Business report

General conditions

External influences

The business performance of EnBW is primarily influenced by the development of the wholesale market price for electricity, as well as the political/regulatory framework conditions such as those relating to funding for renewable energies or in the grids sector – and also the weather conditions. The price of electricity is not only dependent on demand but also on the development of the global fuel/CO_2 markets. In addition, the global energy sector is experiencing a period of fundamental change due to the transition to increasingly carbon-neutral methods of energy generation. On the sales side of the business, there is very intensive competition – especially in business with industry and redistributors.

Macroeconomic trends

Economies

The economies relevant for the business activities of EnBW experienced different levels of macroeconomic growth in 2016: While economic growth in Germany and Switzerland increased moderately, the growth momentum in the Czech Republic and Turkey decelerated noticeably.

The rate of growth in the global economy is set to accelerate in 2017. In the national markets relevant for EnBW, the rate of macroeconomic growth in 2017 is expected to reach a similar level to 2016. Overall, the economic trends are expected to have a slightly positive influence on the business activities of EnBW.

Development of gross domestic product (GDP)

in %	2017	2016	2015
World	3.4	3.1	3.2
Eurozone	1.6	1.7	2.0
Germany	1.8	1.9	1.7
Switzerland	1.7	1.5	0.8
Czech Republic	2.7	2.5	4.6
Turkey	2.0	2.0	4.0

Development of interest rates

The development of interest rates in the 2016 financial year was significantly influenced by the expansive monetary policy of the European Central Bank (ECB). In the middle of March, the ECB lowered the base rate to 0% and raised the penalty rate – paid by commercial banks to the ECB on their deposits – from 0.3% to 0.4%. In addition, its ongoing bond-buying programme was widely expanded. Due to the continuing low interest-rate environment, companies had to further reduce the discount rate, especially for pension and nuclear provisions. The resulting evaluation effect led to a significant increase in the pension and nuclear provisions. This effect is non-cash-relevant but did however increase the E net debt of the companies.

The average of the consensus forecasts for the ECB main financing rate for the end of 2017 remained unchanged at 0.0%.

Development of the sector and competitive situation

The energy sector is undergoing a period of radical change. In Germany and the surrounding European countries, the Energiewende is fundamentally changing the political and regulatory conditions, while the structure of the market and the competition are in a state of flux. In the area of generation, the rise in renewable energies is reshaping the energy landscape. On the sales side, competition in business with retail customers remains acute in both the electricity and gas sectors: The number of suppliers from outside the sector is increasing and customers have a very high level of price sensitivity. Many cities and communities are also pursuing the re-municipalisation of their electricity, gas and water supplies. In this challenging environment, companies in the sector need to review their business models and orientate themselves to the new market conditions (p. 13 f. and 22).

International, national, regional and new competitors

Competitor segment	Companies	Characteristics
International competitors	E.ON/Uniper, RWE/innogy, Vattenfall, Enel, Engie, Iberdrola, EDF	› Broad-based, internationally oriented growth strategy › Growth especially in renewable energies, grids and sales/solutions
National competitors ("DACH"region)	EnBW, Verbund, ALPIQ, EVN	› Stable national position, activities in selected foreign markets › Focus on market development, for example in renewable energies, grids, sales and/or solutions
Regional competitors	MVV, SWM, Thüga, Stadtwerke Stuttgart, EWE	› Focus on regional markets › Main focus of the business activities mostly in area of grids and sales
New competitors	1&1, Tesla, Google, NEXT Kraftwerke, sonnen, wpd	› Entry of new market participants increases competition and leads to a fragmentation of the value chain

Cross-segment framework conditions

Climate protection

In December 2015, 195 countries successfully reached an internationally binding climate protection agreement at the United Nations Climate Change Conference in Paris. The core element of the agreement is the commitment to limit the rise in global temperature to "well below 2 °C" and if possible even to only 1.5 °C above preindustrial levels. In the second half of this century, the aim is to make the world carbon neutral, i.e. free of emissions.

At the UN climate conference in Marrakesh in November 2016, the 196 participating countries affirmed their commitment to the "full implementation" of the Paris Agreement in a final declaration. The final declaration contains a roadmap for the practical implementation of the Paris Agreement with progress set to be reviewed in 2017 and the parties taking stock of their progress in 2018. There is uncertainty in relation to the future attitude of the USA – the world's second-largest source of CO_2 emissions – towards climate protection. In contrast, China – by far the largest emitter of CO_2– committed itself to continue its ambitious climate protection strategy "whatever the circumstances".

Germany has set itself ambitious targets but is currently behind schedule on the required track to achieving them. The Climate Action Plan 2050 agreed by the German government in November 2016 sets ambitious sector targets for the reduction of greenhouse gases by 2030. However, it is expected that important measures – such as the handling of fossil-fired power plant capacities, the expansion of electromobility or the readjustment of the tax and levy system – will only be developed after the parliamentary elections in autumn 2017.

The strategy being followed by EnBW of concentrating its investments on renewable energies, expanding the grids and developing new and increasingly digitalised business models promotes the achievement of the targets set at the Climate Change Conference, while the strategy itself is being promoted by the international efforts for climate protection.

Design of the electricity market

The European Commission initiated the consultation process on the future design of the European market in 2015 in order to adapt the market to challenges posed by a decentralised and digitalised energy world. EnBW ensured it was intensively involved in the consultation process started by the European Commission and welcomes this approach – especially the cross-border consideration of the security of supply and the opening of national capacity mechanisms. Concrete proposals for legislation or policy measures (winter package) were published by the European Commission on 30 November 2016.

By passing the Electricity Market Act at the beginning of July 2016, the German government decided to create an Energy-only-Market (EOM 2.0). The EOM 2.0 is an electricity market where electricity can be sold as previously, but only the electricity itself is remunerated and not generating capacities. The EOM 2.0 aims to remove distortions that still exist on the market and that hinder pricing. This pronounced market orientation of the electricity market is welcomed by EnBW. We view the planned reform of the electricity market as a low-risk and cost-effective option for continuing to guarantee a secure supply by strengthening market forces.

Market conditions are increasingly necessitating the decommissioning of conventional power plants. At the same time, power plants that have been selected for decommissioning, especially those in southern Germany, are still required to guarantee the stability of the grid and thus secure the supply of

electricity. In order to prevent the decommissioning of system-relevant power plants, the law intends to obligate operators to maintain these facilities as reserve power plants (grid reserve). Therefore, the power plant operator has a right to be reasonably reimbursed for the costs that arise. The grid reserve consisting of existing power plants will be expanded by the construction of up to 2 GW of new reserve power plant capacity. However, the construction of new reserve power plants is still subject to the approval of the EU Commission. If this approval is given, EnBW will participate in the corresponding tender procedure. The Electricity Market Act also includes the introduction of an additional capacity reserve, which will be maintained for times when there is an extreme shortage of generating capacity on the electricity market. EnBW welcomes the establishment of a competitively-oriented process for creating the capacity reserve outside of the wholesale market.

European Energiewende

The European Commission presented a comprehensive package of legislative proposals and reports (winter package) on 30 November 2016 entitled "Clean Energy For All Europeans" that has implications for all stages of the energy value chain. The focus has been placed on a binding improvement in energy efficiency of 30% by 2030 and a target of at least 27% of final energy consumption accounted for by renewable energies. The main proposals of the legislative package are:

- A European electricity market designed to integrate renewable energies competitively and via price signals
- The removal of priority feed-ins for renewable energies and combined heat and power (CHP)
- Strengthening competition in balancing energy markets
- The fundamental separation of grid operation and the facilities providing system services
- Stronger European concentration of the tasks of transmission system operators

The European Commission has initiated a two-year legislative process through the publication of the drafts, which will have a lasting influence on the German Energiewende until 2020. EnBW believes that its position in relation to the design of the electricity market and the focus on the generation of renewable energies has been vindicated.

Sales segment

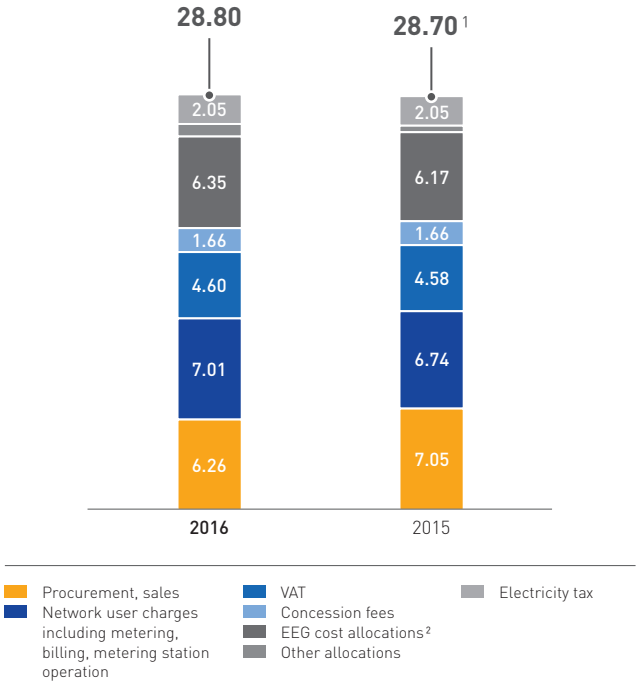
Electricity and gas prices for retail and industrial customers

According to an analysis of electricity prices by the German Association of Energy and Water Industries (BDEW) published in November 2016, the average monthly electricity bill for a household with an annual consumption of 3,500 kWh in 2016 came to €83.99 compared to €83.70 in the previous year. Taxes and levies accounted for more than half of this amount. EnBW increased the price for the basic supply of electricity by around 2.4% as of 1 January 2016 because an increase in the grid user charges and state levies such as the EEG and CHP cost allocations could not be fully offset by the lower wholesale price for electricity. For industrial customers receiving a medium-voltage supply, the average electricity price including electricity taxes rose according to calculations made by BDEW by 1.4%, from 15.23 ct/kWh in the previous year to 15.44 ct/kWh in 2016.

According to calculations by the German Federal Statistical Office in 2016, natural gas prices for private households had fallen by 2.9% compared to the previous year; the price of natural gas for industrial customers fell by 11.3%.

Average electricity price for a 3-person household (annual consumption of 3,500 kWh)

in ct/kWh



[1] The figures for the previous year have been restated.
[2] Application of the German Compensation Mechanism Ordinance (AusglMechV) since 2010.

Source: BDEW
As of November 2016

Structural changes

Despite the continued overall positive economic environment, the **demand for energy** in Germany is gradually declining due to the use of energy-efficient devices and processes. This has led to a continuously high level of competitive pressure in all segments. In the area of energy services, however, there will be new applications for electricity for electromobility, urban infrastructure and in other business fields. In the long term there may even be an increase in demand as fossil fuels are replaced by electricity – such as through the use of heat pumps – and due to the politically desired expansion of electromobility. More than 20% of new buildings are now equipped with heat pumps. In order to accelerate the market penetration of electromobility, additional incentives have been introduced: For example, increased funding for electric cars in the form of purchase subsidies was agreed in early 2016. Furthermore, the German

government aims to provide funding of around €300 million for the expansion of the charging infrastructure. However, this funding has only led to limited growth up to now.

The Federal Ministry for Economic Affairs and Energy (BMWi) published its **Green Paper on Energy Efficiency** on 12 August 2016. It poses key questions and discussion points on the central challenges of and approaches for reducing energy consumption in Germany in the long term. Similar to the process for the design of the electricity market, the green paper also aims to initiate a consultation process that will end with the development of a medium to long-term strategy for reducing energy consumption in Germany (White Paper on Energy Efficiency). As with the white paper on the design of the electricity market, it can be assumed that the consultation process will lead to a comprehensive package of political measures. EnBW believes that the green paper process is an opportunity to remove existing hindrances on the market in the areas of energy efficiency and flexibility marketing and thus to strengthen the energy services sector. The increasing digitalisation of the energy supply system is acting as a basis for the development of innovative business models. The digitalisation law that came into force on 2 September 2016 includes an obligation for the installation of **smart meters** in progressive stages. Firstly, large consumers with annual consumption of more than 10,000 kWh will receive digital smart meters from 2017. Smart meters will then become obligatory for private households with an annual consumption of 6,000 kWh or more from 2020. Netze BW successfully tested the roll-out of smart meter systems for single-rate meters under real conditions for local authorities and private customers in 2016 (ROMI project). In the subsequent pilot phase running until the middle of 2017, the functionality and stability of the devices will be improved further. The roll-out across the region will start from the middle of 2017.

Grids segment

The basis for the success of the Energiewende will be the expansion of the energy grids to meet demand. This primarily concerns the electricity grids. In particular, the connection of renewable energies will require further construction measures at both the transmission and distribution grid level. Within the reform of the incentive regulations and the determination of the rates of return on equity for the third regulatory period, important framework conditions for the gas and electricity grid operators have, from a regulatory perspective, now been defined.

For the **transmission grids**, the Federal Requirements Plan Act has now given priority to underground cables ahead of new overhead lines where this is possible and appropriate. According to assessments made by the transmission system operators (TSO), this will cause a delay of approximately three years to the completion of the high-voltage DC transmission lines (HVDC). The concerns of citizens and local authorities will be comprehensively addressed in dialogue events. Our transmission system operator, TransnetBW, is participating in the process for expanding the grid with its SuedLink and ULTRANET projects.

The measures for the **expansion of the grids** require a high level of investment in the grid infrastructure. The Federal Network Agency lowered the rates of return on equity for the third regulatory period by more than two percentage points for these investments on 12 October 2016. In addition, the regulatory framework for the distribution grids was developed further as part of the reform of the incentive regulations. The defined rates for return on equity apply to operators of gas grids from 1 January 2018 and for electricity grid operators from 1 January 2019. They will fall for new facilities from 9.05% to 6.91% and for old facilities from 7.14% to 5.12%. The regulatory rates for return on equity remain constant for the whole regulatory period of five years. The fall in the rate of return has a negative effect on the profitability of investments and will increase the level of strain on our grids business.

The reform of the Incentive Regulation Ordinance (ARegV) was approved in August 2016. It regulates the investment conditions for distribution grid operators. The most important new aspect is that an annual comparison of investment expenditure will replace a flat-rate budget for the financing of the **distribution grids** in the future. By removing the previously existing time delay on the recognition of investments, it will be possible to refinance the investments directly via the grid fees. The adjustments to the regulatory regime for network charges for electricity and gas are due to become effective from the third regulatory period (electricity in 2019, gas in 2018). EnBW and its subsidiary Netze BW have actively participated in the consultations for the reform of the ARegV.

The German Federal Cabinet agreed the draft bill for the law on the modernisation of **grid fees** (Netzentgeltmodernisierungsgesetz, NEMoG) on 25 January 2017. The law will remove the remuneration for decentralised feed-ins (so-called avoided grid fees) step by step up to 2030. The idea behind the avoided grid fees is that decentralised generation can reduce the electricity consumption from upstream grid levels and thus avoid grid costs. The remuneration for the decentralised plants is financed via the grid fees. EnBW believes that the draft bill does not reflect the requirements placed on the electricity grids as part of the Energiewende. It is sensible for controllable producers of electricity such as CHP power plants, pump stations or gas turbines to benefit from the effect of reducing grid costs and this effect should be retained. In contrast, the continued payments during the intended transition period to volatile, non-controllable producers of electricity (such as solar and wind energy power plants) are in conflict with a fair distribution of the grid costs.

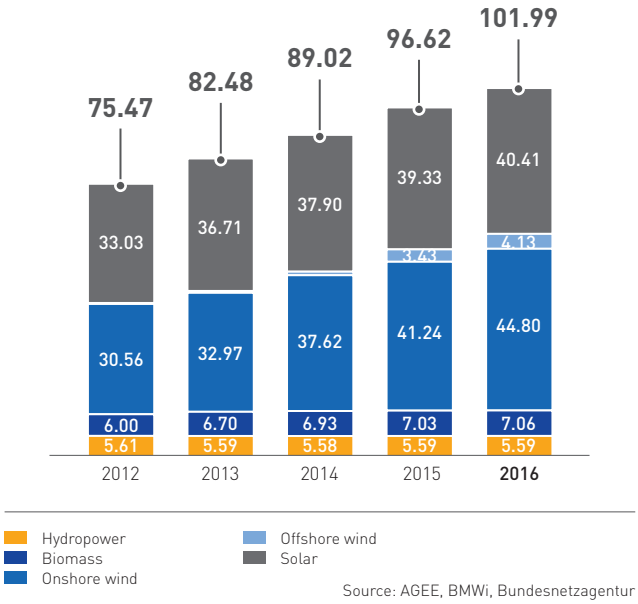
Renewable Energies segment

The expansion of renewable energies is progressing steadily. According to the German Working Group on Energy Balances (AGEB), its share of overall electricity generation only increased slightly due to the weather conditions to 29.5% (previous year: 29%) in 2016 despite the further expansion in capacity. Generation from photovoltaic power plants fell by 1.0%. Electricity generation from wind power only increased by 0.8% due to unfavourable wind conditions. EnBW is

planning expansion in the area of renewable energies of around 300 MW in 2017 (p. 76 f.).

Installed net output for electricity generation from renewable energies in Germany

in GW/year



Source: AGEE, BMWi, Bundesnetzagentur
As of 31/12/2016

The revised German Renewable Energies Act (EEG) 2016 was passed by the Bundestag and Bundesrat on 8 July 2016. The funding of renewable energies will be provided based on a competitive auction system in future, which will replace the existing fixed feed-in tariffs. The design of the auctions aims to maintain the envisaged expansion corridor for renewable energies, enabling more intensive competition and guaranteeing a diverse range of stakeholders. In our estimation, the switch to the new funding system will significantly change the success factors for market participants. The size of the portfolio and the ability to cooperate will play a significantly larger role. Even against the background of the new funding conditions, EnBW will play an active role in the expansion of renewable energies.

For **onshore wind power plants**, there is a transitional period for the completion of already approved projects up to the end of 2018. In the case of projects that have not yet been approved, the funding will be switched over to an auction process. Three rounds of auctions will thus be held in 2017. Aside from the very challenging criteria for the prequalification of new wind turbines in accordance with the Federal Immission Control Act (BImSchG), the gross expansion limit of 2,800 MW per year (or 2,900 MW from 2021) could lead to a situation where net growth will stagnate or even be negative in certain years. In addition, a so-called grid expansion zone will be defined for onshore wind farms for the first time, within which the new construction of wind power plants will be limited until the grids have been expanded sufficiently to eliminate any bottlenecks within Germany. With a high proportion of its projects in southern Germany, EnBW welcomes the designation of a grid expansion zone because it offers comparative advantages for less densely utilised wind energy regions.

For **offshore wind power plants**, the target of 15 GW of installed output by 2030 has been defined. There will also be a period of transition to competitive auctions for offshore wind power plants: All wind farms that are placed into operation by 2020 will receive funding in accordance with the EEG 2014. Transitional auctions will be held for wind turbines that are connected to the grid between 2021 and 2024, while the central auction process will apply to new projects from 2025. EnBW will realise its EnBW Hohe See and Albatros projects as planned by 2019 and participate in the tender procedures for subsequent projects (p. 76).

For **photovoltaic power plants**, there are only plans to directly regulate the expansion volumes for large power plants with an installed output of more than 1 MWp. Here, the central auction model will also apply. Actual expansion will also be dependent, however, on the investment decisions made about small power plants, whose profitability is being increasingly shaped by own consumption models. An expected trend for the cost of battery storage systems to decrease in combination with lower funding subsidies will make such models more and more attractive. EnBW is offering an innovative product called EnBW solar+ that optimally combines a photovoltaic power plant and a storage system.

Generation and Trading segment

Electricity wholesale market

In the first quarter of 2016, the prices on the wholesale market for electricity experienced a significant fall, in parallel with falling fuel prices, and recorded a ten-year low. In the second quarter, wholesale prices recovered due to increasing fuel prices and were able to compensate for the losses in the first quarter. A moderate fall in the third quarter was followed by a significant increase in the fourth quarter, which stemmed from a combination of increasing coal prices and expectations of a shortage on the French market. The expectation of possible scarcity in France arose because of additional inspections on components at 19 nuclear power plants and the expected poor availability of the power plants as a result. The pressure on conventional generation nevertheless continues to be high, especially in Germany. The electricity generated by large power plants is at times being largely forced out of the market by renewable energies. The wholesale market price for electricity is expected to fall again from the second quarter of 2017 – after the French nuclear power plants have been reconnected to the grid.

Development of prices for electricity (EPEX), base load product

in €/MWh	Average 2016	Average 2015
Spot	28.98	31.62
Rolling front year price	26.58	30.96

Gas market

Alongside long-term gas import contracts, which form an important basis for Germany's gas supply, the increasing global supply of liquefied natural gas (LNG) is playing a growing role. As a result, this could place long-term contracts linked to the price of oil under pressure. The border price index for natural gas published monthly by the German Federal Office of Economics and Export Control (BAFA) stood at €17.00/MWh in November 2016, which was 7.2% below the December 2015 figure (€18.32/MWh) and 10.6% below the figure for the same month in the previous year (€19.02/MWh). As a result of the oversupply on the gas markets, we do not anticipate that prices will recover further in the short term.

Development of prices for natural gas on the TTF (Dutch wholesale market)

in €/MWh	Average 2016	Average 2015
Spot	14.02	19.81
Rolling front year price	15.40	20.06

Oil market

The oil market continued to be characterised by oversupply in 2016. However, the possibility of a cap on production by OPEC and some non-OPEC countries including Russia was actively discussed and received media coverage from early in the year. This speculation and high unplanned losses in production in, amongst other countries, Nigeria, Libya and Canada, meant the front month price once again reached a level of around US$52/bbl up to the start of June, following a year-low price in January of US$27.88/bbl. Hereinafter, the Brent price experienced sideways movement in a range between US$42/bbl and US$52/bbl until OPEC and some non-OPEC countries including Russia finally agreed on 30 November 2016 to some caps in production with effect from 1 January 2017. The front month price then rose by the end of 2016 to US$56/bbl. We thus anticipate that oil prices will remain relatively constant at the current level.

Development of prices on the oil markets

in US$/bbl	Average 2016	Average 2015
Crude oil (Brent), front month (daily quotes)	45.13	53.60
Crude oil (Brent), rolling front year price (daily quotes)	49.28	60.45

Coal market

Following a low in the first quarter of 2016 when coal prices for front year delivery fell below US$40/t, the coal market recovered considerably during the further course of the year and had already increased to almost US$60/t by the middle of the year. It continued to improve until November and reached a year high of almost US$78/t. However, it was not able to sustain this level and following significant intermittent losses was trading at US$70/t at the end of the year. The generally increasing demand for coal and the effect of state-imposed production caps in China are the main reasons for the price developments after the first quarter. We do not anticipate a significant increase – based on the current level – in coal prices in 2017.

Development of prices on the coal markets

in US$/t	Average 2016	Average 2015
Coal – API #2 rolling front year price	53.63	54.64

CO_2 allowances

Under the European E Emissions Trading System, sufficient emission allowances must be submitted to cancel out the amount of CO_2 emissions from power plants. In line with the prevailing downward trend, the price of emission allowances (E EU Allowances – EUA) fell to less than €5/tCO_2 by the middle of February. During the further course of the year, prices were volatile and ranged between almost €7 and slightly below €4/tCO_2. In this context, individual events such as the Brexit decision caused significant movement in prices. Due to the oversupply of E CO_2 emission allowances on the market, prices are not expected to increase in 2017. In the long term, the E ETS Post 2020 Reform, as it stands in current negotiations, could cause prices to rise.

Development of prices for emission allowances/daily quotes

in €/tCO_2	Average 2016	Average 2015
EUA, rolling front year price	5.34	7.70
E CER, rolling front year price	0.38	0.48

Nuclear power

The Bundestag and Bundesrat approved the law of reorganising responsibility for nuclear waste management in the middle of December 2016 which is anticipated to come into force in the first half of 2017. It states that the intermediate and final storage of the radioactive waste and the necessary financial funds for these tasks be transferred to the federal state as a safeguard. As a result of the additional payment of a risk premium, the operators of the nuclear power plants should no longer be obligated to make any subsequent contributions to the fund. The operators will still be responsible in future for the complete financing and management of decommissioning, dismantling and specialist packaging of the radioactive waste. The statutory regulations will be supplemented by a public law contract between the government and the operators.

Further details about the statutory regulations and their impact on EnBW will be presented in the chapter "The EnBW Group" (p. 50 ff.).