

I am an engineer and not a politician so I have a different perspective on NY State's Energy plan than most of the people in Albany. It's more about the science and less about the money, but having been an Engineer in the Power Systems Laboratory at Bell Labs and having run my own manufacturing business for over four decades, I have a fundamental understanding that without the money, you can't do the science. I decarbonized my business and my home two decades ago with planning going back to when Bill Clinton was still president. This morning, I drove to Albany from Westchester in a Tesla that is now almost six years old. I have provided large amounts of data from my research, gratis, to the Public Service Commission that was used as the basis of a state energy efficiency hearing back in 2008. The result of that hearing was large energy savings on NY State's electric transmission system. Con Ed has a renewable interconnection solution named after my company as a result of my filing a tariff petition against them to promote easier interconnection of renewables.

I have been living the electric lifestyle for two decades which is where NY State is trying to go. While the state's intentions are good and I would love to see the state's energy plan succeed, unfortunately I can safely say that NY State's plan is a disaster waiting to happen because the math and physics don't work.

I have been speaking with stake holders and policy makers at the state for over four years now, since early 2019. I have provided numbers dense presentations to state engineers and state regulators. During multiple meetings, they didn't dispute any of the data. I showed them how the energy generated by their planned renewable energy installations would not support the level of electrification that they were about to mandate. The only response that I received was that they would install renewables faster than I was calculating, except I was using their installation rates. I told them that they were ignoring reality because the plan was going to run into money issues, NIMBY issues, and the Jones Act. Anyone that has actually installed energy systems and had to get them approved and running would be aware of these real world hurdles. However, based upon my readings it is apparent that most of the designers of this plan have never done anything beyond pontificating from behind a desk and have a minuscule comprehension of the utility system. If it were otherwise, they would never have proposed this. I have also been appalled at the reporting on energy issues from many media outlets that doesn't correctly reflect scientific and engineering reality. The press has been misled by interest groups and those engaged in self-deception. However, the net effect is that we have a misinformed public driving politicians to do things that don't hold up under scientific scrutiny and that cannot be realistically achieved.

Four years after I first addressed the issue with the state, their renewable installation rates are falling behind what they projected and what I used in my analysis. The warnings that I gave them in March, 2019 are all coming true. This is because interconnection costs are higher than projected and there are not enough engineers available to do the analysis to ensure that the new generation can be interconnected without causing faults on the utility system. This is not as straight forward as dropping some solar panels down and then just plugging them in. Four years ago, the math said that at the rate of installation, there would not be enough renewable generation available to support the state plan for at least seven decades, 50 years after the state's 2040 date. That is even more true now. Late last year, the NYISO issued a warning that the Downstate utility system would be under stress starting in 2023. The farther along that

downstate building electrification proceeds, the more that stress will increase.

Additionally, any renewable generation system is going to need large amounts of battery storage to support the grid when there is no sun or wind. The primary material in these batteries is Lithium. Since the Summer of 2019, Lithium costs have increased by at least 600% despite the recent price drop and Lithium prices are expected to rise another 15% this year. NY State recently released their 6 GW Energy Storage report. Beyond the fact that the name of the document is an oxymoron because 6 GW is a measure of power and not energy, buried on page 94 of the 104 pages is a statement that 1000 hours of storage will be needed. When I researched energy storage costs about two years ago, the cost for utility grade battery storage was \$283 per KWh. Extrapolating the storage cost using only 4 GW for 1000 hours at 2 years ago's cost yields a bill of \$1.2 trillion dollars. Except the report also says that recent costs in NY State for installed storage have been \$567/KWh which increases the bill to \$2.3 trillion. If we use the full 6 GW mentioned in the title of the report, the cost rises to \$3.4 trillion in a state with an annual budget of about \$230 billion. So the storage costs alone, without any renewable generation or grid improvements could be over 15 times the state's annual budget. And the present batch of batteries is only going to last about 10 years for that price and then will need to be replaced. There is no way to generate tax revenue to overcome that sized shortfall. For that kind of money, you could build enough nuclear plants to electrify the entire Northeast United States that would last seven to eight times as long as the batteries and that would have a higher reliability. The recently passed Federal Inflation Reduction Act allocated about \$340 billion for renewable projects for the entire United States, one tenth of NY States projected Storage costs.

The state plan is short on labor, energy, land, generation, grid capacity, public support, and money to be able to achieve what they want in the stated time frame.

NY State's plan is not revolutionary. Germany has been trying the same thing since 1990 and has failed magnificently. After over 30 years, they have only decarbonized 34% of their electric grid. They state 42% but 8% of that is wood combustion that has a higher carbon footprint than coal and twice that of natural gas. Their energy costs are twice that of France, next door. Germany has recently had to restart several shuttered coal plants to offset the lost energy of their shuttered nuclear plants that, according to the 1990 plan, would no longer be needed. That has not been the case. Keep in mind that this energy shortfall is occurring without having enacted vehicle electrification that NY State has mandated in 2035. They have recently acknowledged by their actions that the plan is having major issues and in late November signed a deal to import 2 million metric tons of LNG from Qatar over the next 15 years. California has embarked upon a similar plan and is having major issues with it and as a result, is suffering from rolling blackouts and power failures during times of peak load. California says that they are 60% GHG Free on their instate utility system while not acknowledging that they have had to import large amounts of coal generation from out of state to replace the shuttered gas generation and doubled the carbon footprint related to that energy. They are acting as though GHG emissions are cognizant of political borders on a map. Two years ago, energy failures in Texas during cold weather resulted in between 300 – 700 deaths and \$195 Billion in property damage. Utility failures in NY State during extremely cold weather will yield similar results.

Climate Change is real. I was fundamentally aware of that back in the 1990's when I started designing the systems for my home and business. The state's effort to do something that has the previously documented issues is going to fail and also will not reduce Greenhouse gas problems. Beyond that, it is also going to divert resources from projects that could actually help to deliver significant carbon reductions at a much lower cost and could also be implemented far more quickly. The clock is ticking. Our children are counting on us to get this right the first time which will not happen if the state keeps chasing unrealistic fantasies.

Renewable generation can be used to help reduce fossil fuel combustion but it will not be able to support the state's generation needs for many decades. The US Department of Energy has acknowledged this. Why are we trying to duplicate failed programs from other jurisdictions because the alternatives don't meet a standard of ideological purity? Even though the alternative solutions will work as well or better, while also being less expensive, they are being dismissed out of hand. No one wants to combust any more fossil fuels than is absolutely necessary but this quest for the perfect is going to fail miserably and the end result is going to be both a public health crisis brought on by a lack of energy and an economic crisis resulting from energy costs that will make it impossible to live or work in NY State.

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