Impact of system constraints on pricing in ERCOT

When there are no constraints on the electric system, ERCOT's dispatch system will select the lowest cost resources to serve load, and wholesale power prices across the system are the same. However, prices can vary across the electric grid to reflect limitations in ERCOT's ability to use the lowest cost power to serve the load. These limitations can be regional or localized and are driven by transmission congestion. This congestion may be due to limited generation availability, transmission outages and/or abnormal patterns in load.

While transmission congestion can occur at any time, it is more likely to occur when the system is strained. This may include spring and fall when maintenance outages are high, and also includes the summer months when demand is high and power reserves are low. In warmer temperatures, transmission lines generally carry less power, which can contribute to tight grid conditions.

When this occurs, ERCOT systems are designed to prioritize meeting electricity demand across the broader system and managing congestion that may have large regional impacts. Should there be conflicting system needs across the region, this ensures that the most urgent concerns are addressed first.

Price fluctuations on the ERCOT system may be driven by transmission congestion costs or by operation of a scarcity pricing mechanism called the Operating Reserve Demand Curve (ORDC).

Localized transmission congestion

When there is localized transmission congestion, power prices will increase or decrease at specific nodes on the system to reflect the situation, but they may not be the same as the rest of the ERCOT region. In some cases, ERCOT may need to reduce energy production to address a local constraint, even when power is needed to meet demand system-wide.

In this type of situation, ERCOT uses a prioritization system to address the congestion and meet system needs. Some generators may be asked to lower their output, while others may continue to operate at their full output. As this is happening, prices are increasing to reflect the system conditions. The prioritization system uses prices to move the generators up and down, and generators that can relieve the congestion are sent higher price signals compared to those that either do not resolve the constraint or make it worse. Generators that make the constraint worse can also see negative prices.

Generators that are backed down can also be compensated for providing reserve power, which is used by ERCOT to address sudden changes on the electric system. When this occurs, generators are paid a higher price for the electricity they are producing, as well as for their ability to provide reserve power. So, generators are still helping the grid even if their electricity production is limited.

Use of the Operating Reserve Demand Curve

When generation is scarce and power reserves are low, a price adder referred to as the Operating Reserve Demand Curve, or ORDC, is triggered to drive wholesale prices up to reflect that scarcity. Generators who can produce power during this time are compensated for the wholesale power price plus the ORDC price adder. During scarce conditions, power prices can go as high as $9,000/MWh.

All generators in ERCOT provide great value to the grid, and the ERCOT system is optimized to meet energy demand while also providing sufficient reserve power.

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