storage being fed into the transmission system. Major border points remain congested, preventing cross-border trade.

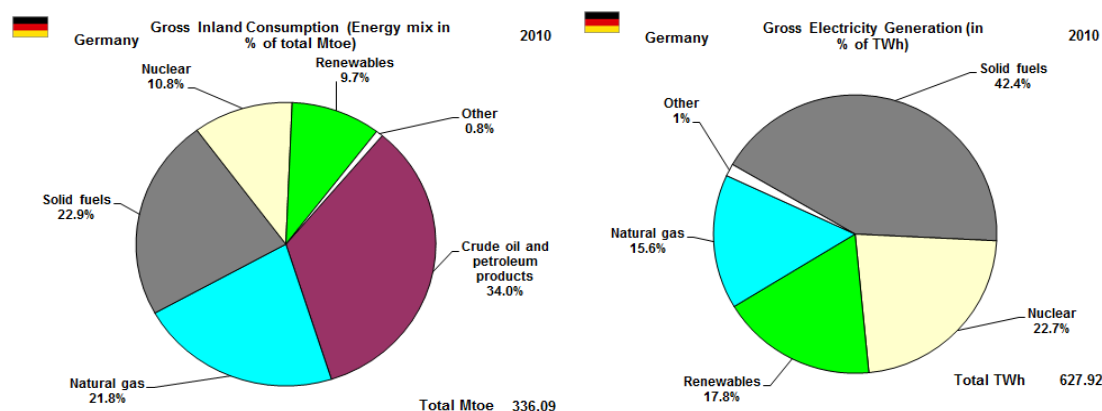
1. General overview

In 2010, the energy mix was dominated by fossil fuels, with crude oil and petroleum products accounting for more than one third. Solid fuels were almost equally divided between lignite and hard coal. In the electricity mix, fossil fuels had again the highest share, but solid fuels were the main source. The main source of renewable electricity was wind, contributing 38 TWh in 2010. As far as the renewable target for 2020 is concerned, the goal for Germany is an 18 % share of renewable energy.⁴⁶ This improved from 7.1 % in 2006 to 11 % in 2010. The production of renewable energy has substantially increased in Germany, meeting 20 % of consumption in 2011. Germany intends to increase this figure further to 35 % by 2020. The share of electricity from cogeneration⁴⁷ was 13.2% in 2010, which is a slight increase compared to the 2005 level of 12.6%.

⁴⁶ This is the share of renewables in Gross Final Energy Consumption.

⁴⁷ The share of electricity produced in combined heat and power plants (CHP).

Charts 1 and 2



Source: Eurostat

2. Regulatory framework

2.1. **General.** As Germany had notified full transposition of the Third Package Directives by the end of September 2011, no infringement proceedings for non-transposition have been opened. One infringement procedure is still open on the Second Package, concerning the lack of congestion management and transparency provisions for access to the network for the cross-border exchange of electricity.

2.2. **National Energy Regulator.** In 2010, the German national regulatory authority, the Bundesnetzagentur, employed 2600 employees, with 185 working on energy issues, and had an annual budget of EUR 155.4 million, including around EUR 18 million for energy regulation.

2.3. **Unbundling.** Germany's power transmission system comprises four TSOs: Tennet, Amprion, 50Hertz and TransnetBW. There are 54 regional utilities responsible for distribution and over 800 municipal distributors. For gas, there were 18 transmission system operators in 2010, down from 22 in 2006, the largest being Open Grid Europe, Wingas, Ontras, and Thyssengas, and 27 regional network operators. In 2011, there were 743 distribution system operators. The certification of most TSOs is under way. The German TSOs have opted for different unbundling models, i.e. partly for ownership unbundling (OU), partly for the Independent Transmission Operator (ITO) model. Both choices are as such legitimate under German law.

3. Wholesale markets

3.1. **Electricity.** Generation is still dominated by four large private companies, E.ON, RWE, EnBW and Vattenfall. Although their share was reduced after antitrust investigations by the Commission and the commitment by E.ON to divest 5000 MW of its generation

capacity,⁴⁸ the four largest producers together still controlled 82 % of the German electricity wholesale market in 2010.⁴⁹ The special regime for renewable power generation in terms of pricing and marketing in Germany poses specific challenges in that it tends to weaken the strength of market signals.

The German and Austrian wholesale markets are largely integrated.⁵⁰ Market integration with other neighbouring markets is progressing thanks to the introduction of market coupling in the CWE and Northern regions. Through the coupling of electricity markets in north-western Europe, the national electricity spot markets of 9 countries are now integrated at wholesale level. The power exchange EEX, located in Leipzig, operates the German power derivatives market (futures and options), whereas the German spot market (day-ahead and intra-day) is operated by EPEX Spot in Paris. Liquidity on both EEX and EPEX Spot is high. Regarding the trade in day-ahead volumes, this reached 238 TWh on EPEX Spot in 2011⁵¹ (47.1 % of German power consumption). The average day-ahead wholesale price in 2011 for baseload power was EUR 51.1/MWh (an increase of 14.8% compared to 2010). Compared to neighbouring countries⁵², the German energy price at wholesale level is fairly competitive, which can be explained partly by favourable weather conditions for the production of renewable electricity (mostly wind) and also its maturing technology, which decreases the marginal costs of wind power.

3.2. Gas. Germany produced approximately 13 % of its consumption in 2010, with net imports accounting for 82%. In volume, natural gas imports amounted to 88.7 bcm with the following breakdown : 37 % Russia, 33 % Norway, 25 % Netherlands and 5 % other countries. The German gas market has seen significant developments towards more competition over recent years. The German regulator has implemented an entry-exit system, reformed the balancing rules and reduced the number of market areas drastically, from more than 20 in 2006 to six in 2009 and only two market areas today. Today, Germany has a dual-quality market area (the L-gas and H-gas networks requiring separate operation for technical reasons) with all customers included in one large balancing area. Two antitrust decisions by the Commission addressed the problem of insufficient access to transport capacity in Germany. The Commission's intervention led RWE to divest its gas transport network and E.ON to release significant volumes at the entry points to its gas networks. Congestion of main import/export points due to long-term bookings remains an obstacle to cross-border trade and

⁴⁸ See European Commission, press release IP/08/1774, *Antitrust: Commission opens German electricity market to competition*, 26.11.08.

⁴⁹ However, this figure does not take into account subsidised renewable electricity production. If this is included, the four accounted for around 70 % of generation in 2010.

⁵⁰ Germany and Austria form one trading area.

⁵¹ Source: EEX annual report.

⁵² For a comparison with wholesale prices in neighbouring countries, please refer to Table 9 in the Staff Working Document on Energy Markets in the EU, part 2.

competition.

Recent German legislation on capacity allocation and congestion management is intended to improve the situation, particularly by increasing the use of capacity auctions on a centralised booking platform. Both German virtual points (hubs), NCG and Gaspool, have grown significantly since 2007. The volume of trading on the exchange has grown steadily, recording an increase of 216% in 2010 compared to 2009. One main reason for this was additional procurement on the exchange for system balancing energy by the two balancing zone operators, NetCologne Germany and Gaspool.⁵³ The average day-ahead wholesale price in 2011 was EUR 22.9/MWh on both hubs (an increase of 30.9% compared to 2010, which reversed the significant drop in 2009). This was due to the improvement in the economic climate and the rise in gas demand. Regarding **liquidity**, 9 TWh in day-ahead volumes were traded in 2011, compared to the national consumption of 870 TWh. With a churn rate of 2.1 for H-gas zones, as compared to that for TTF (3.4), there is a potential to increase liquidity. Gas delivered through Nord Stream is expected to contribute to a higher churn rate.

4. Retail markets

4.1. **Electricity.** In 2010, the share of the four largest electricity suppliers for household customers at national level was 43.8% (a drop of 6.3% within two years). However, this trend at national level has not affected the continuing dominant position of local basic suppliers at regional level, such as Stadtwerke. Household customers are still reluctant to switch away from local basic suppliers despite price discrepancies and the presence of competitors. Supplier **switching** increased from 4.9% in 2009 to 6.3% in 2010. **Power prices** for households and industrial consumers have increased in recent years. The structure of retail prices reveals that net power prices have changed only marginally, decreasing slightly for industrial consumers. The increase in retail prices is mostly due to taxes and levies. Network costs accounted for 42% of the electricity bill for German households (without taxes) in 2011, while energy and supply costs took up 58%. In the case of industrial electricity prices these proportions were 27% and 73% respectively. End-user prices are not regulated. A **correlation analysis** of half-yearly averages for industry shows a moderate influence of the wholesale price on the retail price with a time lag of six months. For households, this influence was less apparent. German law requires **smart meters** to be installed in new buildings, in buildings undergoing major refurbishment and for customers consuming over 6000 kWh per year. No nationwide roll-out schedule is in place yet.

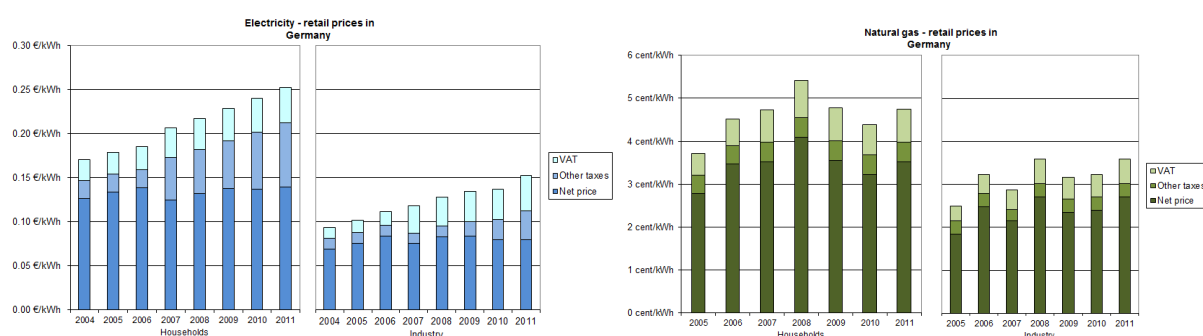
4.2. **Gas.** In 2010, some 720 000 household customers switched gas suppliers. The volume of gas supplied to customers who had already switched doubled from 47.18 TWh in 2009 to 110.38 TWh in 2010. This corresponds to a switching rate of 10.88%. In 2010, most household customers had a choice of between 11 and 20 gas suppliers. In 36 network areas, a

⁵³ Nonetheless, the 47,110 GWh traded on the EEX for spot and futures products was less than 3% of OTC trading. In parallel, there was strong growth in OTC trading, so the volume traded on the EEX hardly changed in percentage terms.

household customer could already choose from over 50 suppliers. Another important trend is the fact that the wholesale prices for gas, which had decreased significantly since the second half of 2008, has had a positive influence on household customer prices.

Gas prices for final consumers were more volatile than power prices. For both households and industry, they decreased after 2008 and increased again in 2011. This can be explained by the general drop in energy prices due to the economic slowdown in 2009 and the subsequent recovery. Unlike for power prices, taxes had less impact on price movements. The **correlation analysis** of half-yearly prices points to a significant influence of the wholesale price on retail prices for households and industry. For industry, the correlation is stronger within the same half-year, but for households it increases with a lag of six months. End-user prices are not regulated.

Charts 3 and 4



Source: Eurostat

Note: since 2007, Eurostat has applied a new methodology for the calculation of retail prices.

4.3. **Consumers.** German consumers rate the performance of their retail electricity market third highest of all EU countries and scores on choice, comparability and ease of switching are amongst the three highest in the EU. A similar picture is observed for the retail gas market (ranked 6th highest in the EU), where the scores for ‘choice’ and ease of switching are the highest in the EU and the number of complaints is the second lowest.⁵⁴ While there is no officially recognised online **price comparability tool**, there are a number of privately run online price comparison services for electricity and gas. *Bundesnetzagentur* provides advice for energy consumers via a hotline. **Complaints** are handled by the NRA, although it does not settle disputes between customers and suppliers. For out of court settlements, this task was attributed to a special arbitration body for energy. Germany does not specifically define ‘**vulnerable consumers**’ in energy law, but assistance is provided under general social laws and related support schemes. This includes bill rebates, discounted tariffs, benefit entitlement checks, and debt advice to low-income families with several family members and specific needs.

⁵⁴ 8th Consumer Markets Scoreboard, 2012, European Commission, DG SANCO, http://ec.europa.eu/consumers/consumer_research/editions/cms8_en.htm

5. Infrastructure

5.1. **Electricity.** In the light of the Fukushima accident and following review of its policy on nuclear energy, Germany decided to shut 8 nuclear power plants in 2011 (8300 MW). This has led to a significant drop in capacity in the south of Germany and increased the need for power transportation from north to south. North-south and east-west power flows in Germany increased in the first half of 2011. With new wind parks being developed in the North and Baltic Seas and a further increase in the share of renewable generation (35 % planned for 2020), the existing bottleneck on the north-south axis will be further exacerbated. The German electricity grid is expected to see increasing electricity imports, and network constraints will significantly aggravate the current problem of loop flows on neighbouring systems. In 2011, Germany passed a law requiring a network development plan to be prepared jointly by all TSOs, with the aim of streamlining planning procedures at federal level. Technical, financial and environmental expertise has been brought together within *Bundesnetzagentur*. Until recently, priority projects were progressing only slowly due to public acceptance issues and the separation of spatial and regional plan approval regimes. This situation might improve now that Germany has a streamlined approval regime at federal level.

Under the European Energy Programme for Recovery (EEPR), one important north-south link, the Halle-Schweinfurt electricity line, has received funding of EUR 100 000 000 and should be completed in the coming years.

5.2. **Gas.** After the UK, Germany is the EU's second largest gas market, accounting for 17 % of EU gas consumption. 86 % of its imports arrive via pipelines. It has the largest gas storage capacity in the EU (20 bcm). In November 2011, the first arm of Nord Stream came online, the second arm followed in October 2012 Nord Stream has the capacity to bring a total of 55 bcm/y of Russian gas to Germany by the end of 2012. Germany will have to enhance the interconnectivity of its gas infrastructure to neighbouring countries, including reverse flows, and develop new north-south and east-west transport capacity. Good progress is being made on reverse flows with Austria. Significant bottlenecks remain at the borders with Denmark (Ellund) and Poland (Lasow), within southern Germany and on the north-south route.

KEY INDICATORS FOR THE ENERGY MARKETS IN GERMANY IN 2010

ELECTRICITY		GAS	
Number of companies representing at least 95% of net power generation	> 450	Number of entities bringing natural gas into country	22
Number of main power-generation companies (1)	4	Number of main gas entities (4)	7
Market share of the largest power-generation company	28.4%	Market share of the largest entity bringing natural gas	
Number of electricity retailers	> 1000	Number of retailers selling natural gas to final customer	820
Number of main electricity retailers (2)	3	Number of main natural gas retailers (5)	2
Switching rates (whole electricity retail market)	6.3%	Switching rates for gas (whole retail market)	6.7%
Regulated prices for households - electricity	NO	Regulated prices for households - gas	NO
Regulated prices for non households - electricity	NO	Regulated prices for non households - gas	NO
HHI in power-generation market(3)	2021	HHI in gas supply market (3) (in 2009)	1886
HHI in electricity retail market (3)	NA	HHI in gas retail market (3)	approx. 300
Electricity market value (bn €) (6)	88.054	Gas market value (bn €) (6)	55.250

Sources: Eurostat, CEER.

(1) Companies are considered 'main' if they produce at least 5 % of national net electricity generation.

(2) Retailers are considered 'main' if they meet at least 5 % of total national electricity consumption.

(3) The HHI (Herfindahl-Hirschman Index) is a commonly accepted measure of market concentration. It is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers

(the higher the index, the more concentrated the market). Moderate concentration: 750–1800; high concentration: 1800–5000; very high concentration: above 5000.

(4) Entities are considered 'main' if they handle at least 5 % of natural gas (indigenous production or imported).

(5) Retailers are considered 'main' if they sell at least 5 % of the total natural gas consumed by final customers.

(6) Value for 2009.