



EUROPE GERMANY

Germany is heavily dependent on energy imports due to its limited domestic energy resources. In 2023, 68% of the primary energy consumption had to be covered by imports. The only domestic energy sources that Germany has in significant quantities are renewable energies and lignite. However, the share of renewables in covering primary energy consumption was only at roughly 20% in 2023 – despite a strong expansion in recent years. With the decommissioning of the last three nuclear power plants in April 2023, Germany will no longer use nuclear energy to generate electricity. Coal-fired power generation is to be phased out by 2038 at the latest.

Geopolitical issues remain among the most critical uncertainties. In the recent past, political or economic global crises have repeatedly caused **supply chain** disruptions. In addition to the production and logistics restrictions caused by the COVID-19 pandemic in 2020 and 2021, political conflicts such as the war between Russia and Ukraine lead to supply bottlenecks, price increases and a **risk to peace** in Europe. Russia's war of aggression against Ukraine also led to a major change in Germany's import structure since 2022. As a result of the cessation of natural gas pipeline deliveries to Germany and the oil and hard coal embargo against Russia energy purchases from Russia no longer play a significant role in Germany's supply. Norway became Germany's most important energy supplier of crude oil and natural gas in 2023, followed by the USA.

Import prices for energy, which had risen massively in 2022, fell again in 2023. Despite this development, import prices were still significantly higher than the prices recorded until 2021. As a result, consumer prices for energy products in 2023 were at a significant higher level than before the Russo-Ukrainian war. This situation, which represents a considerable burden for the competitiveness of industry and consumers, poses a risk to public **acceptance of the energy transition**. The energy crisis has raised awareness among the German population for a more secure and affordable energy supply since the beginning of 2022. Questions of acceptance and **populism** are, therefore, increasingly at the center of the German energy debate. The rise in populist ideas targeted at, among other things, the sharp rise in energy prices and ambitious climate policy measures are one of the biggest sources of uncertainty for energy experts in Germany.

CO₂ emissions in Germany have fallen by 43% since 1990. The Federal Climate Change Act, passed by the Bundestag and Bundesrat in April 2024, will create the conditions for achieving the targets of further reducing greenhouse gas emissions by 65% by 2030 (compared to 1990) and for achieving climate neutrality by 2045. In order to meet these climate targets, a massive acceleration and increase in the expansion of wind and solar power plants is required. The electricity system should be practically climate-neutral by 2035. In 2023, more than 50% of Germany's electricity consumption was covered by renewables.

Strengthening and expanding the **transmission** as well as **distribution grids** and more flexible solutions for **energy storage**, including **demand management**, are key action priorities – and at the same time among the most critical uncertainties. The new spatial, increasingly decentralised distribution of electricity generation and the increased demand for electricity (particularly because of the transformation of industry, electric vehicles, and heat pumps) require an accelerated expansion of the **electricity grid infrastructure**.

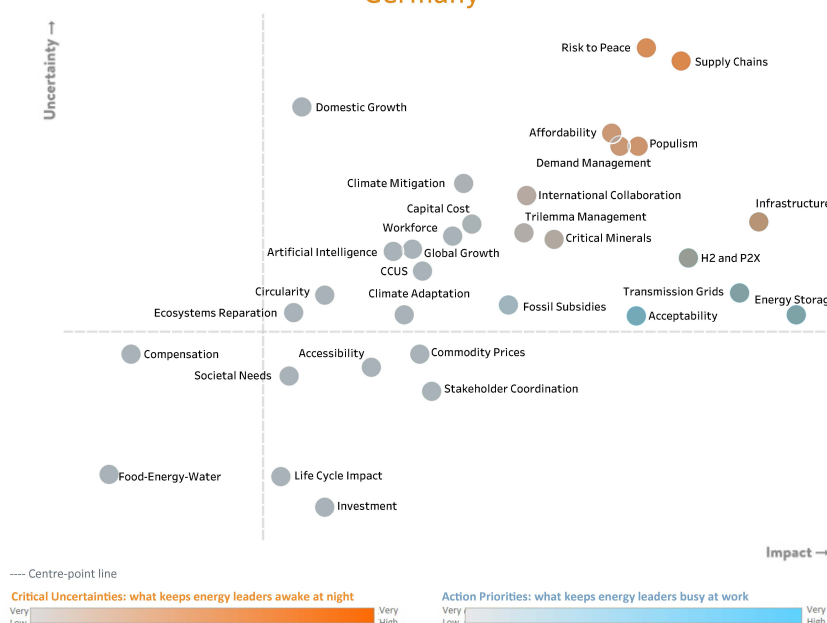
One key element for decarbonising Germany’s industry is the use of hydrogen-based technologies, particularly for processes that are difficult or impossible to electrify and for replacing fossil raw materials in material use. **Hydrogen and its derivatives** are also to be used in the future transport sector, particularly for heavy commercial vehicles, air transport and shipping. According to the German government, hydrogen demand in 2030 is expected to be between 95 and 130 TWh. The target for domestic electrolysis capacities was doubled to at least 10 GW in 2030 in the 2023 update of the National Hydrogen Strategy. The German government estimates that 50 to 70% of the hydrogen demand will have to be covered by imports (in the form of hydrogen and its derivatives).

The prerequisite for importing hydrogen is the rapid development of the necessary **import infrastructure** and integration into the European hydrogen network. The development of the hydrogen network infrastructure in Germany is planned in two stages: in the first stage, a hydrogen core network connects central hydrogen locations by 2032 and, in the second stage, a nationwide hydrogen network is being implemented. In a draft application submitted for the hydrogen core network, the transmission system operators have identified 9,700 km of hydrogen pipelines with expected investment costs of around €20 billion.

Furthermore, the Federal Minister for Economic Affairs and Climate Action presented key points for a Carbon Management Strategy (CMS) and new legal regulations on the Carbon Dioxide Storage Act in February 2024. The development of a CO2 pipeline infrastructure and the offshore storage of CO2 in the German Exclusive Economic Zone (EEZ) and on the continental shelf are to be regulated. In addition to the carbon capture and storage (CCS) from industrial plants, CCUS is also to be permitted for gas- and biomass-based electricity generation plants. Access to CO2 pipelines should remain excluded for emissions from coal-fired power generation, however. Despite these developments, the politically desired expansion of CCS is not yet perceived as an important action priority among German energy experts.

WORLD ENERGY ISSUES MONITOR | 2024

Germany



WORLD ENERGY COUNCIL

Acknowledgements

Germany Member Committee
 Prof. Dr Hans-Wilhelm Schiffer
 Maira Kusch
 Burkhard von Kienitz