Black Start

What is Black Start for the Statewide Grid and why it is an Important Consideration for Austin

Black start is the process for restoring the electric grid after a full or partial blackout. It is a worst-case scenario event — low probability but very high impact — that grid operators must plan for just in case.

The black start process relies on generating units that are capable of starting up with no external power source, which is a special characteristic available only in some units. Black start units are typically natural gas or hydroelectric generators that have a separate start-up source other than the electric grid. North American Electric Reliability Corporation (NERC) reliability standards govern black start requirements for transmission operators and regional reliability organizations. ERCOT protocols implement these standards locally.

Black start is a tightly coordinated process with several steps:

- **Initiation —** Following a blackout, operators begin to implement pre-existing Black Start Plans, which are coordinated amongst ERCOT and all transmission operator utilities. They stabilize any parts of the grid that are still operational, assess the situation and start up available black start certified units.
- **Cranking Path —** Black start units generate initial power, which energizes a cranking path — a transmission line connecting the black start unit to another generator. When this happens in multiple locations across the state, each isolated area is called an island.
- **Sequential Restoration —** The power from each island is used to start additional generators. This creates a domino effect that gradually brings more of the grid back online. As this occurs, distribution operators bring on just enough demand to balance the power output, though very few customers are restored at this stage at the distribution level. Once possible, the islands "connect" forming larger areas of the energized grid. The true goal of this stage is to rebuild the "backbone" of the transmission grid and create a stable base from which all customers can be re-connected at the distribution level.
- **Full Restoration —** The process continues until the entire grid is re-energized, customers are re-connected and normal operations are restored. This requires careful balancing of voltage and frequency, two of the characteristics of a healthy electric grid — think of them like blood pressure and heart rate to the human body. The exact time a full black start restoration would take in ERCOT isn't known for certain — because it has never happened — but experts estimate it could take weeks to months.

Black Start and ERCOT

- After the 2003 Northeast Blackout — which affected parts of the Eastern Interconnection, the system was able to re-energize quickly by importing power from neighboring systems without executing black start plans. ERCOT's relative lack of transmission connections to neighboring systems makes having a robust system of black start generators much more important. Concerns about black start in ERCOT have grown since the system came close to a complete blackout during Winter Storm Uri in 2021.
- ERCOT relies primarily on natural gas for black start capabilities. Hydroelectric is another option, but ERCOT has very little power of this type in the system. Regulators are exploring allowing batteries to act as black start resources, but that idea is in its very early stages and would require significant technical and operational changes.
- In addition to relevant NERC standards, black start resources must meet ERCOT's requirements, including the ability to start within a short time and having access to a minimum of 72 hours of fuel. ERCOT selects black start units through a

competitive process in which bidders submit an "availability bid" measured in hourly standby costs of $ per hour. ERCOT then evaluates these bids and selected units are paid as bid for a certain period of contracted time.

Black Start and Austin Energy

- Two of Austin Energy's four gas turbines (peaker units) at the Decker Creek power station currently participate in ERCOT's black start program, with Unit GT1 serving as the primary black start unit and Unit GT3 serving as the backup unit.
- While Austin Energy is compensated for providing black start services, being a part of this process means we play a critical role in getting power back to Texas after a blackout. As a public-power utility, Austin Energy works 24/7 to provide our community with power and services. It's important for us to be there for them in a black start scenario, when it's needed most.

ERCOT inspects Austin Energy peaker units at Decker Creek Power Station.

You can also find information on Black Start in this KUT article —

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