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Six Myths About Renewable Energy

The impact on jobs and other assumptions that don't hold up anymore

By KEITH JOHNSON

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Old ideas die hard.

The country has been debating renewable energy for decades—how much we should support it, what place it should have in our energy policy, how big an impact it actually has.

Yet many of the things we think we know about renewable energy go back to the earliest arguments. Many of the debating points we hear today are based on outdated facts and assumptions that don't hold up anymore.

So, we set out to look at a few persistent myths or beliefs held by both supporters and critics of renewable energy. We've focused largely on wind and solar power, in part because they've shown explosive growth in recent years but also because they are at the center of political debates over energy.

MYTH NO. 1: Renewables Are an Insignificant Source of Power

One of the most persistent criticisms of renewables is that they account for a fraction of the U.S. electricity system—despite years of federal subsidies and breakneck growth.

When looking at "newer" renewable energies such as wind and solar power, that's largely true. Wind accounts for about 5% of generation capacity and a little over 4% of U.S. electricity production, or roughly one-tenth what coal provides.



Getty Images

Including hydroelectric power, renewables account for about 14% of U.S. electricity output.

But the criticism overlooks one important point: Conventional hydroelectric power, such as the Hoover Dam, is also renewable energy. Taken together, hydroelectric and other sources—biomass, geothermal, solar and wind—combined to account for 12% of U.S. electricity production last year, and close to 14% so far this year. The entire nuclear fleet provides about 19%.

It's also important to remember the scale of the country's renewable efforts. The U.S. has the second-biggest electricity system in the world, accounting for about 20% of the entire world's generation capacity. Wind power's 5% of that pie is a big slice. The 60-odd gigawatts of wind power installed in the U.S. amounts to more electricity-generation capacity than in the entire country of Australia or Saudi Arabia, and as much as all of Mexico. It's about half as much power as in France or Brazil.

To be sure, the wind doesn't always blow. Wind farms produce only about one-third of their listed capacity, while a nuclear plant produces almost 100%. But even that discounted amount of electricity generated by U.S. wind farms is huge in global terms—54% of all the juice generated by Mexico, 26% of France and Brazil, 62% of Australia, 64% of Turkey and more than twice that of Switzerland.

The seemingly small share of power produced by renewable energy at the national level also reflects the fact that some states have a lot of green power and some have practically none. Texas

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has the biggest electricity system in the country, and gets 11% of its juice from renewables, nearly all from wind. New York and Georgia both have large power sectors, but get relatively small amounts from renewables.

MYTH NO. 2: Renewables Can Replace All Fossil Fuels

The flip side of critiques of renewable energy is boosterism. A handful of proponents describe a future where 100% of energy needs can be met affordably and reliably by renewables.



Associated Press

Shifting heavily to solar and other renewables may be technically feasible but would raise several big practical challenges.

Focusing on electricity, researchers at the National Renewable Energy Laboratory tackled this question. They found that, technically, by 2050 the U.S. could get 80% of its electricity from renewable energy and keep the lights on every hour, every day, in every corner of the country. (Their study didn't consider a 100%-renewable scenario.)

Perhaps. But getting there would be a long, tough slog. The study found that the U.S. would need to install about 20,000 megawatts of renewable generating capacity every year for a couple of decades, gradually ramping up to about 40,000 megawatts every year. The study found no reason to doubt the global renewable-energy industry's ability to eventually meet that level of

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production. What might be trickier, the study found, is finding a place to put all those wind farms, solar arrays and hydroelectric facilities.

Managing the big upfront capital costs of wind and solar power would be another obstacle. And down the road there could be another challenge: Areas with lots of variable power could see wholesale power prices close to zero at times. That would complicate the economic case for fresh investments in generation capacity year after year.

The U.S. would also need to virtually duplicate the entire existing network of transmission lines by 2050 to handle 80% renewable energy. The study notes that the trick would be figuring out where the lines would go, who would pay for them, and which state and local governments would be in charge.

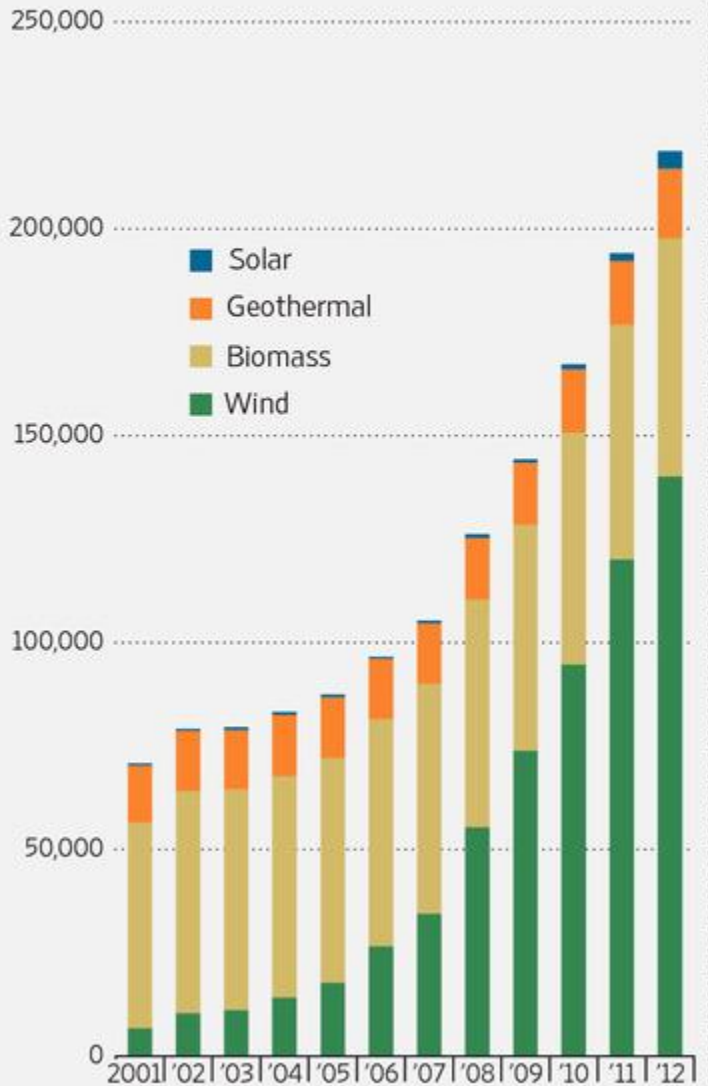
In other words, there's no technical reason renewable energy can't provide 80% of the power in the U.S. by midcentury. But there are a host of challenges that would have to be met first.

MYTH NO. 3: Renewables Are Too Expensive

Forget about problems down the road. Another criticism of renewables is here and now: They're expensive ways to generate electricity.

Green Growth

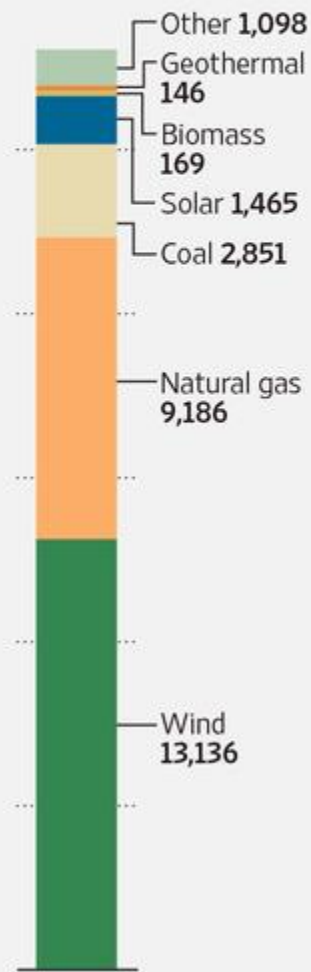
Electricity generation by renewable sources other than hydropower has tripled since 2001, due mostly to increased wind output. Figures are thousand megawatt-hours per year.



Source: Energy Information Administration

Change in the Air

New generating capacity in the U.S. has included increasingly significant amounts of renewable sources, with wind surpassing natural gas last year (new capacity in megawatts)



The Wall Street Journal

One new, comprehensive comparison of wholesale electricity prices, in the Journal of Environmental Studies and Sciences, concludes that coal-generated power costs 3 cents a kilowatt-hour; new gas plants would produce juice at 6.2 cents; wind power costs 8 cents; and solar photovoltaic, 13.3 cents.

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But there are two big issues to bear in mind. First, costs are falling fast—thanks largely to technological advances such as larger wind turbines and cheaper components for solar-power arrays—so in some places, solar and wind power can cost even less.

The latest price data for wind-energy power-purchase agreements, released by the Department of Energy last month, showed that nationwide, the price of wind-generated electricity fell to just over 4 cents per kilowatt-hour nationwide, not counting the 2.2-cent federal tax subsidy. In some regions, well-sited wind farms produce electricity for closer to 2 cents.

Likewise, Lawrence Berkeley National Laboratory just released its latest report on the costs of installing solar power. Costs for small-scale solar residential arrays fell by about 13% in the past year, driven largely by cheaper solar components due to a global supply glut. Utility-scale prices also fell.

There's also the question of hidden costs. Coal-fired electricity, for instance, has nasty side effects, including air pollution, health impacts and carbon-dioxide emissions that contribute to global warming (all of which factored into the Obama administration's proposal Friday for new limits on coal emissions)—and those don't show up in coal's price tag. If coal and other fossil fuels had to tally the total costs their use imposed on society, coal wouldn't be the cheapest source of electricity, and clean-burning renewables wouldn't look nearly so pricey.

Add all the hidden costs together, and the total cost of different power sources looks quite different, according to that recently published study. At an existing coal-fired plant, the cost goes up by 6 cents per kilowatt-hour, making its true cost 9 cents; at a new coal plant, it would go up by about 4 cents to 13.2 cents. New natural-gas-fired electricity would go up by 1.3 cents, bringing its total to 7.5 cents. But wind and solar and nuclear energy don't go up—because they don't cause asthma, and they don't emit carbon dioxide.

A few cautions when comparing the cost of different power sources. Gas plants are often used to meet peaking power demand, when they can fetch higher prices. Solar power also produces during hours of high demand, and its power is more valuable. But wind power produces more at night and less in the daytime, so its electricity is less valuable to the system.

Furthermore, different energy sources have additional costs that muddy direct comparisons. Nuclear plants have decommissioning costs, waste storage and liabilities that aren't always fully priced in. Variable sources such as wind and solar power need extra transmission lines and special efforts to integrate their power into the grid, which isn't included in the cost.

MYTH NO. 4: Variability Dooms Renewable Energy

The sun doesn't always shine, and the wind doesn't always blow, so wind farms and solar arrays generally punch below their weight. A 100-megawatt wind farm will generate on average the equivalent of 34 megawatts of power that's available full time.

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Granted, there are forms of renewable energy that almost always generate power: geothermal plants and hydroelectric facilities, for example. But since the bulk of growth in renewables in the U.S. comes from wind and solar power, their variability is a flashpoint for critics and a technical challenge for grid operators. Variability costs money to deal with, requires some level of backup power to offset and can even lead to renewable-energy generation being wasted, note researchers at the Lawrence Berkeley National Laboratory. When power-grid operators either don't want or can't handle wind power, for instance, they just dump it—a process called curtailment.



Bloomberg

As wind power spreads, the fact that output isn't always available from any one location is becoming less important.

Still, things are improving rapidly. Consider the situation with wind power. Curtailments have fallen steadily in recent years as system operators have gotten better at using forecasting and integrating wind power. Investment in new transmission lines has also picked up pace, enabling wind farms in isolated locations to offer power more readily to a wider area.

That is the key to overcoming the natural variability of renewables such as wind and solar power. Individual wind farms may be very volatile. But scores of wind farms over thousands of square miles show less volatility—the wind is always blowing somewhere. As grid operators have added more wind in more locations to their systems, as well as the lines to carry that wind, integrating wind power into the electricity system has become easier.

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Take Texas. Four years ago, facing severe transmission constraints, the state was dumping 17% of all the wind power it produced. In 2012, after adding more wind farms and almost 2,600 miles of transmission lines, curtailments were below 4%, and wind power provided 10% of the electricity in the nation's biggest power market.

MYTH NO. 5: Cheap Natural Gas Is the Enemy of Renewable Energy

With the boom in U.S. natural-gas production, many concluded that renewable energies would be battered by a relatively clean, cheap fuel source. While natural gas has transformed the electricity sector, gas and renewables are actually complementary, not rivals.

A glance at national trends makes clear that the two energy sources can grow together. Natural-gas electricity generation rose 34% from 2009 to 2012. Wind generation rose 92% in the same period and solar generation almost fourfold, though the renewables grew from a much smaller base.

Granted, cheap natural gas makes it difficult for wind power to compete without federal subsidies. But researchers are finding that gas and wind complement each other as part of a balanced electricity-generation portfolio.

Look at it from a utility's perspective. Natural-gas plants have low upfront costs, don't rely on fickle federal subsidies, and their output can be dispatched to meet swings in power demand. Gas, therefore, gives reliable power now, with little worry in the short term about federal policies.

But over the longer term, volatile gas prices could be deadly—as could environmental rules from Washington. That makes the wind farms and other renewable-energy projects an appealing way to hedge. Almost all of their costs are up front—there's no fuel to buy, so no worries about volatile prices. Because renewable energy doesn't produce any harmful emissions, it doesn't face the specter of future federal rules—and indeed could benefit from state rules mandating green power.

MYTH NO. 6: Renewable Energy Means Millions of Green Jobs

During the 2008 campaign, Barack Obama touted the prospect that investing in clean energy could produce five million "green jobs." The idea of creating jobs helped underpin the \$90 billion clean-energy stimulus in 2009 and later efforts, and remains a staple of administration rhetoric.

But renewable energy has not been the job creator that its boosters envisioned. While the amount of wind and solar power has more than doubled since President Obama took office, renewable-energy jobs have not.

The hardest part of sizing up green jobs is figuring out what a green job is. The Bureau of Labor Statistics came up with an expansive definition: goods or services that benefit the environment or

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make a company more environmentally friendly. According to the most recent data from the BLS, the U.S. had 3.4 million green jobs in 2011. But the categories are generous, to say the least. Private-sector green jobs included petroleum and coal-products manufacturing (3,244 jobs); school and employee bus drivers (166,916); logging (8,837); paper mills (18,167); and iron and steel mills (33,812). The numbers get so fuzzy as to become all but meaningless as an indicator of employment potential from clean energy.

Direct-employment numbers from renewable energies are clearer. In 2012, the wind industry said it employed about 81,000, the solar industry employed about 119,000, and geothermal energy may have employed about 20,000. The Hydropower Association estimates the sector employs between 200,000 and 300,000 people today.

Not only are those numbers quite modest, but in broad terms they haven't increased much since 2008, before the recent strong growth in renewables. In 2008, the wind industry said it employed about 85,000 people. So while installed wind capacity more than doubled, wind employment shrank. Solar employment stood at about 93,000 in 2010. Two years—and a ninefold increase in solar power—later, solar employment had increased just 28%.

The contrast between the promise and the reality of green jobs becomes even clearer when compared with other energy sectors. Coal, for example, is shrinking as a share of the U.S. electricity mix. Nevertheless, total coal-sector employment of about 150,000 is the highest since the mid-1990s.

And, by far, the biggest jobs story in the energy patch has come from the oil and gas boom. According to a fresh study by energy consultancy IHS Cera, unconventional oil and gas production—hydraulic fracturing, or fracking, for natural gas and tight oil—accounted for about 360,000 direct jobs.

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Corrections & Amplifications

An earlier version of this article had two myths No. 3 and no Myth No. 4. The numbering has been corrected.

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