

Security Through Energy Policy: Germany at the Crossroads

R. Andreas Kraemer

R. Andreas Kraemer has been director of Ecologic Institute in Berlin, Germany, since its founding in 1995. Well-versed in sustainable development and environment policy after more than 20 years in the field, he is a professor in the Berlin Program of Duke University in Durham, North Carolina, and cochairman of the OekoWorld advisory board on “green” investments. Ecologic Institute Washington, D.C., of which he is chairman, opened in 2008.

Germany has been a leader in renewable energy development, setting ambitious climate protection policies at home that have fueled growth of new technologies and related jobs that are now being exported around the world.



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Courtesy of Ecologic Institute

The greatest concern in Germany is not acute domestic effects of climate change, but that developments around the world might harm political stability in other countries, result in a loss of trade, induce migration, and ultimately cause conflict. Promoting good climate policies abroad is seen as being in Germany's best interest and as good global citizenship.

At the heart of Europe, with all neighbors being member states of the European Union (E.U.), Germany is in a favorable position, geographically and politically. Some E.U. countries like Belgium, the Netherlands, Britain, or Denmark will likely suffer more from rising sea levels, while others around the Mediterranean will feel stronger effects from changing rainfall patterns. Germany has comparatively strong, well-organized, and efficient government and can respond to emerging threats more effectively than countries with more limited statehood, especially developing countries outside the E.U.

Germany is most vulnerable to the effects of climate change along the North Sea and Baltic coasts, but these are not densely populated. However, we find many houses, businesses, and much transport infrastructure along the rivers. Seasonally low flow already forces the occasional shutdown of nuclear plants and other installations. Recent record floods in all large rivers are seen as a consequence of changing climate, with a warmer atmosphere carrying more water and triggering stronger rainfall or snowfall. In time, a partial retreat from vulnerable areas will become necessary, yet there is no sense of urgency now.

TRANSFORMATION

Promoting energy efficiency and renewable energies is the preferred way to a climate-safe future for Germany. Fossil energy carriers are on the way out, as may be nuclear power.

Domestic hard coal production from deep mines is expensive and in phase-out; surface-mined soft coal (lignite) will remain a fuel for power generation for some

time but is politically on the defensive. Very likely, no new coal-fired power plants will be built in Germany. Domestic oil and gas production is economically irrelevant, and reliance on imports is not only expensive but brings with it threats to security of supply. Disruptions in gas deliveries from Russia in recent winters have not affected Germany directly but still raised concerns about supply security, as well as the outlook for the new democracies in Russia's shadow.

German energy taxes raise the prices of fuel, gas, and power, inducing families and businesses to monitor their energy use. Manufacturers develop efficient industrial equipment, household appliances, and cars, while building regulations promote insulation and efficient heating (and cooling) systems. Public investment programs, tax breaks, and dedicated credit lines support retrofits of existing buildings, and the efficient co-generation of heat and power.

Net metering and attractive feed-in tariffs support renewable power producers and are gradually leading to more diversified

structure of distributed power generation. The key Federal Renewable Energy Act provides for feed-in tariffs above grid price levels to support emerging renewable energy technologies during the early phase of market development, especially for solar

and wind power. The tariffs, designed to provide a stable economic environment for otherwise very risky investments in renewable energies, go down over time and will end as the renewable energies reach grid parity and can survive on the market.

Germany never focused on fermenting grain to make ethanol as a bio-fuel, which is inefficient and environmentally harmful, but approached bio-energies — including bio-diesel, biogas, and wood pellets — more broadly. The production of storable biomass and biogas, and their subsequent conversion to power and heat, is a particularly dynamic and promising field now, attracting innovators and investors alike.

As a consequence of these policies, renewable energies now make up 15.1 percent of total power consumption and 9.5 percent of total energy consumption (2008).

Last year's turnover of the industry was 29 billion euros (more than \$40 billion), and it employs about 280,000 at various levels of qualification.

In 2008, overall greenhouse gas emissions decreased by 12 million tons, or 1.2 percent, from 2007 levels. Total emissions are now 945 million tons CO₂e (CO₂ equivalent) and within Germany's target corridor of the Kyoto Protocol, which allows Germany emissions during the period 2008 to 2012 at 21 percent below those of 1990. Germany's 2008 emissions are 23.3 percent below 1990 levels, making it likely that Germany will meet the target.

When could Germany supply all power needs from renewable sources? A federally funded research and demonstration project links variable wind and solar power plants with biogas-to-power plants, hydropower, and pump storage to form a virtual "combined renewable power plant" (kombikraftwerk.de). Thirty-six plants linked throughout Germany proved able to follow the load curve on the grid and supply a fixed proportion of power demand through the year.

Assessments of the renewable power and industrial scale-up potentials indicate that a full conversion to renewable power could be attained by 2050. This transformation would be completed even earlier by using smart-grid technology,

demand response, load-variable power use, feed-in tariffs, and battery storage in electric automobiles; the German government wants to see 1 million electric cars on its roads by 2020. The concomitant phase-out of coal and nuclear power makes the transformation attractive in view of climate change and the proliferation risks and security policy price of nuclear technologies.

DOING WELL BY DOING GOOD: EXPORTING SOLUTIONS

Germany did not wait for other nations to bear the brunt of climate change and copy solutions others had found. Instead, Germany has developed domestic policies and worked with its partners in the E.U. to formulate continentwide responses to the challenges of climate

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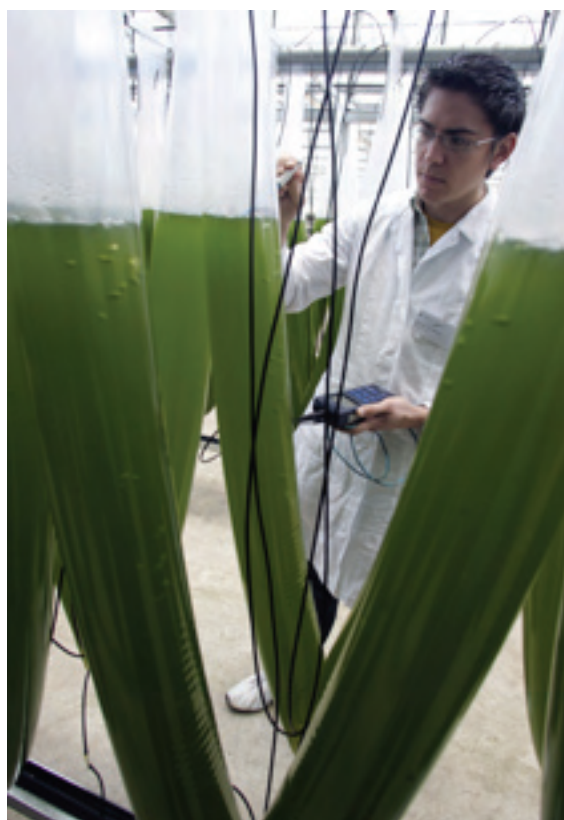
change. Germany engages with energy exporters, such as Russia, and many others to diversify its sources of energy, improve energy security and understanding of the need to mitigate greenhouse gas emissions, prepare for the impact of unavoidable climate change, and move toward sustainable and equitable societies.

Examples of this approach include German leadership in setting up the International Renewable Energy Agency (IRENA) and the International Carbon Action Partnership (ICAP), promoting international cooperation for efficient carbon markets. The Transatlantic Climate Bridge establishes bilateral links with the United States and Canada. A significant share of German cooperation with developing countries and emerging economies is directed at climate solutions and access to sustainable energy supplies.

This proactive attitude is not new. It can be traced to the beginnings of the E.U. in the 1950s and, more specifically, to the oil crises in the 1970s and early 1980s. Since the establishment of a full-fledged federal ministry of environment in 1986, German policies on environment, climate, and energy were marked by continuity and consistency across party lines and through changes in government. In setting effective policies at home, developing new technologies and services, letting them mature in the domestic and European markets, and selling them to other nations, Germany has created and secured businesses and jobs and provided solutions for others to adapt and adopt. ■

For more information, see www.ecologic.eu <[http:// www.ecologic.eu](http://www.ecologic.eu)>; www.ecologic-institute.us.

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Germany has invested heavily in renewable energy research and development. A scientist at RWE Energy Company in Bergheim, Germany, tests algae grown in a pilot project for carbon dioxide reduction for coal power plants.