

In the Dark

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Los Angeles declared a power emergency last month when temperatures in the area averaged 90 degrees, six degrees higher than the historic average for the area. Repeating for emphasis, a six degree difference in temperature caused a power crisis. That sort of thing is not supposed to happen in a region where 15% power reserve margins are the regulatory goal. While power seems unusually short in southern California, power plants are being closed and new projects abandoned elsewhere. The Oyster Creek nuclear plant in New Jersey will shutter next month prior to the end of its useful life, and it was announced that the Duane Arnold nuclear plant in Iowa will be retired early in 2020. Last week, AEP abandoned the large, new "Wind Catcher" transmission project in Oklahoma. Reports suggest that regions may be electrical power short, yet utilities are cutting generation and transmission capacity.

- >> **Reserve margins are low in several regions.**
- >> **Electricity demand is trending down.**
- >> **New generation sources are making reserve margins less reliable.**
- >> **Electric vehicles (EV) could change everything.**



Trying to Beat the Decline Curve

The National Electrical Reliability Council (NERC) sees regional power problems, and California is not even one of them. NERC projects both the Texas region and the Southeast region as being power short through 2021. The power shortage is measured in reserve margins, or the amount of power generation capacity still available under normal operating conditions. Much of the country operates under the prescription that 15% reserve margins are sufficient. Deflating those reserve margins, seven coal-fired power plants and one gas-fired power plant are closing in Texas over the next year. The absence of this electrical generation capacity will lower the reserve margin in the region to near 10%. Nearby, the Southeast looks to be short electrical power due to the either long delay or cancellation of the new Sumner nuclear power plant which has encountered design and cost issues. The Southeast region is expected to drop into the low-teens in terms of reserve margin over the next few years. Power reliability is likely to suffer.

Figure 1: SERC-E Planning Reserve Margins

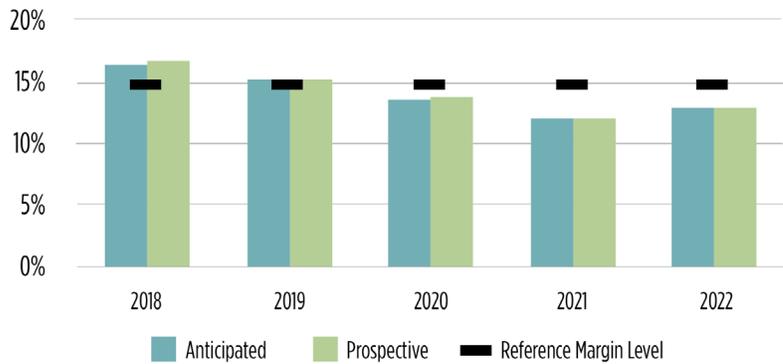
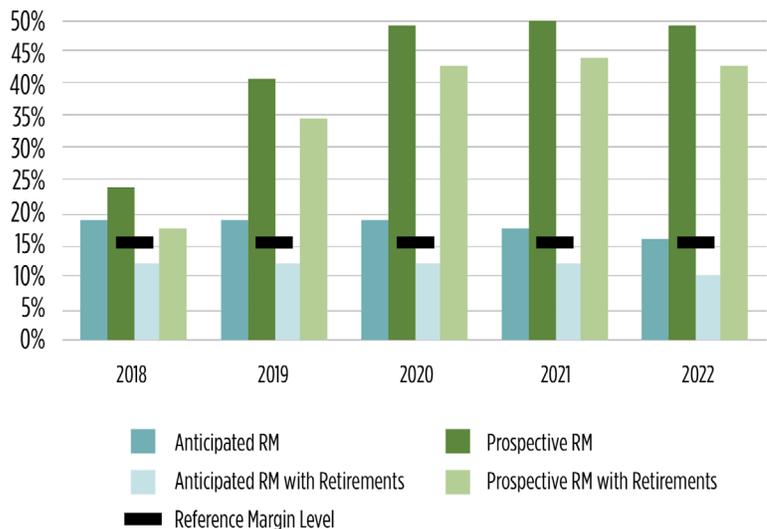


Figure 2: Texas RE-ERCOT Planning Reserve Margins with Announced Retirements



Source: Bloomberg, JAG Capital Management



Plant closings that result in lower reserve margins are being accepted by utilities and regulators due to a lack of demand growth. US electricity consumption was down 1.37% in 2017 according to the Energy Information Administration (EIA). Moreover, NERC recently lowered its 10-year forward electricity demand growth estimate to a 0.6% average annual rate, the lowest ten year growth rate recorded since Thomas Edison discovered it. The adoption of LED lighting is believed to be the primary driver of the lower energy consumption. LED is believed to be nearing 40% penetration of lighting market. Many technologies max-out near 80% market penetration, leaving LED room to continue to grow. While LED is making inroads, the largest consumer of power nationwide is HVAC systems; heating, ventilating, and air conditioning. Efforts are underway to decrease HVAC energy consumption at the commercial level, especially targeting data centers which use about 2% of the nation's electrical power. With their plant closings and project cancellations, it appears that utilities and regulators are relying on these and other energy efficiency efforts to be successful. Demand is racing supply downward.

Fair Weather Power

So, with demand falling and plants closing, why are Californians (and others) experiencing power outages? Mix has something to do with it. NRG Energy closed three California natural gas-fired power plants this year. Natural gas plants have historically been used to supplement power needs during peak demand periods. Without "peaker" plants, California is less able to supply demand spikes during hot evenings. Instead of the natural gas peakers, the state depends more on hydro, wind, and solar to provide power. Less hydro power is available this year due to a reduced snow-cap in the Rockies and that has contributed to the power deficit. Nature provided less water, and hot days can be unfriendly to wind turbines. Europe has numerous wind turbine reports that winds often calm on the hottest days, and that may be happening here as well. Finally, the state's utilities are making the case that increased use of off-grid power, like rooftop solar and power collectives, is making demand planning harder. In sum, power reliability problems appear to be a function of increased reliance on less reliable energy sources. As such, even brief periods of above normal (summer) or below normal (winter) temperatures will stress the power grid.

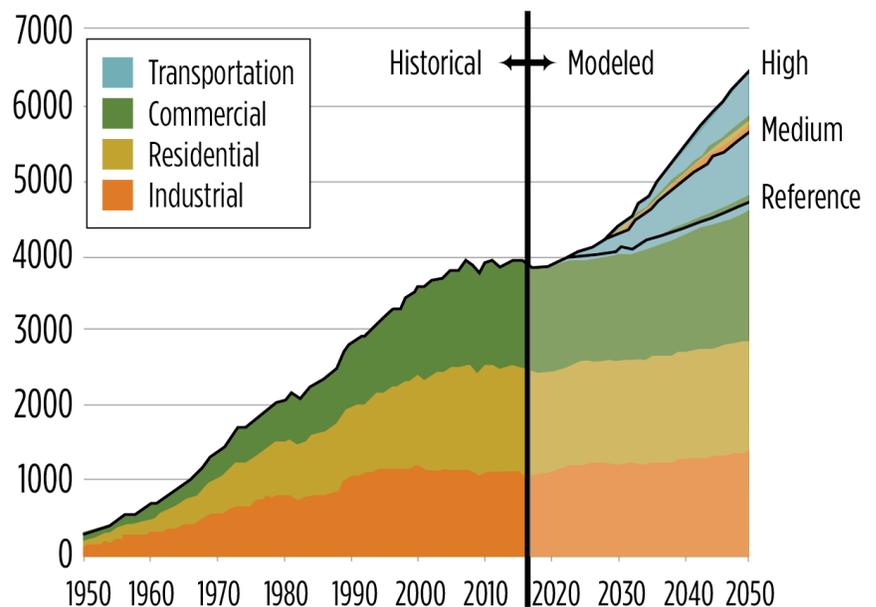
Off the Shelf Power

US consumers tend not to tolerate unreliable electrical power for long periods of time. Blackouts bring national media attention, rolling blackouts have not been well received, and some industrial processes, like aluminum smelting, incur large losses during power failures. Sales of both home and commercial backup generators have spiked after such events in the past, and part of the sales pitch for rooftop solar panels and home battery systems is contingency planning for power outages. These solutions are well known and readily available.

Could be Wronger than Wrong

While there are ready solutions for the problem of decreasing reserve margins for grid electricity, there may not be a solution to a more material failure in long term power supply planning. The National Renewable Energy Laboratory (NREL) foresees a future full of electric vehicles, a future US electric generating capacity in no way supports. The NREL goes beyond the NERC's 10 year demand forecast to look forward 30 years. Wired magazine sees EV's becoming greater than 15% of autos on the road by 2035, and NREL calculates that EV's will ultimately rise to require a 20% increase in power generation by 2050. If these forecasts prove accurate, instead of 0.6% annual growth in US power consumption, the figure rises a full percentage point to 1.6% per year for the next thirty years. There are hopes that EV's level power consumption through the day (currently there are peaks in the early morning and evening), making power generation more efficient, but it seems doubtful that such increased efficiency can overcome a 20% deficit. Simultaneous changes in both direction (down to up) and magnitude (less to more) can be forceful.

Potential Electricity Consumption from Electric Vehicles



Source: National Renewable Energy Laboratory, JAG Capital Management

Conclusion

In the near term, reserve margins are headed below levels prescribed by regulators in several regions and the power supplies that make up those reserve margins are increasingly dependent on environmental factors. As such, the reserve margins themselves look to be less reliable than historically perceived. Electrical generation appears vulnerable, but we guess that it will take either blackouts or inability to fuel new EV's to draw new capital to the area. For now, JAG sees opportunities in small home generators, batteries, and solar panels to offset the seemingly inevitable power outages. Long term, in what we see as a future full of EV's, electrical equipment is a growth market.

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