Federal Ministry
for Economic Affairs
and Energy

Energie wende
Switch to the Future

ENERGY TRANSITION IN BRIEF

PHASING OUT NUCLEAR ENERGY

Germany intends to switch off its nuclear power plants by the end of 2022 and replace them with other forms of energy. The use of energy-efficient technologies is to reduce energy consumption.

The first nuclear power plant in Germany commenced commercial operations in 1962. 36 additional plants came on stream in the following 27 years. In 2000, the Federal Government and the energy utilities agreed on the "Nuclear Consensus" implementing a structured phase out of nuclear energy for commercial electricity generation.

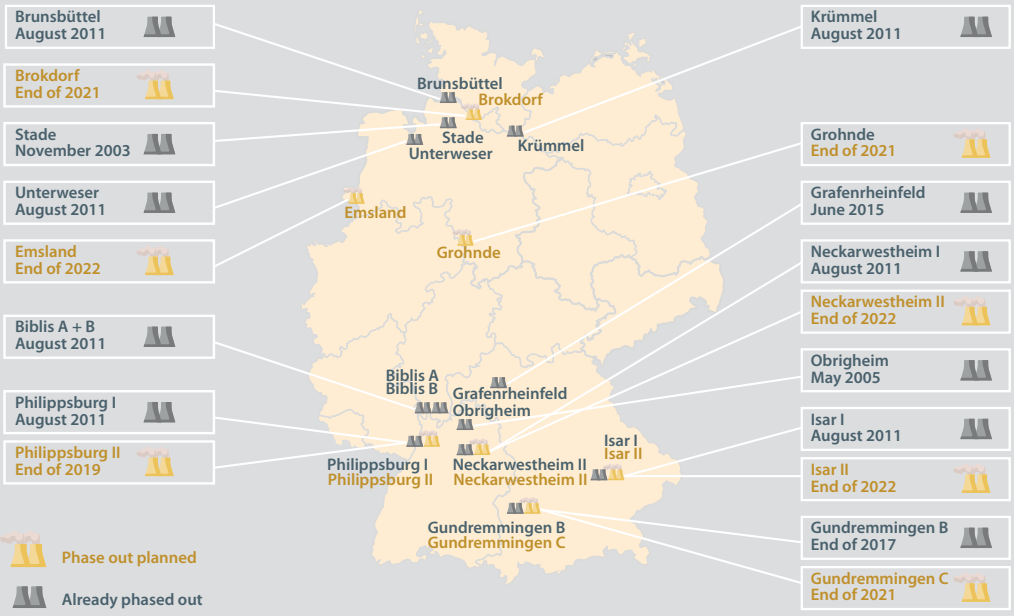

Figure 1: Nuclear energy in Germany
(Source: in-house on basis of Federal Ministry for Economic Affairs and Energy)

Ten years later, the Federal Government adopted an Energy Concept that set the course for Germany's transition to the age of renewables. In this Energy Concept, nuclear energy was assigned the role of a "bridging technology" to be used up to the point where renewables have become reliable and economically viable enough to replace them, and the necessary infrastructure has been put in place.

Following the nuclear disaster at Fukushima in March 2011, the government decided to accelerate the energy transition and to completely phase out power generation in German nuclear power plants by the end of 2022. Eight nuclear power plants were switched off that same year. At present (2019), seven nuclear reactors with a nominal capacity of approximately 10 gigawatts are on stream. This means that the proportion of gross electricity generation supplied by nuclear energy dropped from 27 % in 2004 to around 11,8 % in 2018. In the same period, the proportion of renewable energy rose from 9.3 % to 35 %. Also, the amount of electricity generated from hard coal declined from 22.8 % to 12.9 % between 2004 and 2018, whilst lignite-fired generation dropped from 25.6 % to 22.5 % in the same period.

Renewable energy and energy-efficient technology: Germany is modernising its energy system

In parallel to the nuclear phase-out, Germany is restructuring and modernising its energy system. In order to achieve a lasting cut in energy consumption, the Federal Government is investing in energy-efficient technology. This means that it is still possible to achieve the ambitious climate targets: in comparison with 2018, the proportion of electricity generation deriving from renewable sources is expected to more than double by 2050, from around 35 % to roughly 80 %.

EXPLANATION IN BRIEF

Who is funding the disposal of nuclear waste?

The Act Reorganising Responsibility for Nuclear Waste Management, which entered into force on 16 June 2017, has restructured the financial and material responsibilities for the disposal of nuclear waste in Germany. Reponsibility for the decommissioning, the dismantling and the appropriate packaging of the radioactive waste remains with the operators of the nuclear power plants. The Federation is responsible for implementing and financing the interim and final storage of the radioactive waste.

The funding for the interim and final storage, totalling approximately € 24.1 billion, was transferred by the nuclear plant operators on 3 July 2017 to the Nuclear Disposal Fund, a federal fund for financing the disposal of nuclear waste.

How is the highly radioactive waste being disposed of?

The revision of the Repository Site Selection Act in 2017 introduced new rules for the disposal of highly radioactive waste and spent fuel elements. The recommendations of the Commission on the Storage of High-Level Radioactive Waste from 2016 were taken on board. As a consequence, final storage in Germany is to take place in a final repository mine in deep geological formations. The three rock types of rock salt, clay and crystalline rock are possible host formations.

Is Germany's electricity supply secure?

Despite the decision to phase out nuclear energy, Germany is still able to supply its own electricity. Today's electricity generation is based on conventional and renewable sources of energy. In 2019, the average interruption to the electricity supply for households and businesses was only around 14 minutes across the country. This is an outstandingly good figure compared with other countries, and it has kept improving over the last ten years despite the increasing feed-in of renewable energy. Furthermore, the amount of electricity generated exceeds demand, so that Germany is able to export increasing amounts of electricity to its European neighbours.

Who will guarantee Germany's nuclear safety?

Even after all of Germany's nuclear power plants to generate electricity have been closed down, nuclear technology will still be used in a wide range of medical procedures, in industry and in research. Germany will need to continue to use nuclear technology for these high-tech applications beyond 2022. Also, existing interim and final repositories will have to remain safe. Germany will therefore continue to invest in safety research and the monitoring of nuclear facilities, and will feed in its experience and expertise at international level.

Figure 3 Nuclear phase-out timeline
(Source: in-house)