

The Birth of a Power Source

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OXFORD – Germany has just crossed the threshold of 20% renewable power – honoring its 2020 commitment to the European Union eight years ahead of schedule. As a bonus, towards the end of the decade, the world will also thank Germany for affordable solar power – not because the technology was invented there, but because its citizens will have paid for the critical cost-reduction phase by offering a large market.

Germany's decade-long support of the rollout of solar photovoltaic (PV) technology has forced the technology down the cost curve at an accelerated rate. Before 2015, it will be fully commercial for sunny South Africa, Greece, or Mexico – and soon thereafter for Germany itself. Without Germany's energy policy, this reduction in costs would have taken far longer to achieve.

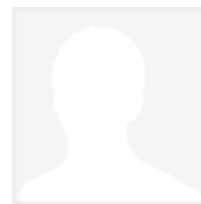
But German policy is not simply a matter of altruism. It is a combination of sound industrial policy and acceptance of the responsibility to shoulder Germany's share of the EU 2050 carbon reduction goals.

The story is sometimes told as follows: “Germany has subsidized solar PV for years through artificially high feed-in tariffs. The result has been lots of solar panels – many of them imported from China – in a country with little sun, and 100,000 expensive jobs.”

The costs are certainly substantial – higher even than the estimated €4 billion annual subsidy that Germany currently doles out to its nuclear industry, not to mention the €2 billion subsidy for coal. Yet stories often reflect the frame of the storyteller, so here is an alternative version: “Recognizing that new technologies require support to become competitive, Germany invented a system of diminishing feed-in tariffs. And when solar hits cost parity, Germany will have a well-positioned industry cluster. It will also have made a substantial contribution to the global commons by picking up the bill for everybody else.”

Some argue that governments don't have a role in picking the economy's winners and losers, and that the market should decide which technologies come out ahead in the race to decarbonize the power system. But the market can work its magic only when individual companies are large enough to fund the early learning curve of a new technology until it becomes competitive (and thus profitable).

The scale of the energy system and the long lead times needed to develop a new technology make radical change incompatible with short-term shareholder interests. At a minimum, a market-based



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approach would require putting a price on carbon and stopping subsidies to some of the old sources of power, both of which are currently out of reach politically. But, even with a hefty carbon price, it is unlikely that the market on its own would deliver low-carbon power.

The reason is that the cost of goods and services, including low-carbon power, is reduced in two ways: research, such as thin-film technology to replace silicon-based solar panels, and incremental improvements in design, logistics, or operations as new technologies are implemented. The cost of solar panels has fallen by 10-20% for every doubling of the manufacturing volume. Only by actually making more has the technology gotten cheaper.

This is what officials ignore when, as Dutch Prime Minister Mark Rutte put it, “wind turbines are powered by subsidies.” As Germany has demonstrated, time-bound and diminishing subsidies are necessary to make any new power source competitive with the old. But, because the benefits accrue globally, this can be a hard sell for a narrow domestic agenda, particularly given that a decade of support may be required.

Germany is actually not unique in midwifing a new energy technology. Brazil has successfully rolled the dice on a sugar-cane ethanol industry, and Denmark has taken an early lead in on-shore wind power. The United Kingdom’s massive push into offshore wind power takes on a different meaning when viewed as a balanced contribution to the global commons.

According to the International Energy Agency figures, offshore wind power would not be competitive until the early 2020’s – but the scale of the UK’s plans could change that, making it competitive much sooner, as well as giving the country’s industry a critical competitive head start. And the rewards go well beyond Britain: just as the UK will benefit from Germany’s push in solar, Germany would reap rewards from the British effort.

It doesn’t always work: France’s 1973 Messmer plan might well have led to safe and cheap nuclear power for all. But things turned out differently, and nuclear power has become an increasingly unattractive option. This is the heart of learning: sometimes it works, and sometimes it doesn’t. True failure is not trying at all and free-riding on others’ efforts.

Once someone agrees to underwrite the early-deployment phase of a new energy technology, what comes next is picking an area with some established expertise. Britain has been able to use its shipyards and its engineering skill base to capitalize on the opportunity of offshore wind. Likewise, Brazil’s farming pedigree and favorable climate, not just its visionary policies, have made it the leader in ethanol fuels.

Many other energy technologies are waiting for similar champions in order to reach their full potential. These include concentrated solar power, carbon sequestration and storage, driverless electric cars, direct-current backbones, zero-energy buildings, and second-generation biofuels.

Governments should investigate the merits and possible pitfalls of each of these technologies, assess their own domestic strengths, and make strategic, long-term decisions about spearheading one or more of them. At a time of economic hardship, taking such risks would not only provide jobs, but would also offer potentially huge economic rewards.

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