Germany's energy model can save the world

The US and China can switch to renewables now – and prosper from it

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The People's Climate March and the United Nations Climate Summit that took place last week in New York City have, hopefully, focused Americans' attention on global warming, at long last. If the United States is now actively looking around for best-practice policies, one place to start is Germany's Energiewende, or clean energy transition, which has turned nearly one-third of the country's electricity production green in just over 10 years. Some projections have Germany running solely on renewables by 2050.

If Germany can do it, so can the U.S. — and China too.

Until now, the U.S. media have gotten the Energiewende terribly wrong, pronouncing it exorbitantly expensive, inflexible and destined to sink Germany's export-driven economy. (To be fair, the U.S. is not the only confused country, so poorly has Angela Merkel's government sold Germany's successes.) Indeed, there's plenty to be learned from the German undertaking. Yet, contrary to logic, just when the rest of the world is waking up to the climate disaster and preparing to take action, forward-looking

Germany is getting cold feet. Merkel's conspicuous absence at the U.N. summit is just one indication of her refusal to take a lead role in climate protection. But that doesn't mean the U.S. and other high-emission countries can't learn from the steps Germany has taken so far.

Renewables lead the way

Germany's strong suit is renewably generated electricity, which accounts for 31 percent of its power (and up to 74 percent on very windy, very sunny days). The backbone of the transition is solar photovoltaic (PV) and onshore wind power — the two renewables that are currently the most cost-effective. Although every country's renewables profile will look different (Iceland, for example, relies on geothermal for 98 percent of its energy), solar PV and onshore wind technologies have advanced far beyond where they were just six or seven years ago and now pay off their investment quickly. In other words, in most countries, they will lead the way.

Germany shows us that the latest generations of solar PV modules and land-based wind turbines generate enough power, when distributed in a decentralized smart grid, to keep an industrial and often cloudy country running smoothly and keep it internationally competitive. There's no need to wait for more advanced or even cheaper technology, a common charge of conventional energy

advocates. If Germany has been able to make nearly one-third of its power carbon-free in a decade, other countries should be able to do so just as quickly — if not more quickly now with much better technology.

Decentralized grids work

Because solar PV and wind power are weather-dependent, they are often considered unreliable — at best, a feel-good contribution to the energy supply of industrial countries. Critics charge that intermittent power generators such as wind and the sun cannot replace base load capacity — the minimal volume of energy that must be available at all times — even on windy and cloudless days, to keep factories humming and homes warm in the winter. In the past, coal, gas and nuclear provided steady base load energy day in and day out from huge, centralized plants in the vicinity of urban centers and industry.

But a system based on renewables looks different from the old model. Instead of a base-load supply that is pretty much the same from day to day, low-carbon energy systems like Germany's rely on a patchwork supply that differs every day, even every hour, and differs from region to region, village to village. When the sun is shining in Bavaria but there's no wind on the North Sea coast, the decentralized smart grid seamlessly distributes electricity where it's needed — and the other way around when it's windy but

not sunny. Bioenergy and small hydroelectric power plants contribute regularly to the mix and, in the future, so will offshore wind farms.

The smarter the grid is and the better it is connected across regions, countries and international borders, the more smoothly power will be generated and traded, keeping the supply as steady as the old base-load models. German experts say that storage technology that harnesses electricity at times of overproduction is not imminently necessary if a system has a decentralized smart grid — another technology that, far from the stuff of science fiction, is ready and affordable now.

The shift to citizen-owned energy in Germany has dethroned the big utilities that for so long put the brakes on anything that looked like a threat to fossil fuels.

One indisputable piece of evidence on behalf of this new model: Power outages in Germany have decreased (to 15.3 minutes in 2013) as the renewable content of its power supply has increased since 2006; in all of Europe, only Denmark (which has higher renewable content than Germany in its power supply) and Luxembourg have higher supply security.

Gas should replace coal

Of course, there must also be conventional generation capacity on hand for those days that are less favorable for renewables: windless, cloudy days. And here there's a cautionary tale, a glitch in the German model, though one that could easily enough be remedied, were German politicians so inclined. In Germany, gas is meant to be the go-to fossil fuel to ensure supply stability, the backup when solar and wind can't get the job done on their own. But because of coal's current low price (and the high price of gas), Germany is burning more coal (and seeing higher emissions) than it did in previous years.

This is entirely counterproductive and a blemish on Germany's record. There are different ways to address this, such as fixing the EU's emissions trading scheme, the whole point of which was to make carbon emitters pay the price. But it's not working (the result of a miscalculation in its original design), and as a result, Germany has been burning coal like never before. In Germany, as in the U.S., there has to be a strategy to exit from coal as quickly as possible.

Nuclear is not an asset

Germany is simultaneously phasing out nuclear energy, converting to renewables and striving to hit ambitious EU

climate targets. A majority of Germans have been anti-nuclear since the 1980s. Merkel has been as well, since the 2011 meltdowns at the Fukushima site in Japan, after which she shut down a third of Germany's reactors and accelerated the phase-out of the rest of the fleet by 2022.

Although Germany embarked on its Energiewende long before Fukushima, taking the crutch of nuclear away from Germany has forced it to focus on transforming its entire energy system to run on renewables. As long as nuclear power was in the picture, for example, Germany was under less pressure to redesign its grid. Moreover, the construction of nuclear plants is now so expensive that renewables are the cheaper, safer option that creates more jobs and decentralizes supply.

Power to the people

An essential characteristic of Germany's Energiewende is that nearly 70 percent of the generation capacity of the renewables is in the hands of farmers, small- and medium-size businesses, cooperatives, green investment funds and community-owned utilities. This kind of small-scale, distributed production is what makes the disparate patchwork supply function as well as it does. It has numerous advantages, including the involvement of millions of citizens in the transition. This has given them a stake in the Energiewende, which is one reason that upward of 85

percent of Germans consistently support the Energiewende. Moreover, the shift to citizen-owned energy has dethroned the big utilities that for so long put the brakes on anything that looked like a threat to fossil fuels. In Germany it's not that they've stopped trying, but now they have opponents with more than posters and banners in their hands.

The tragedy in Germany, however, is that the chancellor and her center-left government don't trust their own accomplishments. I can't remember the last time I heard Merkel — under fire from the powerful coal, automobile and heavy industry lobbies — mention the Energiewende, much less trumpet its success as something that Germans should be proud of and that other countries could imitate. Almost all the enthusiasm comes from below, from localities and the owners of renewables generation. Pro-Energiewende demonstrations in Berlin regularly bring tens of thousands into the streets. There are no demonstrations against electricity prices, which are higher than average in the EU but include a subsidy for renewables.

Germany should be leading the way on a variety of fronts — including electric vehicles, low-carbon heating, energy efficiency and the phasing out of coal. But its biggest successes thus far have been in renewably generated electricity. Since this is impressive in its own right, Merkel

should have been in New York City sharing with the rest of the world the pros and cons of the Energiewende.

This is where other countries can from learn from Germany — particularly if it dares to follow up on its accomplishment.