Americans for a Clean Energy Grid

Transmission Expansion and All-of-the-Above Generation

During this century, we don't know what the electricity resource mix will look like, but we do know the country will need more power than ever. We also know that new power resources are expensive to build and generally low cost to fuel and maintain, meaning it's most economically efficient to run them as continuously as possible.

Getting that power to the customers who need it will require a well-connected transmission grid. We've faced this challenge in the past – in response to the building of big dams in the 1930's to 1950's, then again when large nuclear units were built in the 1960's to 1970's. A large grid expansion was needed to get that power to customers then, and we need to do it again now.

The grid of the future integrates resources from geothermal, to carbon capture and sequestration (CCS), to nuclear, to wind and solar. These all need greater transmission buildout to ensure continuous access to customers. We need to expand the grid to meet this challenge.

New energy resources have high capital costs and low operating costs.

Let's break down how the cost intensity varies between capital and operating (both fixed and variable) for each of the key energy technologies likely to comprise the grid of the future.

Technology	*CAPEX* *$/kW*	*Fixed O&M* *$/kW-yr*	*Variable O&M* *$/MWh*
Geothermal	$8,966	$147	$-
*Coal with Carbon Capture**	$5,827	$122	$15
*Gas with Carbon Capture**	$2,486	$58	$4
Nuclear	$8,811	$152	$2
Onshore Wind	$1,447	$30	$-
Offshore Wind	$3,351	$100	$-
PV Solar	$1,331	$21	$-
4-hr Battery	$1,716	$43	$-

Table 1: 2022 Technology Costs (Source: NREL ATB)

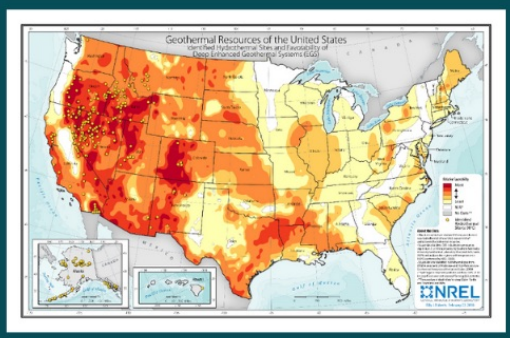
*Note that the CCS projects do not include the costs from carbon transportation and storage

No matter how technology costs change in the future, but we know that the above resources benefit from generating as much as possible. This can be achieved by being able to:
1) be located at a site that provides optimal generation features, increasing the ability to consistently run, or 2) deliver this continuous power to customers through transmission lines.

The greatest economic benefits are achieved through constant operation of these resources. Without an integrated grid, the electricity generated by these diverse resources cannot be delivered to the places where people need it the most. Expanding transmission throughout the U.S. will create access to cheaper and more reliable power nationwide.

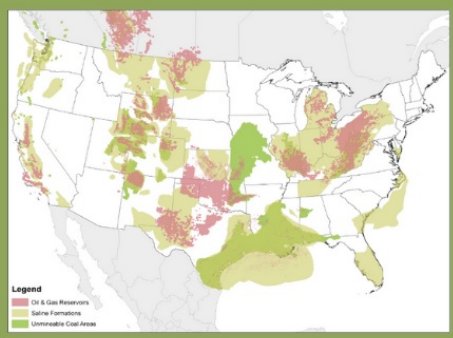
Geothermal Energy

While recent advancements in drilling have enabled more suitable locations for geothermal power, there are still a limited number of places with the right geology to make it economically viable. However, the reach of remotely located geothermal energy can dramatically expand with increased transmission.



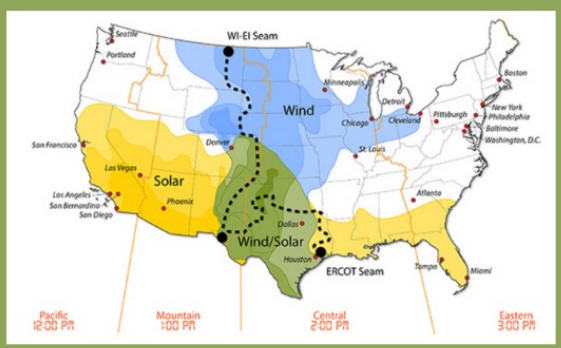
Natural Gas and Coal with CCS

As existing fossil fuel plants are retrofitted and CCS units are built, these units must be located near the best-suited underground carbon storage sites. To address their unique location requirements, transmission allows these units to supply power to areas beyond where geology supports carbon storage.



Wind and Solar Energy

Solar and wind resources are stronger in some regions than others. These regions can sell plentiful electricity during times of excess and use the same transmission lines to import power when the wind is low or the sun is not shining.



Nuclear Energy

Nuclear plants must be located near large water sources to cool the plants and spin the turbines. Prioritizing that siting criteria with the fact that nuclear units are not built in cities means that these plants need transmission to deliver this tremendous amount of power to load.