Smart Grid Expectations and Our Changing Relationship with Power

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The introduction of the Smart Grid is about so much more than technology. The technology may make the data more accessible, the power more efficient, and the ecological impact more manageable, but the technology is only the catalyst or the capstone of a much more powerful underlying phenomenon. The Smart Grid represents a change to our earliest and most consistent and dependent relationship with technology, our consumption of electrical power.

In his April 9, 2010 remarks at the **Brookings Institute**, author **Peter Fox-Penner** captured the essence of this very well when he said:

"...a technological revolution known as the smart grid will give all of us much more control over our own power use, enable the greater use of prices that vary by application and time, and allow the integration of dispersed generators in storage units. For the first time in the industry's history, you and I will soon be able to see how much power we are using for each of our own applications and change our use in response to price signals and other grid controls."

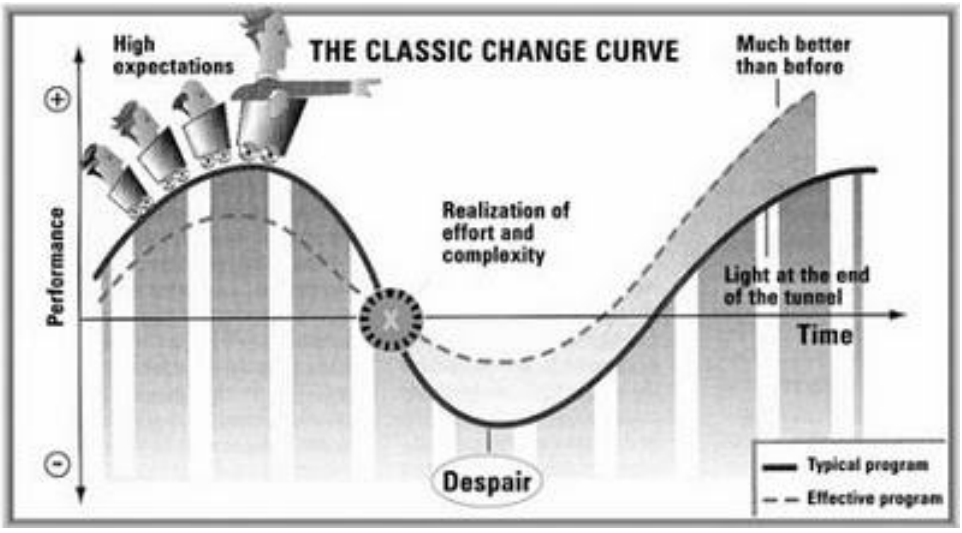
This describes more than a means of improving the grid's efficiency or reliability, it evokes a sea change in its approachability, in the intimacy and interactivity of our relationship with power, and this is really **the make-it or break-it criteria for the Smart Grid as an evolutionary shift in our lives with electricity.**

Some of us have probably had the experience of a similar change in a relationship: That individual for whom we have privately pined finally returns our interest. That **car**, so long a dream, can finally be owned, driven, and shown off. We finally put our names on the reservation list of a **restaurant** that we have only read about. Each of these represents a change in a relationship, like our changing relationship to electricity through the Smart Grid, and that change is not automatically smooth, because change is about expectation, distraction, disappointment, realization, and then hopefully, satisfaction.

Understanding the Cycle

There is a diagram that does a fine job of representing these various stages of a change in a relationship, and it is called "Schneider's Classic Change Curve." It describes the path that our emotions run along as we finally achieve or acquire some end result that we have long hoped for. It is helpful, as we begin to see exuberance for the Smart Grid evolve into some

cynicism or disappointment, to know these stages, and to understand the key role that communication will play in decreasing the depth and duration of the dips.



Schneider's Classic Change Curve

- **Great Expectations for the Smart Grid**
  When the government forks over **$3.4B in grant money** to produce the very first steps in a new generation of infrastructure, it is natural to expect Bigger and Better. Or Faster and Cheaper. Or More Open and Safer. These expectations have been building among the various constituents that have been on the receiving ends of the promotion and prototyping of the Smart Grid. Many other communities watch enviously, as dollars pour into making electricity more responsive, less expensive, and just as reliable. There is even a certain amount of panache that accompanies residency in a truly Smart City. Things are going to be great.

- **Next Stop: Disappointment, Distrust, Despair**
  The base element of such an enormous change is confusion. Motion and turbulence can create a very wide shadow, and the natural optimism of advocates makes some level of disappointment almost inevitable. When the first effort is smart metering, focused on optimizing time/capacity based rates, it is hard to see the actualization of the interactive dream. The realization that markedly more data and control is passing through the meter creates worries about the nature of the consumer's actual participation in the network. When bills go up, which they will naturally do without a dedicated campaign to change consumption behavior, all of those expectations and hopes are squandered against a backdrop of negative impacts, published risks, and rising costs.

- **And Finally the Light at the End of the Tunnel**
  Rational expectations, created through the painful collision of what is possible and what is happening, finally allow for an understanding of what is realistic to expect from the new grid. Pricing becomes comprehensible, delivery is understood, and people are much more capable of determining how they will participate: as simple consumers or as producers as well. There are no longer expectations based on communications: The survivors know what to expect because they have witnessed what is, and if it is sufficiently balanced, they will accept it.

In the Schneider diagram, there are two different paths through these changes, one

"Typical", and one "Effective." It is obvious that "Effective" is less disruptive, drops less deeply into the pit of despair, and achieves a higher steady state. **The difference between the two is communication.** Clear communication is needed up front about timelines, functionality, tradeoffs, and priorities. By setting realistic expectations for outcomes, the risk of disappointment to the audience is very much reduced, because they know more clearly what they will be getting. During the course of actual deployments, more communication is needed on what is happening, what is changing, and what the resulting impacts will be on the consumer. This decreases both the depth and the duration of any dissatisfaction that might occur, and consistently level-sets the audience to a new family of expectations. During execution and roll-out, communication helps everyone to understand what activities are left, and what other activities might occur during the resolution of the project. By maintaining this open channel throughout the process, the path is much smoother, and there are many less surprises.

And Security?

Security requires perhaps the most attention of all. Unlike the roller coaster of experience that may typify the adoption of the general base of Smart Grid enablers, violations of security are often simply one-way tickets to the **Pit of Despair** regardless of the timing of their appearance. Communications on the various security concerns and new requirements must span customers, implementers, legislators, and enforcers, to achieve the common level of knowledge necessary to preclude a backlash. Recommended areas for clear communication and early exposure include:

- Full disclosure of all customer information to be collected, with rationales for collection
- Definition and assurances of protection for personal or private data and attributes
- Plans for incident response and communication in the event of a breach
- Opportunities for consumers to tailor or limit the information that they share, with any impact on services or pricing that they may receive.

In other industries, a lack of this type of transparency has led to long delays in adoption of more integrated technologies such as the federation of patient records in health care, or the broad adoption of electronic voting infrastructure. Understanding what will be shared, with whom, and with what protections, can alleviate both up front concerns and any sense of distrust or betrayal if accidental disclosure does occur. It can also surface, very early, when the public requires more protection or information in order to confidently participate.

We are already hearing voices of protest in the very young Smart Grid consumer community. Off-peak rates and AMI are seen as tools for increasing utility profits with little consumer value. The lion's share of grant money has gone to implementing technologies beneficial to running the grid, and not to deploying cutting edge user-visible improvements. These early expectations for the grid were mis-set through the natural propensity of evangelists to expect the best and communicate that vision. **There is still plenty of time to improve the honesty and realism of those communications**, and utilities must be diligent in their efforts to present the reality of the solutions, the risks, and the benefits, and to **dedicate themselves to educating their customers, and not simply to convincing them**.

*Jack Danahy and Andy Bochman are authors of the **Smart Grid Security Blog***. They are kicking off a monthly **Smart Grid Security webcast series**, courtesy of IBM, on Wednesday, April 28, at noon EST. (Schneider's Curve Image courtesy of **iowalibrarian.com**)