RESISTANCE
By Steve Huntoon

Electric Infrastructure: Sky Keeps not Falling


Huntoon

Every four years, the American Society of Civil [not Electrical] Engineers releases its Chicken Little report on American infrastructure.[1] The report says our energy infrastructure — the second largest category after roads and bridges — should get a D+.

I don't know if the rest of the infrastructure sky is falling,[2] but when it comes to electric infrastructure, most everything in the report is wrong.[3]

[See ASCE's response on page 4.]

For starters, there is this claim: "With more than 640,000 miles of high-voltage transmission lines across the three interconnected electric transmission grids … the lower 48 states' power grid is at full capacity, with many lines operating well beyond their design."

The fact is that 0 (zero) transmission lines are being operated beyond their design capacity. The grid has been and continues to be designed and constructed to cover projected peak demand years in advance. And every line is operated within its design limits. The ASCE claim is alarmist and wrong.

Then there is this: "Often a single line cannot be taken out of service to perform maintenance as it will overload other interconnected lines in operation."

Hello, this is why most maintenance is performed in off-peak months — as has been done for decades.

And this: "As a result of aging infrastructure, severe weather events, and attacks and vandalism, in 2015 Americans experienced a reported 3,571 total outages, with an average duration of 49 minutes."

Whoa! "Total outages" is outages, large and small, across the entire country. The total number of people claimed to be affected? 13.2 million out of America's 325 million population.[4] The average number of people affected per outage? 3,714. Yes, less than 4,000 people per outage. For an average duration of 49 minutes.

And what portion of these 3,571 outages is even attributable to allegedly overloaded infrastructure, the gravamen of the ASCE report? According to ASCE's own data, a mere nine (yes, nine) outages are attributed to "overdemand."[5] Major outage causes are weather and trees at 1,069, faulty equipment and human error at 942, vehicle accidents at 419, squirrels at 89, etc.

So much for the present.

As for the future, the report relies on an obsolete projection of future electric demand. Increased efficiency and distributed energy resources, among other factors, have caused the U.S. Energy Information Administration to halve projected growth between 2016 to 2025, from ASCE's assumed 8% to the current 4%.[6] Using ASCE's methodology, it means "needing" $467 billion instead of $934 billion over the next 10 years.

ASCE projects spending of $757 billion, so under ASCE's own methodology, using the current EIA growth projection, we will be spending hundreds of billions *more* than we need to.

There's more. Buried in the study is an implicit assumption that the efficiency of electric generation is static; in other words, the capital cost of generating electricity remains constant, so we have to keep deploying the same dollars of investment per unit of increased electric demand.


Transmission tower near Palm Springs, Calif. | © *RTO Insider*

The fact is that competitive market forces inexorably force down costs and thereby prices. Recent years have seen significant increases in the efficiency of natural gas generation and reductions in the cost of new electric generation capacity.[7] In other words, we are generating more electricity per dollar of capital investment.

Finally, the report doesn't recognize differences in how infrastructure decisions are made in this county. Other infrastructure, such as roads and bridges, do compete with other governmental spending priorities in political decisions by federal, state and local elected officials.

Electric infrastructure investment is not a political decision. It is determined by long-term planning criteria overseen in large part by independent regional (RTOs) and national (NERC) organizations, that in turn are overseen by an independent, highly regarded federal agency (FERC).[8]

Our electric infrastructure deserves an A.

Let's save the D+ for the ASCE report.

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[1] http://www.infrastructurereportcard.org/wp-content/uploads/2016/10/2017-Infrastructure-Report-Card.pdf.

[2] For critiques of the "roads and bridges are crumbling" theme, see http://www.npr.org/sections/itsallpolitics/2015/07/23/425292193/surprise-americas-roads-are-improving and http://www.economicpolicyjournal.com/2016/08/donald-trump-and-perennial-myth-of.html?m=1.

[3] This column reprises an article I coauthored 15 years ago, "The Myth of the Transmission Deficit," https://www.fortnightly.com/fortnightly/2003/11/myth-transmission-deficit. Fifteen years later the sky keeps not falling. More recently I've explained why big transmission is a big mistake. http://www.energy-counsel.com/docs/The-Rise-and-Fallof-BigTransmission-Fortnightly-September2015.pdf.

[4] https://powerquality.eaton.com/About-Us/News-Events/2016/PR100316.asp. Eaton, an electric equipment maker, is the source of the ASCE outage information.

[5] https://www.switchon.eaton.com/pdf/journey/business-continuity/cost-and-causes-of-downtime-infographic.pdf.

[6] EIA's 2017 Annual Energy Outlook projects electricity sales in 2025 of 3,892 billion kWh, which is about a 4% increase over 2016 sales of 3,727 billion kWh.

[7] "Heat rate" (Btu per kWh) declines for natural gas units are shown here: https://www.eia.gov/electricity/annual/html/epa_08_01.html.

[8] There are some states where reliability is more state-overseen than federal. Yes, state commissions face some political pressure to keep rates down … but even more to not have outages.