Smart-Grid Roadblocks

Strategies for surviving the industry's transition.

By Robert Spencer and Bernie Bujnowski

For all the possible smart-grid benefits to be realized, utilities must undertake significant changes. The smart grid will drive a shift from a predominantly asset focus to a more nuanced operating model where the customer figures more prominently. This requires greater inventiveness and ease with change than utilities traditionally have demonstrated.

Utilities wanting to exploit the potential of the smart grid to create new sources of revenue and to improve operations need to overcome three specific barriers. They need to be able to integrate information and operations in different ways, demonstrate an ability to be more adaptable, and modify some cultural tendencies.

This requires significant transformation, but there are models from successful utility change programs that can be leveraged. Utility companies face barriers in these endeavors, but there are actions they can take that have proven successful. In the end, however, the question utilities will need to answer is whether they will serve the new market they are creating with smart grids or defer to other, more nimble organizations.

Transformation Challenge

Arguably, the smart grid represents a change that will be truly transformational in nature. When utilities started out as declining marginal-cost operations and prices were steadily falling, operational effectiveness was less important than was increasing loads that were driving economies. This naturally emphasized asset strategies, driven by cost-based marketing incentives that could be shared with customers.

Then, when the economics flipped and new loads fueled rising marginal costs, operational effectiveness became critical. This further intensified the focus on assets and the need to optimize hardware investments. During this period, many utilities were compelled by regulators to encourage conservation, and marketing strategies evolved into energy-reduction programs. Still, rates for residential customers remained stable, though often using inverted rate structures to incent energy reductions.

But the smart grid changes all of this by exposing customers to a potential level of volatility, and exposing utilities to new operating complexities unknown in the electricity industry to date. Two-way information flows will enable customers to make more informed consumption decisions, but will expose them to less-stable pricing. Likewise, utilities will be able to use demand response to better manage supply and distribution resources, but this presumes customers can be recruited as trusting partners in the process.

However the operating models evolve, these changes will have profound implications both inside and outside of utilities.

On the customer side, there will be a fundamental change in the value proposition in the relationship with their utilities. Provided they can overcome privacy reservations associated with sharing more consumption data, customers will expect greater value from information that utilities collect and maintain on their usage and behaviors. They also will expect utilities to help them make better (or at least more informed) consumption decisions. This all requires a greater sense of partnership, collaboration and responsiveness than traditionally has characterized the utility-customer relationship.

Exploiting the smart grid will require unprecedented functional integration, personal adaptability and cultural change.

On the utility side, there are complexities associated with accommodating new, more variable sources of generation like those provided by alternative energy providers and microgrids. They also will need to learn at a faster rate and in a more dynamic fashion to invent new services and take advantage of new capabilities facilitated by the smart grid. As capable as utilities are, however, these won't be easy changes to assimilate. They'll require very different behaviors and many new skills. They also will transform internal relationships and dependencies in fundamental ways.

There is much change ahead. To be successful, utilities need to overcome behaviors driven by a lack of integration, low levels of adaptability and organizational cultural tendencies.

Integration Barriers

The benefits of a smart-grid solution—ignoring for the moment any new revenue sources that might be developed—are derived from a number of functions (*see Figure 1*). But for these benefits to be realized, utilities will need to do a better job of integrating data and activities across various functions. This requirement will run headlong into operational and organizational conventions that will make integration changes difficult to implement.

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Reliability is arguably the primary orientation of utilities today, shaping regulatory relationships, information systems and hardware investments. This, in turn, has led to functional segmentation of operating processes and systems. Further, the geographic-centric nature of most utility operation centers causes a great deal of process inconsistency and custom design.

To get the most out of smart-grid technologies, system operators will need to understand the dynamics involved in conservation-related load-control programs. Likewise, customer information system data will need to be factored into asset planning activities. These illustrate the kinds of functional and system integration that will need to occur, and how widespread and daunting this task might be—for nearly every utility function will be affected.

Further, if customers are to be engaged as full partners, every utility function will need to have a similar view of the customer. Similarly, as plans for services or offerings change, each function will need to be updated and consistency will need to become the rule rather than an exception.

Are utilities up to this challenge of becoming a more customer-focused and -driven enterprise, or will they fall back on functional missions more narrowly defined? And what expectations will regulators express to shape these outcomes? Integration strategies and investment decision making will need to anticipate the answers to these questions to avoid costly mistakes.

Adaptability Barriers

Integrating systems and processes in new and different ways will require an unprecedented amount of change for most utilities. Utilities for the most part, however, will need to overcome a number of barriers to achieve the level of adaptation required.

First and perhaps most important, are the attributes of utility staff that will impede adaptation. The median age of most utility staff continues to hover at around 50. Further, the industry as a whole has a generally higher proportion of employees related to one another than does other industries. These two demographic factors serve to reduce adaptability in the best of times and certainly will become a major complication during a period of major transition induced by the smart grid.

A related complication concerns the attributes of many utility employees. They often exhibit a high sense of social purpose and enjoy the opportunity their work provides to serve the community. They also tend to be long-term employees, with low turnover rates, and they're willing to accept more modest salaries in exchange for retirement security.

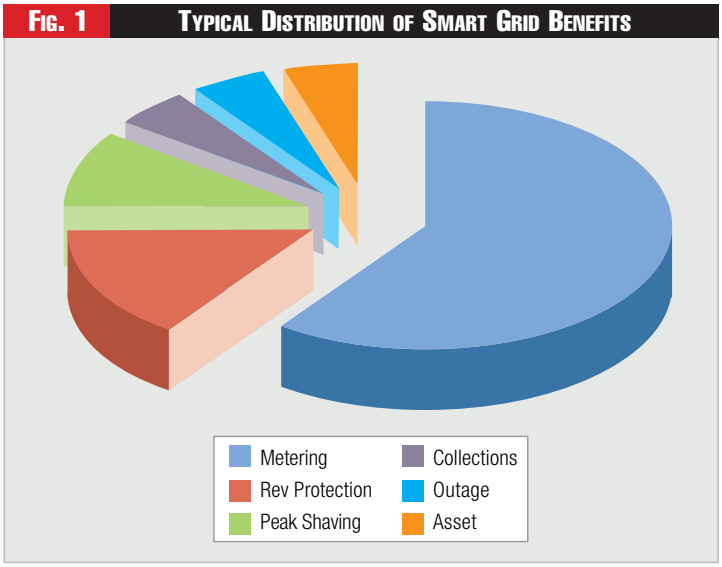
Further, it's common to find that many utility employees have hired into locations where they have grown up, making them often resistant to relocation or other disruptions in their lives. All of these factors contribute to the formation of very strong social networks and institutional memories that serve to impede change.

Finally, the deliberate style of decision making in most utilities tends to put a brake on, rather than stimulate, change. The need to manage risks associated with investment recovery invites a cautious approach, but given the level and extent of changes that lie ahead, much more invention will be required—and with it an acceptance of more risk taking and timely decision making. Importantly, though, this risk taking will need to occur in the context of substantially greater attention to the customer experience than utilities typically provide.

An example is found in the personal characteristics likely to be most important in driving adaptation in a smart-grid environment (*see Figure 2*). Yet, the issues discussed seem to undermine each of the characteristics by promoting stability, predictability and social cohesion.

Can utility leaders help their organizations overcome these (and perhaps their own) conservative natures? Are they prepared to establish metrics and development programs for their leadership teams to promote greater adaptability? And will regulators be able to reframe the need for a return on investment to include also the value of learning? These critical questions need answers to help shape boardroom and national energy policies in a smart-grid world. »

Fig. 1 Typical Distribution of Smart Grid Benefits



Source: Author's Analysis

Cultural Barriers

The very factors that have helped create integration and adaptability barriers would be less serious if not for the fact that they have become embedded in the organizational cultures of most utilities. In this context, "culture" means the values and habitual behaviors organizations develop to promote successful actions. In other words, many of the new behaviors needed will not just be difficult to achieve, but often will appear to be just plain wrong and unacceptable.

Fig. 2 Critical Factors Influencing Personal Adaptability

- ❑ Solving Problems Creatively
- ❑ Dealing with Uncertain Work Situations
- ❑ Learning New Tasks, Technologies and Procedures
- ❑ Demonstrating Interpersonal Adaptability
- ❑ Handling Work Stress

Source: Author's Analysis

The three most significant underlying cultural values are reflected in the geographic-centric focus, policy-caretaker orientation, and hierarchical nature of utilities.

The geographic orientation of locally based employees warrants special attention. Most utilities, in the United States at least, were formed through a series of mergers. Generally, the level of integration is low, however, and most continue to operate today more as a federation of regional field service operations than a corporation with common processes. This often leads to antipathy toward all that is corporate and an us-versus-them attitude (*i.e.*, local area versus headquarters) when new programs are introduced. Smart-grid programs won't be successful, however, where employees aren't enthusiastic promoters with customers regardless of geography.

Customer relationships tend to go one way in most utilities. This makes sense when considering the importance placed on utilities conforming to utility commission regulations and authorizations. Smart-grid programs, however, will require a much higher level of collaboration and counseling. This will require an ability to listen to customers to resolve potential privacy concerns, advise them on usage issues, and uncover new program opportunities. Overall, such changes run counter to existing service processes, by reversing trends toward greater self-service and less customer touch.

Finally, whether a reflection of a field-mission orientation or some other factor, most utilities have well-defined and rigid hierarchies. Examples abound; in unionized utilities, negotiations are more likely to favor field workers than office staff who are considered to have subordinate interests. Likewise, engineers typically have a directive role and are commonly found in senior management positions at most utilities. Further, the hierarchies tend to reinforce a command-and-control management style.

With smart grid, however, many of the functional roles and relationships potentially have to change. The call-center representative role, for example, will have to shift from a reactive, order-taking and complaint-resolution focus to a full-service adviser role and possibly even a marketing job. Likewise, load-following analyses potentially will give way to customer readiness, and asset managers likely will find the insights of customer-service reps a useful source of ideas for better balancing supply-and-demand requirements. And all the employees involved with smart-grid technologies and programs will need to take greater responsibility and accountability for the customer experience.

So, will utilities be able to take on the attributes of a more market-sensitive operation while retaining an asset focus? Will the underlying values that have made one group more important than another, whether among employees, communities versus corporate, or customer versus assets, be able to be reshaped? And how supportive will regulators be of the massive cultural transformations required? These are important questions that again should occupy utility boards and regulatory commissions in the months ahead as smart-grid program designs begin to move forward.

Winning Strategies

Although they face considerable difficulties, utilities can draw on useful lessons of others in managing integration, adaptability and cultural changes.

First, leadership will be key. Utility leaders need to define clear objectives to improve functional integration, the adaptability of their organizations and their cultures. This might appear to be easiest with a major change in leadership teams, but that also would create a significant amount of stress that usually slows down the change process.

Instead of replacing people, successful leadership programs have several common characteristics. First, low leadership team turnover is extremely important. As author and management consultant Jim Collins notes, first get the people "on the bus" who will lead the change, and then stick with them. This is especially true for the most senior leader who needs to be prepared to stick with the change agenda for at least three, and ideally five or more, years—in other words, to the end.

A laser-like focus by the senior team on what it's trying to achieve also is important. This requires a determined leader who can see beyond espoused public pledges to ensure concrete actions are taking place across the organization.

Finally, an effective leadership program includes a simple set of metrics and related goals, ideally in a balanced scorecard framework, which are impossible to achieve without actually »

exhibiting the new behaviors. For example, if the objective is to create a learning environment and more responsiveness to customer needs and interests, the top team will monitor the rate at which innovative programs are proposed and implemented.

Next, the organizational structure and processes will need to be reworked to achieve and sustain needed changes. This will start with change decision processes, allowing greater autonomy of work group teams to make operating decisions, but also compelling them to explicitly consider the customer experience in their designs. One strategy that can be effective is to realign work groups by specific smart-grid processes, such as demand response, rather than functions, and then delegating decision-making authority to them. This is a way of stimulating adaptation, while also creating greater integration and starting to move the culture, at least within the smart-grid process groups.

Also related to the organizational structure, all roles and accountabilities should be redesigned to underscore the smart-grid outcomes desired. This is a simple way to define and reinforce for employees a new focus expected in their work. For example, the customer-service representative job could be redesigned as customer energy consultant or smart-grid marketing consultant. Likewise, engineers responsible for asset planning could have roles reframed as smart-grid planning engineer or demand-response asset planning engineer. Changes in accountabilities also should include an update of performance objectives and, if warranted, compensation to ensure alignment of expectations.

Changes in organizational structures or processes will require communications and training, especially for managers and supervisors. When executing a fundamental realignment of duties, it's important to provide as much support as possible. Getting management capabilities and expectations aligned so they can better lead employees is a key success factor.

Employees and customers alike need to be engaged in the change program with as much collaboration as possible. This is extremely important to ensure the customer experience is tightly monitored and managed. Here, social media strategies can make it easy and transparent for all those involved to share perspectives on what is working and what could work better. Microsoft One Note provides such a capability, as do blogs and utility Web sites.

Also, in managing the customer experience, it will be useful to start with simple program and rate structures and then move on to the more complex. This will allow for the capture of key lessons learned and, again, promote a sense of collaboration and engagement. It also will help avoid major disconnects between customer expectations and their actual experiences as can happen when, for example, opportunities for bill reductions are not realized.

Finally, employees and customers can benefit from an examination of conservation programs that have been conducted. Key will be the identification of customer characteristics that have been associated with participation and sustained results. This will provide the source of hypotheses that can be tested in any experimental designs.

It isn't altogether clear that utilities are well suited to working in a more customer-focused environment. Fully exploiting the potential of the smart grid will require unprecedented functional integration, personal adaptability and cultural change. But as utilities choose to take on these changes, they should find developing their management capabilities and organizational talent, metrics and possible restructuring to be extremely helpful. F

FIG. 3 CHANGE PROGRAM CHECKLIST

- ❑ Qualify the leaders who will participate
- ❑ Define the smart-grid customer strategy
- ❑ Establish metrics to track progress
- ❑ Empower smart-grid process teams
- ❑ Define smart-grid roles and accountabilities
- ❑ Develop training, especially for managers
- ❑ Implement collaboration/networking tools
- ❑ Experiment with a variety of simple rates
- ❑ Identify differentiating customer characteristics

Source: Author's Analysis