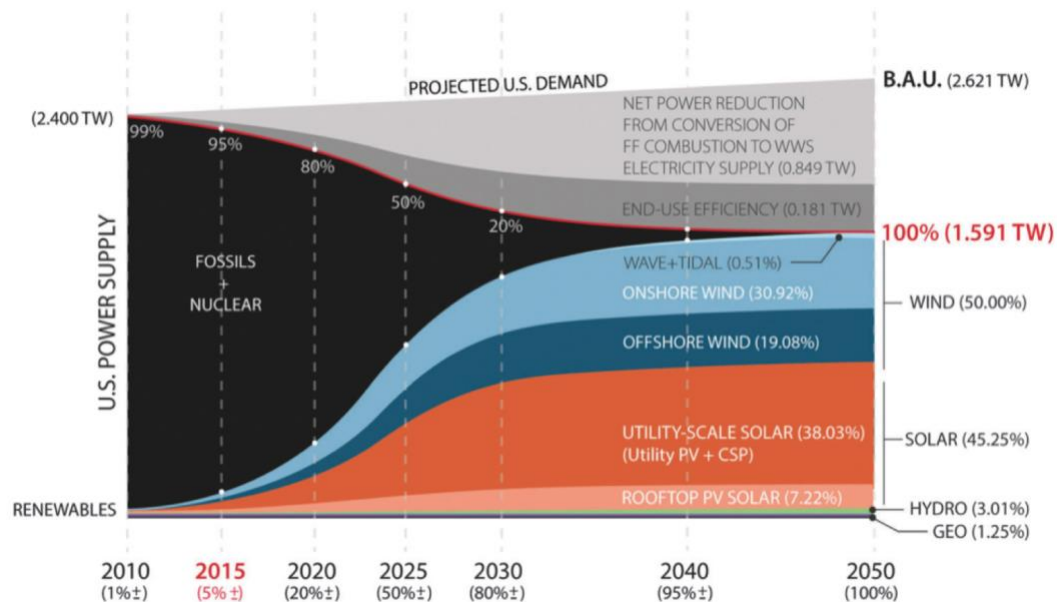


100% Renewable Energy by 2030: How Feasible is the Green New Deal's Proposal?

By Allie Collins-Anderson and Justine Huang | May 8, 2019



The Issue:

Economists and climate scientists alike agree that climate change is rapidly transforming our planet. How to go about mitigating or even reversing those changes is more heavily disputed. Many lawmakers, such as Rep. Alexandria Ocasio-Cortez (D-N.Y.), and public interest groups have proposed plans to reach 100% renewable energy in the United States in efforts to help lessen the effects of climate change. The [Green New Deal](#) proposes to reach this goal by 2030. And according to a [study conducted at Stanford University](#), 139 countries could achieve 100% renewable energy by 2050. But how feasible is this goal?

The Facts:

- According to the [Energy Information Administration](#), in 2018, renewable energy sources accounted for just 17% of total U.S. electricity generation, and wind and solar accounted for 8%.
- **Many studies say 100% renewable energy by 2050 is economically and technologically feasible.** One [study](#) shows that based on expected improvements of established, commercially available PV, CSP, and CAES technologies, solar energy has the technical, geographical, and economic potential to supply 69% of the total electricity needs and 35% of the total (electricity and fuel) energy needs of the U.S. by 2050. It predicts that by 2100, renewables will cover 100% of the total U.S. energy demand. A second [study](#), produced by T.W. Brown et al, shows that energy systems based on renewables are not only feasible, but already economically viable and decreasing in cost every year. Solar, wind and hydro potential are 30 times more than business-as-usual forecasts for energy demand in 2050. Technology already exists to account for the variability of wind and solar generation. Brown argues that we do not need to radically alter the design of the electric grid because the shift is already well underway and accelerating. A grid based on 100 percent renewables can compete in cost with fossil fuel systems, even before factoring in the costs of pollution, global warming, and water usage. A separate [study](#) conducted by Mark Jacobson et al. concludes that it is possible to get to 80% renewable energy (wind, water, sunlight) by 2030 and 100% by 2050. It requires terminating all construction of new coal, nuclear, natural gas, or biomass fired power plants. In addition, it requires that all new power plants, devices and machines, and modes of transport including vehicles, trains, buses, ships, and aircraft are electrified and built on renewable energy. Jacobson argues that the plan is possible due to technological advancements significantly decreasing the cost of these technologies.
- **However, a few studies that claim 100% renewable energy is feasible don't consider the costs of added infrastructure needed to support new energy sources.** For example, a [study](#) by Christopher T.M. Clack et al. counters Jacobson's study, claiming it doesn't consider costs associated with its proposal. Jacobson proposes the use of underground thermal energy storage (UTES) systems throughout the country which would provide heat to every home, business, office building, hospital, school, and factory in the U.S. Clack et al. points out that the Jacobson study does not account for the cost of installing the physical infrastructure (pipes and distribution lines) needed to supply this new energy source. Clack highlights that Jacobson also failed to consider the infrastructure costs of increasing hydroelectric power: increasing the number of turbines, which would require major reconstruction of existing facilities, as well as additional supporting infrastructure such as penstocks, tunnels, and space. The authors of this counter study suggest, as an alternate proposal to Jacobson's, that there currently exist commercially available technologies, such as nuclear and bioenergy, that could be utilized to help decarbonize the global energy system. These alternative energy sources to 100% wind, water, and solar (as Jacobson proposes) would not require major infrastructure investments and would be more reliable than the sources which Jacobson relies on.

- **A number of nations and regions are at or close to 100% renewables already, including Denmark, Norway and parts of Germany, but the size of those regions matters.** Canada is at 62% renewables and Brazil is at 76%. However, the countries that produce close to 100% renewable electricity tend to have relatively small populations and large hydropower generating capacity relative to energy demand. [For example](#), both Albania and Paraguay generated 100% of their *electricity* from hydropower in 2013. However, neither run completely on 100% renewable *energy*. According to the Solutions Project study, published in the journal *Joule*, the countries closest to 100% renewable energy are: Tajikistan (76%), Paraguay (58.9%), Norway (35.8%), Sweden (20.7%), Costa Rica (19.1%), Switzerland (19%), Georgia (18.7%), Montenegro (18.4%), and Iceland (17.3%). This makes it seem unlikely the U.S. will be able to do the same anytime soon, as hydropower is [projected](#) to compose only 18% of total renewable electricity generation by 2050 in the U.S.
- **100% renewable electricity is different than 100% renewable energy.** Electricity generation is only one component of the overall energy that supports daily life. Several studies have found ways to generate renewable electricity but those studies only find solutions to part of the dirty, climate-changing energy problem. For example, a [study](#) by Trieu Mai et al. proposes a renewable electricity system which would transform the way that electricity is generated in the U.S. by 2050. The proposal includes the use of biomass, geothermal, hydropower, solar, and wind energies which it says would generate 80% of the country's electricity needs in 2050. According to the U.S. Energy Information Administration's [Annual Energy Outlook 2019](#), the percentage of renewable electricity generation is projected to increase from 18% to 31% between 2018 and 2050. During the same period, electricity generated from nuclear and coal sources is expected to decrease. A continued decline in the price of natural gas and increased use of renewable sources for electricity generation have contributed to a shift in profitability of certain generating sources. A large percentage of coal and nuclear generators are suffering production losses as wholesale electricity prices have decreased and the rate at which certain types of generating sources are utilized is changing - a greater percentage of renewable generation is steadily dominating the market. Neither study, however, addresses whether or not producing 100% renewable *energy*, not just electricity, is feasible by 2050.

What this Means:

Much academic research on the subject concludes that 100% renewable energy by 2050 could be achieved, with the right political and economic leadership and policies. [Countries](#) like Sweden, Costa Rica, Nicaragua, Scotland, Germany, Uruguay, and Denmark are already leading the charge in becoming completely fossil-fuel free, and most plan to achieve this goal by 2050. Studies such as [Jacobson's](#) show that, economically, the United States, as well as most other countries, could switch from fossil fuels to renewable sources entirely. Whether or not politicians choose to hop on board is another story. The Green New Deal's proposal to achieve 100% renewable energy by 2030 is likely to be overly optimistic and not feasible. However, it can be seen as a rallying point for critical climate action. Changing from fossil-fuel use to renewable energy will require substantial investment in our energy infrastructure and technology, and will

require citizens to adjust their daily practices when it comes to energy use. But changing our energy use preferences today and investing in the future will allow us to avoid the irreversible economic and environmental consequences of climate change and put the Earth on a sustainable path toward 100% renewable energy.