

Building a Social Roadmap for the Smart Grid

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Short Abstract

The utility industry has done a relatively good job of establishing technical roadmaps for the Smart Grid. What's needed now is a social roadmap, which provides direction for how people should use the Smart Grid. With a social roadmap, three things are clear: we must understand the customer experiences, we must transform the customer relationship, and we must drive customer engagement.

Short Summary

This article guides utilities in creating a social roadmap for the Smart Grid. From a foundation that emphasizes customers' role as co-creators of value, the article explores the interrelationship between customer experience, customer relationship, and customer engagement. Effective orchestration of these elements results in the only aspect of the Smart Grid that can be truly smart: the people within it.

Building a Social Roadmap for the Smart Grid

Innovation is an aspect of human nature. People are constantly inventing new things and new ways of using things. However, as 3M's Post-It Notes™ demonstrated, we don't always anticipate how we will use a new thing when we first invent it. We need to play around with the new thing, try it out, and see what other people are trying. Sometimes our experience learning how to use a new thing leads us to go back and improve the thing's design, to better support the uses we have found. 3M's Post-It Notes™ evolved in this way and have improved over the years.

So it will be with the Smart Grid, the latest new thing the electric utility industry has invented. We are at that stage of invention where we're becoming a little more certain about what the Smart Grid *is*, and we're beginning to experiment with it to find out what it can *do*. That experimentation should lead us to go back and improve the Smart Grid's design, based more on our experience than on engineering alone. This article takes a look at where we are and what's ahead of us, down that road as we build a social roadmap for the Smart Grid.

Where We Are

The utility industry is doing a relatively good job of establishing technical roadmaps for the Smart Grid. In the U.S., the National Institute for Standards and Technology has published standards for interoperability, privacy, and security. Meter, network, and device vendors are cooperating and competing to deploy fundamental Smart Grid technologies, such as meters, data collectors, communications systems, and meter data management systems. Consultants and utilities are defining technical roadmaps for the integration of these new Smart Grid components with legacy technologies and systems. We have been busy deciding what the Smart Grid is.

As the initial Smart Grid tests and trials proceed, the utility industry is now refocusing its efforts on what the Smart Grid should do; i.e., how employees and customers should use it. Industry Smart Grid conferences now feature tracks about the social side of the Smart Grid. Automated meter projects now emphasize customer communications. Regulatory interveners are publishing reports and taking positions about the Smart Grid. But figuring out what the Smart Grid should do will take more than PowerPoint presentations, isolated technology trials, and contentious rate design proceedings. To make progress, we need to head in the right direction, and that means we need to figure out what that direction is. It would also help to have a map.

How to Make a Map

Making a map is always a process of recognizing what things are, where they are in relation to one another, and how to represent them properly.

If we were in a park and we were thinking about Smart Grid roadmaps, we might look to one side of the paved pathway ahead of us. We would note that a dirt track branching off of our path had worn through the grass as it headed in a slightly different direction. We might notice that although the paved pathway meandered deliberately through the landscaping ahead, the dirt track took a more direct road down the hill in front of us. Travelers had voted with their feet in favor of the dirt track rather than the paved

“design.” We might also note that the park managers weren’t impressed with the popular movement and were beginning to install a fence along the paved pathway, to enforce their notion of where people should walk.

Innovation always involves a tension between what designers had in mind and what people believe they want. Designers often quote Henry Ford, who said that “if I had given people what they wanted, I would have given them a faster horse.” Design often carries us forward to innovations and shows us possibilities for doing things we never would have imagined. But it’s also true that initial designs often meet with social resistance. Designers may believe our lives would be more fulfilled, and the landscaping preserved more effectively, were we to take the route the paved pathway specifies. But we, with our goals, hop the fence and muddy our shoes to get down the hill faster.

The reason we find ourselves hopping the fence is that the park designers either didn’t know our preferences, or else they set them aside in favor of other considerations. To be fair, we didn’t know their preferences either, so we might be missing a beautiful view or tearing up the sod and creating environmental damage without thinking. It would have been better for both of us to have engaged in a dialogue.

Just as the park designers could have benefitted from an early-stage dialog with their customers, so could the designers of the Smart Grid. It might be a good time for those who are designing the Smart Grid to get together with those who will use the Smart Grid. In fact, there’s good precedent for these conversations.

In 2004, Steve Vargo and Bob Lusch set forth an important and new way of describing how companies and their customers work together to create value: customers can ‘co-create’ value when they apply their knowledge and skill to effectively use a product or service. As the product or service is designed and improved, mixing customer insight with company insight throughout the process usually creates more value than would be created by the company working alone. Helping customers to understand what the designers had in mind and allowing customers to ‘cut their own path’ results not only in better products and services, but greater value. Helping the company to understand what customers have in mind and allowing designers to redesign paths to suit customers results in a similar outcome.

‘Co-creation’ moves beyond design. The ‘co-created’ products and services emerging from company/customer collaboration often provide customers with an important role in using them. In the utility industry, customers already ‘co-create’ value through self-service. They establish their own online accounts, reduce energy waste in their premises, and shift energy use on a peak day.

We can think of co-creation as combining the perspective of the company and the perspective of the customer, much like a map-making surveyor will sight through the azimuth to the pole held by his coworker. Repeated measurement processes from different points of view combine to make a map. There are three kinds of co-creation processes we need to accomplish to build a social roadmap for the Smart Grid:

1. Understanding customer experiences
2. Transforming customer relationships
3. Driving customer engagements

Understanding Customer Experiences

While utilities have begun to consider how their work processes might change while taking advantage of the Smart Grid's technical possibilities, few utilities have considered how these changes might be experienced in turn by their customers. Utilities offer customers an array of touchpoints (e.g., printed materials, websites, people, bills) yet few utilities have designed these touchpoints from the customer perspective. Vendors of energy-related products and services work between utilities and customers, and are beginning to provide insight into customer experiences.

We can best understand the customer perspective through the Coproduction Experience Model (CEM), an effective, proven model for designing customer experiences (Honebein & Cammarano, 2005). The four components of this model are Vision, Access, Incentive, and Expertise.

Vision refers to the goals, feedback, and expectations that set the standards for a customer experience. Utilities have a vision of the Smart Grid that focuses on franchise-wide system management and is interpolated in to individual premises. Utilities provide programs and rates to meet their system management goals and recover the costs of meeting those goals. Customers have a vision of the Smart Grid that focuses on their individual households and businesses, and is extrapolated out to the community. Customers need to know what to expect and receive feedback regarding how they are using energy more effectively and economically in their lives. These two points of view meet in websites, energy displays, and thermostats: vendors such as Aclara, Google, Ingersoll-Rand, Microsoft, OPOWER, Tendril and others are working to link utility and customer visions in their products and services. The social roadmap for the Smart Grid begins with this alignment of visions.

Access refers to the processes, people, tools, and interfaces providing experiences to customers. Utilities often allocate most of their resources to energy production, delivery, and ratemaking, rather than the delivery of experiences to their customers. Customer attention is drawn to other factors such as outage management, customer service, and billing. Today, utilities build complex models to recover costs, while customers are concerned about security, privacy, and health. These two points of view meet in enterprise software, infrastructure systems, and customer service contractors, particularly in large-scale projects such as automated metering, customer information systems, and call center development. The social roadmap for the Smart Grid makes progress when utilities realize that they deliver much more to customers than energy.

Incentive refers to the rewards and penalties that motivate utilities and its customers. The utility recognizes incentives grounded in rates, standards, and legislation based on economic and financial modeling, while the customer recognizes incentives based on a broader array of benefits such as savings, control, community stewardship, and even enjoyment. The utility builds complex models to recover costs, and can run the accounting to come up with a preferred solution. Meanwhile, customers struggle to weigh the tradeoffs among convenience, time, risk, and money, and different customers will prefer different solutions. The social roadmap to the Smart Grid develops further when utilities realize that incentives and penalties that motivate customer performance are valued differently by different customers.

Expertise refers to the knowledge, skills, and attitudes that the utility and its customers need to properly design, develop, test, introduce, provide, and sustain experiences. Both utilities and customers have been moving to substitute expertise built into software, systems, and devices (automation) for expertise built into human beings (education). While utilities favor information technology that works automatically, and customers seek information technology that explains itself along the way, both can

now see that automation has outrun education. Thus, it is time to redress the balance. The social roadmap for the Smart Grid becomes sustainable when utility employees and customers are educated, active participants within it.

These four components, Vision, Access, Incentive, and Expertise, indicate how far utilities are from understanding their customers' experiences. Customer experiences of energy and energy use are far more personal, diverse, and valuable than utilities have realized. Neither utility employees nor customers are yet expert enough to bridge the gap. Why is it that these customer experiences are so different from one another? How do customers evolve in their energy experiences? How does it matter that households and workplaces often include more than one person? We need much more fundamental research into how energy use fits into customers' lives and work, and much more insight into how the Smart Grid might improve and transform these customer experiences.

Transforming Customer Relationships

Understanding customer experiences is only the first step down the social road to the Smart Grid for utilities and customers. Once both utilities and customers understand customer experiences, it is likely that both will see opportunities to do better. Yet doing better will require new relationships between utilities and customers. As we know from other realms, dysfunctional relationships can seem to have a stubborn ability to stay in place. Even when we have insight into how unsatisfactory a relationship is, it isn't always obvious where change should begin.

We recently conducted research with the gracious help of a large investor-owned utility, investigating how to transform utility/customer relationships. The first step was to identify what these relationships were currently. We gathered data from regulatory filings, utility leaders, and customers. The utility's regulatory filings (including a Smart Grid filing) told us how the utility talked about its customer relationships. A caucus with 33 utility leaders asked participants to use *relationship metaphors*¹ to describe current and desired utility/customer relationships. A survey of 763 customers asked customers to do the same thing. The customer survey results list the relationship types considered, how customers saw them today, and how customers would like them to be in the future (Table 1).

Relationship Type	Description	Current	Future	Change
Arranged Marriage	An involuntary relationship that was arranged by another person.	19.53%	10.75%	-8.78%*
Casual	An infrequent relationship with low familiarity.	51.90%	39.45%	-12.45%*
Marriage of Convenience	A long-term relationship that you maintain due to availability rather than choice.	60.81%	55.44%	-5.37%*
Partnership	A long-term, voluntary relationship that has high trust and commitment.	19.27%	42.33%	23.06%*
Best Friend	A voluntary relationship of high familiarity that shares common interests and is highly give-and-take.	2.10%	12.84%	10.74%*
Childhood Friend	An infrequent relationship of low familiarity, with strong feelings of comfort and security.	2.36%	6.29%	3.93%*
Acquaintance	A voluntary relationship with low familiarity, that is	19.40%	16.25%	-3.15%

¹ Fournier's (1999) model characterizes company/customer relationships with these terms. We used the terms as broad metaphors to enable utility staff and customer participants to better describe their company/customer relationships.

	easy to get into and out of.			
Kinship	A sustained, involuntary relationship that persists because “it’s part of the family.”	9.17%	7.73%	-1.44%
Avoidance	A relationship that you no longer wish to maintain.	1.05%	0.92%	-0.13%
Introductory	A voluntary relationship based on getting to know something better, that may become more involved later.	4.33%	5.24%	0.91%
Dependent	A highly emotional relationship driven by strong needs, with a high tolerance for misbehavior.	3.28%	2.62%	-0.66%
Temporary	A highly emotional relationship that lacks commitment and give-and-take.	2.36%	1.57%	-0.79%
Bitter	A highly involved relationship that is negative and unforgiving.	1.05%	0.79%	-0.26%
Private	A close and highly emotional relationship that is not discussed with others.	1.57%	1.83%	0.26%
Reliant	An involuntary relationship that is very controlling and elicits negative feelings.	6.42%	2.36%	-4.06%*

Table 1: Results of customer relationship survey (N=763). * Indicates statistically significant results at the 0.05 level.

The data in Table 1 indicates that surveyed customers saw today’s relationship with their utility as primarily a *marriage of convenience* (61%) and *casual* (52%). But both of these types were among the three that showed the greatest difference between current state and future preference: *casual* (-12%), *arranged marriage* (-9%), and *marriage of convenience* (-5%) all declined significantly. In contrast, *partnership* (23%) and *best friend* (11%) increased significantly.

In our caucus, utility leaders were assigned to represent relationship types, and then to try to persuade others in the caucus to support their assigned type as the current utility/customer relationship type. In this opinion-building process we saw strong support for *marriage of convenience* (14), *arranged marriage* (11), and *reliant* (8). We also saw these relationship types reflected in the language utilities crafted in the regulatory filings we reviewed as well, with the addition of *partnership* in some AMI filings.

These results tell us that utilities and their customers may see their current relationships as driven by circumstances rather than choice, and that the relationships lack familiarity. Customers seek relationships with more mutual trust, commitment, and common interests. We believe that utility initiatives building trust and based on choice will be seen by customers as moving the utility/customer relationship in the right direction.

The Smart Grid social roadmap must lead utilities and customers toward more choices they make together, and more commitments that they fulfill together, building trust. Because both trust and choice require intensive communication, the utility/customer relationship should be more engaged than it has been in the past. This requirement for customer engagement is a major challenge for both utilities and customers. It requires investments of time, attention, resources, and reputation at levels much higher than in the past. But we must drive down the road of customer engagement if the Smart Grid is going to be the kind of new relationship with their utilities that customers want.

Driving Customer Engagements

More than one utility has sought to foster customer engagement by telling customers that they should or could become more engaged with their utility. Some utilities have sought to educate their customers about the utility, in the conviction that customers who have a better understanding of the utility would naturally become more engaged. Other utilities have asked their customers to complete extensive ‘energy audits’, or provided their customers with piles of information and data about their energy usage, or both, in the apparent belief that engagement is based on facts and figures.

Engagement, however, is driven by action: observable, measurable, increasingly significant actions. Through these actions, Lanier and Hampton (2009) suggest that the aim of engagement is to hold customer attention, and this is accomplished through experiences that unfold over time, flow together, and perform. Thus, the utility cannot drive engagement through its communications, education, and information alone. Furthermore, driving engagement requires action by both the utility and by the customer. The utility alone cannot build utility/customer relationships based on choice and trust. Utilities can only provide the opportunity and the motivation for customers to act with them. To move across the social roadmap toward the Smart Grid, utilities must motivate customers to act in concert with them.

Fortunately, we have what it takes to motivate utility customers to engage with the utility. There are three keys: habit, technology, and friendship. We can illustrate by example how these three factors lead to customer action and customer engagement.

1. Habit

One of the familiar problems faced by utilities deploying smart meters, home area networks, electric vehicle chargers, or other on-premises technology is the requirement to successfully conduct installation. Once installation is scheduled, the customer experience often includes notification letters, reminder telephone calls, a knock on the door on installation day, and door hangers. But utilities can fail to realize that a major cause of failure in this installation notification process is that the information the utility originally had about the customer (e.g., telephone number, address, e-mail address) was incomplete or inaccurate. If the utility asks the customer to engage early in the process by requesting customer verification of the contact details, the later notifications can be impactful.

Inviting customers to verify information may seem like a trivial start to customer engagement. It may be small and easy, but it is not trivial. Starting small and easy is part of a psychological process we call shaping. Shaping eases customers into engagement through small actions that pave the way down our social road to larger actions. Human beings are wired to develop habits beginning by little, tentative steps, and then playing with something or ‘trying it out’, and then finally by in-habiting a particular action. We ‘get used’ to doing things when we repeat them and make them part of our lives. Trust and habit are closely related: the customer who calls in once to verify utility information has started down the road to a habit. The more the customer and the utility work together to create experiences, the more trust can develop.

2. Technology

Inviting customers to take action by joining programs has been a challenge for utilities, because a program like demand response may well significantly increase customer interactions. Customers who don’t understand their bill, or how to program their thermostat, or when events will occur, may take actions that prove expensive to them (like using energy during weekday afternoons), or may take actions that are expensive for the utility (like calling in regularly to the call center). A major source of lost

opportunities during these experiences is that the utility doesn't seem to keep track of customer engagement. Yet a utility could track customer interactions through its customer information system (CIS) or better yet, its customer relationship management (CRM) system. It could monitor the progress of individual customers from simple to complex interactions, and from cautious to trusting interactions. If the utility can be trusted to pay attention to customer concerns, and one form of paying attention is remembering those concerns, then customers are more likely to engage with the utility about those concerns.

Technology helps us make a routine of many complex actions, avoiding trial and error, documenting our progress, and easing our learning. We take technology for granted, especially in discussing the Smart Grid, but we need to keep in mind that a primary purpose of technology investment is enabling the customer to play a reliable role in the Smart Grid. When the Smart Grid becomes obedient as well as merely smart, customers will have more trust in it.

3. Friendship

We should return to the notion suggested above that *partner* and *best friend* are directional aspirations customers have for their utility relationships. Friendship leads to customer action and customer engagement down the social road because it is a relationship between people, and because the relationship is valuable and enjoyable for its own sake. For example, we have become used to websites being friendly, and online experiences being satisfying. During the past decade firms in many industries have used online experiences to help customers meet their personal needs. Customers speak different languages, use different applications, and respond to different materials: the company that appreciates these differences that make us who we are invites engagement.

Yet many utilities have confused providing customers with their personal usage information with providing customers with personal service. One of the major issues providers of online energy calculators have is that customers find the process of inputting data about their household and their house to be tedious, difficult, and unsatisfying. Customers can sense the fixed formulas at work across their data; many rarely return to the audit after a first, partial attempt to complete the process. A friend would be of more service to these customers. A friend might be found on YouTube or Facebook rather than an energy calculator. A friend might help the customer do something, rather than merely know something.

The Road Ahead

Building a social roadmap for the Smart Grid understandably leads us to a society: utility customers, utility employees, utility regulators, and even utility vendors, relating together well. These participants in the Smart Grid understand customer experiences, know how to transform them, and drive customer engagement. But moving down this road takes a lot of work, and in conclusion, looking at the social roadmap for the Smart Grid, we might ask ourselves if the journey is worth the effort.

The only aspects of the Smart Grid that can be truly smart are the people within it. If we train employees and foster vendors without engaging customers, our Smart Grid initiatives will fail to realize their potential because customer action is the fundamental driver. Until we engage utility customers, and enable them to make better choices and trust their utilities more, the Smart Grid will only be an aspiration. The social roadmap for the Smart Grid is our road forward.

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