

## Reality Check - The Grid is Fragile Everywhere

By Thomas Beck, AIA, NCARB

The topic of the fragility of the grid was our intended topic for this week, well before freezing temperatures plunged our southern neighbors into frozen powerless homes and businesses. The consequent issues of water and food shortages, propane/natural gas supply outstripped by demand, bursting pipes, collapsing roofs, deaths, and hospitalizations from carbon monoxide poisonings are simply powerful punctuation to a “there but for the grace of god go I” scenario under which every U.S. citizen lives. Yes, here in Colorado our normal weather patterns compel us to insulate our homes, pipes, roofs and our grid infrastructure. But climate change affects us all, as our town experienced last fall when the entire village was evacuated due to wildfires.

Mother Nature, frankly, does not care if you are a red, blue or purple state. Science matters, math is truth, and in a state like Texas, where only 7% or so of the winter power supply comes from wind and solar, you can't blame a complete breakdown of your grid on renewables. Or, in the current alternate reality universe, you can say it but that still does not make it true.

Our grid across the United States is fragile. Human nature is not always logical. For example, it is a fact that the cost of generating electricity via fossil fuels is now much more expensive in monetary terms than generating electricity via hydro, wind and solar. Many proponents of gas pipelines, increased drilling, and fossil fuels argue otherwise.

When we choose to build on the cheap, keep building costs down by using substandard building materials, processes and labor practices, the price is simply kicked down the road to be paid at a later time with larger energy bills. The quality of manufacture can include insulation that both reduces the need to cool in the summer, and to heat in the winter. Building design can address lighting with daylighting options to reduce the need for electrical lighting during the day. Building design can recognize the inherent climate of a location, and insulate to keep interiors in hot climates cool in the summer, build in natural ventilation strategies to take advantage of overnight cooling, and incorporate interior courtyards for both privacy and practical environmental design. Historical examples of ethnic architectural solutions that acknowledge the realities of one's surroundings abound, such as the thick-walled adobe constructions of the North American southwest.

Ecologically, in order to reduce our carbon footprint with the goal of eventual net zero, we are moving toward all electric buildings and cars. In order to support this infrastructure we will need to ensure that our grid is robust. To do so we need interstate transmission lines. These interstate lines help balance the grid, which helps us use a larger percentage of wind and solar energy.

Our main power lines into and out of Estes Park provide cheap hydro power to the Front Range grid in the summer, and provides us power in the winter, as well as other times of year. An example of the long-term thinking necessary for grid upgrades, improvements and changes can be seen in the Estes-to-Flatiron Transmission Lines Rebuild Project, which has been underway for over a decade and is now finalizing the design and complete construction specifications.

(<https://www.wapa.gov/transmission/EnvironmentalReviewNEPA/Pages/estes-flatiron.aspx>)

We need to take a long-term view of infrastructure investment, at least 10 years minimum and out 30 to 50 years or more, and built to last 50 years or more. Even if projects cost more initially the taxpayer would be better served with projects that cost 10 or 15% more but last twice as long.

The U.S. historically has been a nation of innovators. Think Ben Franklin, Thomas Edison, Henry Ford, and more recently Bill Gates, Steve Jobs, and Elon Musk. Not to mention the many women and inventors of color who are not as famous, such as Maria Telkes's 1947 100% solar house, conceived with architect Eleanor Raymond. (<https://www.mentalfloss.com/article/53164/19-things-you-might-not-know-were-invented-women>) To think it is time to stop innovating and stick with the low-hanging fruit of existing technologies and infrastructure is antithetical to our American spirit.

Innovations like the Global Cooling Prize (<https://globalcoolingprize.org/>) in which participants around the world compete to develop climate-friendly alternatives to traditional air conditioning that have at least 5x less climate impact are positive steps toward finding new solutions to age-old problems. The Rocky Mountain Institute (RMI) reviewed Bill Gates' new book "How to Avoid a Climate Disaster" and reflects that the concept of the cooling prize "just goes to show how we can come up with better technologies even in mature industries where innovation has slowed down." (<https://rmi.org/climate-where-technology-infrastructure-and-policy-meet/> )

Innovation will produce new jobs, as will investment in education, science, research and upgrading our grid and infrastructure to withstand the new normal climate change has wrought. This wake-up call is an opportunity to get things right.

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