

Energy Overview and Energy Policyⁱ

Germany is the world's fifth largest energy consumer--14.4 quadrillion Btu, or quads, in 1996. Germany consumes about 2.9 million barrels per day (bbl/d) of oil, nearly all of which it imports. Germany consumed 3.7 Tcf of gas in 1996, around 80% of which it imported. Germany has coal reserves of 74.2 billion short tons (bst), of which 36% is hard coal (anthracite and bituminous), while 64% is soft coal (lignite and subbituminous). Currently Germany ranks fourth worldwide in installed nuclear capacity, behind the United States, France, and Japan. Nuclear power generates some 30% of Germany's electricity supply. The contribution of renewable energy to Germany's fuel mix is growing steadily. This is due, in part, to the fact that German utilities are now obligated to pay independent power producers (IPPs) a minimum price of 90% of their average electricity rate for wind and photovoltaic energy (about 10 cents per kWh), and 70% for energy from water, biomass, or biogas. As of early 1998, the total capacity of wind power reportedly reached 2 GW, making Germany the largest producer of wind energy in the world.

Figure 4: Germany's Total Energy Consumption 1996 (14.4 Quads)

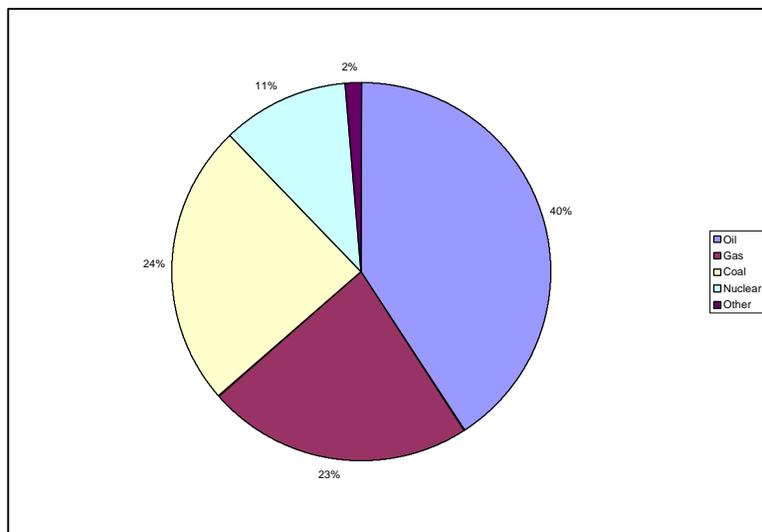


Table 1. Germany: Energy Overview 1996

Dependence on Energy Imports: 63%	Energy-Related Carbon Emissions: 870 million metric tons
Energy Consumption per Capita: 176.3 million Btu	Carbon Emissions per \$1000 GDP: 0.16 metric tons
Energy Consumption per \$1 GDP: 9500 Btu	Carbon Emissions per Capita: 2.9 metric tons
"Kyoto Commitment": 21% reduction in greenhouse gas emissions from 1990 levels by 2008-2012	Energy Use Per Unit GDP 1995: 4.7 MJ. ⁱⁱ

Germany's energy policy has two overarching goals: (1) to forge a consensus on future energy security and energy use, particularly with regard to the roles of coal and nuclear energy, energy conservation, and the more intensive use of renewable energy sources; and (2) to ensure environmentally benign energy supply and use. There are also four major issues, discussed below, around which the energy policy debate in Germany now revolves.

Climate Change. One of the German government's main efforts in the 1990s has been the development and application of a comprehensive strategy for the protection of the global climate. Germany has been a leading proponent of international political action to mitigate global climate change and a strong supporter of international treaties such as the United Nations Framework Convention on Climate Change and the Kyoto Protocol. Under the terms of the Kyoto Protocol, the European Union has committed itself in principle to a 7% reduction in greenhouse gas emissions from 1990 levels by 2008-2012. Within the European Union, however, the emissions reduction obligations of individual countries will differ significantly, as specified in the Community Strategy on Climate Change. Germany has committed itself to a 21% greenhouse gas emissions reduction, while other countries, including France, will have no reduction obligations.ⁱⁱⁱ The German government intends to achieve this target through a combination of policy measures including carbon taxes, renewable energy portfolio standards, and legislation such as the Electric Feed Law. This law requires German utilities to purchase renewably generated electricity from independent power producers at a minimum price of 90% of the average electric rate for wind and solar photovoltaic energy, and at 70% of the average rate for electricity generated by water, biomass, and biogas.^{iv}

The German government has also been working to secure the participation of German industry in climate change mitigation efforts. For example, in 1996, after three years of intensive negotiations, the government reached agreement with industry regarding voluntary emissions reduction commitments. During that time, industry's position on voluntary commitments gradually evolved from resistance to acceptance of voluntary carbon emissions reductions. Industry's attitude changed as it became clear that its failure to adopt for itself responsibility for emissions reductions would result in the imposition of new regulations that would allow much less flexibility in achieving reductions. According to industry estimates, voluntary measures will produce an absolute reduction of 170 million tons. An independent monitoring agency has been tasked with oversight responsibility for the program.^v

Germany has demonstrated sincere commitment to lead in addressing the climate change problem and to act unilaterally on the issue. The limits of this commitment will be tested in upcoming years, however, as rising taxes on fossil fuels coincide with efforts to phase out Germany's nuclear power capacity (discussed below).

Energy Security. Security of Germany's energy supply is also an important policy objective, given the country's heavy dependence on energy imports (approximately 96% and 80% for oil and natural gas, respectively). Germany relies for its energy security on cooperative arrangements with the members of the European Union, the International

Energy Agency, and the countries of Eastern Europe and the former Soviet Union. For example, Germany is participating in the European Union's efforts to create trans-European energy networks integrating the gas and electricity systems of all EU Member States and forging network linkages with non-EU countries, such as Russia and Algeria, as well.^{vi}

Hard coal and lignite will continue to help safeguard Germany's energy supply for the foreseeable future, although the contribution of domestic hard coal will become much smaller in the future. Rising domestic coal production costs make it increasingly difficult for Germany's coal producers to compete with cheaper foreign suppliers. Nevertheless, the federal government and the governments of Germany's two major coal states, North Rhine-Westphalia and Saarland, still provide large subsidies for coal mining in order to preserve jobs in the domestic coal industry.

The German government's energy security policy extends beyond measures aimed at ensuring reliable supplies of fossil fuels. For example, the 1991 Energy Plan focuses on several major developments affecting Germany's energy sector in the aftermath of reunification. The Energy Plan addresses the energy security implications of changes in the international political context, such as European integration, the threat of global climate change, and the ongoing political and economic transformations in Central and Eastern Europe. In addition, it embodies important policy shifts, favoring the increasing use of market-based mechanisms rather than government intervention for the management of the economy and as an instrument of energy security. At the same time, the plan calls for increasingly strict safety and environmental legislation, which has resulted in the closure of several nuclear power plants in the former East German states.

The Future of Nuclear Power. Nuclear energy has played a central role in German energy policy over the past three decades. However, the extent to which nuclear energy will continue to enjoy its central role in German energy is an open question. One of the first actions of Germany's Social Democratic Party-Green Party coalition government in October 1998 was the declaration of its intent to phase out all of Germany's nuclear power plants, which currently supply over 30% of the nation's electricity. The timeline for these plant closures is, as yet, undetermined, with estimates ranging from one to twenty years.

In conjunction with its proposed elimination of nuclear power in Germany, the new government has proposed to increase taxes on gasoline, heating oil, and electricity as a means of encouraging conservation and use of renewable energy, and as a means of raising revenues to finance social security programs.^{vii} The extent to which these policy measures are feasible remains to be seen. Since nuclear power is Germany's major non-carbon-emitting energy source, its elimination would require its replacement by a combination of energy conservation, and energy from other sources—most likely from fossil fuels in the short to mid-term. The rapid elimination of nuclear power would make it extremely unlikely that Germany would be able to meet its international greenhouse gas reduction commitments, while the levying of new taxes on fossil fuels would further constrain German industry and consumers in their energy options.^{viii} However, it is also

important to note that the current nuclear phase out plan applies only to nuclear power generated in Germany. Imports of nuclear-generated electricity from other parts of Europe, namely France, would not be restricted or penalized.

Utility Restructuring. Another major development in Germany's energy policy is movement toward the deregulation of the energy industries, particularly electric and gas utilities. Energy deregulation is closely related to other economic and political goals, such as the enhancement of international economic competitiveness, particularly for energy-intensive export industries, and the advancement of European integration through the creation of trans-European energy networks. Energy integration among the countries of the European Union is an important element of the development of a common EU market for all goods and services. From a legal standpoint, energy integration is mandated by the EC Treaty, which defines the internal market as an "area without internal frontiers in which the free movement of goods and persons, services, and capital is ensured."^{ix} Deregulation will help to reduce barriers to energy transactions within the EU and is intended to result in lower energy prices for European consumers and industry—most of whom pay higher premiums for energy than those of other regions. Trans-European energy networks will also contribute to Germany's and Europe's energy security by enhancing overall system flexibility.^x

Competition in Germany's energy industries is very limited currently, although proposals are now being considered for the revision of the legal and regulatory frameworks to allow third-party access. In the electric utility industry, for example, nine supra-regional monopolies control 80% of generation and nearly all transmission. Sixty regulated regional companies produce or distribute electricity over about two-thirds of the country; 40% of distribution is controlled by the "big nine" utilities, while another 850 companies, including many small-scale, local electricity cooperatives, are involved in distribution alone.^{xi} The highly-fractured nature of the German electricity market indicates that it could take several years for full retail competition to be achieved nationwide. Legislation passed in 1998, however, opened approximately 25% of electricity generation and transmission market to competition as of February 1999.^{xii}

ⁱ Information in this section is from the U.S. Department of Energy, Energy Information Administration, "Country Analysis Brief: Germany," May 1998, <http://www.eia.doe.gov/emeu/cabs/germany.html>

ⁱⁱ Calculation based on energy use per DM 1000 (real, 1995) economic output. ⁱⁱ Bundesministerium für Wirtschaft, 1998. *Energie Daten '97/'98*, p. 24.

ⁱⁱⁱ European Commission, "Energy for the Future: Renewable Sources of Energy," Green Paper for a Community Strategy COM (96)576, pp. 7-9.

^{iv} U.S. Department of Energy, Energy Information Administration, "Country Analysis Brief: Germany," May 1998 <http://www.eia.doe.gov/emeu/cabs/germany.html>

^v 4. Bericht des Arbeitskreis I, Energieversorgung der Interministeriellen Arbeitsgruppe CO2 Reduktion, "Klimaschutz und Energiepolitik," Dokumentation Nr. 445, 1997, pp. 17-19.

^{vi} European Commission, Directorate-General for Energy (DG XVII), "Trans-European Energy Networks: Policy and Actions of the European Community," September 1997.

^{vii} "German Tax Reform Will Increase Energy Taxes," 23 October 1998, Price Waterhouse Coopers Tax News Network http://www.taxnews.com/tnn_public/

^{viii} See, for example, William Drodziak, "New German Cabinet Signals a Left Turn: Taxes, Social Policies to Be Revamped," *Washington Post* 20 October 1998, p. A. 15; Roger Cohen, "In Inaugural Speech, Schroeder Stresses Jobs and Environment," *New York Times* 11 November 1998.

^{ix} Gunther Rexrodt, "Energy Policy in the European Union," *Energy in Europe* No. 24 (15 September 1997) http://europa.eu.int/en/comm/dg17/24rex_en.htm

^x European Commission, Directorate General for Energy (DG XVII), *Trans-European Energy Networks: Policy and Actions of the European Community*, September 1997.

^{xi} A.M. Klom, "Electricity Deregulation in the European Union," *Energy in Europe* No. 24 (15 September 1997) http://europa.eu.int/en/comm/dg17/24rex_en.htm

^{xii} See: Heimfrid Wolff, "Grenzen und Chancen einer dauerhaften und durchhaltbaren Entwicklung im Energiesektor (Kurzfassung)," im Auftrag des Bundesministeriums für Wirtschaft, Bonn, November 1997 <http://www.bmwi.de/>