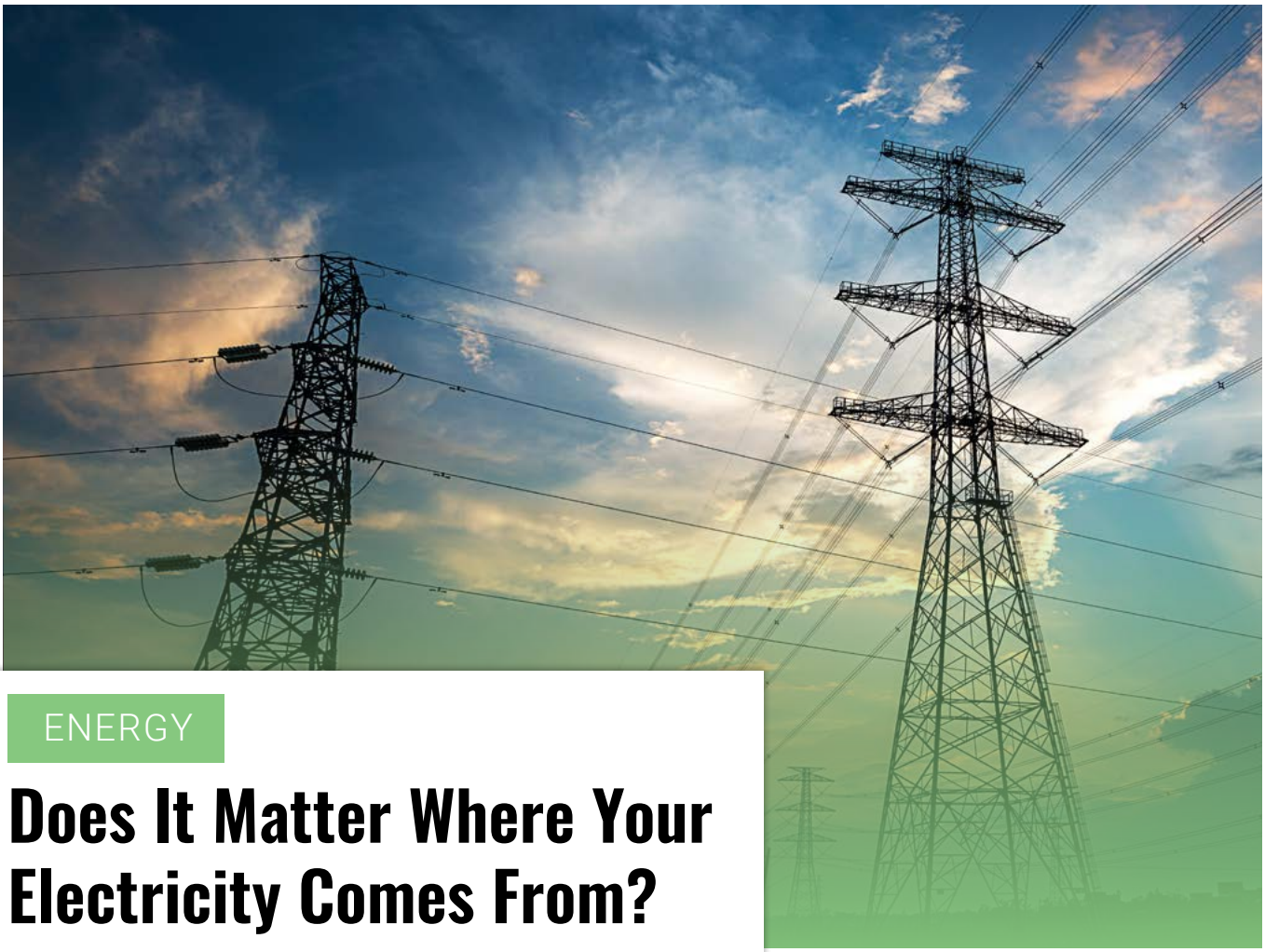


ENERGY

Does It Matter Where Your Electricity Comes From?

Why the answer is yes and how to find out for yourself.

It seems like a complicated question at first. When you are presented with a multitude of other things to worry about in life, sometimes you decide to skip out on this one until a later day.

Now that you have found this blog, you are ready to find out this ultimately important question! There is a large variety of sources with this information. You may have already come across some of them.

An easy way to think of this topic is in supply and demand terms. The more electricity is produced in your area – the cheaper it will be for you to use it, because it is not being bought from somewhere else. Or, it would be that simple if there was not a total of at least 9 different sources of electricity, which all work differently. Whether you are concerned about your costs or pollution, this article should help you.

Why Different Sources?

Different sources of electricity are extracted and used differently. That means the costs also differ from each other. If you become informed about energy sources that your area uses, you can then advocate in your own interest. Knowledge empowers, and it is the same case on this topic.

People are likely concerned with at least one of two things - either the carbon footprint or cost. Sometimes both, and these are important reasons for you to learn more about your electricity. United States Energy Information Administration (EIA) has a website with a generous amount of information on current and previous energy use. EIA is recommended for in-depth research, and some of that research is in this article.

Of course, everyone is welcome to do their own research on top of what is here.

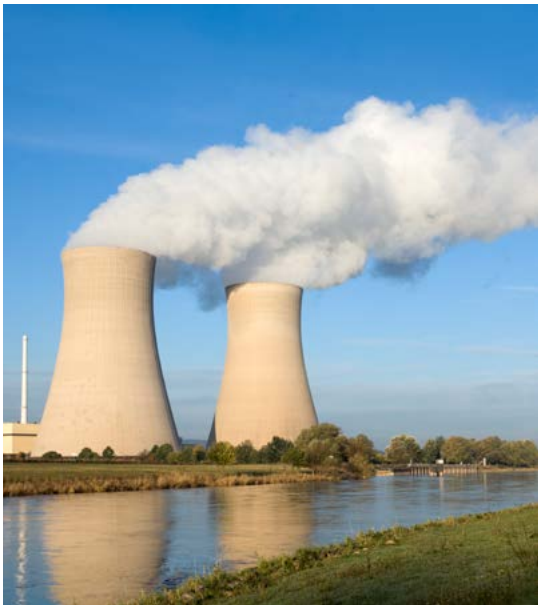
Different Sources of Electricity and How They Work

currently dominating others. For most recent updates, it is recommended once again to seek the latest updates from the EIA.

The following is a simplified list of U.S. energy sources as of 2017 according to the EIA, with some interesting facts throughout.

Natural Gas – Natural gas was the largest source of electricity, generating about 32% of U.S. electricity in 2017. It is extracted from deep underground formations and cracks that resulted from decay of organism tissue as old as 100 million years. In 2018 the Florida SERC region had the highest coefficient in the nation when it comes to generating electricity with natural gas at 66.6%, according to the Environmental Protection Agency.

Coal – In 2017 coal was the second largest energy source in the U.S., nearly even with natural gas at 30% of total electricity production. Coal is rock that is high in carbon and it formed from plants that died in swamp areas before the time of dinosaurs. There are several known extraction methods, which often depend on how deep underground the coal is. It may be discovered close to the surface, making it easier to mine. Though, most coal deposits are deep underground. In 2018 the coefficient of this electricity resource was highest in the Midwest SERC region, at a remarkable 71.4%. This is one of the smaller regions, containing parts of states Missouri and Illinois. This means that this region has the least diversified electric economy in the country. A few other midwest regions are close to that point as well, with coal dominating their grid.



Nuclear – Nuclear energy is a source of about 20% of electricity nationally. The U.S. Office of Nuclear Energy argues that nuclear energy is one of the most efficient and reliable options for electricity generation (as they would). There is some ground to it. Fission reactions release far more energy into the grid and uses far less resources (uranium in this case) than its fossil fuel and renewable counterparts. Same cannot be said about the efficiency of construction of these powerplants, as they take many years to complete. Atomic sector energy generation coefficient was the highest in RFC East (Pennsylvania Region), where it reached a total of 39.7% in 2018.

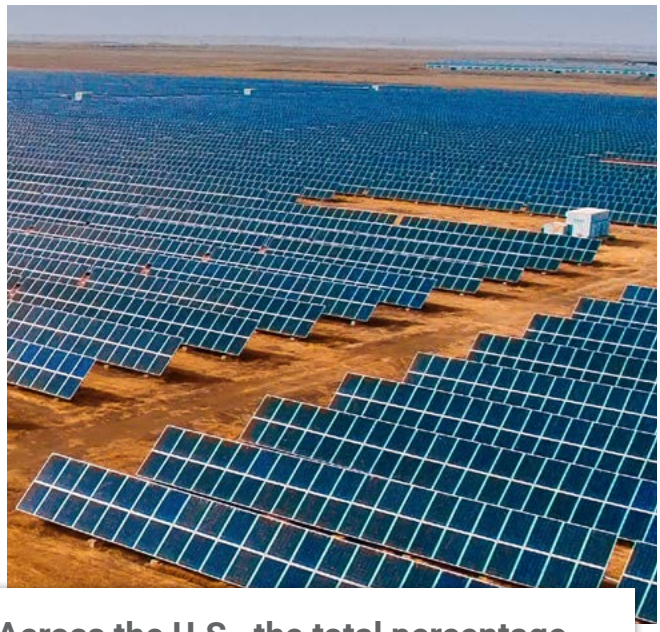
Hydropower – one of the more traditional ways of harnessing nature's energy is hydropower. Even an old grain mill besides a river is an example. With modern technology and by means of the water cycle, naturally occurring flow of water moves a turbine inside a dam which is connected to a generator. The EIA shows this process in detail **here**.

Geographical factors play a large role in what kind of source is used for electricity in an area. You might guess that the highest hydropower producing region in the U.S. would be Alaska, and you would be right! Its coefficient for hydropower was 65.4% in 2018. Not taking large dam construction projects into account - it is generally one of the cheaper electricity sources once constructed.

Wind – if you have visited the Midwestern U.S., or the Northern European Plain region, you may well be accustomed to the sight of windmills. They are a perfect example of wind power, which humans have used for quite some time. Just like water, wind turns the turbines that are connected to generators which produce electricity. Wind power makes up for about 6% of our electricity here in the U.S., with the highest coefficient at 21.1% in the northern Midwest region MROW.

Biomass – a less popular way to generate electricity, biomass accounts for just about 2% of electricity in the U.S. Biomass energy is produced through burning of alternative fuel such as waste and plants. Wood makes up nearly half of all biomass energy production, as it contains vital chemicals due to the photosynthesis process. This form of energy production is most utilized in the New England region, regulated by NPCC.

Solar – across the U.S., the total percentage of electricity produced from solar panels is around 1.5% of the total grid. The sun has powered life on earth for many years and in various ways. Today, we are fortunate to have the technology to capture the energy it produces in the shape of electricity. The leading region in the U.S. in the generation from this abundant resource is California WECC, with it accounting for about 10% of their grid. Price makes adopting this energy source difficult. Yet it might still become more common in the future, just as other technologies have done in the past.



Wind and Solar, are two very fast growing industries at the moment. And the costs of the technology is promising to lower as the use becomes more widespread.

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Geothermal – the Earth's core is really hot, and it is gradually cooling off by releasing the heat outward. While at a very small rate, humanity has been able to collect some of this heat and use it as energy. Steam naturally comes up and turns turbines at designated sites. Those, in turn, generate electricity. Plain on the surface, but fascinating underneath, this energy resource leads to questions that go back to the formation of the planet. Scientists estimate that at least a portion of this heat was generated then. On mainland United States, California WECC region has the highest ratio of electricity produced from geothermal activity at 4.1%. However, in Hawaii geothermal energy is at 9.5% of the total grid, only third behind oil and wind in the region. This falls in line with the history of formation of the islands, which are known to have formed from volcanic eruptions years ago.

Calculating Your Costs by Fuel Type

Note: Research presented here was narrowed down to just electricity production, to stay simple. You may have to account for your gas use separately if you use a gas stove or water heater.

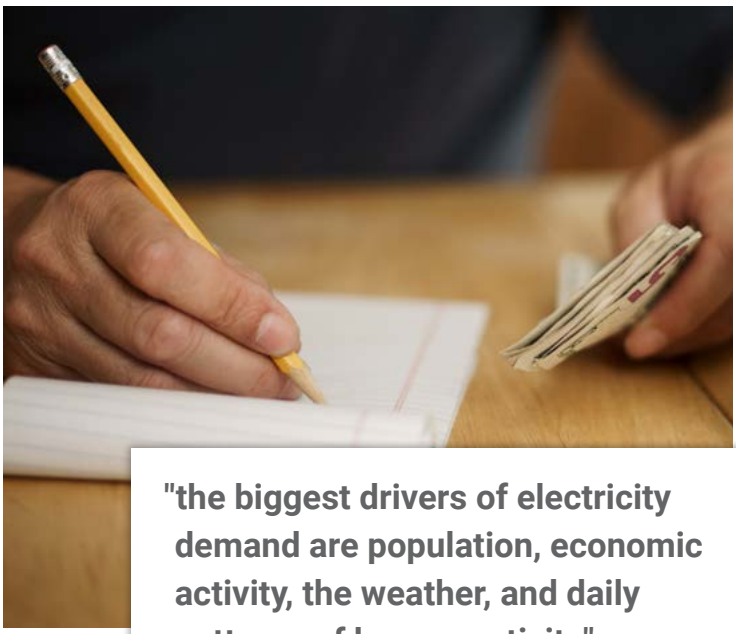
According to Seth Blumsack, Assistant Professor of Energy Policy at the Department of Energy and Mineral Engineering of Pennsylvania State University, “the biggest drivers of electricity demand are population, economic activity, the weather, and daily patterns of human activity”.

For best understanding of your personal electricity costs you have to think about the area where you live to a certain extent. Follow the steps below to calculate your costs per fuel type.

Let us use the state of Oklahoma as an example. The major electricity supplier in this region is OG&E, so here is how to calculate the costs by fuel type in this scenario:

1. Through an account on the provider's website - monthly bill and usage records can be accessed.
Look for the kilowatt-hour per month figure.

Note: To get a broader picture you could also calculate the average of multiple months and use that number.



> **"the biggest drivers of electricity demand are population, economic activity, the weather, and daily patterns of human activity"**

2. To get a very specific unit of measurement, we convert that kilowatt-hour value into the imperial measurement system for energy – BTU’s. **British Thermal Units** are used to count power output of different energy sources and compare them with more precision.

1 kWh (kilowatt-hour) = 3,412 BTU’s
If your usage was 900 kWh per month, then using simple multiplication you find out that you used 3,070,800 BTU’s.

3. Using data from the [EPA's power profiler](), you can see the percentages of different energy sources used in any particular region regulated by the EPA. Change the percentage of an energy source into a decimal number and multiply it by the BTU value retrieved in the previous step. The same can be done with kWh, but not advised.

In Oklahoma 40.7% of energy comes from natural gas,
3,070,800 BTU's x 0.407 = approximately 1,249,815 BTU's of energy.

4. Here is why BTU's are helpful – the EIA uses them to compare resources to each other. One cubic foot of natural gas equals 1,037 BTU's, so we divide the number we got by that: 1,249,815 / 1,037 = about 1,205 cubic feet of natural gas our building uses per month.

This conversion allows you to see the real value, in addition to the monetary value on your monthly bill. If you find out your local cost of natural gas per cubic foot (which EIA also provides), you can easily figure out how much you pay for it specifically and how much you pay for other resources in comparison.

If you are curious about your energy use, about your energy community and about the role you play in the power grid - I hope this research helped you visualize your energy plan and figure out what energy source will benefit you.

If you are not living on a deserted island, chances are that energy plays a large role in your life. Take a moment to pause and appreciate these scientific breakthroughs. They allow us to create and enjoy modern technology, which we depend on so much.

HAPPY CHARGING!