




How should utilities respond to the competitive threats embedded in some DER technologies and take advantage of customer engagement opportunities also present there?

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Meet the Author:

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Setting the Context – Defining competitive threats embedded in DER technologies:

DERs encompass a broad set of technologies that bring new sources and forms of supply into the grid. By their very definition, these are distributed in various parts of the grid, primarily at distribution-level voltages.

The list of DERs (from NY REV) includes Solar (PV, CSP), Fuel cell, Wind, Thermal, Hydro, Biogas, Cogeneration, and Combustion generators. They also include various forms of storage and demand response. As we look at this list, it is easy to see that many of the items in the list are not new at all. Cogeneration, combustion generators, and a few others have been around for a while now.

What is changing, however, is that these technologies and others are coming down in price and as a result, more of them are showing up in the distribution grid where historically the electric system has been planned only for one-way flow of electricity. In addition to price reductions, regulatory mandates, and state-level subsidies have also led to increased deployment. The presence of these resources in the distribution system are changing the dynamics of the relationship between the utility and its customers in new and interesting ways. Let's analyze some of them.

- *Individual customers: Individual customers (both residential and some commercial/industrial) are able to take advantage of these mandates and subsidies and deploy behind the meter one or more of the options listed above.*
- *Microgrids: Taking advantage of DERs and the availability of new technologies to manage and control them is allowing (universities, industrial and commercial) campuses to install local sources of generation and manage much of their own supply needs internally.*
- *Aggregators: Taking advantage of these technologies and control mechanisms, newer business models are coming up in which aggregators learning from the sharing economy successes of companies such as Uber and Airbnb are trying to bring those ideas into the electric grid. The examples of plans and ideas are vast and varied as can be expected from something as nascent as this.*
- *And there are more.*

To recap, the competitive threat of DERs is not coming just from their existence but from the result of their existence which is resulting in decreased purchase of electricity from the utility and increased the complexity of distribution system planning and managing reliability to historical levels.

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So, why is this important – or detrimental to the utility?

Utilities are basically Asset Management companies. They install large and expensive assets and expect to get a rate of return on them. Because they invest in the assets, the state PUC guarantees them a rate of return on their assets. This is the rate of return that their investors/stakeholders expect and deserve as a part of their investment. The assets cover a broad spectrum ranging from generators, circuit breakers, transmission/distribution lines, substations, transformers and so on. In return for this investment and as the service to its customers, the utility operates the assets to deliver power reliably to their customers and here again, the state PUC steps in by monitoring the quality and reliability of the power delivered to the customers.

While, for the most part, the delivery cost of the power is a pass through component, the utility recoups the return on its asset investment by bundling it into the cents/KWH that it charges the customer. Utilities can often incur penalties for not meeting certain distribution reliability metrics.

So – with the examples provided above, if the customer takes a reduced amount of energy, the utility gets a reduced return on its investment and possibly incurs penalties for reduced distribution reliability

This is a problem.

So, what are the options?

There are several options that can be pursued and are either being considered have already been implemented by utilities across North America. Let us look at some of them:

- Unbundling: in this option, the utility separates out the cost of the energy delivered from the cost of the infrastructure being provided. This way, the customer only pays for the true cost of the energy being delivered to their premise but pays for the privilege of being connected to the grid. Of course, the customer is always free to completely disconnect from the grid upon which they will not pay either the energy charge or the connection charge.*
- New services: The advent of DERs has provided utilities with opportunities to partner with their customers who have DERs installed in their premises. These services could take on a plethora of options ranging from managing and maintaining the DERs to taking on the extra energy fed into the grid and others. Each of these options has the potential to bring new revenues into the utility.*
- Installing DERs on customer's premise: The utility could use ratepayer (and PUC approved) funds to install DERs on customer's premise and use the excess energy to assist in delaying or avoiding grid-upgrades thereby saving money for the ratepayer and supporting/encouraging an environmentally beneficial generation mix.*

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For any of these to work, the utility needs to work closely with the regulatory compact at their state and work out the details, because they will all need regulatory approval. In some states, utilities cannot own generation and in some states these rules also include storage. There is a level of complexity that needs to be resolved before forward steps can be made.

So what??

Competition is not new to the utility industry. Starting with PURPA of 1978, EPA of 1992 and FERC orders 888/889 which drove wholesale deregulation, to retail in states such as Texas and now from DERs, the utility industry is no stranger to competition. PURPA did not drive the generation entities to ruin, FERC orders 888/889 and Texas deregulation did not bring ruin to transmission companies. Similarly, DERs will not bring ruin to distribution companies.

The key to any competition is to create a level playing field for all players – including utilities

The playing field cannot be one-sided. For example, if you look at Demand Response, one cannot expect any self-respecting industry to agree to ask its customers to consume less of its product but also expect the same level of reliability. One cannot expect utilities to be asked to continue to provide reliability services, ancillary services (voltage support, frequency support), connection to the grid and so on, for no extra charge and all for a decreasing amount of product sales. They are linked inextricably and must remain so.

This means that these new sources of competition need to be supported by new regulations and for that to happen, the regulators also need to be enlightened with the ability to look at both sides of the equation, ensuring the reliability of the system is maintained, free riders aren't allowed and that environmental mandates are achieved.

As a power system engineer, I am positive that utilities will weather this competition and all parties will win.