

## Future Power only from Wind and Sun? The German Experiment



The New York Times recently reported on Germany's intent to produce all of its electricity from renewable sources, notably wind and solar, by 2050. The country is phasing out its nuclear plants by 2022 and is engaged in a massive effort to build wind farms, with a large proportion in Schleswig Holstein (North Sea). Because this province is remote from the rest of the country and does not consume much energy, a huge amount of transmission capacity is needed to bring the power to the majority of domestic electricity consumers. Solar contributes much less than wind. On a recent weekend, Germany produced 60% of its electricity demand from wind and solar! That is an impressive statistic, though demand was down(see below) and the weather was particularly sunny and windy.

It is instructive for us to understand what is going on in Germany and why this course, while laudable from an environmental standpoint, will not be followed in the U.S. for a number of reasons- at least in our life time. (See also my post dated June 2nd, 2013)

Two important points about Germany. (1) The country has only one abundant energy resource, namely lignite coal, which is a poor fuel that is also highly polluting. (2) The environmental movement in Germany is consistently strong, with a "green" party that has substantial clout. So, with no little or no oil or natural gas production, the country must import large amounts of oil and coal(bad for the environment), as well as natural gas and it can generate very little hydropower. All of this, together with the planned phase-out of nuclear energy makes Germany the best candidate for shifting its electricity production to renewable sources. If successful, this would substantially reduce its bill for fuel imports while greatly cutting its emission of carbon dioxide. But the capital cost of the program and its effect on consumers is startling.

At this time, German consumers pay almost three times as much for electricity as we do in the U.S., including a \$ 270 annual surcharge to subsidize operators of renewable power. This has caused consumers to drastically reduce electricity consumption to the point where living standards are affected( Very low wattage light bulbs, heating fewer rooms, etc). Government subsidies are expected to reach \$ 40.5 billion by 2020. These are partly to manufacturing firms to keep their costs competitive with foreign rivals, though this subsidy is being challenged by EU authorities. Capital costs of the renewable energy plan are expected to amount to \$ 735 billion. And beyond this are the uncertainties of wind and solar energy production, which depend on climate and matching supply and demand, given the fact that electrical energy cannot easily and cheaply be stored. (A great deal of new research is now starting to be carried out in large scale batteries for energy storage, but that's a decade or more away).

The contrast with our own energy outlook is clear. The U.S. now has very abundant supplies of natural gas, it is not phasing out its nuclear capacity (though some older plants will shut down), there is no "green" party or strong environmental support in Congress, which will never vote for a program that would cost trillions of dollars, while sharply raising the cost of electricity, as in Germany.

Since all German parties support the country's energy plan, it seems on track to be implemented as envisioned. Though a consumer backlash would not be surprising.

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