Southwest Power Pool facilitates a wholesale power market and manages the transmission system across 17 states. The Federal Energy Regulatory Commission designated SPP as a regional transmission organization. We do not own or build transmission lines or generation (power plants), but we do have an active and critical role in the ongoing evolution of the electric grid. New generation and transmission can only connect to our region’s existing transmission system once we have studied and approved it.
Attachment V of SPP’s Open Access Transmission Tariff governs our generator interconnection (GI) process. This tariff defines the rates, terms and conditions for SPP’s activities and customer interactions.

To explain the GI process, let’s use the fictional example of Ms. Smith. Ms. Smith lives on wind-rich land in Oklahoma and is considering turning part of her property into a commercial wind farm.

Ms. Smith does not own any transmission infrastructure. A local utility company owns the transmission system in her area.

To connect her generator to the utility’s transmission system, she must follow the guidelines of SPP, her area’s regional transmission organization. SPP will analyze her request and inform her what transmission upgrades will be needed to connect her windfarm to the utility’s transmission system.

First, Ms. Smith must submit a GI application to SPP during an “open window” application period. The open window for data submission lasts 11 months. SPP studies all requests submitted during an open window as a group. SPP will study Ms. Smith’s windfarm along with other interconnection requests.

Ms. Smith must pay for study costs, place a security deposit for the GI project and provide detailed information to SPP including:

- Evidence she owns or has the right to acquire the site for her wind generator.
- The type of interconnection service she wants.
- The generator’s capacity including summer and winter output ratings.
- A one-line diagram illustrating the point of interconnection, transmission leads, transformers, collector system cables and other required information.
- The generator’s proposed commercial operation date.

SPP will study Ms. Smith’s application and send her a “phase one” report consisting of a power flow analysis and short-circuit ratio calculation. The report will include an estimation of costs Ms. Smith would incur to connect her wind generator.

After reviewing the estimated interconnection costs and other factors identified in phase one, Ms. Smith can choose to remove her GI request from the study process, or she can continue to phase two. If she moves to phase two, she must pay additional security deposits. These deposits represent a commitment from Ms. Smith that her request is not speculative and that she is serious about moving forward with completing the interconnection. SPP will provide her with short circuit and stability analysis, providing more technical detail about her request.

If she continues to phase three, she will pay more security deposits. SPP, along with the transmission owner, will perform its most detailed study and send her list of the transmission upgrades that will be required to connect her wind generator. The list will be a nonbinding, good faith cost estimate plus or minus 30%.

The final step is interconnection. If Ms. Smith moves forward, she will execute a generator interconnection agreement with SPP and the transmission owner and provide SPP with evidence that she has begun development of her wind generator.

At this point, SPP will serve as a lien holder of securities to ensure Ms. Smith pays the transmission owner for the needed upgrades. If the transmission upgrades are needed to connect only Ms. Smith’s generator to the grid, she will be responsible for all upgrade costs. If SPP determines a transmission upgrade is needed to connect not only Ms. Smith’s generator but also other generators, Ms. Smith may only be required to pay a portion of the upgrade costs. Other generator owners who will benefit from the upgrade will share the remaining costs.
Changing generation mix

Around 800 generators powered by diverse energy sources – coal, wind, natural gas, oil, solar, nuclear, biomass and hydroelectric energy – participate in SPP’s wholesale energy markets. The makeup of this generation fleet has changed dramatically in recent years.

Of all the North American regions served by grid operators like us, SPP’s contains the most onshore wind potential and the highest confluence of wind and solar potential. Wind is a zero-fuel-cost generation source and plays a major role in keeping wholesale electricity prices down. Between 2001 and 2020, the amount of wind generation in SPP increased exponentially.

The use of coal-fired generation in SPP has decreased compared to wind and natural gas. No new coal generation is being planned, and older plants are being retired. Gas is widely used in the market when intermittent resources such as wind and solar are not available.

While there is only a small amount of solar energy installed in SPP, its presence is growing. The capacity of connected battery storage is beginning to grow as well. These emerging technologies are expected to evolve and become more efficient, affordable, and prevalent in our region.

SPP’s management of this changing generation mix is a challenge and opportunity. We must ensure we keep the grid reliable and energy prices affordable while taking old generators offline and bringing new ones online.

Generator interconnection queue

A new generator does not simply plug into the power grid like you would plug a lamp into a wall socket. It takes infrastructure like breakers, transformers and voltage control equipment to move power from a generator onto the transmission system. SPP gathers detailed technical information about a potential new generator - including its placement, generating capacity, and impact on the surrounding system - to determine what additional work may be needed to connect it to the grid.

SPP’s GI queue represents new generators “waiting in line” to be analyzed and connected to the grid. In 2021, the queue primarily consists of requests to add wind generators, with a growing number of requests to add solar and storage.

100,028 MW Total
SPP’s GI queue as of July 9, 2021

- Solar (44,390 MW)
- Wind (33,048 MW)
- Storage (13,415 MW)
- Gas/Thermal (13,415 MW)
- Hybrid: renewables + storage (3,140 MW)
**The GI study process**

**Benefits of the GI process**

SPP’s GI process enables us to balance reliability and economics as we add new generation sources to our regional electric grid. Maintaining the diversity of our generation portfolio by adding wind, solar, battery storage, and natural gas helps us reliably manage the electric system. Because intermittent resources such as wind and solar are not always available, other generation sources are needed to ensure we can maintain electric reliability while keeping wholesale market prices low.

Our region’s growing portfolio of renewable energy is attracting new businesses like Google, T-Mobile, Facebook, AT&T and Microsoft that want to locate in the SPP region and buy electricity from renewable sources in our market. This interest is bringing tremendous opportunity for the SPP region.

SPP.org/engineering/generator-interconnection/