

Facing our Region's Challenges:
Reflections of an ISO - New England Board Member

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Introduction

I am grateful to have the opportunity of speaking to you today. I've now served nine years on the board of the ISO New England, and three as chair of the Markets Committee. Naturally, one accumulates thoughts over that span of time, and you have offered me a forum where I can share them with you. Thank you. Let me also add that my comments today are my own personal thoughts, and I am not speaking as a representative of the ISO, its management or my fellow directors.

First let me honor your profession, of serving in the public power sector. Such service has a long and distinguished heritage. Many of you may be familiar with the multi volume biography of Lyndon Johnson, written (and still being written!) by Robert Caro. In the first volume, Caro uses a chapter to describe what the Texas hill country was like before electricity: the harsh rigor of daily life. Men rising at 3 am to milk their cows by hand; women yoking themselves up, to carry heavy pails of water up the hill to the home, then wash the heavy clothes by slapping them with paddles and ironing with hot coals in sheds that became furnaces in the heat. All this at a time, in the early 1930's, when urban America had had electricity for over two decades.

President Roosevelt had a vision that all Americans, regardless of income, regardless of how rural their life, deserved the comfort and the freedom from toil that electricity provided. And so, the New Deal created the Rural Electrification Administration, to bring electricity to those who were not being served by utilities. The young congressman, Lyndon Johnson, lobbied hard to bring the funds to his district that allowed the wires to be strung. The lights went on across the Texas hill country in 1938. And that year, so reports Caro, parents across his district named their new-born sons, "Lyndon." Serving the public, with low cost and reliable power: that is the pedigree of your profession.

Also, I would like to honor the ISO New England management team, led by Gordon and Vamsi. I acknowledge that my own early background in viewing management was not very elevating: I worked at Lehman Brothers in the 1980's, where if one asked "How many Lehman Brothers partners does it take to screw in a lightbulb?" the right answer was "Nine: One to screw in the lightbulb and eight to push the ladder over." But kidding aside, in my professional life, I have never worked with management as collegial or thoughtful; as determined to find workable solutions to the problems that must be faced; or as respectful and mindful of the views of others. It has been a privilege to work with them, and with my colleagues on the Board.

We as a nation face two existential crises: threats from climate change, and the growth of authoritarianism. Perhaps discussing these two together will surprise you. But New England must grapple with the impacts of both, and I would like to explore these two grave threats, and their intersection, on our power system and our consumers.

Climate Change:

The threats posed by climate change are well known to all of us. To note just one increasing risk from within our industry: I recall a NEPOOL sector meeting in 2017, during which I asked the

Transmission sector what keeps them up at night. The answer: increasingly severe storms, and the consequent investment needed to upgrade distribution lines and maintain reliability. Of course, the need for upgrading distribution wires is minor, compared to the impact of severe heat, rising sea levels and drastic changes to the survival of plants and animals around the globe.

I've traveled my own journey on the imperative of dealing with climate change: from recognizing it as an issue, to taking it seriously, to regarding it as a matter of urgency.

But urgency must not obscure realism.

First, realism in respect of geography: The only solution is a world-wide solution. I recall listening to a government official of Rhode Island, a few years ago, stating that the people of his state really cared about climate change because of the looming danger of sea level rise in Narragansett Bay. I thought to myself that Rhode Island – on its own - could not do anything that would make any material difference to the height of Narragansett Bay; and that meanwhile, the Indian solar company that I chaired, Azure Power, probably had greater scope for helping, due to its efforts to decarbonize a rapidly growing major country still dependent on large thermal coal plants. Realizing the need for this world wide effort, this realism can quickly turn to cynicism: Why bother about our small piece of the planet, when it amounts to so little of the total that must be transformed?

Yet clearly, decarbonizing New England remains our job. All regions of our country must do their part, not only to decarbonize our national economy, but to demonstrate by example. No one should doubt the difficulty of India and China managing to decarbonize; yet we also know that whatever influence we may have on the policies of other nations, that influence is nil without the solid evidence of our own material progress.

Secondly, we must be realistic in terms of time to success. I have no doubt that all of you know how daunting the challenge is. Most of the New England states have had policies in place for a decade to incent more renewable energy. Yet after this time, only about 10% of the power on our grid today comes from these sources. And looking ahead, construction of New England's off-shore wind projects – as major an effort as that is – pales in comparison with other high hurdles: finding land for on-shore wind and solar, the years ahead to develop technologies, such as modular nuclear reactors and long duration storage, and construction of thousands of miles of additional transmission lines. The Future Grid Reliability Study, just released by the ISO last week, puts these challenges into stark relief: New England currently has 5.6 Gigawatts of wind, solar and storage capacity. The deep decarbonization scenario will require between 73 and 90 gigawatts of such capacity – 15 times as much as we have today.

To meet the vast increase in the demand for storage capacity, the world must rapidly scale up production of such essential inputs as cobalt and rare earth elements. The recent study on storage from MIT highlights this challenge: production of these elements will have to increase at sustained compounded annual growth rates that are two to four times what has been achieved in maximum single years in the past.

We should also be aware that the faster the transition, the more it must rely on technology that is commercial today, especially wind and solar. It takes time to nurture new technologies, such as small modular reactors – time that has limits to being compressed because of R & D required. Some of my female colleagues on the ISO board have stated this point succinctly: “9 women cannot make a baby in a month.” In sum, compression of time limits the technical options available to achieve the goal.

Such sobering thoughts do not dampen my optimism that we can substantially decarbonize our economy. But by when? By 2030, as some politicians have proclaimed? Clearly impossible. By 2050? That seems plausible and would be a stupendous achievement.

If the timeline I offer seems a low a bar to some, let me note the danger of proclaiming targets that are patently unrealistic. For when such targets are not met, public officials lose credibility and hence the confidence of the citizens they lead, when, in fact, it is vital that officials retain the confidence of the public for a transformation that is so challenging and costly.

We must also recognize that while pursuing this goal, reliability must be maintained, even as we greatly increase the amount of electricity we generate AND do so with an increasing scale of intermittent resources. I want to be clear about the following: We do not cite the importance of maintaining reliability as a counterweight to the need to decarbonize. To the contrary, maintaining reliability is the handmaiden of decarbonization; for if the public were ever to believe that we must choose between reliable supply of what our lives depend upon, and a further decrement in carbon emissions, the public’s support for the transformation will plummet. Further, we will jeopardize the people’s interest in decarbonizing two other sectors – transportation and home heating – that now emit more carbon than the power sector. In sum: a means of securing and ensuring adequate energy reserves, especially for the winter – including the maintenance of, and some investment in, fossil fuel infrastructure – is important to maintain the public’s support of economy wide decarbonization.

Therefore, our conversation should be the following: How do we incent decarbonization but also maintain the necessary number of conventional generating units, often gas and oil fired – and the attendant infrastructure, including fuel storage – that secures a reliable transformation to the future we all seek? We should focus on steadily reducing the use of fossil plants as zero carbon resources become available and power from them can be stored; not criticizing the presence and need of these fossil fueled plants. Gordon van Welie’s statement regarding the “four pillars” of a successful transition – growth in zero carbon resources, maintenance of adequate balancing resources, need for energy adequacy and construction of more transmission – is an important part addition to this conversation.

Markets

To encourage this transformation, I remain a strong advocate of markets – and hold a healthy regard for market forces. Think of what market forces have already achieved: I remember, when I was a power industry executive in the 1990's, that we believed the natural gas prices of \$10 mm btu's was a given. But then came the massive growth in fracking that led to the price collapse, and this, in turn, propelled the massive switch from coal to gas fired generation around the country – cutting carbon emissions/kwh in half at every new plant that replaced an old coal station.

We had come to believe that the era of low gas prices would endure, with resulting low marginal prices in our energy market. We have therefore been grappling with the issue of how key regional assets, such as our nuclear power plants, would remain profitable and serve our needs. But that has now been upended by the rapid escalation of gas prices in the past 18 months. A war induced blip? I will discuss that further below, but we should recognize that perhaps the low prices we enjoyed were the result of BOTH plentiful supply of fracked gas AND the constraint of exporting LNG, suppressing demand. That demand constraint has now been removed, and I expect that sustained world-wide demand for LNG will induce the construction of more export terminals, and hence provide steady uplift to domestic pipeline gas prices.

No doubt this price increase will induce more gas production over time, but if this uplift in prices is sustained, we should expect this factor alone will provide a powerful incentive for renewables and other non-fossil sources of power. To put this in perspective, economists have long thought that a reasonable price on carbon, if one were to be established, would be approximately \$40/ton. This would cause power prices to increase approximately 1.5 cents/kWh, if a modern combined cycle plant were setting the marginal price. Yet the increase in natural gas prices over the past 12 months – from \$3 to \$8/mm btu's, raises energy prices by over three cents/kWh – double the impact of the typical carbon price figure.

In sum, we may be moving from an era of cheap gas – which incited a key wave of investment in gas fired generation and a resulting reduction in the carbon intensity of the power sector – to an era of more expensive gas that will incite further investment in zero carbon resources, and thereby propel another steep decline in carbon intensity.

This is not to suggest that subsidies, incentives and market design do not matter: these instruments of policy and tariff matter a great deal. Just that we should remain both humble and nimble in our work and remain aware of the larger forces at play.

Regarding state policies, I respect the efforts by the States to kick start the offshore wind development. I don't believe that there is any other means, within this decade, for the region to make such a material reduction in carbon emissions. And as much as I believe in markets, there are times when an argument derivative of the "infant industry" justification for subsidizing a new sector makes sense. Given the risks, it's hard to imagine developers investing the vast sums required to develop offshore wind, without a fair measure of revenue assurance if they generate the power they expect to.

However, the grand goal for using markets is to allow us to retire PPA's that ultimately become an inefficient and costly means to decarbonize the power industry. And we must care about cost. Consumers in New England want three things from their power: They want it green, reliable and cheap. Currently, we can provide any two of those things, but not all three. So, if there is consensus in the region for power that is green and reliable, the challenge is cost.

Why is that so, given the low operating costs of renewable energy, and the opportunity to move away from generation now requiring expensive natural gas? First, New England does not enjoy the natural advantage of the great plains states for onshore wind, or the southwest for solar. These technologies cannot be built to the same scale here or be as productive. Also: the consumer will have to pay for assets that have low-capacity factors and hence high costs per kWh. Utility scale wind and solar plants will require radial transmission lines that will likely have substantial excess capacity due to the intermittency of the supply that they carry. A substantial fleet of conventional generation facilities will still be needed, even if, due to renewable energy and batteries, their hours of operation are few. These units must be well maintained, with stored fuel, and profitable to their owners.

How then do we use markets to achieve the desired transformation which, while not low cost, will at least be at the lowest cost possible? The program set out by the ISO is our effort to address that question. And put simply, these further reforms represent our continued effort to "get prices right."

First: Capacity accreditation. Generation must be paid for the capacity a unit truly provides – not more, not less. The ISO's determination to assess without favor all forms of generation – fossil and zero carbon alike – is a major protect that will no doubt be controversial when accreditation values are recommended. But so be it. We must send the signals to developers to provide the types of generation – and storage – that will truly add to system reliability; and not make capacity payments to units that do not.

Second: Ancillary markets. This project is vital to co-optimize reserves, procure more efficiently the synchronized or fast start capacity that the ISO operators believe is needed the next day; and, in its second phase, provide additional incentive for generators to have fuel on hand when the system could be constrained – including constraints caused by lulls in renewable output.

Third: the Pathways work, which in essence is an effort to find market means to provide an added tilt towards zero or low carbon generation. We appear to be moving towards a consensus that the option to be studied further is the "Hybrid:" a moderate price point for Net Carbon Pricing and a Forward Clean Energy Market for new resources. The conversation on these market-oriented policies continues, but let me offer some observations:

- Let's not think of a chosen pathway as an "ultimate" answer - THE policy that will "do the job" of achieving zero carbon over the next 30 years. Instead, let's focus on the near term: What steps can be taken now – or soon – that promote decarbonization and be politically feasible?

- Second, we should notice a significant finding in the Pathways report: that the payments consumers make through an NCP program flow overwhelmingly to zero carbon resources. Therefore, the incidence of this program is actually quite similar to the FCEM structure or any other program which benefits zero carbon sources of power.
- Third, NCP will provide material benefit to the two large nuclear plants that are so essential to meeting both our decarbonization goals and providing reliable base load power. Putting these second and third points together has yielded the thought that we might well change the name of the program to emphasize these results. I'll offer one: CERI - the Clean Energy Reliability Incentive.
- I want to emphasize a key premise of the Pathways project: that New England will develop its zero-carbon economy more efficiently if choices are made through auctions that are pan-technology and pan-regional, rather than a series of one-off auctions by a particular state for a particular type of technology. Let the market participants speak, allowing them the full scope for their ideas, choices and ingenuity.
- Advancing these structures requires extensive discussions with the states, as both the price points for CERI (if you'll allow me to use that term), and the size and scope of a FCEM – can only be determined by the states. And now, with energy market prices as high as they are, there will need to be discussion of the timing of when a Pathways structure might be put in place.

I have set out the broader trends in market prices; and discussed the continuing programs that the ISO wishes to pursue to further a reliable transformation of the grid to “get prices right” to incent zero and low carbon generation and to enhance reliability. As hard as will be to launch these programs, my greatest concern is not our ability to do so; but rather, the frictions that may not allow supply to respond to the carefully considered price signals we send.

Let's consider some examples:

- A gas only generator receives the price signal that the owner's unit will receive a low-capacity accreditation value, due to lack of reliable supply of gas in the wintertime. How can the owner respond? Will the community and authorities permit the owner to build a distillate oil tank?
- The great disadvantage of wind and solar is the vast amount of land for utility scale projects: A solar project requires about 6 to 7 acres per MW, with only a 20% capacity factor. The amount of additional solar capacity envisioned in the Future Grid Reliability Study would require over 100,000 acres of land just for solar, just between 2025 and 2040. How much local opposition will there be for the land required for sizable arrays?
- Large scale expansion of renewable energy and accessing hydro power from Canada require significant construction of transmission lines. Easy to permit and build? Hardly.

We need look no further than the so far successful effort to stop Northern Pass and now the NECEC project, to be built in a remote part of Maine.

Those who oppose such projects are no doubt sincere. Yet clearly, we will not make the progress needed to decarbonize, if significant projects are successfully stopped by local opponents saying, “Yes, I take climate change very seriously, but not this project, not here.” And we will not have the reliability we need if fuel storage projects are successfully stopped by local opponents saying “Yes, I understand we need to keep the grid reliable, but not with any fossil fuel.” Local fervor can become collective hypocrisy: We will all proclaim the urgency of decarbonization, but not construct the infrastructure and plants we need to achieve our goals. This, in my view, is a most urgent public discussion that we must have.

An upcoming focal point of this discussion could well be the Everett LNG terminal. Will New England allow this vital facility to close and leave the entire region dependent solely upon the St. John facility in New Brunswick, to provide such a critical source of wintertime fuel?

Authoritarianism

Had I given this talk a year ago, I may well have ended it with the points just made. But the world has experienced an upheaval in the past 6 months that compels comment. I therefore would now like to discuss what I believe is another existential crisis – very different from climate change – but just as ominous: The rise of Authoritarianism.

I would like to start with a quote from Alexis de Tocqueville, in his magisterial account of American democracy, written in 1835.

“There are at the present time two great nations in the world. I allude to the Russians and the Americans. Both of them have grown up unnoticed; and while the attention of mankind was directed elsewhere, they have suddenly placed themselves in the front rank of nations, and the world learned their existence and their greatness at almost the same time.

The American struggles against the obstacles that nature opposes to him; the adversaries of the Russian are men. The former combats the wilderness....; the latter, civilization with all its arms. The conquests of the American are therefore gained by the plowshare; those of the Russian by the sword. The American relies upon personal interest to accomplish his ends and gives free scope to the unguided strength and common sense of the people. The Russian centers all the authority of society in a single arm. The principal instrument of the former is freedom, of the latter, servitude. Their starting point is different, and their courses are not the same; yet each of them seems marked out by the will of Heaven to sway the destinies of half the globe.”

I feel chills when I re-read this passage. I first read it in college, in the early 1970’s, at the height of the cold war, and marveled at de Tocqueville’s prescience. I reread them in the 1990’s, when we thought we could feel safe that these words had lost their relevance. But now, I read them again, with the sense of horror and foreboding. Who would have believed that today, a major European power would unleash a brutal assault on a peaceful neighboring country?

But also: while many may conclude that in the long run, Russia will not be successful and has lost its super-power status, we must also contend with the rise of China – not as a nation joining the ranks of developed market economies organized by the rule of law, but as a highly centralized autocracy, with state directed enterprises and an omnipresent surveillance of its people that even George Orwell could not have imagined. And finally, we must be aware of a creeping rise of authoritarian instincts even within democratic states – such as Hungary – but also, frighteningly, here in our own nation as well. How does this existential threat affect our world of providing electric power? In three ways, as I discuss below:

The first is the immediate crisis caused by Russia’s invasion of Ukraine and Putin’s decision to sharply curtail the supply of natural gas to Europe. This of course has led to the steep surge of LNG prices and heightened the risk of New England procuring LNG supplies it may need this coming winter. At times last winter, we faced pipeline gas and LNG prices of over \$20/MMBtu’s, resulting in prices of over \$150/MWH. Europe is now paying \$100/MMBtu’s for LNG – in the summertime. Could these be the prices that New England generators will have to pay this coming winter – and perhaps the next - for this fuel, in competition for cargoes that will otherwise go to Rotterdam? Prices that may have to be paid even if the winter is mild?

If faced with such prices for natural gas, the ISO markets will react to clear generators with lower cost fuels – primarily oil. This could well require state and local authorities to provide necessary waivers for these plants to produce higher levels of carbon emissions. I expect that as strongly as New England wants to make progress towards decarbonization, residents will want officials to mitigate such material price increases in any way possible. Anticipating this, it will be vital that every oil and dual fuel fired unit on our system be well maintained and ready for this winter.

Beyond the impact of the upcoming winter, we can expect that the Ukrainian war will cause a seismic shift in the perspective and policies of western Europe: Russia will not be trusted for a generation or more, and governments will be determined to free themselves from being held hostage to Russian oil and gas. We can therefore expect even greater determination to advance towards a zero-carbon economy – driven now by a national security imperative, as well as fears of climate change. This, of course, is welcome: As I said above, decarbonization is only successful if undertaken everywhere. But Europe’s greater push will also heighten the near and medium term competition for the inputs to the green economy and hence, at least initially, may slow the pace of transition that we wish to undertake in New England. And for sure, there will be added pressure on all to resolve supply chain bottlenecks.

The second impact of authoritarian government is associated with China. China today manufactures 70% of the world’s solar panels and, as importantly, is the leader in solar R & D. China mines 90% of the world output of rare earth elements, so vital to decarbonization technology. With the values and attitudes that the Chinese leadership espouse, with the geopolitical threats that are emerging, can we be comfortable pursuing a fast-track commitment to decarbonization, based on such a supply chain? Other nations have already begun taking defensive steps. The Indian solar market is burgeoning, yet virtually all the panels have been imported from China. Therefore, the Indian government – starting three years ago – began to impose what has become a highly dirigiste industrial policy that requires Indian solar developers

to purchase from domestic manufacturers. Such considerations have now come to our shores, as evidenced by the recently passed bipartisan “CHIPS” act. But this act focuses on semiconductors, not solar panels and other needed inputs. What more should we do? Must we do, to permit unfettered progress towards decarbonization? Substantially reducing reliance on China will be costly and time consuming, no doubt slowing the speed of our transition. But I submit that we cannot allow China to do to us someday, what Russia is doing now to Germany and western Europe.

Finally, we must look at our own nation. How do we combat our own dark authoritarian instincts? How do we abate the anger so many feel towards government? How do we reduce the despair that many feel, at a seeming inability to solve our problems? To consider an answer, let me again quote from de Tocqueville:

“The strength of free nations resides in the township. Town institutions are to freedom what primary schools are to knowledge: they bring it within people’s reach and give [people] the enjoyment and habit of using it for peaceful ends. Without town institutions a nation can establish a free government but has not the spirit of freedom itself.... In America, not only do institutions belong to the community but they are kept alive and supported by a community spirit.”

As the mayor of the small Town of Chevy Chase, Maryland, I take these words very much to heart. But let me enlarge the scope of de Tocqueville’s meaning: How do we behave as individuals, when working within the local and regional institutions that we touch every day. Do we strengthen those institutions or weaken them? Do we advance democracy or weaken it?

What is required is civility, transparency, tolerance and a commitment to deal with facts. We must avoid demonizing ones’ perceived opponent and thereby torquing the anger of the public. Instead, we need to explain the issues – and the complexities of these issues – that we are all working hard to resolve. With understanding, we can find common ground, make necessary compromises, and forge solutions.

To be sure, one of the major reasons it has been such a privilege to serve on the ISO board, has been the opportunities to observe the high level of discourse among the stakeholders of our power system. But passions and Covid induced separation have cracked our comity. Our community can do better. With dialogue and understanding, we stand a far better chance of enhancing confidence in our institutions, strengthening our democracy, and building the broad, deep and enduring support for the policies of decarbonization that our region, our nation, and our planet require.