

The background of the entire page is a photograph of a renewable energy landscape. In the foreground, there are rows of blue solar panels. Behind them, two large white wind turbines stand against a clear blue sky with some light clouds. The overall scene is bright and clear, suggesting a sunny day.

GERMANY'S GREEN ENERGY FAILURE:

A LESSON FOR U.S. POLICYMAKERS

Introduction

Over the last two decades, the German government has passed a series of laws designed to spur an “energy transformation” from conventional to renewable sources.¹ This includes a feed-in tariff scheme passed in 1991 that requires utilities to purchase renewables at above-market rates, regardless of whether the energy is wanted or needed.

In 2010, German Chancellor Angela Merkel took “energy transformation” a step further, announcing ambitious targets for cutting Germany’s greenhouse gas (GHG) emissions, increasing renewable energy as a source of electricity generation, and slashing energy consumption.² Germany intended to reach these benchmarks by levying new energy taxes, continuing feed-in tariffs, and relying on nuclear power as a short-term bridge to renewables such as wind and solar.

The Institute for Energy Research (IER) commissioned a study in 2009 titled, “*Economic impacts from the promotion of renewable energies: The German experience.*”³ The study warned that Germany’s green energy subsidies, particularly the feed-in tariff, would result in “massive expenditures that show little long-term promise for stimulating the economy, protecting the environment, or increasing energy security.”

As predicted, the results have been devastating. Germany’s “energy transformation” has threatened to destabilize the country’s electric grid, imposed enormous costs on German families, and undermined Germany’s economic competitiveness to the brink of “deindustrialization.” As a result of these policies, Germany has some of the highest electricity prices of industrialized countries. In fact, Germany’s residential electricity rates are three times the average rates in the United States. Moreover, Merkel’s decision to abandon nuclear energy in the aftermath of the Fukushima Daiichi nuclear disaster has undermined Germany’s own emission reduction goals, resulting in increased, not decreased, greenhouse gas emissions. Three years later, even as Japan begins to restart its idled nuclear fleet, Germany continues to deprive itself of this reliable energy source.

Opposition to “energy transformation” is growing rapidly. A commission of experts appointed by the German parliament recently called on Chancellor Merkel to abolish all green energy subsidies, explaining, “there is no justification for the continuation of the EEG (Renewable Energy Sources Act),”⁴ Germany’s feed-in tariff law passed in 2000. Meanwhile, a coalition of more than 100 European business leaders called on EU Member States to reevaluate their green energy policies.⁵ As the group explains, “EU industry does suffer from an important disadvantage in total energy and climate costs in comparison with competing regions of the world.”

¹ Heinrich Böll Foundation, *Energy Transition: The German Energiewende*, <http://energytransition.de/>

² German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety, *The Federal Government’s Energy Concept of 2010 and the Transformation of the Energy System of 2011*, Sep. 28 2011, http://www.bmub.bund.de/fileadmin/bmu-import/files/english/pdf/application/pdf/energiekonzept_bundesregierung_en.pdf

³ RWI Essen, *Economic Impacts from the Promotion of Renewable Energies: The German Experience*, October 2009, http://www.instituteforenergyresearch.org/germany/Germany_Study_-_FINAL.pdf

⁴ See <http://www.reuters.com/article/2014/02/26/germany-energy-idUSL6N0LV31I20140226>

⁵ International Federation of Industrial Energy Consumers, *More Than 100 CEOs from the Manufacturing Industry Sign a Manifesto Asking to Streamline EU’s 2030 strategy towards Growth and Jobs*, Feb. 27 2014, http://www.ifieceurope.org/docs/20140227 IE_Press_Release_Manifesto.pdf

U.S. President Barack Obama once urged America to “look at Berlin” to “save this planet” from rising greenhouse gas emissions.⁶ But while President Obama advocates for the U.S. to be more like Germany, officials there are beginning to reevaluate their own policies. The German government recently proposed a phase out of green energy subsidies,⁷ while the country constructs new coal-fired generating capacity. Meanwhile, the U.S. government continues to funnel subsidies to green energy companies while the Environmental Protection Agency (EPA) is saddling U.S. coal industry with costly regulations.⁸

This paper analyzes the German government’s support for green energy and the impact of these policies on the German economy. Germany’s “energy transformation” takes on fresh relevance as the country curtails its support for renewables and Japan plans to restart idled nuclear reactors. The German experience with green energy should serve as a cautionary tale for the United States, which continues to pursue similar policies even as Germany begins to reverse course.

‘Energy Transformation’ and a History of Subsidies

Germany, like the rest of the world, depends on conventional sources such as natural gas, coal, and nuclear to meet its electricity needs. For more than four decades, Germany has generated most of its electricity from coal. More recently, since the early 80s, nuclear has joined coal as one of the leading sources of electricity generation, followed by natural gas. Germany relies on these sources because they are the most abundant, reliable, and affordable sources of energy currently available.

Instead of allowing the most economical sources of energy to compete and drive down energy costs, the German government has for more than two decades subsidized expensive, unreliable renewable energy sources. In 1991, Germany established the Electricity Feed-in Act, which mandated that renewables “have priority on the grid and that investors in renewables must receive sufficient compensation to provide a return on their investment irrespective of electricity prices on the power exchange.”⁹ In other words, utilities are required to purchase electricity from renewable sources they may not want or need at above-market rates. A subsequent law passed in 2000, the Renewable Energy Act (EEG), extended feed-in tariffs for 20 years.¹⁰

As IER has pointed out, Germany’s feed-in tariff provides lavish subsidies to renewable energy producers. In 2009, the feed-in tariff for photovoltaic solar was eight times higher than the wholesale price of electricity.¹¹ Meanwhile, on-shore wind has required feed-in tariffs that are in excess of 300 percent

⁶ Barack Obama, *A World That Stands as One*, July. 24, 2008,

<https://my.barackobama.com/page/content/berlinvideo/>

⁷ Andrea Thomas, *Merkel Backs Plan to Cut Germany’s Green Energy Subsidies*, Jan. 22 2014, Wall Street Journal, <http://online.wsj.com/news/articles/SB10001424052702304632204579336220103661350>

⁸ Madeline Chambers and Vera Eckert, *Germany’s Industrial base at Risk If Green Energy Shift Fails*, Jan. 21 2014, Reuters, <http://www.reuters.com/article/2014/01/21/us-germany-energy-gabriel-idUSBREAOK0KW20140121>

⁹ Institute for Energy Research, *EPA Emissions Rule Will Destroy U.S. Coal Industry*, Sep. 17 2013, <http://www.instituteforenergyresearch.org/2013/09/17/epa-proposed-rule-will-destroy-u-s-coal-industry/>

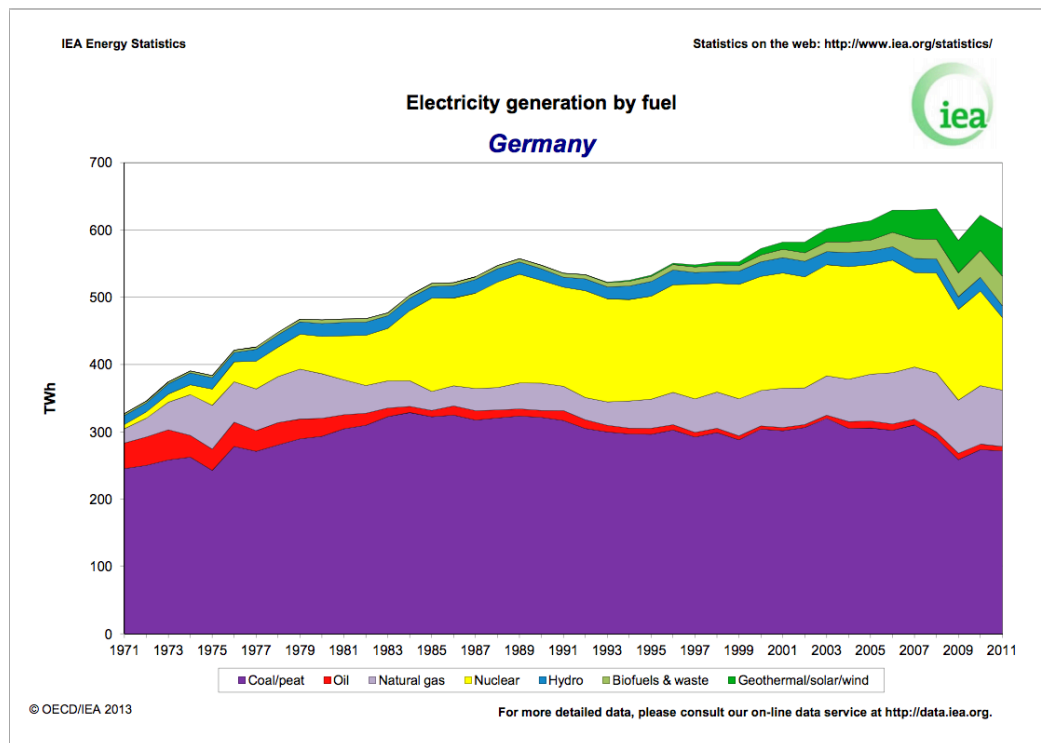
¹⁰ Heinrich Böll Foundation, *Energy Transition: The German Energiewende*, <http://energytransition.de/>

¹¹ Institute for Building Efficiency, *Feed-In Tariffs: A Brief History*, Aug. 2010, <http://www.institutebe.com/energy-policy/feed-in-tariffs-history.aspx>

¹² RWI Essen, *Economic Impacts from the Promotion of Renewable Energies: The German Experience*, Oct. 2009, http://www.instituteforenergyresearch.org/germany/Germany_Study_-_FINAL.pdf

higher than market prices just to achieve cost parity with traditional sources such as coal, nuclear, and natural gas.¹²

Despite more than two decades of subsidies, solar and wind still account for just 11 percent of overall generation.¹³ The following chart displays Germany's electricity mix between 1971 and 2011:



In 2010, Chancellor Merkel announced a dramatic expansion of the “energy transformation.” Germany’s Ministry for Environment, Nature Conservation, and Nuclear Safety described the Merkel plan as “not a precision landing,” but as a way to “send signals to the general public and to the various sectors about whether we are on track to reach our goals in the course of actual events.”

To that end, Merkel’s plan sets long-term targets for reducing greenhouse gas emissions, increasing renewables as a source of electricity generation, and reducing energy consumption. These targets¹⁴ include:

- Using 2010 levels as a baseline, greenhouse gas emissions are to be cut 40 percent by 2020, 55 percent by 2030, 70 percent by 2040, and 80 to 95 percent by 2050.

¹² Ibid.

¹³ International Energy Agency, *Germany: Electricity and Heat for 2011*, <http://www.iea.org/statistics/statisticsearch/report/?country=GERMANY&product=electricityandheat&year=2011>

¹⁴ German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety, *The Federal Government’s Energy Concept of 2010 and the Transformation of the Energy System of 2011*, Sep. 28 2011, http://www.bmub.bund.de/fileadmin/bmu-import/files/english/pdf/application/pdf/energiekonzept_bundesregierung_en.pdf

- Utilities are to generate 35 percent of their electricity from renewable sources by 2020, 50 percent by 2030, 65 percent by 2040, and 80 percent by 2050.
- Using 2008 levels as a baseline, primary energy consumption is to be 20 percent lower by 2020 and 50 percent lower by 2050. Compared to 2008, electricity consumption is to be 10 percent lower by 2020 and 25 percent by 2050.

In the plan, the environment ministry stressed that Germany should “remain internationally competitive and costs to consumers [should] be contained” as the country pursues its aggressive green energy targets. But as will be explained below, Germany is failing on both counts, with energy costs spiraling out of control and German industry losing global competitiveness.

The Fukushima Nuclear Scare

Germany’s “energy transformation” was supposed to depend on nuclear energy as a medium-term bridge to renewables like wind and solar. The original plan called for extending the operating lives of Germany’s nuclear fleet by an average of 12 years to allow time for wind and solar to mature into competitive industries.¹⁵

In 2011, however, the German government abruptly reversed course on its support for nuclear power in the aftermath of the Fukushima Daiichi nuclear meltdown. Though Fukushima was caused by an incredibly unlikely tsunami triggered by a 9.0 magnitude earthquake, it generated permanent repercussions in Berlin. Directly due to the singular incident in Japan, Merkel and her cabinet hastily reformulated their long-term energy policy,¹⁶ immediately shuttering eight nuclear reactors and ordering a complete phase-out of the remaining reactors by 2022—even as Japan plans to restart its own reactors.

The German government’s abrupt decision to abandon nuclear power has resulted in staggering costs for German families and businesses. E.ON, Germany’s largest electric electricity provider, announced job losses of up to 11,000.¹⁷ Berenberg Bank estimates that the nuclear shutdown will increase energy bills across Germany by 20 percent.¹⁸

Those employed directly in the energy sector are not the only ones suffering as a result of the German government’s decision to abandon nuclear. The German economy is especially dependent on energy-intensive manufacturing to drive growth. For instance, compared to the United Kingdom, where manufacturing accounts for 15 percent of the economy, manufacturing accounts for a full quarter of Germany’s economy.¹⁹ The Federation of German Industries explains that German manufactures may “lose a competitive edge against rivals in the United States, where a boom in the unconventional shale gas production has led to a sharp drop in industrial energy costs.”²⁰

¹⁵ Ibid.

¹⁶ Institute for Energy Research, *Germany’s Grim Nuclear Phase Out*, Aug. 5 2013, <http://www.instituteforenergyresearch.org/2013/08/05/germanys-grim-nuclear-phase-out/>

¹⁷ Tom Bawden, *German Nuclear Shutdown Forces E. ON to Cut 11,000 Staff*, The Guardian, Aug, 10 2011, <http://www.theguardian.com/business/2011/aug/10/german-nuclear-shutdown-forces-eon-to-axe-11000-jobs>

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ Henning Gloystein, *High Energy Costs Could Hurt German Industry*, Reuters, Nov. 8 2012, <http://www.reuters.com/article/2012/11/08/energy-industrials-competition-idAFL5E8M8HR520121108>

Damages to Germany's manufacturing sector are already considerable. In 2012, Germany's largest steelmaker, ThyssenKrupp, was forced to sell one of its mills in the Rhineland to a Finnish competitor, which shut down the plant the next year, resulting in a loss of 400 jobs.²¹ The plant had been in operation for more than 110 years.²² Those affected by closure do not attribute it to "low-wage competition from the Far East or mismanagement at ThyssenKrupp's Essen headquarters, but rather on the misguided policies of the German government."²³ Economists, business leaders, and union leaders alike are blaming "the government, [which] has expedited de-industrialization."²⁴

Another ironic byproduct of the allegedly carbon-conscience Germany's nuclear shutdown is increased reliance on coal-fired power plants. German electricity generation from coal increased 8.2 percent between 2011 and 2012 to compensate for the loss of hastily shuttered nuclear reactors.²⁵ Unlike America, which has benefited from a boom in shale gas development, Germany is not extracting significant amounts of natural gas from shale. Instead Germany is building new coal capacity at a rapid rate, approving 10 new coal plants to cope with the high costs and unreliability of renewables.²⁶ This, in turn, is leading to increased emissions, despite the government's aggressive emission reduction goals. In 2012, for instance, Germany's carbon dioxide emissions rose by 1.3 percent over 2011 levels.²⁷

²¹ Frank Dohmen and Alexander Neubacher, *Merkel's Switch to Renewables: Rising Energy Prices Endanger German Industry*, Der Spiegel, Feb. 24 2012, <http://www.spiegel.de/international/business/merkel-s-switch-to-renewables-rising-energy-prices-endanger-german-industry-a-816669.html>

²² Stehlseite, *It's Over*, Aug. 12 2013, <http://www.steel-photo.org/tag/thyssenkrupp/>

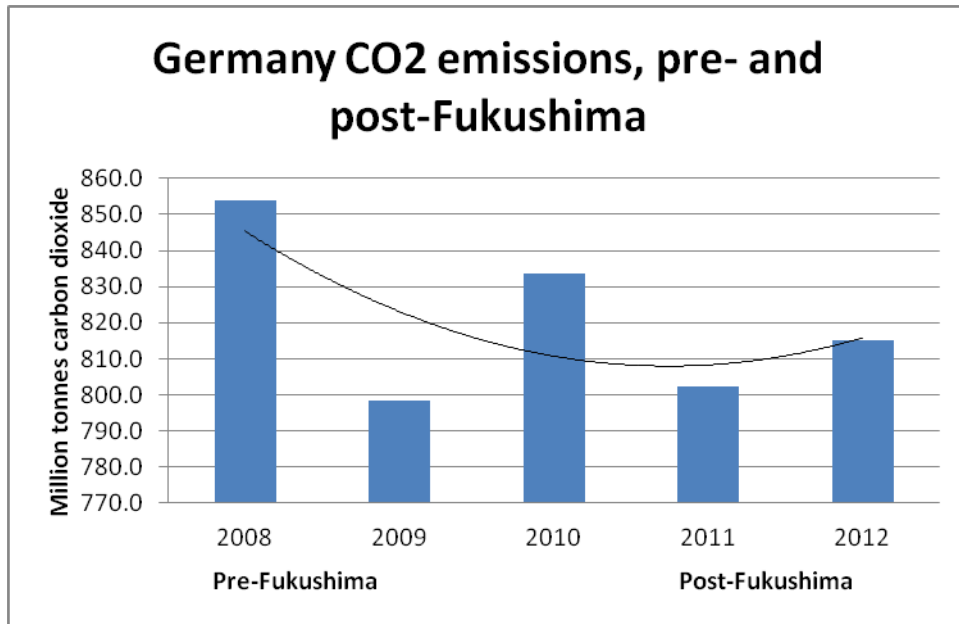
²³ Frank Dohmen and Alexander Neubacher, *Merkel's Switch to Renewables: Rising Energy Prices Endanger German Industry*, Der Spiegel, Feb. 24 2012, <http://www.spiegel.de/international/business/merkel-s-switch-to-renewables-rising-energy-prices-endanger-german-industry-a-816669.html>

²⁴ Ibid.

²⁵ Fraunhofer ISE, *Electricity Production from Solar and Wind in Germany in 2012*, Feb. 8 2013, <http://www.ise.fraunhofer.de/en/downloads-englisch/pdf-files-englisch/news/electricity-production-from-solar-and-wind-in-germany-in-2012.pdf>

²⁶ Brigham A. McCown, *Germany's Energy Goes Kaput, Threatening Economic Stability*, Forbes, Dec. 30 2013, <http://www.forbes.com/sites/brighammccown/2013/12/30/germanys-energy-goes-kaput-threatening-economic-stability/>

²⁷ British Petroleum, *BP Statistical Review of World Energy*, June 2013, http://www.bp.com/content/dam/bp/pdf/statistical-review/statistical_review_of_world_energy_2013.pdf



The Japanese government recently unveiled plans to restart its idled nuclear sector, three years after Fukushima prompted Japan to shut down all 48 commercial nuclear reactors.²⁸ Meanwhile, the German government remains committed to closing all of its nuclear plants and foregoing a reliable source of electricity generation—one that even Japan has come back to recognize as an “important baseload electricity source.”²⁹ As will be explained below, Germany’s continued mistrust of nuclear energy has threatened to destabilize the country’s electric grid and is imposing enormous costs on German families.

Renewables and Grid Destabilization

After Fukushima, the German government hastily decided to replace its reliable nuclear generators with renewables, primarily wind and solar. More than two years later, Germany has learned firsthand that unlike baseload power sources (nuclear, coal, and natural gas) that are reliable, solar and wind power are inherently intermittent and thus cannot be depended on to meet the country’s energy needs.

Overreliance on solar and wind threatens grid reliability and increases the likelihood of blackouts. Every moment of every day, grid operators must carefully balance supply to meet demand. Wind and solar, however, only work when and where the wind is blowing and the sun is shining, not necessarily when and where electricity is needed. In some extreme cases, eastern Germany (where more than one-third of the nation’s wind turbines are located) produces three to four times more electricity than is actually being consumed, straining the grid and threatening blackouts.³⁰ The following chart shows the fluctuating output of solar and wind energy on two days in May 2012.

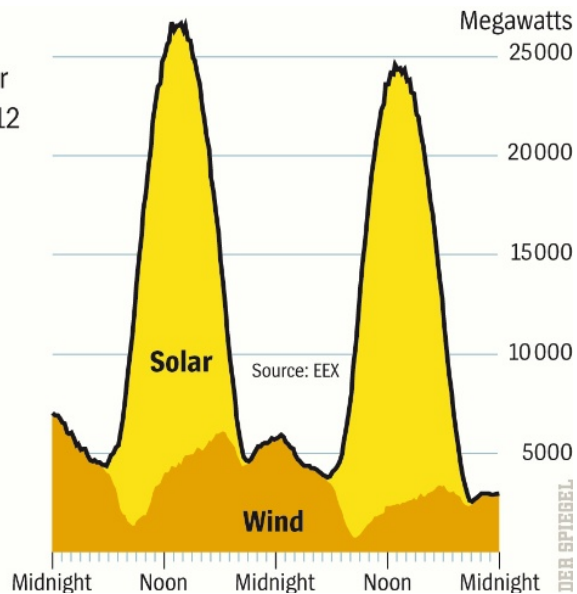
²⁸ Hiroko Tabuchi, *Reversing, Japan Makes Push to Restart Dormant Nuclear Plants*, New York Times, Feb. 25 2014, http://www.nytimes.com/2014/02/26/world/asia/japan-pushes-to-revive-moribund-nuclear-energy-sector.html?_r=0

²⁹ Maria Iwata, *Japan Sees Key Role for Nuclear Power*, Wall Street Journal, Feb. 25 2014, <http://online.wsj.com/news/articles/SB10001424052702304610404579403741256563088>

³⁰ Institute for Energy Research, *Germany’s Green Energy Destabilizing Electric Grids*, Jan. 23 2013, <http://www.instituteforenergyresearch.org/2013/01/23/germanys-green-energy-destabilizing-electric-grids/>

Fluctuating Output

Wind and solar energy fed into the power grid, for example, on May 25 and 26, 2012
In comparison: Net output of the Brokdorf nuclear power plant: 1,410 megawatts



To illustrate how even brief moments of grid instability can wreak havoc, consider this real-world example. In 2012, when the voltage from Germany's electric grid weakened for just a single millisecond at 3 a.m., the machines at Hydro Aluminum in Hamburg ground to a halt, production stopped, and the aluminum belts snagged, hitting machines and destroying a piece of the mill—with damages to the equipment amounting to \$12,300.³¹ The voltage weakened two more times in the next three weeks, causing the company to purchase its own battery-powered emergency system at a cost of \$185,000.

Since 2009, these short but expensive interruptions to the German electric grid have increased by 29 percent and the number of service failures has increased 31 percent, with about half of those failures leading to production stoppages.³² Such stoppages have caused damages ranging from several thousand to *hundreds of thousands* of Euros each. German companies have responded to these grid fluctuations by purchasing their own power generators to mitigate risks and many companies warn that they might be forced to leave the country if the government does not re-stabilize the grid.³³

As renewable energy overburdens the grid in some regions, it also underserves German residents in others. Noting the frantic actions of the German government after the Fukushima incident, Warburg Research analyst Stephan Wulf explains that there is “[a] lack of sufficient network capacities for transmitting the power generated in the North Sea to the large industrial consumers in southern Germany.”³⁴

To address these transmission concerns, Germany plans to build three “power autobahns” stretching north to south to move growing supplies of renewable energy across the country. The plan involves

³¹ Catalina Schröder, *Energy Revolution Hiccups: Grid Instability Has Industry Scrambling for Solutions*, Der Spiegel, Aug. 16 2012, <http://www.spiegel.de/international/germany/instability-in-power-grid-comes-at-high-cost-for-german-industry-a-850419.html>

³² Ibid.

³³ Ibid.

³⁴ Andrea Thomas, Jan Hromadko, and Friedrich Geiger, *Merkel Looks to Map Out Nuclear Exit*, Wall Street Journal, Apr. 24 2012, <http://online.wsj.com/news/articles/SB10001424052702303459004577363803837063214>

laying about 1,740 miles of new transmission lines and upgrading 1,800 miles of existing cables by 2022, bringing wind power generated in the north to consumers in the south.³⁵ This plan is a scaled down version of the recommendation made by Germany's four main grid operators, who indicated that the country's green energy overhaul would require about 2,400 miles of new cables and a fourth power-line corridor,³⁶ costing \$25 billion.³⁷ There have even been calls to nationalize the electrical grid.³⁸

Long Lines

Power-grid operators and the planned power-line expansion



³⁵ Stefan Nicola, *Merkel Cabinet Backs Power-Line Plan to Absorb Renewables Growth*, Bloomberg, Dec. 19 2012, <http://www.bloomberg.com/news/2012-12-19/merkel-cabinet-backs-power-line-plan-to-absorb-renewables-growth.html>

³⁶ Ibid.

³⁷ United Press International, *German Electric Grid Need Pegged at \$25B*, June 1 2012, http://www.upi.com/Business_News/Energy-Resources/2012/06/01/German-electric-grid-need-pegged-at-25B/UPI-97441338546600/

³⁸ Frank Dohmen and Gerald Traufetter, *Power Play: Politicians Call for Nationalization*, Der Spiegel, Jan. 16, 2013, <http://www.spiegel.de/international/business/member-of-merkel-cabinet-calls-for-nationalization-of-german-power-grid-a-877576.html>

The cost to expand transmission networks in order to integrate renewables stands at \$33.6 billion, which grid operators say only accounts “for only a fraction of the cost of the energy transition.”³⁹ These costs are in addition to the green energy surcharge paid by consumers to subsidize renewables⁴⁰ and the feed-in tariff, which cost German consumers an estimated €20.4 billion in 2013.⁴¹ George Erdmann, professor of Energy Systems at Berlin’s Technical University, estimates, “Subsidies for renewable energy, including an expansion of the power grid, will saddle energy consumers with costs well over €300 billion (\$377 billion).”⁴²

As Germany builds expensive transmission lines to integrate renewables into the grid, Germany’s allies and neighbors are taking defensive measures against Germany’s parasitic use of their own power grids. Poland and the Czech Republic are constructing a large-scale switch to insulate their grids from the effects of Germany’s unstable grid.⁴³ As a result, Germany is turning into a costly, unreliable electrical island.

Crippling Costs, Rising Taxes, and Looming Deindustrialization

The “energy transformation” is not just an engineering problem to be solved by experts. It is also an economic problem that directly affects German families and businesses. In 2013, Germans spent approximately €100 billion (\$130.5 billion) on energy, or about an average of €2,500 (\$3,263) per household.⁴⁴ In contrast, the average American household spent more than \$1,000 less on energy in 2009.⁴⁵ In 2012, the average price of electricity in Germany was 36.25 cents per kilowatt-hour,⁴⁶ compared to only 11.9 cents for U.S. households.⁴⁷

The following chart from the Manhattan Institute compares average residential electricity rates in 2012 for a handful of developed economies, including the U.S., EU, and Germany. At 35 cents per kWh, Germany’s residential electricity rates were nearly 10 cents higher than the EU average and nearly triple the U.S. average.

³⁹ United Press International, *German Electric Grid Need Pegged at \$25B*, June 1 2012, http://www.upi.com/Business_News/Energy-Resources/2012/06/01/German-electric-grid-need-pegged-at-25B/UPI-97441338546600/

⁴⁰ Max Luke, *Trash, Trees, and Taxes: The Cost of Germany’s Energiewende*, The Energy Collective, Sep. 16, 2013, <http://theenergycollective.com/maxluke/274041/trash-trees-and-taxes>

⁴¹ Gerrit Wiesmann, *German Rush to Renewables Faces Backlash*, Financial Times, Oct. 15 2012, <http://www.ft.com/intl/cms/s/0/347e5530-16b4-11e2-957a-00144feabdc0.html?siteedition=intl-axzz2KoRNOzOh>

⁴² Alexander Neubacher and Catalina Schröder, *Germans Cough Up for Solar Subsidies*, Der Spiegel, Jul. 4 2012, <http://www.spiegel.de/international/germany/german-solar-subsidies-to-remain-high-with-consumers-paying-the-price-a-842595.html>

⁴³ Daniel Wetzel and Die Welt, *Poland and Czech Republic Ban Germany’s Green Energy*, Global Warming Policy Foundation, Dec. 29 2012, <http://www.thegwpf.org/poland-czech-republic-ban-germanys-green-energy/>

⁴⁴ Focus, *Wenn das Geld nicht mehr zum Heizen reicht*, Feb. 12 2012, http://www.focus.de/immobilien/energiesparen/tid-27705/strom-und-heizkosten-ueberfordern-verbraucher-wenn-das-geld-nicht-mehr-zum-heizen-reicht_aid_838837.html

⁴⁵ U.S. Energy Information Administration, *Residential Energy Consumption Survey, 2009*, <http://www.eia.gov/consumption/residential/>

⁴⁶ Europe’s Energy Portal, *Germany Energy Prices Report, 2013*, <http://www.energy.eu/historical-prices/Germany/>

⁴⁷ U.S. Energy Information Administration, *Average Retail Prices of Electricity*, http://www.eia.gov/totalenergy/data/monthly/pdf/sec9_11.pdf

Figure 2. Residential Cost of Electricity in US Versus Other Developed Countries in 2012

Country	Cost per kilowatt-hour (in US dollars)
EU	\$0.26
Denmark	0.41
France	0.19
Germany	0.35
Ireland	0.26
Italy	0.28
Japan	0.26
Netherlands	0.24
Spain	0.29
Sweden	0.25
Switzerland	0.22
U.K.	0.20
U.S.	0.12
Source: Eurostat and International Energy Agency (IEA)	

In addition to rising energy bills, Germans are also paying higher taxes to subsidize expensive green energy. In 2013, energy taxes increased about 25 percent to an historic €31.6 billion, or \$42 billion.⁴⁸ By far the biggest cost is the Renewable Energy Levy, the funds of which subsidize renewable energy production. Between 2012 and 2013, this surcharge rose from €14.1 billion (\$18.9 billion) to €20.4 billion (\$27.3 billion). The German government raised the surcharge again at the start of the new year by 18 percent.⁴⁹ As a result, 80 German utilities are set to raise electricity rates by 4 percent, on average, in February, March, and April of this year.

Families are bearing the brunt of Berlin's green energy taxes. For the energy surcharge alone, German households forked over €7.2 billion (\$9.6 billion) in 2013. As Fred Roeder, director of Young Voice, explains, "Government intervention in the energy market, and especially laws requiring minimum quotas for green energy, raise energy prices. These higher prices are ultimately paid twice, first by taxation and then in the market, and all by the consumers."⁵⁰

The poor, who spend a higher percentage of their incomes on energy than the upper and middle class, suffer disproportionately due to higher energy costs. As many as 800,000 Germans have had their power cut off because of an inability to pay for rising energy costs, including 200,000 of Germany's long-term

⁴⁸ Institute for Energy Research, *Back to Berlin: Obama Should Take a Second Look at German Policies*, Jun. 19 2013, <http://www.instituteforenergyresearch.org/2013/06/19/back-to-berlin-obama-should-take-a-second-look-at-german-policies/>

⁴⁹ Vera Eckert, *Five Million German Households Faced with Higher Power Bills*, Feb. 24 2014, <http://www.reuters.com/article/2014/02/24/germany-powerprices-idUSL6N0LT1SZ20140224>

⁵⁰ Fred Roeder, *What The U.S. Can Learn From Germany's Green Energy Debacle*, Forbes, Nov. 7 2013, <http://www.forbes.com/sites/realspin/2013/11/07/what-the-u-s-can-learn-from-germanys-green-energy-debacle/>

unemployed.⁵¹ In fact, the International Energy Agency warns that Germany risks a consumer backlash if the government fails to curtail runaway energy costs.⁵²

In addition to saddling families with higher energy bills and green energy taxes, the German government's energy transformation agenda undermines the country's economic competitiveness. Ulrich Grillo, president of the Federation of German Industries, warned the government that rising energy costs would force German firms to flee to other countries, including the United States.⁵³ Moreover, a new report by IHS Consultants finds that Germany's exports would have been worth €15 billion more in 2013 if industry had not paid higher electricity prices compared to international competitors.⁵⁴ Higher energy bills cost German manufacturing €52 billion in net export losses between 2008 and 2013, according to the report.

From Berlin to Brussels, opposition to green energy subsidies is intensifying. The German Chambers of Industry and Commerce now considers energy supply "the top risk for Germany as location for business."⁵⁵ Indeed, German automaker BMW elected to build a new energy-intensive plant in Washington State to avoid paying six times as much for electricity in Germany.⁵⁶ Germany's own Minister of Economics and Energy, Sigmar Gabriel, describes the government's energy transformation as an albatross around the neck of his country that could lead to a "deindustrialization" of the German economy.⁵⁷

Most recently, the Commission for Research and Innovation, a group of experts appointed by the German parliament, recommended to Chancellor Merkel that Germany abolish all green energy subsidies. The Commission finds that Germany's renewable energy subsidies have not had a positive impact on the environment or innovation. The report concludes, "For both reasons, therefore, there is no justification for the continuation of the EEG (Renewable Energy Sources Act)."

Finally, the International Federation of Industrial Energy Consumers recently called on EU Member States to reassess their support for green energy in light of rising costs and diminished

⁵¹ Benny Peiser, *Europe Pulls the Plug on Its Green Future*, The Australian, Aug. 10 2013, <http://www.theaustralian.com.au/news/health-science/europe-pulls-the-plug-on-its-green-future/story-e6frg8y6-1226694405337>

⁵² International Energy Agency, *IEA Says Further Action Is Needed If Germany's Energiewende Is to Maintain a Balance Between Sustainability, Affordability, and Competitiveness*, May 24 2013, <http://www.iea.org/newsroomandevents/pressreleases/2013/may/name,38340,en.html>

⁵³ Hardy Graupner, *High Energy Costs May Drive German Firms to US*, Deutsche Well, May 22 2013, <http://www.dw.de/high-energy-costs-may-drive-german-firms-to-us/a-16828773>

⁵⁴ IHS, *Securing Germany's Global Competitiveness in a New Energy World*, Feb. 28 2014, <http://www.ihs.com/info/ecc/a/competitive-energiewende.aspx?ocid=gcsv2:pressrls:01>

⁵⁵ Frank Dohmen and Alexander Neubacher, *Merkel's Switch to Renewables: Rising Energy Prices Endanger German Industry*, Der Spiegel, Feb. 24 2012, <http://www.spiegel.de/international/business/merkel-s-switch-to-renewables-rising-energy-prices-endanger-german-industry-a-816669.html>

⁵⁶ Chris Bryant, *High European Energy Prices Drive BMW to US*, Financial Times, May 27 2013, <http://www.ft.com/intl/cms/s/0/be69a732-ab5a-11e2-8c63-00144feabdc0.html - axzz2semJOnNF>

⁵⁷ Investor's Business Daily, *Europe Starts To Run, Not Walk, Away From Green Economics*, Feb. 5 2014, <http://news.investors.com/ibd-editorials/020514-689033-europe-finds-anti-co2-policies-are-destroying-the-economy.htm>

competitiveness.⁵⁸ According to the group, which represents more than 100 European business leaders, “EU industry does suffer from an important disadvantage in total energy and climate costs in comparison with competing regions of the world.”

Lessons for the United States

Germany’s failed energy transformation agenda provides important lessons for U.S. policymakers. Keeping energy affordable for American families requires learning from Germany’s mistakes. Unfortunately, due to government policies America is running the risk of suffering the same fate as Germany has in recent years.

The German government is slowly learning from its mistakes. Germany is rapidly building new coal plants, while Chancellor Merkel has realized that overreliance on green energy could lead to “a problem in terms of energy supply.”⁵⁹ Most recently, Chancellor Merkel and Energy Minister Gabriel proposed a plan to phase out subsidies for renewables,⁶⁰ with Gabriel admitting, “We have reached the limit of what we can ask of our economy.”⁶¹

Yet in the U.S., President Obama is pushing for some of the same policies that Merkel is abandoning. In his 2012 State of the Union Address, Obama called on Congress to pass a Clean Energy Standard (CES) that would require the U.S. to double the amount of electricity generated from so-called “clean” sources, including renewables such as wind and solar, nuclear, and coal and natural gas with carbon capture.⁶² The president claimed a CES would “create a market for innovation,” but Germany’s energy transformation shows that such policies do more to *close* markets and *stifle* innovation.

While Germany scales back its support for renewables, in the U.S. the subsidies continue to flow. The federal renewable electricity production tax credit (PTC) awarded wind producers \$1.3 billion in 2012 alone, according to an estimate from the Joint Committee on Taxation.⁶³ Though the PTC expired at the end of 2013, Congress may soon pass a tax extenders package that would retroactively reinstate the PTC. Even without the PTC, the Government Accountability Office has found 82 duplicative and overlapping federal programs that support wind energy.⁶⁴ That’s in addition to state-level electricity mandates⁶⁵ and

⁵⁸ International Federation of Industrial Energy Consumers, *More Than 100 CEOs from the Manufacturing Industry Sign a Manifesto Asking to Streamline EU’s 2030 strategy towards Growth and Jobs*, Feb. 27 2014, http://www.ifieceurope.org/docs/20140227 IE_Press_Release_Manifesto.pdf

⁵⁹ Investor’s Business Daily, *Europe Starts To Run, Not Walk, Away From Green Economics*, Feb. 5 2014, <http://news.investors.com/ibd-editorials/020514-689033-europe-finds-anti-co2-policies-are-destroying-the-economy.htm>

⁶⁰ Andrea Thomas, *Merkel Backs Plan to Cut Germany’s Green Energy Subsidies*, Jan. 22 2014, Wall Street Journal, <http://online.wsj.com/news/articles/SB10001424052702304632204579336220103661350>

⁶¹ Madeline Chambers and Vera Eckert, *Germany’s Industrial base at Risk If Green Energy Shift Fails*, Jan. 21 2014, Reuters, <http://www.reuters.com/article/2014/01/21/us-germany-energy-gabriel-idUSBREAOK0KW20140121>

⁶² The White House, State of the Union Address, Jan. 24 2012, <http://www.whitehouse.gov/the-press-office/2012/01/24/remarks-president-state-union-address>

⁶³ Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 2012-2017*, Feb. 1 2013, <https://www.jct.gov/publications.html?func=startdown&id=4503>

⁶⁴ House Committee on Science, Space, and Technology, *GAO Reports Finds Duplication in Wind Energy Initiatives*, Mar. 28 2013, <http://science.house.gov/press-release/gao-report-finds-duplication-wind-energy-initiatives>

subsidies and the billions of federal taxpayer dollars doled out since 2009 on various grants and loans⁶⁶ designed to prop up renewables.

Perhaps the most important lesson for the U.S. to learn from Germany is the folly of abandoning affordable energy for green energy. The German government's decision to force its nuclear reactors into early retirement in the aftermath of Fukushima has wreaked havoc on the German economy. Germany has tried but failed to replace its affordable, reliable nuclear plants with expensive, intermittent solar and wind facilities. As a result, German families are suffering from higher energy bills and German companies are relocating to countries with lower energy prices.

Just as Germany has shut down its domestic nuclear industry, President Obama is determined to bankrupt U.S. coal companies. Coal is one of America's most affordable, abundant, and reliable sources of energy, accounting for about 40 percent of U.S. electricity production. But in 2008, candidate Obama stated, "So, if somebody wants to build a coal plant, they can—it's just that it will bankrupt them."

President Obama is making good on his promise. The Energy Information Administration (EIA) recently forecasted an increase in the number of coal-fired power plants that will be prematurely retired due to onerous EPA regulations.⁶⁷ Meanwhile, the EPA's proposed greenhouse gas emission rule for new power plants will effectively ban construction of new coal facilities.⁶⁸ If Germany's experience is any guide, as more coal plants close more Americans will be forced to pay higher energy bills.

As Germany plans to eliminate all of its nuclear generating capacity by 2020, the U.S. is undergoing a nuclear phase-out of its own. Some nuclear plants are simply uneconomic, but others are suffering from extremely long and uncertain reviews by the Nuclear Regulatory Commission.⁶⁹ This is resulting in a number of early retirements, when just a few years ago 20- and 30-year extensions seemed probable. Indeed, NRC has put 38 units on a retirement list because they exhibit a number of risk factors, including competition from lower-cost energy sources, declining demand, safety retrofit expenses, repairs and rising operating costs.⁷⁰ If all 38 at-risk units were prematurely retired, about one-third of the U.S. nuclear fleet would be shut down and likely replaced with natural gas and renewable generating technologies, resulting in higher greenhouse gas emissions.

The news is not entirely negative. A gap of more than 30 years in new nuclear plant construction ended in 2013, with four units (two twin-reactor installations) breaking ground and a fifth unit being revived at

⁶⁵ Institute for Energy Research, *AEA's Simmons to Testify on Renewable Portfolio Standards*, Nov. 13 2013, <http://www.instituteforenergyresearch.org/2013/11/13/aeas-simmons-to-testify-on-renewable-portfolio-standards/>

⁶⁶ Institute for Energy Research, *Recapping the Obama Administration Green Stimulus Failures*, Jan. 9 2013, <http://www.instituteforenergyresearch.org/2013/01/09/recapping-the-obama-administration-green-energy-stimulus-failures/>

⁶⁷ Institute for Energy Research, *An Increase in Coal-Fired Plant Retirements Means Fewer Coal Mine Jobs*, Feb. 24 2014, <http://www.instituteforenergyresearch.org/2014/02/24/an-increase-in-coal-fired-plant-retirements-means-fewer-coal-mine-jobs/>

⁶⁸ Institute for Energy Research, *Obama's War on Coal Continues While Global Demand Increases*, Jan. 27 2013, <http://www.instituteforenergyresearch.org/2014/01/27/obamas-war-on-coal-continues-while-global-demand-increases/>

⁶⁹ Institute for Energy Research, *Several U.S. Nuclear Plants Retiring Early; Others at Risk*, Oct. 14 2013, <http://www.instituteforenergyresearch.org/2013/10/14/several-u-s-nuclear-plants-retiring-early-others-at-risk/>

⁷⁰ Ibid.

the Tennessee Valley Authority.⁷¹ The combined capacity of the 5 units is more than 5,600 megawatts. At the same time, however, four nuclear reactors were set to be retired by the end of 2013, according to EIA.⁷² These retirements reflect a number of factors, as explained above, including a burdensome and uncertain regulatory environment.

Conclusion

Chancellor Merkel's expanded "energy transformation" plan has had a disastrous impact on Germany. German families are suffering from higher energy bills, Germany's economic competitiveness has deteriorated, and one of the stated goals of the plan—to reduce greenhouse gas emissions—has backfired. The German government's failed green energy experiment, like America's, shows the limitations of energy central planning. Bureaucrats in Berlin or Washington will never make wiser energy choices than a free market driven by price signals. But while Germany has begun to reverse course, the U.S. government continues to press forward, promoting subsidies and mandates that have failed in Europe and are failing in America. We would do well to learn from Germany's mistakes lest we repeat them.

⁷¹ Ibid.

⁷² U.S. Energy Information Agency, *Nuclear Energy Overview*, Feb. 2014, http://www.eia.gov/totalenergy/data/monthly/pdf/sec8_3.pdf