What powers the electrical grid



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You use electrical power for heating, cooling, cooking, refrigeration, light, sound, entertainment, computers, mobile devices and maybe even your car. Without power, life as we know it doesn't exist.

Electrical power travels from the power plant to your house through an amazing system called the power distribution grid. The grid is quite public -- if you live in a suburban or rural area, chances are it is right out in the open for all to see. It is so public, in fact, that you probably don't even notice it anymore. Your brain likely ignores all of the power lines because it has seen them so often.

Although most of us take the power grid for granted, it's anything but simple. There are 450,000 miles (724,205 kilometers) of high-voltage power lines and 160,000 miles (257,500 kilometers) of overhead transmission lines in the United States connecting electrical power plants to homes and businesses [source: DOE]. Since large amounts of energy cannot be stored, electricity must be produced as it is used [source: EIA]. The power distribution grid must respond quickly to shifting demand and continuously generate and route electricity to where it''s needed the most.

The power grid is also evolving. Upgrades in technology now let us connect our own home-generated electricity to the grid -- using solar panels or wind generators -- and get paid back by utilities. The U.S. federal government is also investing in a so-called smart grid that employs digital technology to more efficiently manage energy resources. The smart grid project also will extend the reach of the grid to access remote sources of renewable energy like geothermal power and wind farms [source: DOE].

We use electricity every day--to turn on the lights, to charge our phones, and to keep our food cold. But most of us don"t make our own electricity. Instead, we get it from the electric grid, an interconnected network of power lines and other infrastructure that allows us to move electricity from power plants to our homes, businesses, and factories. Though it"s often generally referred to as "the electric grid," countries can have more than one: for example, the U.S. has three quite separate electric grids that span the country.

The electric grid--and how electricity is generated--plays a crucial role in slowing and stopping climate change. Currently, almost two-thirds of our electricity around the world is generated by burning fossil fuels, a process that releases large amounts of carbon dioxide and other planet-warming greenhouse gases and is among the primary causes of climate change.1 At the same time, the grid is vulnerable to extreme weather events, like hurricanes2and heat waves, that are becoming more common or more intense as our planet warms.

In 1879, a power company in San Francisco connected a coal-fired steam engine to two generators, powering 20 lightbulbs--and creating the first electric grid.3Innovation took off from there, from inventions as simple as switches that allow us to turn on and off appliances without shutting down the grid; as far-reaching as transcontinental "transmission lines" that move electricity over hundreds of thousands of miles4; and as

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complex as utilities, which are companies that make sure there's enough electricity for all users on an electric grid.

1Ritchie, Hannah, and Max Roser. "Electricity Mix." Our World in Data, 28 Nov. 2020, https://ourworldindata/electricity-mix#:~:text=In%202019%2C%20almost%20two%2Dthirds,been%20pretty%20stagnant%20for%20decades.

2Kossin, James P., et al. "Global Increase in Major Tropical Cyclone Exceedance Probability over the Past Four Decades." Proceedings of the National Academy of Sciences, vol. 117, no. 22, 2020, pp. 11975-11980., https://doi/10.1073/pnas.1920849117.

10United Nations Statistics Division. "Ensure Access to Affordable, Reliable, Sustainable and Modern Energy for All." United Nations, United Nations, 2021, https://unstats.un/sdgs/report/2021/goal-07/.

11International Energy Agency, 2021, Net Zero by 2050 - A Roadmap for the Global Energy Sector -
SummarySummaryforPolicymakers,https://iea.blob/assets/7ebafc81-74ed-412b-9c60-5cc32c8396e4/NetZeroby2050-ARoadmapfortheGlobalEnergySector-Sum
maryforPolicyMakers_CORR.pdf. Accessed 18 Apr. 2022.

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