

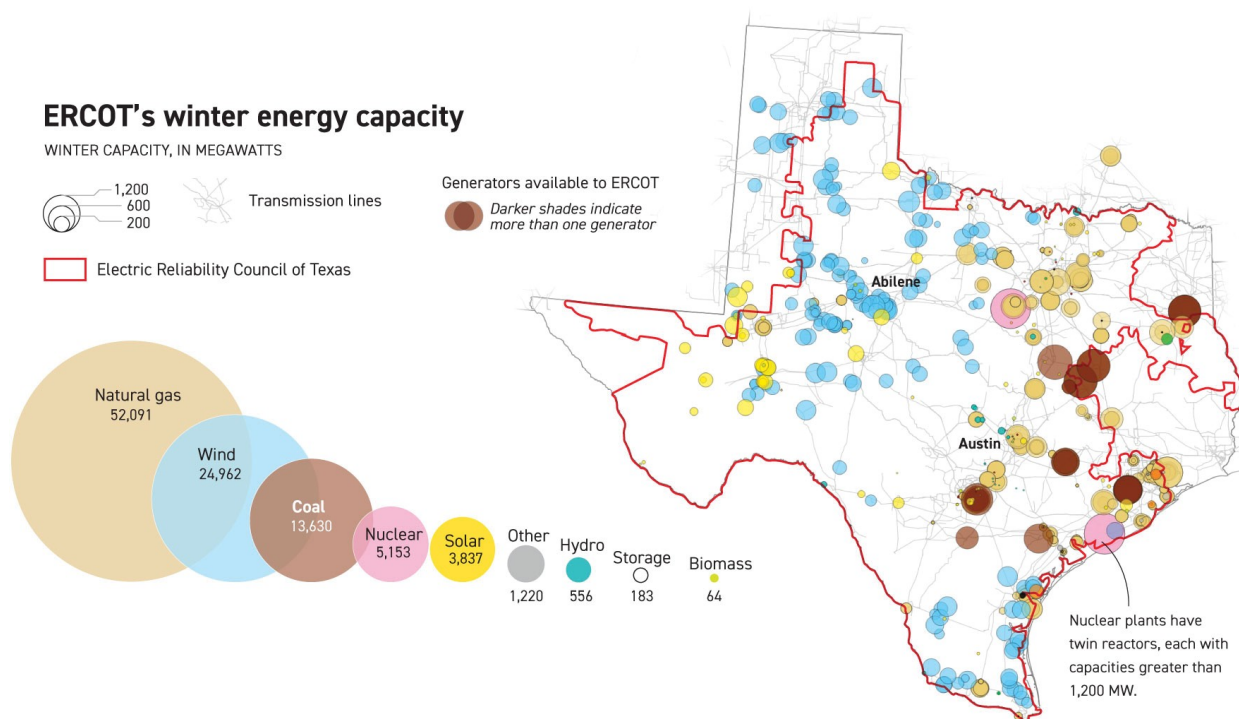


February 23, 2021

How an arctic blast took down an ill-prepared Texas power grid

Just after midnight on Feb. 15, the Texas grid went from “mostly OK” to “RED ALERT!” in the space of just over an hour. A deep cold froze gas plants and wind turbines, turned coal piles into a block of ice, and even drove a nuclear reactor offline, leaving the Electric Reliability Council of Texas, which is responsible for most of the state, with nowhere near enough electricity to supply customers.

Control room operators ordered utilities to start rolling blackouts in order to protect the system from long-term physical damage that would have plunged the state into darkness for months. Instead, ERCOT and utilities spent five days struggling to bring the system out of failure mode as people froze in their homes, pipes burst and food spoiled. The state is only now starting to deal with the fallout of the humanitarian crisis.



Sources: Energy Information Administration, ERCOT, Weather Underground



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A profile of failure: ERCOT power generation, Feb. 6-20

Feb. 6-9: Average February days

The state saw near-normal temperatures. In Abilene, wind speed averages peaked Feb. 7 at 14 mph, dropping to 8 mph by Feb. 9.

Feb. 10-14: Arctic air arrives

As temperatures plummeted, energy demand rose. Nuclear energy remained steady; wind power was variable; coal and natural gas grew to maximum capacity; Texas imported what it could from Mexico and the Southwest Power Pool.

Feb. 14-18: System failure and rolling blackouts

The cascading failures that began early Feb. 15 proved challenging to recover from. ERCOT said that for every generator that came online, another one tripped off. Substations began to fail and power lines overheated as grid operators labored to keep supply and demand in balance.

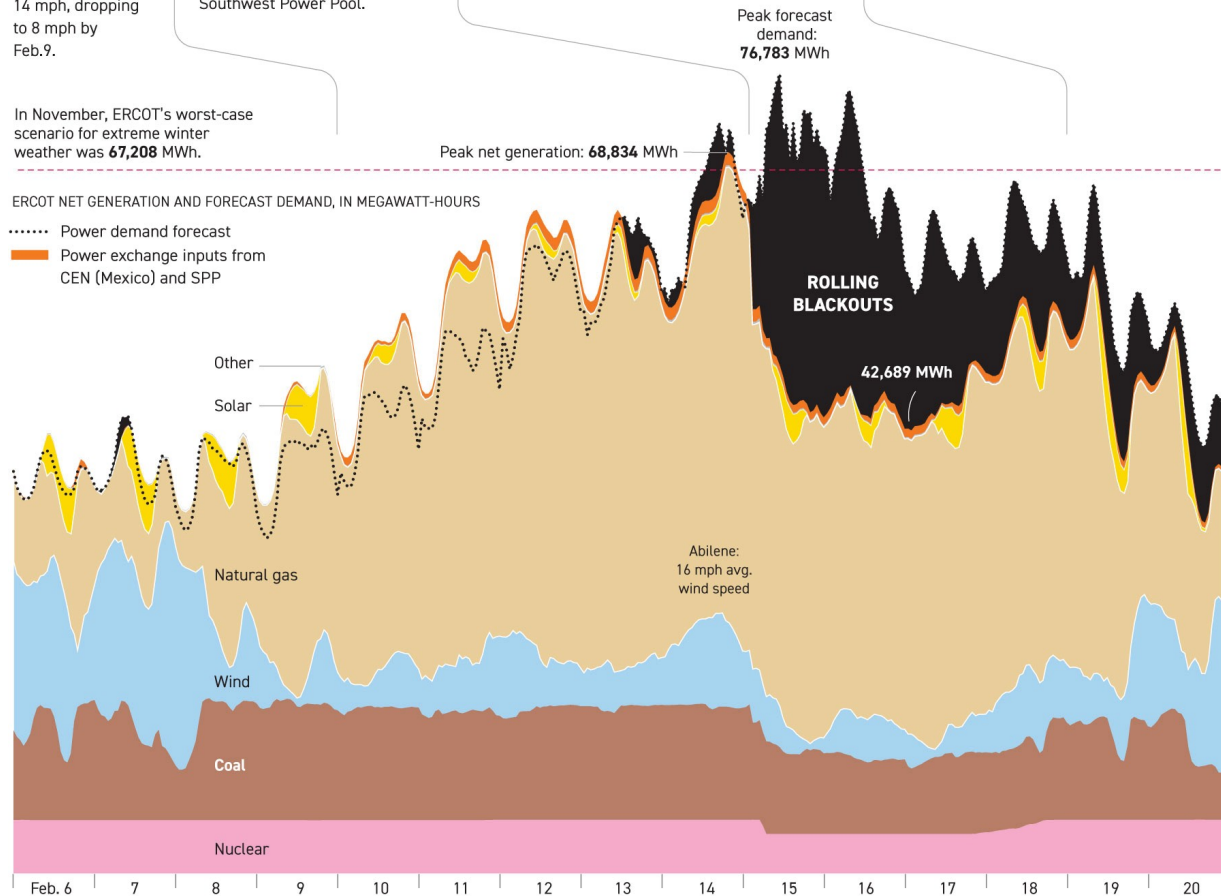
Feb. 19: Beginning of recovery

Utilities managed to get enough generation up and running that ERCOT lifted its conservation measures, ending the blackouts. But water utilities had been unable to maintain water pressure and much of the state remained under boil water orders through the weekend, while grocery stores and filling stations faced shortages.

In November, ERCOT's worst-case scenario for extreme winter weather was 67,208 MWh.

ERCOT NET GENERATION AND FORECAST DEMAND, IN MEGAWATT-HOURS

..... Power demand forecast
 ■ Power exchange inputs from CEN (Mexico) and SPP



Sources: Energy Information Administration, ERCOT, Weather Underground



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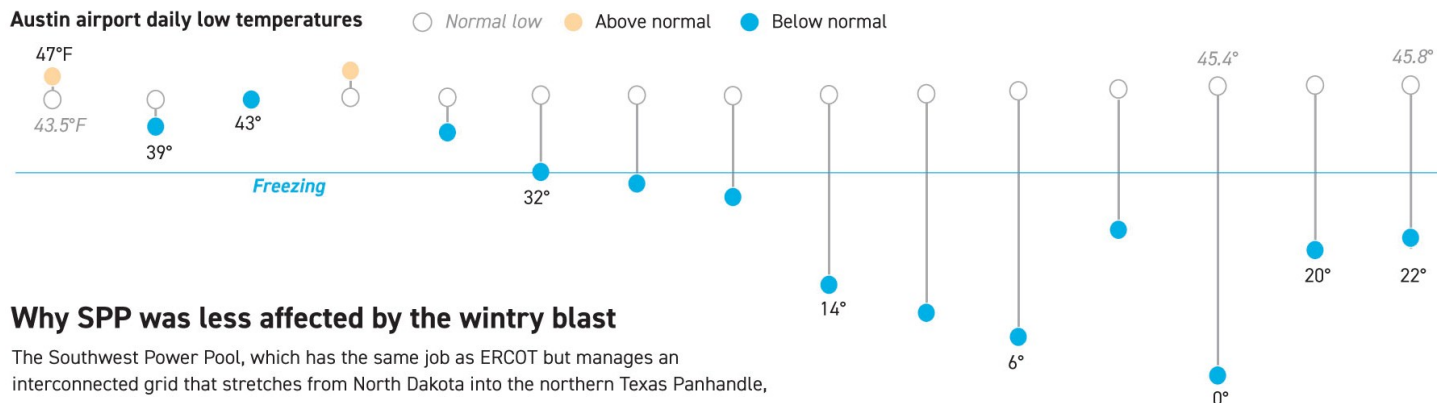
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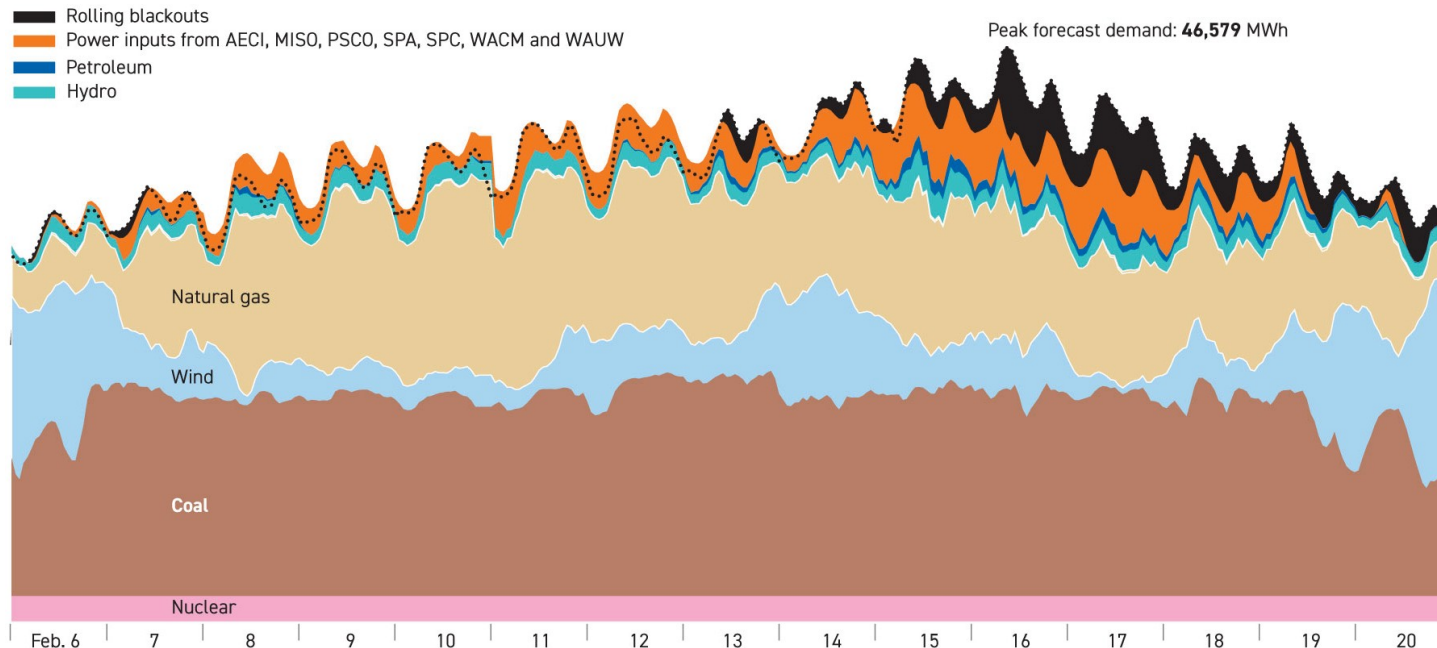
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Austin airport daily low temperatures



Why SPP was less affected by the wintry blast

The Southwest Power Pool, which has the same job as ERCOT but manages an interconnected grid that stretches from North Dakota into the northern Texas Panhandle, suffered rolling outages for stretches of Monday and Tuesday, but recovered far more quickly. Its generators were better designed to withstand the cold, and its connection to the grid to the west allowed it to “wheel” in power from states under less stress.



Sources: Energy Information Administration, ERCOT, Weather Underground



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