Electrical grid basics



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Most people have an idea of what "the grid" is, but often only in a very general sense. While it can be easy to identify grid components such as power lines and electrical equipment, understanding the inner workings of the electric grid may seem mysterious when trying to envision a national network of energy generators, wiring, homes, and buildings.

To put it into simple terms, let"s explore what the grid really is, how the electric grid works, why the grid is used, how the modern electricity grid functions to create and distribute power across North America, and how home solar integrates into the grid.

The grid is a massive, interconnected network of electrical transmission equipment that creates and supplies new electricity to end consumers. Also known as the "electric grid", "electrical grid", "electricity grid", or "power grid", the national grid supplies electricity to users in homes, commercial buildings, and large industrial operations alike.

Take a look around... the grid is everywhere!

Here in the United States, the North American power transmission grid stretches across the entire country, from the shipping docks in Alaska to the last bar in the Florida Keys, with millions of interconnection points in between.

As the sum of many different individual parts, the national grid is made up of several regional grids that have been interconnected to form a network between populated areas of the United States, Canada, and parts of Mexico.

If you've ever plugged something into an electrical outlet at home, then you know exactly why we need the electrical grid. From cell phones to kitchen appliances and even HVAC devices, electricity is a necessity of modern life. Today, we use the energy grid to power nearly every aspect of our society, including transportation, manufacturing, entertainment, and more.

That"s why we need the electrical grid - so that access to electricity is safe and available for everyone. While it is possible to live off of the grid and generate your own electricity, the national grid seamlessly connects energy-generating power plants with the people and organizations that need it to electrify their lives. Over a century in the making, the North American electricity grid has grown and expanded to millions of users from its New York City origins.

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Serving over 100 million customers, the national power grid is managed and maintained by over 500 private and public entities across the United States. While the federal government owns and operates many public facilities, the majority of the power that is generated and disturbed through the electrical grid is owned by privately-owned, investor-led, or cooperative utilities.

To keep the grid running efficiently, regional transmission organizations (RTOs) and independent system operators (ISOs) are responsible for overseeing electrical activity, developing plans, and implementing emergency procedures. While the federal government regulates interstate electricity distribution systems through the Federal Energy Regulatory Commission, state and local grid operations are typically controlled by public utility commissions or electricity reliability companies.

Despite all of its complexities, the essential operations of the energy grid can be broken down into three simple steps: generation, transmission, and distribution. While the shape of the modern power grid is being transformed by new sources of energy, the primary function of an interconnected grid to share resources between connected electricity users will always remain the same.

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