Germany: Case Study in The Failure of Green Energy

by Alicia Cerretani, Benjamin Deniston

Germany's energy policy, especially under the influence of Hans Joachim (John) Schellnhuber, serves as a warning: green energy is not sustainable for a modern industrial economy. Germany's nuclear exit – with laws established to fully eliminate nuclear power in Germany by 2022 – coupled with its massive expansion of solar and wind, has been a disaster. Since this policy has been aggressively implemented for some years, we can now examine the results.

In 2013 an author for the leftist {Dissent} magazine provided a breakdown of the realities of wind and solar power in Germany in 2012:[1]

In 2012 German wind power advertised an installed electrical generation capacity of nearly 31,000 megawatts, but the average production for the year *was only 17% of that capacity*. Solar power fared even worse: with an advertised capacity of 29,000 megawatts, its average generation for the year was only *11% of capacity*.

The expansion of inefficient wind and solar has been massively subsidized, and the costs of electricity are so high that people in Germany call their energy bill their "second mortgage." In 2004 residential electricity was about 23 cents (U.S.) per kilowatt-hour, and by 2015 it was 35 cents (among the highest prices for any developed nation); electricity prices for companies have risen 60% over the past five years, driving Germany's critical industrial and manufacturing out of the nation. A significant portion of this cost increase is directly from a "renewable energy surcharge" added to electricity bills to cover the cost of key subsidies to wind and solar. In 2013 German renewable energy subsidies were around 27 billion US dollars,[2] adding seven cents per kilowatt-hour to electricity bills – an added green energy surcharge which, alone, was nearly 70% of the average total electricity rate in the United States. In an added irony, these measures have not done anything to reduce Germany's annual CO2 emissions, which have remained the same for the past decade.

At the Tenth International Conference on Climate Change (held in Washington D.C., 2015) an overview of the failure of Germany's wind and solar power program was presented by Wolfgang Müller (the General Secretary of the European Institute for Climate and Energy), providing further details of Germany's failed energy policy.[3]

Wind

Between 1994 and 2012, the number of wind turbines in Germany increased from roughly 2,000 to 23,000. Not only do they operate far below capacity, the output fluctuates wildly. In 2014 Germany's 35,000 megawatts of wind power capacity operates at less than 30% of capacity 90% of the time, and at less than 10% of capacity 55% of the time (never reaching above 70%).

To illustrate the dramatically varying, and often minimal, production of power from wind we can examine data from a single month of electricity generation (August 2014) in Figure 1.

Solar

In 2000 Germany solar power capacity was merely 114 megawatts. In 15 years' time – driven by their massive subsidy program – this was increased over 300-fold, to 37,400 megawatts. As with wind, the actual electricity generation never comes close to this advertised capacity figure, and output varies significantly – reaching over 40% of capacity only 11% of the time, and remaining below 30% of capacity 60% of the time.

The fluctuation is not merely from the obvious day-night variation, but day to day as well, with power pro-

1. "Green Energy Bust in Germany," by Will Boisvert, Dissent, Summer 2013.

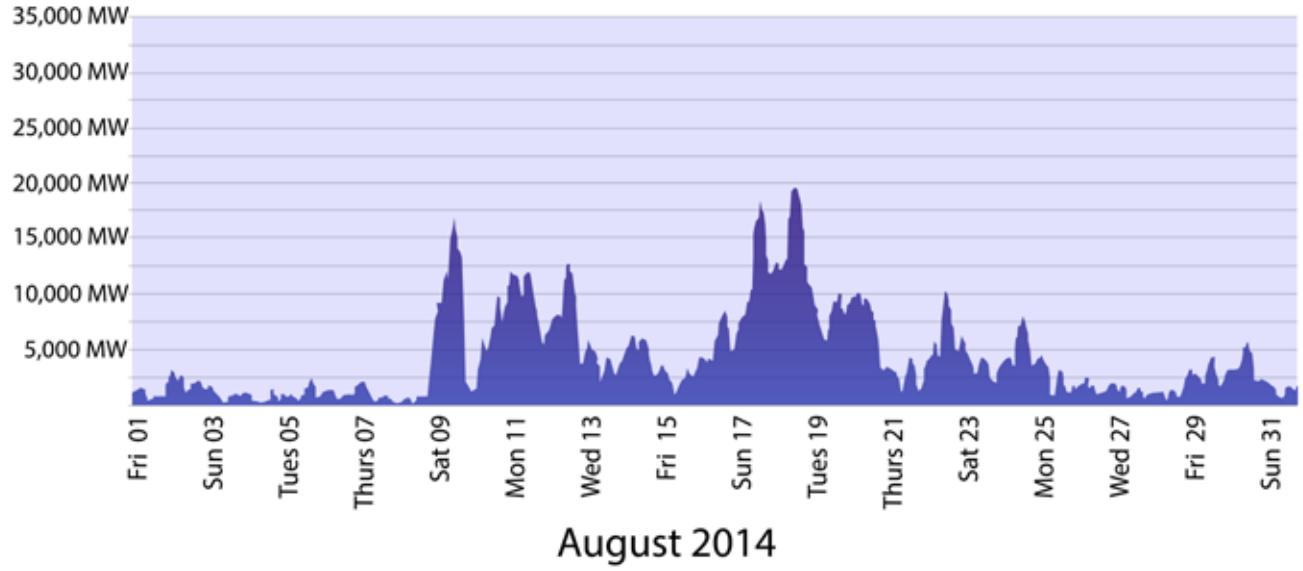
2. More than the United States government has spent on funding magnetic confinement fusion research over the past 50 years.

3. Tenth International Conference on Climate Change (ICCC), Panel 5: "Climate Program Impacts," Heartland Institute, June 11, 2015.

FIGURE 1

Wind: Installed Capacity vs. Output

Maximum installed capacity=35,000 MW

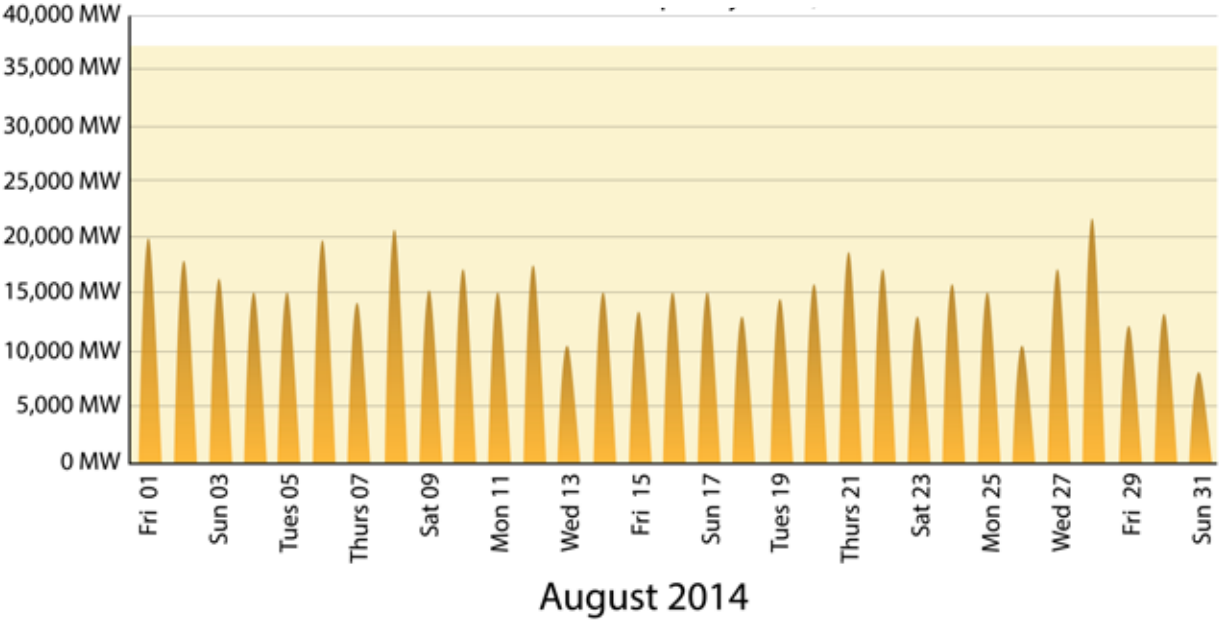


Electricity generated from all of Germany's wind turbines during the month of August 2014, measured against the advertised installed capacity. Image adapted from that used by Wolfgang Müller at the 2015 ICCC.

FIGURE 2

PV: Installed Capacity vs. Output

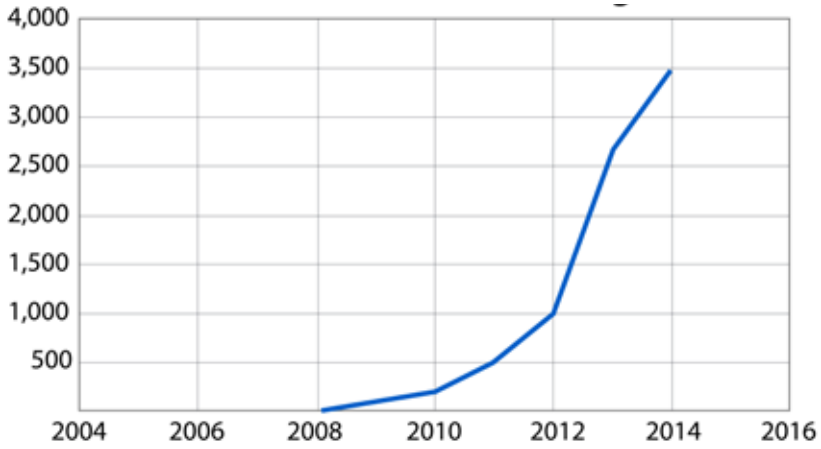
Maximum installed capacity=37,400 MW



Electricity generated from all of German solar power during the month of August 2014, measured against the advertised installed capacity. Image adapted from that used by Wolfgang Müller at the 2015 ICCC.

FIGURE 3

Interventions To Stabilize the Grid



Number of interventions required to stabilize the electrical grid in Germany, 2004 to 2014. Image adapted from that used by Wolfgang Müller at the 2015 ICCC.

duction at the mercy of the clouds. A more detailed examination of a single month shows the dramatic fluctuation in the electricity generation in Figure 2.

Problems for the Grid

If we take Germany's wind and solar power together in 2014, 75% of the time they operated below 20% of their cumulative installed capacity, and the irregular starts and stops created problems for an electrical delivery grid which depends upon reliable supplies of power.

Before the massive expansion of wind and solar power, very few interventions were required to stabilize Germany's energy grid. In 2006 there were only three or four interventions required, but in 2012 there were nearly 1,000 interventions required in order to keep a consistent and reliable source of energy available around the clock. In 2014 over 3,500 such interventions were required to rescue the national energy supply from the effects of fluctuations due to unreliable supply inputs. The trend is shown in **Figure 3**.

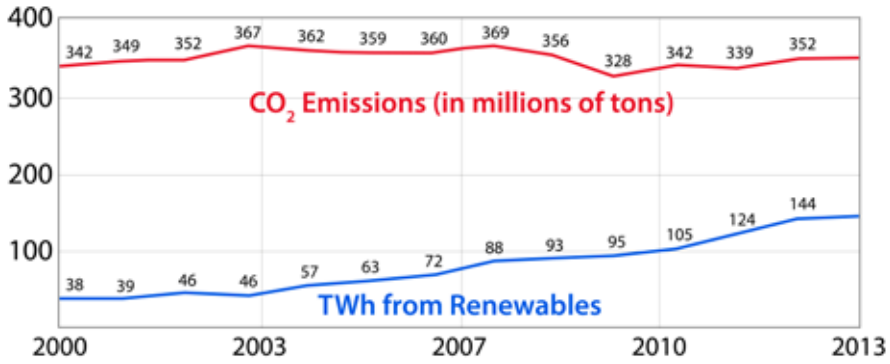
As an added irony to the whole insanity which has been Germany's energy policy under Chancellor Angela Merkel and John Schellnhuber, Germany's level of CO2 emissions has not changed after more than a decade of this green program. The amount of electricity put on the grid from "renewable" sources has nearly quadrupled between 2000 and 2013 (requiring over an eleven-fold increase in installed capacity), but the level of CO2 emissions has remained steady over that entire period, as the shutdown of nuclear power has required an increase in coal and natural gas plants to maintain stable power supplies. In 2012 Germany commissioned 2,900 megawatts of new coal power plants, capable of providing nearly twice the power of all the wind and solar added in that same year.

In total, Germany has massively subsidized a monstrous expansion of inefficient green energy supplies, providing irregular and sporadic power, creating a physical economic drain on the German economy, driving out productive industry and manufacturing, without producing the slightest reduction in their CO2 emissions – and at the price of a "second mortgage" to Germans in the form of their electricity bill.

Let the lesson be learned – there is no need for other nations to repeat this failure.

FIGURE 4

CO_2 Emissions vs. Electricity from 'Renewables'



Electricity produced from renewable sources in Germany compared with total CO2 emissions; despite a nearly four-fold increase in renewable energy, there is no decrease in CO2 emissions. Image adapted from that used by Wolfgang Müller at the 2015 ICCC