

## Grab your Bootstraps!

*Oh, if you ain't got the do re mi folks, you ain't got the do re mi,  
Why, you better go back to beautiful Texas, Oklahoma, Kansas, Georgia,  
Tennessee.*

(Woody Guthrie, 1940)

The American folksinger, poet, artist, and lyricist wrote the song “Do Re Mi” in 1940 during the Dust Bowl in the Great Plains.<sup>1</sup> He is telling citizens from dust bowl states to stay home because they would be turned back at the California border if they had insufficient resources to live without support in their state.<sup>2</sup> The Dust Bowl was probably the result of farming practices on the Great Plains exacerbated by drought.<sup>3</sup> But Woody Guthrie’s dust bowl lesson is that, before moving entire populations into non-drought stricken states, it is best to think about “pulling yourself up by your bootstraps”

Now consider the winter storm of 2021 whereby loss of electrical power resulted in several deaths and hardships in Texas and across the American Southwest. Power bought across state interconnects ran up to about \$1,000 per kwh. Much criticism, most recently from the US Energy Secretary, has been directed at the Texas utility commission, ERCOT, for its perceived “independence” from the national electrical grid as the reason for a sustained electrical grid imbalance.<sup>4</sup> However, such criticism is unhelpful in finding solutions to a public need for reliability of technological systems in the face of rare and consequential externalities. Among other less important contributors, the root causes most relevant to the Texas electrical grid imbalance are; deregulation of electrical production, and the Texas electrical grid size compared to its population distribution. ERCOT has no regulated requirements, beyond contracts negotiated with their customers, for merchants to maintain electrical production through extreme externalities such the freeze, hurricanes, tornados, seismic events, and so forth. Therefore coal plants have no reason to prevent coal piles from freezing in a rare event like the recent winter cold blast; and merchants supplying natural gas from their feeder lines would not add freeze protection unless electrical producers pay for gas contracts during extreme cold.

Greater reliance on connected grids is not a solution; if this were true, Alaska and Hawaii would have even worse performance than California or Texas which

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<sup>1</sup>Woody Guthrie is a primary inspiration of many folk singers including Nobel laureate Bob Dylan.

<sup>2</sup>John Steinbeck’s Pulitzer Prize winning novel “Grapes of Wrath” was published one year expressing the citizens’ plight in print.

<sup>3</sup>For a review of causes see, Schubert, S.D., Suarez, M.J., Pegion, P.J., Koster, R.D. and Bacmeister, J.T., 2004. On the cause of the 1930s Dust Bowl. *Science*, 303(5665), pp.1855-1859.

<sup>4</sup>see <https://www.npr.org/2021/02/26/971840872/energy-secretary-granholm-texas-outages-show-need-for-changes-to-u-s-power-system>, for example. Accessed 14 March 2021.

is not the case.<sup>5</sup> Texas, like California covers a large land area with three very large population centers; and although the California blackout record is much worse than Texas, by a factor of two, its grid is not viewed as “separate.” It seems most likely that should California have a grid management strategy similar to Texas, all other issues aside, the California grid performance would improve, coming close to matching Texas.

Although Alaska has its own grid and covers a much larger land area than Texas, it really has just one major population center in Anchorage. Of course, a major power outage in Alaska is certainly not out of the question, but the grid is much more manageable, given the population distribution. Obviously, Hawaii has some high population centers but they are supplied by separated electrical grids on the relatively small islands they are located.

In this newsletter, research news over the past year, some writing is been focused on protective systems; described as technological systems required by regulation. Such systems are put in place to protect citizens from harms due to a technological system failure. ERCOT, as the utility regulatory authority, could define a protective system that would require reliable excess capacity to be available to the grid; the level of required excess capacity would be maintained by each merchant as recommended by engineers who understand electrical grid dynamics and where power reserves are needed. If adopted, such regulations would require that merchants build, operate, and maintain excess capacity to respond to known externalities; readiness of excess capacity would be verified by regulations for inspection and enforcement. The costs incurred by merchants should be paid back by customers at a guaranteed rate of return through a “use tax.”

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<sup>5</sup>Service interruptions are higher in Alaska:<https://www.eia.gov/todayinenergy/detail.php?id=35652>, Blackouts by state: <https://www.statista.com/statistics/1078354/electricity-blackouts-by-state/>.