ERCOT Grid Insights

Addressing issues important to maintaining a reliable and resilient grid

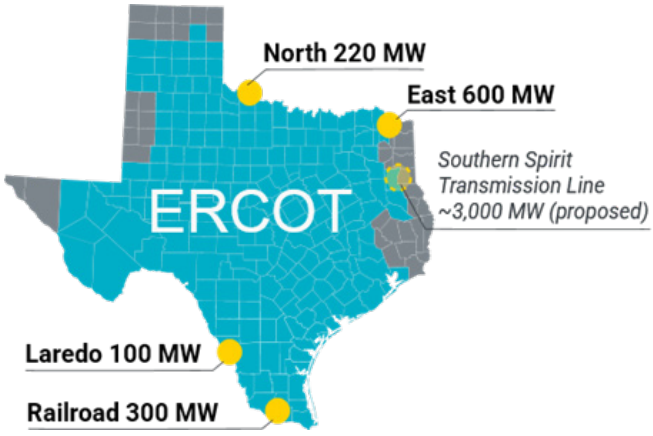
Electricity Connection and Transfer

In this issue: An overview of the various power flow avenues and procedures that ERCOT uses to transfer power between the ERCOT grid and grids on our seams, ensuring daily grid reliability and supporting emergency operations during scarcity conditions. Market Participants schedule energy and Transmission Operators deliver the energy through Direct Current interconnections with other grids and/or the use of "switchable" generation or Block Load Transfers.

DIRECT CURRENT TIES

What: Direct Current (DC) Ties serve as a link connecting two separate power systems together. ERCOT has utilized DC Ties dating back to the late 1980s and currently maintains coordination plans with three DC Tie connections and a Variable Frequency Transformer (VFT), which acts similar to a DC Tie: two DC Ties with the Southwest Power Pool (SPP) (820 MW) and a DC Tie and a VFT with CENACE, Mexico's independent operator of the national grid (400 MW). A new DC Tie named Southern Spirit Transmission Line (proposed for up to 3,000 MW) is currently being planned to connect ERCOT to Southeast power grids.

How it Works: When power transfers are scheduled by wholesale energy providers in or out of the ERCOT region, those transfers of power between grids are controlled using DC Ties. At each DC Tie, AC power in one grid will be converted to DC power and delivered to the adjacent grid, where it is then converted back to AC power. This conversion from AC to DC and back to AC power allows the transfer of power between electric grids that may be operating at slightly different frequencies. The use of these high-voltage DC Ties allows electricity to pass between electrical grids, when directed, to support capacity needs during both normal and/or grid scarcity conditions.



ERCOT DC Tie Connections

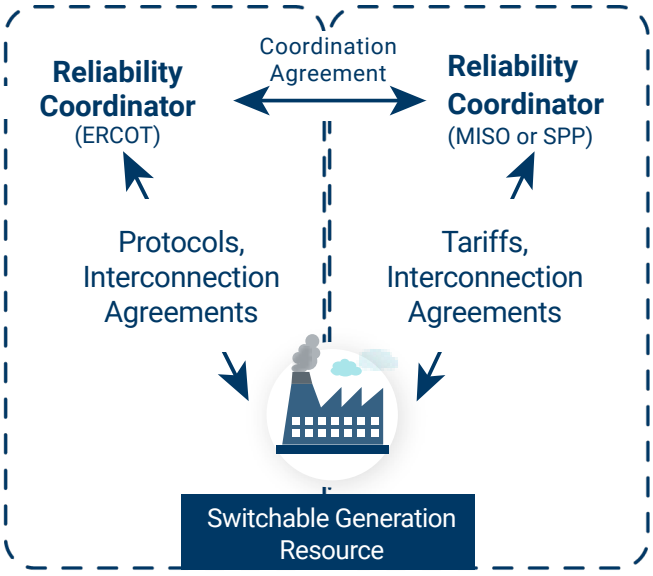
Grid Significance: DC Ties support ERCOT's ability to quickly transfer power with other power grids without interrupting power, allowing electricity to pass back and forth to maintain grid reliability.

SWITCHABLE GENERATION RESOURCES

What: Switchable Generation Resources (SWGRs) are generation units that can be connected to either the ERCOT grid or a different grid, such as SPP or Midcontinent Independent System Operator (MISO). ERCOT has 19 resources at four different stations totaling approximately 3,600 MW. These resources are never connected to both the ERCOT grid and the other grid at the same time.

How it Works: In coordination with ERCOT and other grid operators (SPP or MISO), SWGRs may physically switch their connections and deliver their power to ERCOT or the other grid. Switching must be coordinated to ensure reliability processes are properly addressed.

Grid Significance: SWGRs play a vital role for ERCOT, SPP, and MISO to maintain grid reliability, capacity reserves, and markets effectively by switching generation between grids during both normal and emergency operations.



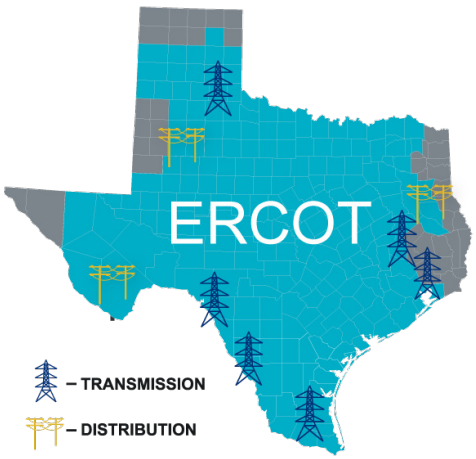
Switchable Generation Resource Process

BLOCK LOAD TRANSFERS

What: In the ERCOT region, a Block Load Transfer (BLT) is a process by which a series of steps are taken to isolate a group, or block, of loads in an area, which then allows for that block to be temporarily connected to and served by another grid and vice versa. There are 18 BLTs in the ERCOT region. When the load is capable of being reliably served by its native grid, the load is then transferred back to that grid.

How it Works: BLTs allow ERCOT to send load to other controlled grids and to receive load from those other controlled grids to ensure reliability and serve a limited amount of load. BLTs are coordinated as they impact other entities' systems. BLTs are typically positioned on the outer edges of the ERCOT grid and operate by physically disconnecting or breaking a block of load from a system. Once the load is isolated, it can then be physically connected to the other grid, which then temporarily serves the load. When not in use, the load must physically break connection to the other grid to isolate the two electric grids, as they are not meant to provide a permanent connection.

Grid Significance: BLTs can be critical for ERCOT, as well as other grids, to maintain the reliability of the grid during periods of severe weather, peak demand, or emergency conditions. Although BLTs are limited, they allow ERCOT and other grids to restore power from outages (like outages from an ice storm, tornado, or hurricane) and manage the flow of electricity and demand on the grid.



Block Load Transfers