Comments on the

"NextGrid Illinois: Utility of the Future" Report

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January 10, 2019

Introduction:

Everspring Energy thanks the Illinois Commerce Commission and the report authors for their efforts to engage in a multi-party visioning exercise about the utility of the future, for having articulated this vision in the "NextGrid Illinois: Utility of the Future" report, and for providing the public the opportunity to provide comments on that vision.

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Summary:

In short, Everspring Energy advises Illinois decision-makers to:

1. Transition as quickly and cheaply as possible to an electric system that emits as few greenhouse gases (GHGs) as possible
2. Minimize subsidies (e.g. net energy metering, or NEM) for rooftop solar
3. Deploy energy storage, although not necessarily on customers' premises
4. Go slow on grid modernization, except where it is needed for reliability, for power quality, and to facilitate electric vehicle (EV) rollout
5. Consider both utility ownership and utility dispatch of distributed energy resources (DERs), aside from demand response, which is inherently customer-controlled.

Discussion:

Green Energy:

Regarding the need for a green grid, not much more needs to be said. Science and common sense tell us that we need to move as fast as possible. However, in moving to a low- or no-GHG future, we need to see what actually works, avoid herd behavior, and keep in mind the costs that ratepayers will bear.

Rooftop vs. Utility Scale:

Solar energy is the most potent symbol of renewable energy, and rooftop solar is the most visible type of solar energy. Utility-scale "solar farm" generating plants often get ignored, despite the fact that even in California, with its well-known Million Solar Roofs[1], the amount of solar energy generated by utility-scale systems is over twice that generated on customer-located, or "rooftop", systems. At the same time, the total life cycle cost of utility-scale solar is roughly one fifth that of rooftop solar.[2] The only

[1] Also known as the California Solar Initiative, the program was established in 2006 in Senate Bill 1. The program closed in 2016 after successfully incentivizing the installation of over 1800 MW of customer-located capacity. Net energy metering (NEM) has continued to incentivize new installations, which now total more than 7500 MW https://www.californiadgstats.ca.gov/.

[2] Lazard publishes annually the range of "levelized cost of energy" (LCOE) for various types of conventional and renewable energy. https://www.lazard.com/perspective/levelized-cost-of-energy-and-levelized-cost-of-storage-2018/.

reason most solar systems continue to be installed on rooftops is because of subsidies established by federal law (Investment Tax Credit, also available to utility-scale plants) and by state regulators (most commonly, through NEM). Without these subsidies, the industry would be only a fraction of its current size, which explains the intense battles taking place in many state capitols about the future of NEM.

It is important to acknowledge the positive role that rooftop solar has played in generating public awareness of solar energy, and for the installation jobs the industry has created. Nevertheless, it is at present an artificially maintained industry, and it costs utility customers who are not rooftop generators a lot of money.

Still, rooftop solar advocates have argued that solar has other benefits: (1) it involves citizen action and ownership, and takes power away from big utilities; (2) it avoids the wild flora and fauna disturbances that can be caused by remote solar farms; (3) by generating power close to where it is consumed, it avoids line losses and (4) it helps utilities avoid distribution grid expansions.

Regarding these claims: (1) it is important to remember that most of the citizens who are benefiting are generally the wealthy, so rooftop solar programs are on average increasing the gap between rich and poor; (2) environmental impact is an important consideration, but can be mitigated by locating solar farms on "brown field" sites, such as degraded agricultural land; (3) line losses are also an important consideration, although the percentage impact will be in the single digits; (4) the net impact of rooftop solar on the grid is not well known, and is discussed below.

Grid Impacts:

Because rooftop solar is located within the load center, it would seem that it would help utilities avoid the need to expand their grid in situations where load was increasing. The report calls this a "non-wire alternative" (NWA). While compelling on its face, the argument ignores the timing mismatch of generation and load. In fact, the evidence about the average net impact on the grid from rooftop solar is so far unclear.

The NextGrid report discusses the capital investments previously spent by ComEd and by Ameren on grid modernization. The companies as well as the ICC should be commended for investing in the grid and improving reliability while keeping Illinois rates below the U.S average. The report also states that so far there is very little DER deployment in Illinois, so little inference can be drawn from the Illinois experience.

California, in contrast, has a fairly extensive DER rollout (e.g. 903,008 solar projects, as of the date of this submission (from the Californiadgstats.ca.gov website)), as well as proceedings in place to direct spending and assign costs and benefits that these DERs are having on the grid. In Southern California Edison's 2018 general rate case filing at the California Commission (Application 16-09-001), the company requested authorization to spend $1.875 billion over a three-year period for grid modernization, roughly 13% of its requested capital budget. The money is intended not only to accommodate DERs into the grid, but also to increase reliability and power quality, so again, it is difficult to tease out the grid modernization costs directly associated with DERs.

Pursuant to legislative mandate, the CPUC has also established an administrative proceeding[3] to establish rules concerning the planning and deployment of DERs. Specifically, the utilities are charged with identifying distribution loops where DERs could be used to defer or avoid grid upgrades, i.e. NWAs. Annually, the utilities file "Grid Needs Assessments" as well as "Distribution Deferral Opportunity Reports".[4] This filing cycle has just begun, and it is difficult to draw conclusions at this time. Regarding final approval of NWAs, the CPUC has determined that these decisions should continue to be made in the context of general rate cases[5].

While these procedural examples are inconclusive regarding the net grid impact from DERs, the technical challenge of operating a grid safely and reliably while communicating with and dispatching two-way flows from a very large number of generators is obviously going to be expensive and challenging. Illinois decision-makers would do well to take a cautious approach, observe how the rollout of DERs and NWAs is accomplished in California and elsewhere, and then see for itself whether this is an approach worth embracing.

Storage:

While rooftop solar is not generally cost effective for the grid or for ratepayers, a newer industry has arrived which is aimed at facilitating the integration of renewables into the grid: energy storage. In California, the vast bulk of customer-sited energy storage is deployed to help commercial customers avoid demand charges.

But storage around the world is being deployed not only on customers' premises, but also on the utility side of the meter, to take advantage of the malleable and programmable nature of energy storage technology.[6] Whether for load shifting (peak shaving, valley filling), frequency regulation, voltage support, black start, or other grid support services, storage can be deployed and dispatched to help the grid. It is a promising frontier for technological and regulatory exploration.

Markets vs. Utility Dispatch for DER:

The focus in the NextGrid paper on storage deployment (and DER in general), that is, customer-located and market-driven, matches other regulatory efforts. At the Federal Energy Regulatory Commission (FERC), Order 841 provides guidelines to regional transmission organizations (RTOs) regarding how to establish market rules so that energy storage owners can participate at both the transmission and the distribution level. In California, the effort to manifest this vision combines the ongoing efforts of the California Independent System Operator (CAISO), the CPUC, consultants, aggregators, utilities, and traders. The end product of this effort will be an extremely long and complicated rulebook, requiring constant market monitoring, continual updates, and the on-going exposure to the risk of market manipulation by participants who "game" market rules.

[3] Rulemaking 14-08-013 hosts the Distributed Resources Plan review process.
[4] Decision D.18-02-004

[5] Decision 18-03-023 provides guidance on grid modernization, but also defers to GRCs the determination regarding cost effectiveness of specific grid modernization proposals.
[6] The discussion here concerns primarily chemical batteries, although to some extent it can also apply to other physical forms of energy storage, such as pumped hydro, pumped air, fly wheels, etc.

The striking feature of this activity, involving countless hours of work by capable, well-intentioned, and well-paid experts, is how unnecessary it is. First of all, it is not clear why storage needs to be located on customers' premises or dispatched pursuant to market signals in order to provide benefits to the grid. Rather, it seems logical that storage which is dispatched directly by the utility would provide more benefits to the grid, for the simple reason that the utility has the birds-eye view of what the grid needs. Furthermore, utility dispatch of storage would avoid the need for the complex market rules mentioned above. Of course, the utility's actions would require oversight, as is traditional and normal for a regulated monopoly. The ratemaking associated with this model of utility dispatch, and whether the facilities are owned by the utility or by third parties, will need to be worked out. At the very least, Illinois decision-makers should seriously explore having direct utility dispatch to deliver the benefits of energy storage to the grid, rather than assuming a market-driven framework.

Demand Response:

Like energy storage, demand response is an activity receiving considerable expert attention in a effort to create market rules so individual customers can sell their "negative consumption" into the market in return for compensation. To address the phenomenon of individual consumers whose small size might exclude them from participating, third (or, fourth) parties enter who aggregate the consumption behavior of many customers. As with storage, the market rules surrounding demand response get very complicated very fast. Perhaps a better alternative is a solution that uses utility tariffs which send price signals to motivate customer behavior.

Micro-grids:

A brief note about micro-grids, a kind of grid modernization that is compatible with the current grid design. As discussed in the report (pages 35 and 36), inserting micro-grids into the larger network is a fairly elegant solution - raising the reliability, improving environmental profile, and possibly lowering costs for a compound, or cluster of customers - without imposing much added complexity or cost to the grid at large.

Electric Vehicles:

The NextGrid report correctly identifies EV deployment as a prime concern for grid modernization. As noted in the report, however, the impacts on the grid from EVs are far from certain. Will EV owners tend to charge from the grid only, and if so will they respond to price signals, and will they need to charge at their place of work in addition to, or instead of, from home? Or, will EV owners also be willing to inject energy into the grid, thus acting like mobile energy storage units, despite fears that over-cycling might reduce battery life? And, how much EV penetration will occur, and how fast? Illinois decision-makers are doing well to stay on top of this, to encourage EV use, and to be prepared to modify their policies as customer behavior begins to reveal itself. However it is done, accommodating EVs necessitates neither subsidized rooftop solar nor the establishment of complicated and game-able market rules.

<u>Conclusion:</u>

As they map out a blueprint for the future of the electric grid and industry, Illinois decision-makers must keep in mind that ultimately they are responsible for delivering safe, reliable, environmentally responsible power to customers as cheaply as possible. They are cautioned against empowering

"prosumers" to participate in electricity markets simply because the technologies and the conceptual models exist. At the end of the day, it needs to make sense for average customers.