

When I turn on my lights, where does my power come from?



In many ways the flow of water helps us visualize the flow of electricity. Just like water follows the path of least resistance, so does electricity. You may not be able to identify where the individual droplets of water in a lake came from but you can define the watersheds that feed it. We can't say for certain where the electricity powering your home comes from but we can tell you more about the system that makes it possible.

Electricity begins its journey to your home at a power plant which may be the coal or nuclear plant hundreds of miles away, the wind turbines you saw on a recent trip, or your neighbor's solar panels. Generation facilities are sited in large part by the availability of certain resources such as rail or barge access for bringing in fuel, water availability for thermal steam generation, or in the case of renewables, adequate flows of wind, water, or adequate sunlight.

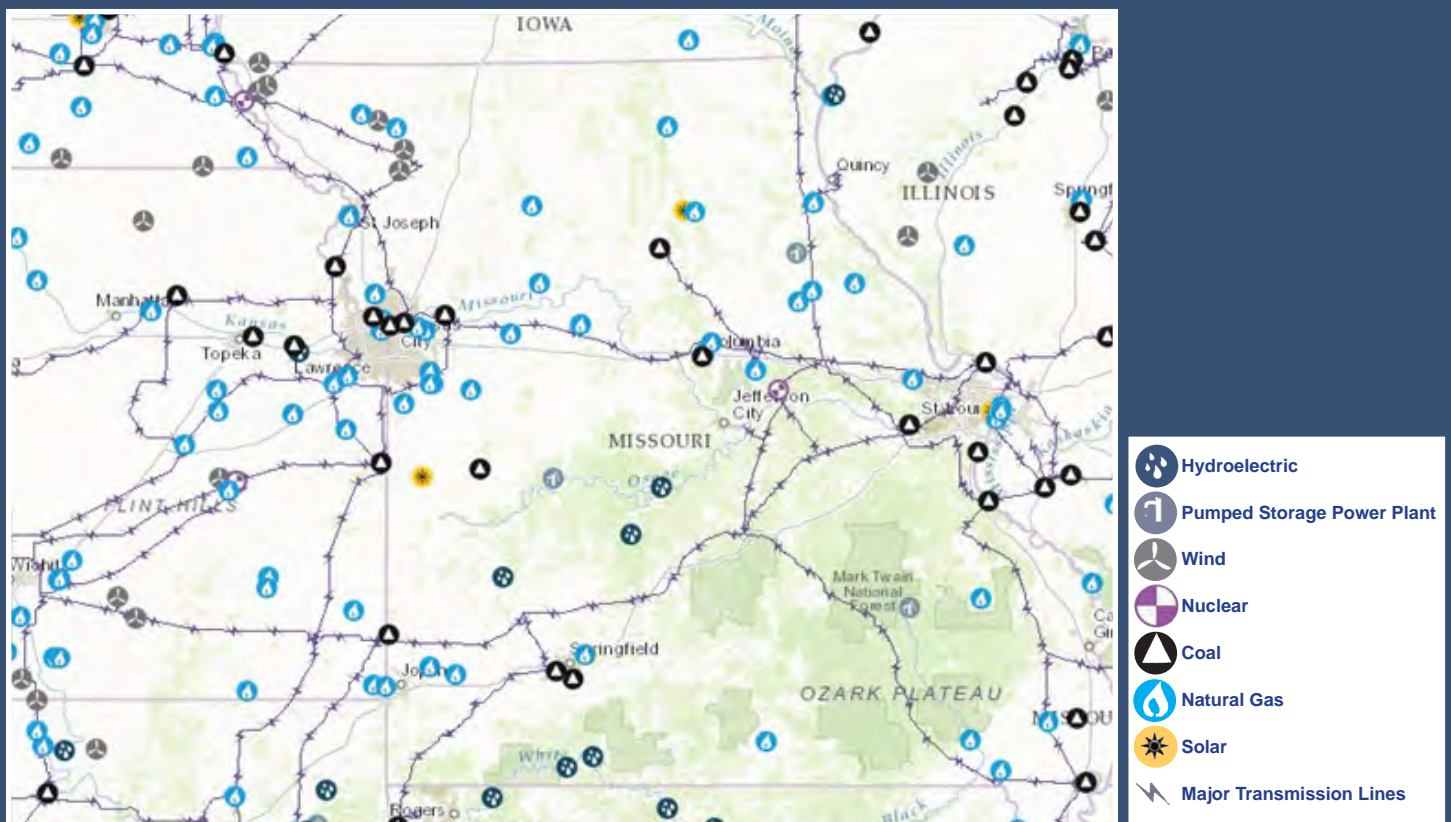
Electricity is transported from power plants long distances via transmission lines and then brought to homes and businesses via distribution lines. Regional Transmission Organizations (RTOs) coordinate and monitor the electric grid over multiple states. Currently, Missouri's investor-owned utilities participate in two separate RTOs, the Southwest Power Pool (SPP) for the utilities in the western part of the state and the Midcontinent Independent System Operator (MISO) for the eastern part of the state.

But where does my power come from?

Depending on the time of day and the time of the year, it could be coming from nearly anywhere in the Midwestern United States or beyond. On a mild fall evening, a few nuclear plants, several large coal plants, hydroelectric dams, and thousands of wind turbines are likely providing all of the energy that is needed to meet customers' load requirements. The transmission system spreads the output of these plants from the Missouri, Meramec, White, and Mississippi River valleys, as well as the wind farms of Northern Missouri,

Southwestern Kansas, Iowa, and even the Dakotas. The locations of coal, nuclear, wind farms, and hydroelectric dams are provided in the map below, as well as major transmission lines.

On a hot summer day, natural gas generation throughout Missouri and other states will be called upon. Also, solar generation on individual homes and businesses and utility-scale solar in St. Louis and Kansas City are all part of the mix to keep your home powered.



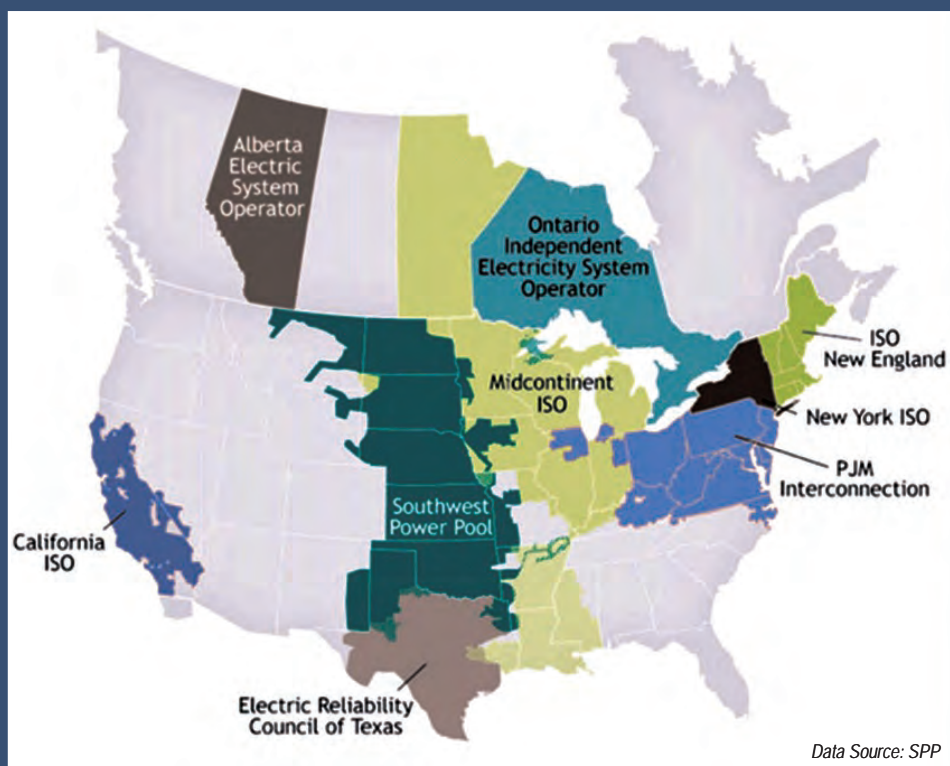
Data Source: EIA

Who decides how energy is generated?

Every utility participating in the RTOs energy market will report how much energy they expect their customers to need in each hour of each day. The utilities also provide the RTO information on what plants the utility has available to generate electricity, and what the cost of the fuel is for each plant to generate electricity. This process also includes renewable generation, such as wind and solar, that has little or no cost of generation. The RTOs use sophisticated computer modeling each day to determine which plants should run at what capacity in each hour, and relay this information back to their member utilities. Like a neighborhood coordinating a carpool to soccer practice, this sharing of information results in the most efficient use of available resources.

By considering the capabilities and needs of multiple utilities together, the RTO energy markets allow individual utilities to operate their plants more efficiently than would otherwise be possible. For example, nuclear units and large coal units operate most efficiently if they produce a steady amount of power, and less efficiently if they are required to “ramp up” when customers require more energy during the day, or “ramp down” when customers use less energy overnight. By spreading the steady energy from these large units out over the load requirements of more customers, the plants can be run more efficiently.

RTO ENERGY MARKETS

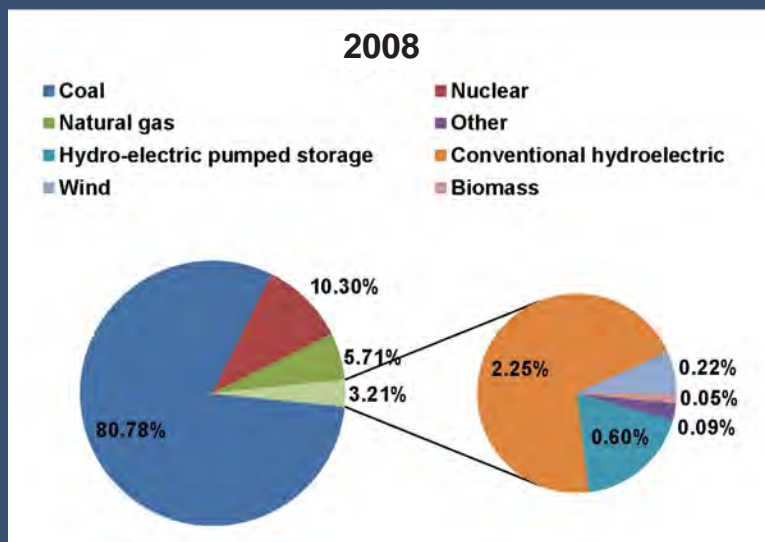


How much of my energy usage is powered by renewable sources?

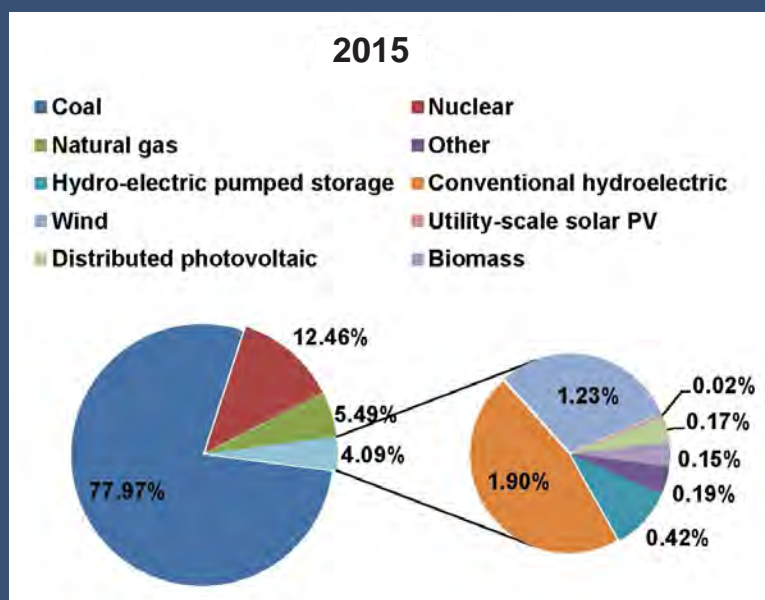
Although renewable energy resources do not make up a large portion of Missouri's current generation portfolio, new renewable resources are being constructed every year. Further, Missouri's mix of renewables is becoming more diverse. The Renewable Energy Standard (RES), passed in November 2008 by voter initiative, requires investor-owned utilities to use eligible renewable energy resources to meet 15% of annual retail sales by 2021. Missouri's RES includes a carve-out for solar electricity and a credit multiplier for in-state generation. Compliance with the RES can be achieved through the procurement of renewable energy or renewable energy credits (RECs) from renewable energy resources inside or outside the state of Missouri.

In comparing the total Missouri generation by fuel type in 2008, the year the RES was passed, and 2015 you see that the diversity of renewables in Missouri has increased¹. It is important to note that the charts at right are based on generation data from all sources within the state of Missouri, not solely the investor-owned utilities which are subject to Missouri's Renewable Energy Standard (RES). Two additional Missouri wind farms were completed in 2016, more than doubling the 2015 wind capacity.

MISSOURI'S ENERGY PORTFOLIO



Data Source: EIA



Data Source: EIA

— Dan Beck, PSC Utility Regulatory Engineering Manager
Claire Eubanks, PSC Utility Regulatory Engineer II
Sarah Kliethermes, PSC Regulatory Economist III
Shawn Lange, PSC Utility Engineering Specialist III

¹Data Source: EIA