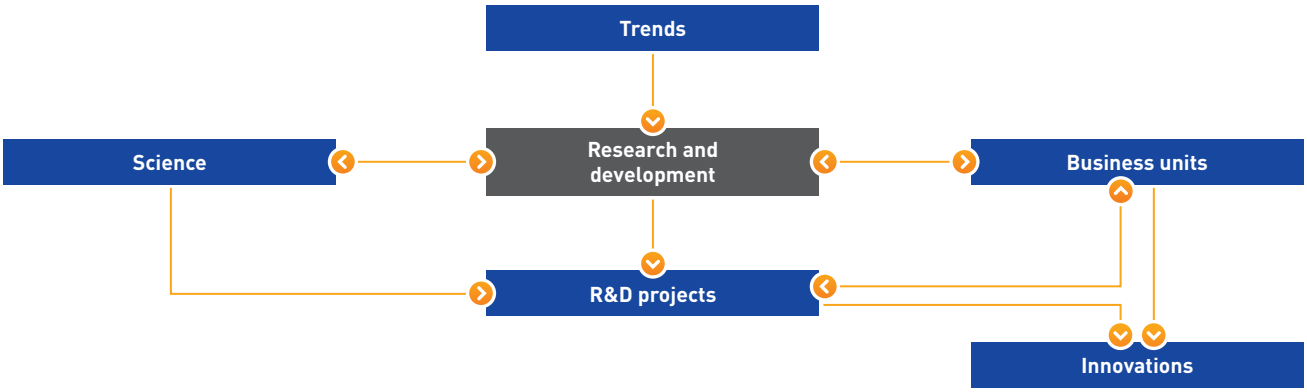
Research, development and innovation

Goals, guidelines and the research and development processes

The goal of research and development at EnBW is to identify important trends and technological developments at an early stage and to acquire the knowledge for subsequent commercial utilisation in pilot and demonstration projects. For this purpose, research projects are carried out in collaboration with the operational units at EnBW or with customers – directly at the site of their subsequent application. They form a project portfolio that is centrally coordinated for all EnBW units. This ensures that successful research projects deliver innovations for EnBW. The research and development activities are integrated into an external and internal network of partners.

The research process at EnBW



Research and development – focal points and selected results

Decentralised power generation and heating

CALLUX: The CALLUX research project ended as planned in 2016. As part of the project, EnBW installed 155 fuel cell heating devices for customers and partners in Baden-Württemberg. The knowledge gained in the practical tests formed the basis for the new EnBW product BrennstoffzellePlus (Fuel Cell Plus). With it, EnBW offers a completely worry-free package which enables customers to combine new technology and systems from a variety of manufacturers to produce heat and electricity for their own home.

Micro gas turbines: EnBW has been cooperating with scientists at the German Aerospace Center (DLR) since 2008 as part of the Decentralised Energy research platform. The development and testing of a pilot plant that can utilise biomass from land management directly on-site for supplying energy ended in 2016. As part of the project, an already existing wood gasification plant was fitted with a micro gas turbine for the first time. A specially developed combustion chamber burns the gas generated from the biomass in a highly efficient way that produces very low levels of pollutants. The project funded by the German government has demonstrated that the micro gas turbine can function as an alternative to a gas motor for the generation of electricity and heat from wood gas.

Renewable Energies

Soultz-sous-Forêts geothermal power plant: The partners Electricité de Strasbourg and EnBW renovated a section of the power plant in 2016 and held an inauguration ceremony in September. Operation in research mode has thus ended and the plant has been switched to the commercial production of geothermal energy. The power plant uses a natural geothermal reservoir at a depth of 5,000 metres. The electrical output of the power plant is 1.7 MW and it has been in continuous operation since September 2016.

Bruchsal geothermal power plant: The power plant recommenced operation in October 2016 after corrosion problems had made the replacement of a connecting pipe between the power plant and the borehole necessary. From 2017, the power plant will not only generate electricity but also provide a public facility in the local vicinity with heating. EnBW is thus expanding its geothermal expertise to include the supply of heating to customers. The experience gained in the construction and operation of the demonstration plants enables EnBW to construct further plants for the sustainable supply of electricity and heating for its own use and for customers.

Storage systems for the smart energy world

Electromobility: As part of the "SLAM – Quick-Charging Network for Road Axes and Metropolises" research project funded by the German Federal Ministry for Economic Affairs and Energy, more than 60 of a total of 68 quick-charging stations have already been installed by EnBW at 34 motorway service stations in Baden-Württemberg. SLAM aims to develop business models for the operation of quick-charging stations and make higher charging outputs of more than 150 kW possible in the future. The cooperation with Germany's largest service station operator Autobahn Tank & Rast GmbH is an important component of the e-mobility strategy at EnBW. The project aims to convey to customers that they can quickly and easily charge their electric cars everywhere.

Active storage systems: EnBW is investigating how green electricity can be used to cover regional demands to a greater extent than ever before with the help of storage systems in a variety of research projects. In autumn 2016, three household customers were fitted with storage systems in order to develop an intelligent control system that can adapt to the availability of electricity on the grid and postpone the times electricity is drawn from the grid without any loss in comfort.

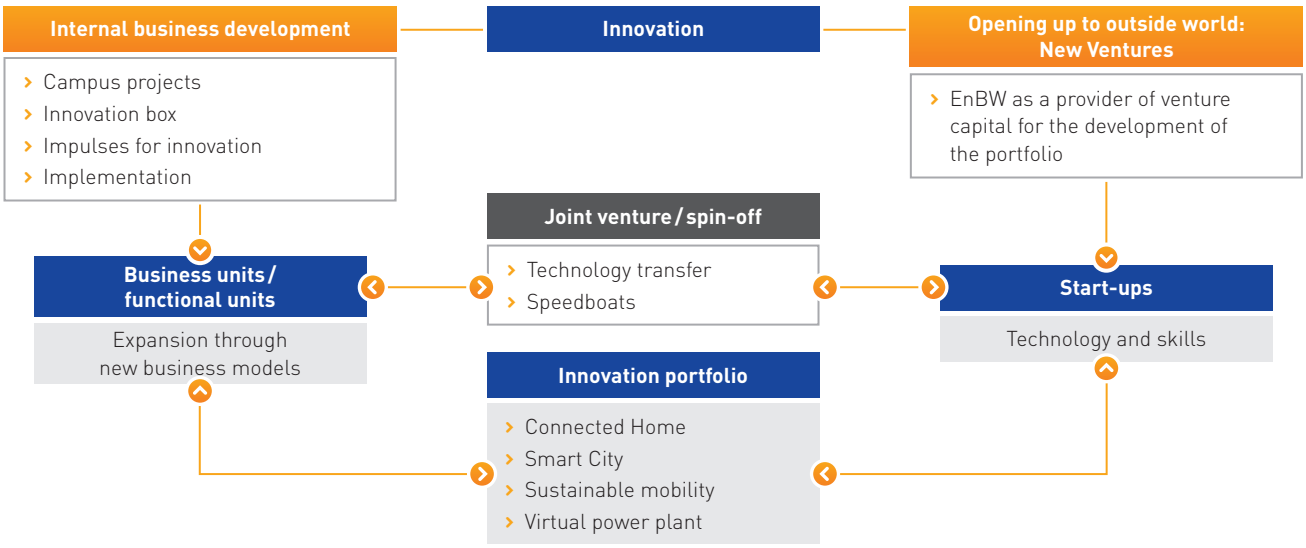
Hydrogen as an energy source and storage system

EnBW has been investigating the possibilities for generating and storing hydrogen from green electricity (sector coupling) with funding from the German government since 2011. For example, EnBW has installed a hydrogen filling station in both Stuttgart and Karlsruhe. The projects ended as planned in December 2016 and in them it was possible to resolve many technological issues. Even after the end of the project, EnBW will continue to supply the hydrogen buses operated by Stuttgarter Straßenbahn AG at the bus extension to the Stuttgart filling station that was built with state funding. EnBW is continuing its work to make hydrogen more economical as an energy storage system and energy source in competition with other energy sources.

Goals, guidelines and the innovation management process

EnBW develops new business models outside of its core business with the central innovation management system in order to quickly identify new sources of revenue for the Group and bring them to the market. The development of new skills and work processes plays a major role. The aim is to establish an agile innovation culture at EnBW in the long term, supported by selected partnerships and participating interests in start-up companies. The innovation process is split into two main areas: the internal generation of new business ideas and the opening up of EnBW to the outside world under the heading "New Ventures".

The innovation process at EnBW



Innovation – key points and results

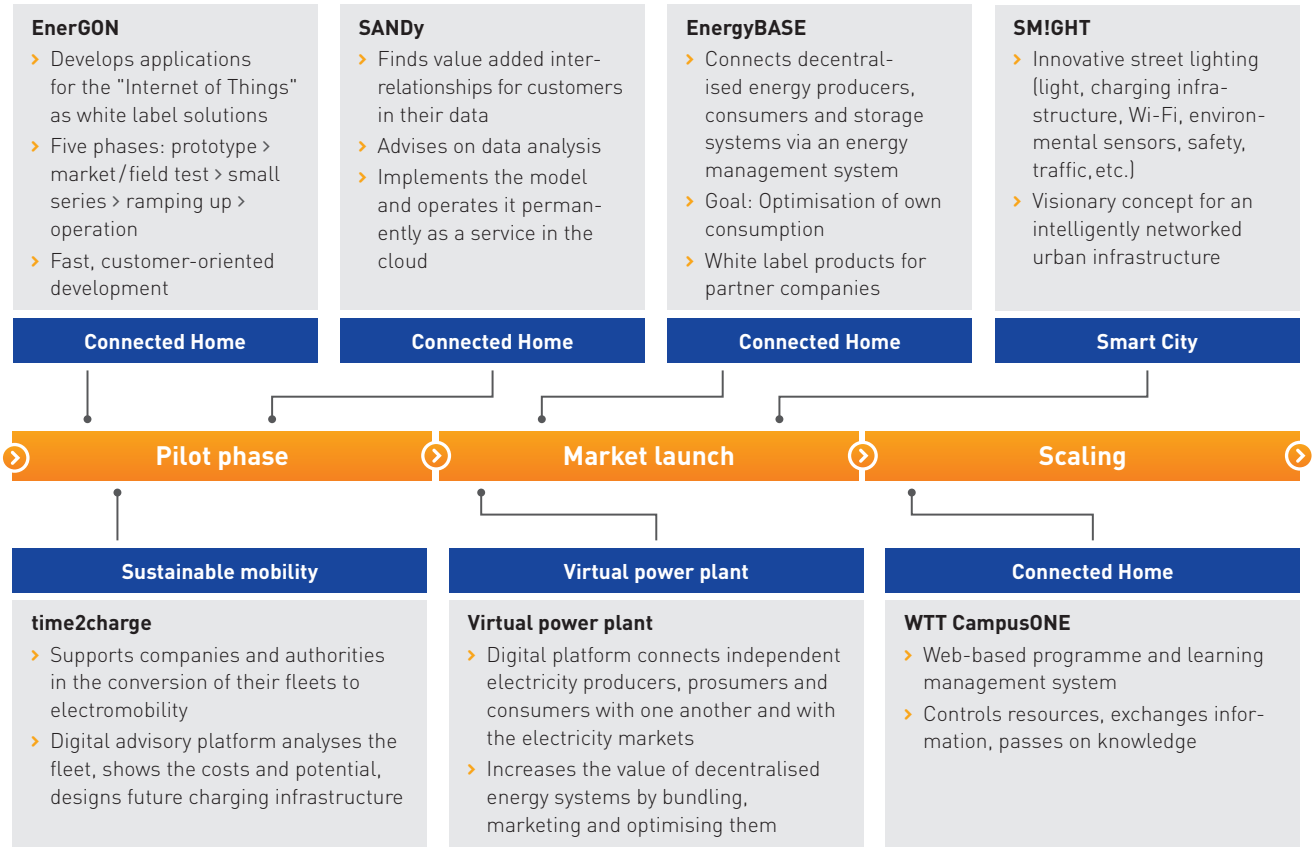
new.New Festival 2016: EnBW supports the initiative to further develop Baden-Württemberg as location for start-ups and innovation. For this reason, EnBW was the partner for innovation at this year's new.New Festival that was held at the Center for Art and Media Karlsruhe (ZKM) in Karlsruhe. The festival provided the market-ready start-ups at EnBW with the opportunity to network with other leading commercial enterprises. EnBW underlined its leading role as an innovative energy company with its participation in the festival.

ACTIVATR programme for new ideas: In cooperation with the start-up company Pioniergeist GmbH, Stuttgart, and renowned companies from the automobile and mechanical engineering sector, EnBW launched the statewide programme for new ideas called "ACTIVATR" in April 2016. One result has been the foundation of the start-up company Binando. The Binando

business model is based on the development of an intelligent waste management solution with the help of fill-level sensors and intelligent routing for the waste management industry. The team is currently conducting two pilot projects to validate the business model with follow-up funding from EnBW. The project is initially evaluating the savings potential that the customer can achieve by optimising their route and thus the profitability of the business model.

time2charge: The digital advisory platform enables companies and authorities to analyse their vehicle fleets and convert them to electric mobility so that they become more sustainable. The platform can show the precise fleet costs and the potential offered by an electric fleet and design the corresponding charging infrastructure. time2charge achieved its first significant market success with the conclusion of a cooperation contract with Hyundai Motor Deutschland GmbH. EnBW is responsible for equipping around 560 dealerships and service points with charging stations and for their subsequent operation.

Current projects at the EnBW Innovation Campus

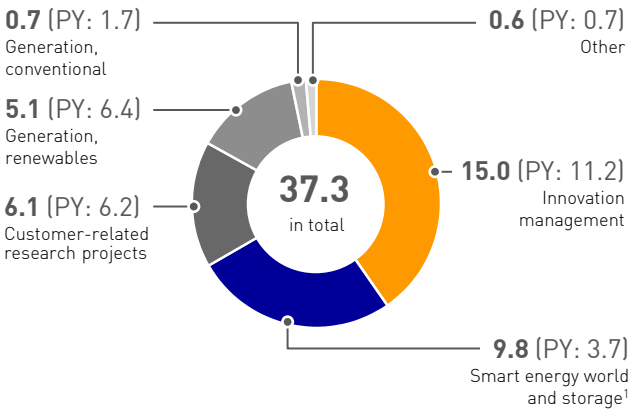


Expenditure and personnel

The EnBW Group spent €37.3 million (previous year: €29.9 million) on research, development and innovation in the 2016 financial year. The reasons for this increase are the intensified activities in the area of electromobility. EnBW received government research funding of €3.8 million (previous year: €3.6 million). A total of 38 staff – as in the previous year – were employed in the areas of research, development and innovation in 2016. A further 72 employees (previous year: 46) were involved in innovation projects. 155 employees (previous year: 109 employees) were involved in research and development projects as part of their operational work. This increase demonstrates that research, development and innovation have become more closely integrated into operative areas than ever before.

Expenditure on innovation, research and development

in € million



[1] Includes e.g. e-mobility and hydrogen.