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Recently, we've seen a flood of unfavorable smart meter headlines. It started in Bakersfield, California, where Channel 29 Eyewitness News broadcast, "*Laughter, jeers: Frustrated PG&E customers pack Smart Meter hearing.*" The backlash spread to the New York Times, which announced, "'*Smart' Electric Utility Meters, Intended to Create Savings, Instead Prompt Revolt.*" And most recently, Bloomberg bannered an article with, "*PG&E Customer Revolt May Threaten Rollout of Obama's Smart Grid."*

There is no question that smart meters are a benefit to utilities, in terms of operational efficiency. However, as one who is working with utilities on their smart meter marketing, customer experience, and customer education strategies, headlines such as these are frightening. They suggest a significant misunderstanding of the technology, the marketing, and the customer experience surrounding this worthwhile innovation. And they are a wake-up call for those of us who are on the forefront of ensuring that we design the social side of smart meter and its related customer-facing services (rates, feedback, and so on) to foster adoption. After all, smart meter systems can help customers save money. They can reduce your carbon footprint. And my family is living proof that these benefits are achievable. However, the road to achieving these benefits is a curvy one, with numerous potholes along the way.

To investigate first-hand these headlines and issues regarding the adoption of smart meter systems, I decided to conduct an experiment with my family. In September, 2009, a neighbor mentioned that our utility had just initiated an opt-in program that featured a new, digital meter and a time-of-use (TOU) rate. Now, the meter for this program isn't really "smart" in the sense of that it is sending my usage data wirelessly to the utility. But it is digital and it does enable the TOU rate. I convinced my family, which consists of my wife, son, and I, to sign up, and then let nature take its course. This is our story. In each section, I will tell our story first (in *italics*), and then immediately follow with commentary, insight, and illustration collected from my consulting experiences with utilities to research, design, and implement the smart meter system customer experience.

Meter Installation

In late September, my wife signed up for the TOU program online. The website had some basic customer education about the TOU rate, as well as a calculator to help determine if the rate would provide us benefits. In early October, there was a knock at our front door. My wife answered it, and yelled back to me in my office, "Honey, the man is here to install the new meter." I grabbed my camera, and rushed outside.

I met the technician at his truck and exchanged greetings. He was dressed in the uniform of the utility, was very friendly, and looked me in the eye when he talked with me (an important non-verbal element of good customer service). I asked if I could observe the installation and take some pictures, disclosing my interest in the process. He agreed, and we walked to the back of the house where our meter hung on the wall. Eight minutes later, we had our new meter. I asked the tech as he was leaving if there were any

other materials he had that would teach me about the rate. He said, "Just look at your next bill. The TOU info will be right on the bill."

To summarize, here's is the play by play of the entire meter installation customer experience.

1. *9:18 AM – Technician knocked on the door, informs us* of his presence and purpose, and asks us to turn off electronics.
2. *9:20 AM – We turn off computers, technician gets tools.*
3. *9:23 AM – Technician goes around back to the meter. Begins installation process. Confirms with me electronics off. There is a brief outage.*
4. *9:26 AM – Installation complete.*

From a customer experience standpoint, this touchpoint was a great customer experience (a touchpoint is a point of interaction between a company and a customer). The technician notified us of his presence, performed the installation quickly, and kept its impact on our day as minimal as possible. And it generally matched the requirements I've collected from customers.

In focus groups I've conducted, *knocking on the door* is the number one customer requirement for a positive customer experience. People want to know when someone is on their property, and they want to know when the power is going out. However, on the utility side, I have experienced resistance to this step because of the perceived cost and impact on installation productivity. I have been told that the utility has the legal right to access and replace its equipment. Thus, this common courtesy is not necessary. However, research indicates that 40% of homes have someone at home when a meter gets replaced. The *knock* goes a long way in establishing a neutral-to-positive customer experience that utilities can leverage in the future when they introduce new rates and enabling technologies. But the knock is just one part of a complete installation customer experience. Utilities can enhance the customer experience (and customer satisfaction levels) with this recipe for success:

1. Send a letter to customers one month before installation informing them of the installation. In the letter, tell the customer what you want them to do to prepare for installation.
2. Use an automated phone system to remind the customer of installation about a week prior, and be as specific as possible when the installation will occur.
3. Knock on the door before installation to announce presence and allow the customer to shut down electrical equipment.
4. Leave a door hanger or information card behind when installation is complete.

These steps will lead to a neutral to positive customer experience, which effectively sets the stage and customer expectations for the next part of the customer experience: the first bill.

Our First Bill

Between the time our new meter was installed and our first TOU bill, we did not receive any additional information or education from the utility, as the installation technician predicted. Based upon the basic education on utility website, my environmentally-eager wife already started shifting usage to off-peak, mainly through delayed dishwasher and clothes washer/dryer usage. In early November, we received our first bill with the TOU rate. We get our bill electronically, so my wife printed it and gave me the copy. I looked at the bill. I could pick out the on-peak and off-peak usage, rate, and cost. But the 13-month graph that allows us to compare usage to other months only had one bar in it – the bars for the past 12 months were missing. So my wife printed me a copy of our previous month's bill which had all the bars.

And to my surprise, our bill had gone from $75 in October to $125 in November. My mind screamed, "IT'S TRUE! THE DIGITAL METER DOES INCREASE ELECTRICITY BILLS!"

I asked my wife to get the bills for the same period last year so I could try to figure things out. "Sorry," she said, "the utility's online billing system only retains bills for the last six months."

In a December, 2009 interview with IntelligentUtility, Andrew Tang, PG&E's senior director of the smart grid program, suggested that the problems in California were exasperated by the lack of proactive communication. His hindsight suggests that customer education, done proactively, would have helped avoid the situation that developed in California. As the author of a book about customer education, I couldn't agree with him more.

I've been investigating this type of proactive customer education for several months. The most interesting investigation has been with the class I teach at the University of Nevada, Reno called Designing Customer Experiences. This past semester, I engaged my students in designing bill presentment experiences for five different types of rates, such as inclining block, real-time prices, and critical peak prices. The activity focused on this question: "What should be the customer experience for the first bill that a customer receives on a new rate?"

The students eagerly got to work. I showed them a video of a real focus group in which customers stated their requirements for the first bill experience. Then, using the customer experience models I teach in class (the models prominently feature customer education and expertise as a component of a customer experience), the teams started designing. All of teams (one team was assigned each rate) immediately focused on the redesign of the bill. But when they presented their initial designs, I, in the role of a simulated utility IT person, hit them with several bombshells:

Students: So, based upon the focus groups, we're going to show these comparisons on the bill.
Me: I'm sorry, you can't show that type of comparison on the bill.
Students: Why not?
Me: Because our schedule won't permit it. And we don't have the resources to make these kinds of changes.
Students: You got to be kidding us. That's what customers say they want.
Me: And, that nice chart you have there. Can't do that either. Don't have the budget for it. The budget was set before you started all this customer stuff.
Students: Is this the way the real world works?
Me: Yes, but remember that utilities aren't competing for customers.

The situation I set up for my students is exactly the same one I've been running into at utilities. The most important touchpoint in the customer experience that can facilitate adoption, the bill, seems impossible to change. If there is one wish I have, it is that utilities start the design of their smart meter programs not with all the whiz-bang technology, but with the bill. Of all the education and information that utilities can provide customers, the bill is the touchpoint that will have the greatest impact on customer adoption and behavior change. The smart meter bill should not be the bill utilities send customers now. It must be something more. It should embed customer education, enhanced feedback, and comparison. It might even be more frequent – one group of students had the idea of providing customers a two-week "pre-bill" during the first month of a new rate. And that's not to say that the bill is the only educational touchpoint. All groups saw customer education as a process, not an event. Customers need some basic educational materials before the rate starts to point them in the right direction. Then as the program evolves, they need educational boosters along the way.

Customer Service

Before calling the customer service folks at our utility to get to the bottom of my increased bill, I did a quick calculation. I added up the electricity supply charges for the off-peak and off-peak rates. I then calculated what I would have paid on my previous flat rate. This is something that customers in focus groups keep reinforcing: comparison – show me that I am better off (or not). To my surprise, I WAS SAVING $25. Without the TOU rate, my November bill would have been twice my October bill. It would have been nice for my utility to show me this information. But now, I was the one who had to find out what was happening.

I called my utility to figure it all out. The first person I talked with was Ms. A. I explained my problem: I recently went on the TOU rate, I just received my first bill, it was $50 more than my last bill, and my kWh usage more than doubled. Why did my usage and bill go up so much? Ms. A hesitantly tried to explain the TOU rate to me, that there were on-peak and off-peak rates, and if I used too much electricity during on-peak rates, my bill would be higher. I asked about how this bill would have compared to my previous rate, and I basically got the same non-answer: on-peak rates are more expensive. This verbal sparring went around a few more times, until Ms. A said, "I have to find someone else to help you." She put me on hold and there I waited for the next 20 minutes.

Tired of waiting, I hung up and called back. After a minute in the "press 1 to continue" queue, Ms. B answered my call. I explained that I had been talking with Ms. A, and repeated the nature of my problem. Ms. B quickly determined that I did need to talk to someone else, and that she was going to, "Find someone for me to talk to in the Expertise Department." I sat on hold for two minutes, and then Ms. B came back to tell me that I needed to talk with Ms. C, who was unavailable. Ms. B took my number and said Ms. C would call me back.

I was very pleased when, thirty minutes later, Ms. C called me back. I once again repeated my story. She explained the TOU rate to me, which I said I understood, that my wife and I had been diligently running appliances off-peak, and that we had recently remodeled our home with Energy Star appliances and have CFLs in 80%+ of our lighting. I asked her, "Am I doing better on the TOU rate than the old flat rate?" She said I had to give the program time, and that I should wait until next month. I told Ms. C that I had heard in California that these new smart meters they were installing, like the one at my house, were causing customer bills to go up. She said the new meters were very accurate, and then pulled up my old bills from last year to compare. We determined that during the same October-to-November period last year, my kWh usage only went up 10 kWh. Ms. C then said that she would send me some information and that she had to go. I asked her why, that I hadn't received an answer to my question. Ms. C said, and I quote, "I can't spend any more time on this with you." Imagine if I wasn't a highly-involved, motivated, and educated customer. The call would have ended here and I would have been extremely dissatisfied. I might have even contacted the local paper to air my complaint, which is essentially what happened in California. But instead I pushed further.

I reminded Ms. C about the smart meter problems in California and that I wanted to understand what was going on. Between October and November, 2009, my usage increased 607 kWh. During the same October-to-November time in 2008, it only increased 10 kWh. Weather patterns didn't seem to be an issue, and we had abandoned our well (a big power consumer), so the expectation was that usage would decrease. She talked to me some more about the appliances I had around the home and any changes to my home, and said that she could send me my 2007 bills for the same period. I asked again how I could

determine whether I was better off on the TOU rate versus the fixed rate, and she explained that my first bill is not a good one to compare. During this time, she pulled up my 2007 bills and told me that the kWh increase between October and November was about 125 kWh (and this was before we remodeled and abandoned our well). I pointed out that my on-peak usage was about 27% of my total usage, which she said was really good. Finally, she said to me, "I think I see why you are concerned."

No wonder there is customer revolt in California! I spent a total of 50 minutes without getting an answer to my question. And I don't blame Ms. A, B, or C for the experience I received. I was the customer from hell, with the hidden agenda to stress test their customer experience. If there is blame in this situation, it rests with utility management. It is obvious that Ms. A, B, and C had received little or no training and their call center metrics were not relaxed to accommodate helping customers adopt this new innovation. In short, there was no proactive customer experience design at work at my utility to facilitate the adoption of this new rate. Had I not done all the work, I would have never known I was actually saving money. Utilities cannot expect this kind self-directed behavior from all customers. Utilities need to make this easier for customers.

Research I conducted for my book, Creating Do-it-Yourself Customers, showed that a cost of a support call ranges from $9.50 to $32.74. Call centers are expensive, and a customer experience should do all it can to limit customers from calling about routine issues that can be addressed through the use of other self-service tools and media. And when customers do call, the customer care representatives must have the training and tools to effectively troubleshoot and resolve the customer's issue.

The Root Cause

Ms. C followed-up as promised and emailed me my bills for the past two years. After about another hour's worth of work exchanging emails with Ms. C, analyzing my own bills for the past two years, and developing a model in a spreadsheet, I determined that the expected usage increase between October and November should be about 21%. The increase I experienced with the new meter was 123%. Ms. C finally referred me to an engineer in the meter shop, Mr. D. Mr. D was good. He explained the potential root causes and proposed a plan to investigate the usage increase: test the old meter, and if necessary, the new meter. He also offered that I could personally observe the test. He located my old meter, confirmed it was mine, and tested it. Sure enough, my old meter at 30 amps was running at 80%, which means that it was running slower. I had been getting a discount on my electricity bills for some time.

My utility, ultimately, was very open and transparent in their efforts to resolve my problem. I wonder what would have happened if PG&E had used this approach. Comparing the mechanical meter to the digital meter is the only way to prove out whether my new digital meter was the cause of high bills. And when they found out the results, my utility didn't try to bury the evidence. Mr. D explained it to my wife, and then me, in plain English.

The good news is that the utility isn't going to back-bill me for who knows how many years we have been receiving discounted electricity service. And other customers will no longer be subsidizing our discount through higher electricity rates. The bad news is that with digital meter my electric bill increased, and that the sizing for our soon-to-be installed solar PV system may be incorrect.

Although our electricity bills are higher these days, we are saving money on the TOU rate. Our first month's savings was $25, with 27% on-peak usage and 73% off-peak usage. In our second month, our savings went up to $34, with 23% on-peak usage and 77% off-peak usage. But, my electric bill is much

higher than it was before. I got a digital meter and my bill went up. Intellectually, I understand this. Most customers won't. I did this as an experiment because I'm professionally involved with smart meters. What will other customers do when faced with this type of emotional reality?

The Moral of the Story

Like a fable, there is a moral tied to my story. Actually, there are three morals.

1. Respect the Five First Principles.
In January, 2009, I published in this journal the article, "*Will Smart Meters Ripen or Rot? Five First Principles for Embracing Customers as Co-creators of Value*." While each of the five first principles offer guidance to enhance the customer experience, the one that stands out in this story is to **embrace customer-centered design**. Through customer-centered design, we can determine what customers need to perform, and then we can design proactive solutions that enable, motivate, and educate.

2. Enhance Transparency
Transparency is a key customer experience requirement that we consistently hear in focus groups. But for utilities, transparency is a very hard requirement to deliver. For decades, utilities have essentially kept ratepayers in the dark (no pun intended) regarding the nature of its services, the various charges on the bills, and how it makes money. We must inform and educate customers about the good, the bad, and the ugly of smart meter systems. We must show what's in it for them, and what's in it for the utility.

3. Start the Journey toward Partnership
Research that I have conducted in the field shows that the relationship utilities have with customers is best described as a *marriage of convenience*. Yet, with the Smart Grid, there is the opportunity to begin to move that relationship toward *partnership*. With one of our clients, we have defined three qualities of a customer experience that signal the start of the journey:

- **Proactive**. A utility's people, processes, and technologies anticipate customer needs and offer tailored choices and delivery channels that satisfy those needs.
- **Mutually Beneficial**. A utility enables customers to achieve their lifestyle or business goals that, in turn, enable the utility to achieve its shareholder and regulatory goals.
- **Collaborative**. A utility engages customers in designing and improving products and services to increase adoption.

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