

2016 Outlook on Power and Utilities My Take: By John McCue



Q: Last year we discussed the ongoing electric power industry transformation and the opportunities that were beginning to come into focus. You spoke of utility companies beginning to adjust their business models and successfully seize growth opportunities, a trend that continued throughout 2015. What's your take for 2016?

John McCue: The opportunities are even clearer now and the momentum behind the industry transformation is accelerating, thanks in part to the growing impact of "exponential technologies" on grid modernization as well as the form and functionality of many customer interactions. These technologies are the same, or similar to those that are continuing to transform many other industries, such as: telecommunications, financial services, retail, automotive, and others.

Q: What are some examples of these exponential technologies?

John McCue: The best examples are three core digital building blocks whose performance relative to cost (and size) is roughly doubling every 24-30 months: computing power, data storage, and bandwidth utilization. These core technologies are fueling the growth of other composite exponential technologies like advanced analytics, artificial intelligence (AI), robotics, drones, additive manufacturing (3D printing), and wearables. And these technologies are in turn being combined to enable exponential change in the business processes and customer interactions of many fields, including energy.

Q: What kind of changes are these technologies enabling?

John McCue: Artificial intelligence is helping to solve a wide variety of challenges, from simultaneous language translation to new drug development. It's also what helps people tag their friends' photos on Facebook. Robotics were first used to perform tedious, repetitive or even dangerous tasks, like defusing explosives and inspecting hazardous environments. Now they are moving on to knowledge work, like gathering and interpreting data, and determining actions based on their own analysis. Additive manufacturing allows us to "print" whole objects layer by layer, reducing manufacturing and assembly costs and enabling new designs, for everything from toys to jet engines.

Q: Can you provide some examples of how exponential technologies are impacting the electric power industry?

John McCue: The good news is that exponential technologies are already helping electric utilities optimize the grid to reach their goals for reliability, resiliency, efficiency, affordability, and environmental responsibility. At the same time, exponential technologies also support products and services that open the electric power industry to new entrants, like renewable energy and energy efficiency providers. Thanks to these exponential technologies, electric utilities can now deploy devices such as smart meters, voltage monitors, and heat sensors across their systems; link them through high speed communication networks; and combine them

Exponential technologies are accelerating the momentum behind the electric power industry transformation

with advanced analytics to enable sophisticated decision making and problem solving in real-time. Some are linking in remotely controlled robotic devices and drones to inspect and maintain distribution systems and assess storm damage. Similarly, gas utilities are deploying progressively more sophisticated robotics to inspect pipelines inside and out for damage or leaks. This overall “internet of things” is increasingly enabling utilities to monitor, control, and optimize grid and system resources, improving performance and asset utilization.

Q: You mentioned that exponential technologies may also support new products and services and new entrants in the electric power industry.

John McCue: Yes, just as exponential technologies enable grid automation and optimization, they are also spurring the growth of distributed energy resources, such as wind and solar power, electricity storage, demand response, and energy efficiency. Solar power researchers, for example, are using supercomputers to design more efficient, less costly solar panels. Researchers at the National Renewable Energy Laboratory (NREL) feed desired attributes for solar cell materials like high light absorptive capacity, flexibility, availability, and non-toxicity into a supercomputer to arrive at possible combinations of materials that they might fabricate and test. Other researchers are using 3D printers to create solar panels that could capture up to 20 percent more sunlight and cut production costs as much as 50 percent.

Q: Is the proliferation of distributed energy resources like wind and solar going to make it more difficult for utilities to operate the electric grid reliably?

John McCue: Fortunately, exponential innovation is helping out there as well. In addition to the two-way communications and monitoring devices I mentioned earlier, utilities are using sophisticated new weather forecasting tools and models that are allowing them to better understand the variance in available solar and wind

resources. Some electric companies have been able to leverage the synergies between wind and solar resources and dispatch them together so they can stand on their own and be as dependable as a conventional power plant.

Q: What else could significantly impact the electric power industry in the next year or so?

John McCue: Most of this discussion has focused on the accelerating pace of change as exponential technologies are becoming part of the value stream of a very old industry. However, we can't walk away from policy implications, such as the impact of the proposed Clean Power Plan. The plan will likely be litigated in the courts, but assuming it's implemented in some form, states would need to submit plans by September 2016 and ensure power plants achieve CO₂ performance goals between 2022 and 2030. Measures would differ from state to state, but in general it will act as an additional accelerant, moving the industry toward renewable energy, energy efficiency, and other low or no carbon emission alternatives.

Q: Do you have any advice for utilities trying to harness these exponential technologies?

John McCue: Companies may need to adopt a new mindset, to recognize that we live in a time of exponential change and that this will impact our business. We should remain open and examine the potential of these technologies, alone or in combination, to change our operating models, our product/service platforms and, most importantly, our customers' experience of us. We should be more aggressive, less “business case oriented,” and more financially risk tolerant of deploying and testing technologies. We should also become more aware of the ecosystem in which we operate—and take advantage of opportunities to partner with technology companies, research labs, and other potential partners. And remember, exponential technologies are not the sole domain of start-ups and tech companies. Large incumbents can harness them effectively as well.



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