Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
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Nuclear and Coal Phaseout – Can It Be Done? – The German Case

The Federal Republic of Germany is demonstrating that it is possible to do away with coal and nuclear power. The share of renewables has tripled since 2010 and accounted for 52 percent of the electricity generated in 2023. Fossil-fuel-based production has declined more significantly than that of nuclear power plants.

Coal is in decline around the globe, at a pace exceeding that which the most optimistic of climate protection advocates had dared to hope. In the US, power generation fell by 19 percent between 2022 and 2023. Great Britain has scheduled to close its last remaining coal fired power station at the end of September 2024. In 2022, nuclear power plants covered around 18 percent of electricity demand in the US, and 14 percent in the UK. Can we make it without coal and nuclear power?

In April 2002, the German Bundestag adopted a law no longer aiming to promote nuclear energy but effectively providing for an orderly phaseout of its commercial use. The plan was to be done with nuclear by the early 2020s. Two thirds of the phase-out from nuclear power had been completed[1] according to the agreed residual electricity-volumes that producers were allowed to generate when disaster struck the Japanese nuclear power plant at Fukushima in March 2011. Only shortly before had the German federal government pushed through a lifetime extension for existing nuclear power plants. And yet, as early as June 2011, a large majority across political party lines in the German Bundestag voted for the gradual and complete phaseout of nuclear power by the end of

[1] Notification in acc. with sec. 7(1)(c) German Atomic Energy Act (AtG) - Jahresmeldung 2011.

2022, thereby essentially resurrecting the phaseout decision of 2002. Despite this, there would be no increase in the amount of fossil fuels burnt. Quite the contrary.

Nuclear Phase-out Completed – Coal Phase-out Underway

In addition to the nuclear phase-out – completed in April 2023 – increased efforts to boost energy efficiency and the expansion of renewable energy sources are central pillars of Germany's energy transition. Since 2000, the country's Renewable Energy Act (EEG) guarantees each operator a fixed price for the clean electricity generated in their respective facilities during the first 20 years of their operation – a so-called Feed-In Tariff (FIT) – and priority access to the public grid over the same period. In 2010, the Bundestag decided, by 2050, to increase the renewable energy share in power generation to 80 percent, to decrease primary energy consumption by 50 percent from 2008 levels, and to reduce greenhouse gas emissions by 80 to 95 percent from 1990 levels.

These objectives in themselves were only achievable if coal was to be completely abandoned. Coal-fired power plants – lignite and hard coal – accounted for roughly 80 percent of emissions generated by the German power sector and thus represent the crucial starting point for action to achieve the envisaged reduction in CO_2 emissions over the short and medium term.

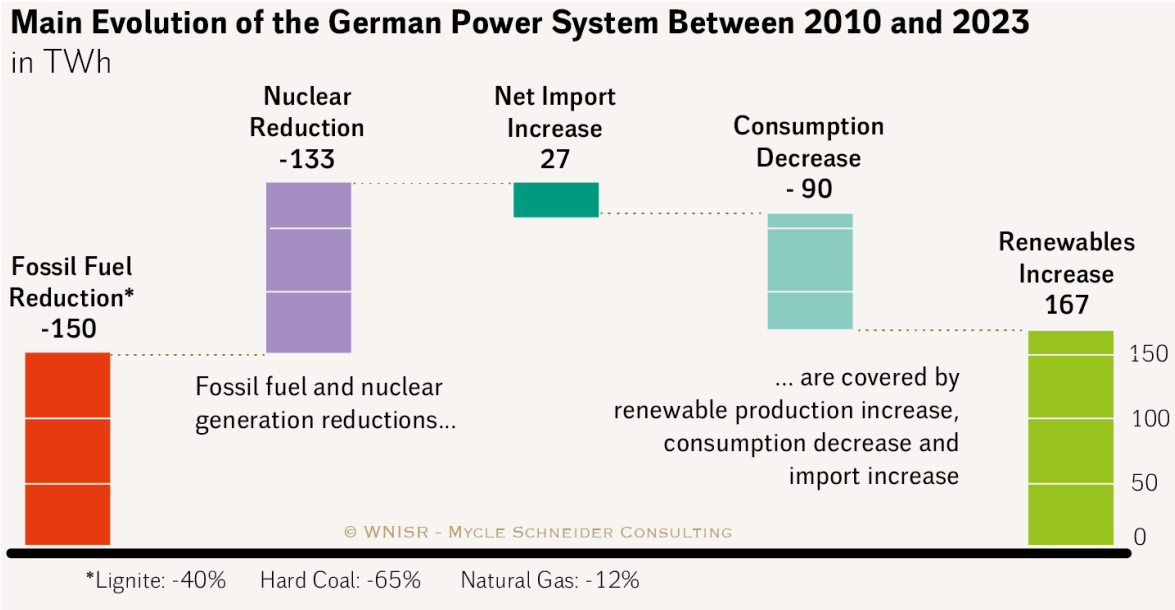
The phase-out of fossil fuels is well underway. Compared to 2010 levels, the year preceding the beginning of the Fukushima disaster, the combined gross electricity production by German power plants running on lignite, hard coal and natural gas had declined by 150 billion kilowatt-hours (150 TWh) by 2023. At the same time, nuclear power production declined by 133 TWh, with national electricity consumption decreasing by 90 TWh. Net power imports increased by 27 TWh. Power trade shifted from net export to net import in 2023. However, this is not linked to capacity restrictions in Germany following the nuclear phaseout but rather to price developments in the European power market. Prices in Germany itself have not increased.

All Fossil Fuels – Hard Coal, Lignite, Natural Gas – Declining Rapidly

This profound transformation process essentially involves substituting fossil and nuclear electricity production with renewable energy generation. Over the same period, electricity

produced with renewables increased by 167 TWh, growing significantly more than nuclear electricity generation declined (see Figure 1).

Figure 1: German Electricity System Development. Sources: WNISR based on AG Energiebilanzen (AGEB), 2024



The share of renewables in gross electricity generation tripled from 17 percent in 2010 to 52 percent in 2023. Moreover, electricity consumption has been declining, as it has been in most countries of the European Union (EU) – thanks to the application of new technologies in households and industry – and has dropped to the 1990-level. A more recent decline in industrial activity and evolving climate conditions have also played a role in the past few years.

As provided for by the latest amendment to the German Renewable Energy Act (EEG 2023), Germany intends to generate its electricity 80 percent greenhouse gas emission-free already by 2030 – in spite of an anticipated consumption increase of one third – and entirely carbon neutral by 2050 at the latest.

Half of World's Economies Past Fossil Fuel Peak

Coal-based electricity is being driven out of the market at an even faster rate, as electricity from climate-disrupting coal-fired power plants is becoming more expensive due to the

rising prices that power plant operators must pay for their CO_2 emissions, and renewables as well as storage options becoming increasingly competitive, even with existing fossil fuel plants.

Think tank EMBER estimates that "…half the world's economies are already at least five years past a peak in electricity generation from fossil fuels. OECD countries are at the forefront of this, with power sector emissions collectively peaking in 2007 and falling 28% since then."[2] All of that was achieved without any increase in nuclear power generation.

Germany is far from isolated in its energy policy. Many countries, in spite of increasingly pro-nuclear rhetoric, are boosting renewables, energy storage, and demand-response options, pursuing readily available solutions and de facto an undeclared nuclear phaseout.

Last update: 2024

[2] EMBER, "Record renewables propel the world towards a new era of falling fossil generation", May 2024, see ember-climate.org/countries-and-regions/regions/world/.