

The background of the page is a complex, abstract design. It features a central area with concentric, slightly wavy lines that create a tunnel-like or vortex effect. Overlaid on this are several sharp, jagged shapes that resemble lightning bolts or stylized arrows, pointing outwards from the center. The overall color palette is grayscale, with varying shades of gray and white.

# Saving The Smart Grid

Hype, hysteria,  
and strategic  
planning.

BY STEVEN ANDERSEN

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mart grid backers might do well to heed the words of George Orwell, himself no stranger to fantastic visions. Of Orwell's many observations was this one, on the mercurial nature of slang and cursing: "The strange thing is that when a word is established as a swear word, it seems to lose its original meaning. It loses the thing that made it into a swear word."

But though "smart grid" might not yet qualify as a curse—not in most circles anyway—lately the term has come down in the world, its meaning undermined by ubiquity. Once a phrase becomes a buzzword, its connotations begin to bob and swirl in the eddies of public imagination. And over the last couple of years, "smart grid" has been through a veritable spin cycle.

"People are getting tired of the word in all its different parts and pieces, because it's been so overused. It's not as bad as 'sustainability' yet, but it's getting there," says Chris Hickman, president of Innovari Energy and former PNM executive. "The very unfortunate part is that the expectations have been completely screwed up."

Indeed, the past year has seen remarkable pushback against smart grid initiatives on several fronts. An Illinois state court ruled in October that Commonwealth Edison was wrong to pass on smart grid costs to customers. Maryland's PUC denied Baltimore Gas & Electric's smart grid investment plan in June, prompting the utility to come back with a less ambitious approach. And public protests in such places as Northern California and Ohio have cast public fears in Orwellian overtones.

Much of the trouble tracks back to the way utilities and public figures talk about smart grid issues. The problem isn't just that "smart grid" is a vague and over-applied term; the bigger problem is that it has morphed into a catch-all idea, stuffed full of promises that could smother the true potential.

"The hype has brought people into the industry who don't understand utilities or even revenue metering," says Mark Munday, CEO of metering technology vendor Elster Solutions N.A. "That has given the industry a black eye. My worry is there's so much focus on the negative that people will miss the benefits of the smart grid. We need to help utilities get out there and talk about the success they've had."

While reflecting on language and usage might not be an everyday utility concern, effective communication around smart grid issues is turning into one of the biggest and trickiest problems facing utilities today—and one that could persist for years or decades. (See "Dos and Don'ts of Smart Grid Communications.")

The critical questions in the discussion shouldn't be

whether to build the smart grid—that seems inevitable as companies upgrade their systems over the course of time—

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*Don McDonnell,  
the McDonnell  
Group*

but how much it will cost and how it will be funded. If the dialogue gets sidetracked by red-herring concerns, however, "smart grid" could turn into a dirty word—with enormous consequences for utilities as well as their customers.

"The smart grid has been over-hyped," Hickman says emphatically. "It's not nirvana; it's the evolution of an analog grid into a digital grid. It's necessary, it's required, and we need to get on with it."

#### **Fickle Winds of Change**

The smart grid concept has entered the lexicon in a way few aspects of the utility sector ever do. That's been a blessing and a curse.

"This term was adopted about four or five years ago, and then it got a major political movement behind it," says Warren Causey, a vice president at consulting firm Five Point Partners. "That led to an acceleration of deployment, which is good, and to a number of other steps forward over the last few years."

However, as with all political movements, there's a pendulum factor. The year 2008, when smart grid really went mainstream, was a moment of dramatic political change. The Obama election, coupled with growing concerns over energy security and environmental issues, pushed smart grid into the public spotlight. The financial crisis played a role, too. The 2009 stimulus package—the *American Recovery and Reinvestment Act* (ARRA)—promoted smart grid projects among the so-called "shovel-ready" public works projects legislators hoped would help get the economy back on track.

Smart grid was a convenient, expedi- (Cont. on p. 36)

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ent term politicians could use. It sounds like progress. The grid was dumb, and we're making it smart! It was an easy concept to sell—and to oversell.

"Between the smart grid and shifting to alternative energy, it'll cost between \$1.5 and \$3 trillion to build out everything that has been postulated," Causey says. "The ARRA provided about \$6 billion—a relative drop in the bucket. Also, there are about 3,500 electric utilities in the country, and only 100 of them got ARRA money. So, you have to look at the overall picture."

In reality, the smart grid is anything but simple, and doesn't lend itself to politicians' sound bites. It's a multifaceted technological conversion, comprised of enabling technologies such as advanced metering infrastructure and meter data management; integration of new renewable generation and storage methods; consumer applications such as home area networks and smart appliances that further enable demand response; and perhaps most significantly, massive and long-term investment in upgrading distribution technology.

So when the political wind shifted, smart grid presented a lot of fronts for pushback.

"Smart grid is a bloated term," says Don McDonnell, managing director of the McDonnell Group, an energy technology consulting and media firm. "Every utility has a vested interest in highlighting the different pieces of the puzzle and affirming that they're part of the industry's smart grid development, because they don't want to be out of style. I believe strongly in the overarching vision for the modernization of our industry, but we're certainly not the best industry at making our case for investment and for innovation."

### Critical Oversight

Since 2008, the Gartner Group has plotted smart grid technologies on a curve it calls "The Hype Cycle"—a graph that plots expectations over time.

The curve follows five phases. First comes the technology trigger, the spark of innovation that sends a new idea skyward. The curve peaks at an apogee of inflated expectations, followed by a steep drop into disillusionment. It's not a simple bell curve, however, and after that nadir comes a more gradual upward slope of rational, revised expectations and the ultimate plateau of productivity.

Pegged along that line are discrete technologies, such as home energy management, PEVs and energy storage systems, along with their estimated timeline to mainstream adoption. It also flags technologies that are expected to be obsolete before they reach the productivity plateau.

While the analysis is subjective, it's a useful way to visualize the wave of hyperbole that almost always accompanies innovation. If one were to plot the course of the overarching smart grid concept itself, right now it would probably be past the hype

peak, sliding toward disillusionment.

"I think the hype balloon is starting to let some gas out," McDonnell says, "and it's probably gas that needs to be let."

If that's the case and broad expectations are at the very least being revised, then it's time for utilities to take a hard look at how they are talking about smart grid to regulators and consumers alike—and to realize they can't take anything for granted.

"The industry utility—vendors, consultants, the whole industry—has gotten a little ahead of itself," says Kevin Cornish, a smart grid consultant at Enspira Solutions. "Some of the commissions feel like utilities and others are starting to play them, throwing out the smart grid term whenever they want to, assuming that's going to allow them to get more favorable rate treatment."

Cornish says the message the Maryland PUC delivered in June—and that other regulators have delivered less overtly—isn't that they're opposed to the smart grid, but that they'll treat it just like any other infrastructure investment—*i.e.*, critically.

"They're sending this signal saying that the utilities have to prove the benefits to ratepayers, and they have to justify projects," he says. "They're not going to create a separate category of smart meter and smart grid and let utilities charge the customer in advance of seeing the benefits, which is the way traditional utility ratemaking has always been."

### Bursting Bubbles

To redefine the smart grid case, the first step for utilities will be to dispel the many misconceptions inevitably spawned by a hype cycle—especially the spurious notion that the smart grid will reduce prices.

"Utilities are scratching their heads as to how they're going to keep prices low, [as opposed to raising rates]" says David Rouls, who leads the global smart grid services group at Accenture. "That's not terribly exciting for consumers because they want prices to go down."

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*Mark Munday, Elster Solutions N.A.*

In many cases, prices have been artificially suppressed, by virtue of running the whole range of utility infrastructure past its useful life span. Now utilities face mandates to integrate higher-cost renewable resources, improve environmental performance and replace old infrastructure that, in some cases, is literally crumbling. No matter what happens, prices won't decline.

"If utilities don't move forward with smart grid, prices will go

up," Rouls says. "If they do move forward with smart grid, prices will go up. It's going to be very interesting to see what brush gets used to paint this picture."

The longer the myth of cost reduction hangs on, the more

almost overwhelming temptation to gloss over that harsh reality and focus instead on the feel-good environmental aspects of smart grid, or on the gee-whiz effect of cool, high-tech gadgets.

"The political involvement has painted smart grid as 'it's the right thing to do, everyone will win, and then all these things will help consumers take charge of their rates,'" Cornish says. "No one is saying 'this is going to cost a lot of money and your rates are going up.' Whenever there's a discussion of rates, the response tends to be, 'we'll put in AMI and demand response and it'll help keep rates low.' And that's just not true."

That, he says, could lead to a huge public backlash. Consumers will feel they got hustled in a boondoggle and got nothing out of it except a bigger utility bill. The grid might be a little bit more reliable, but it was reliable enough before, and cheaper. The resulting anger will make it that much harder for utilities to communicate about smart grid, and to fund essential upgrades over the course of decades.

It will also represent a monumental missed opportunity to truly engage consumers.

"If rates go up and then we try to salt the general public—'yeah, but they would have gone up more if we hadn't implemented smart grid'—that will fall flat on its face. People won't buy it," Cornish says. "Somehow we need to get in front of it and explain to them that rates are going to go up, but we're going to give you tools to be able to manage your energy consumption, to help you address those rate impacts. Frankly we need to be a bit more transparent with them."

## 99.9 Earns an 'F'

One troubling effect of a hype cycle is the way it inflates and otherwise warps expectations. Companies that fail to accurately describe their plans to customers and regulators, including potential setbacks, can find their high-flying smart grid plans quickly grounded.

"Where is the bar? What is success? Nobody is predefining what success looks like," says Chris Hickman, president of Innovari Energy. "Going into these projects expecting no one to complain is completely unrealistic."

Hickman describes the plight of one vendor that managed a smart meter deployment that involved 1,000 employees and 1.5 million consumer touches. The entire project resulted in a complaint rate of just 1/10th of 1 percent—a rousing success by any rational standard. The rollout, however, was publicly branded a failure because a single complaint got national news attention.

"We didn't transform from an analog to a digital communications system without significant problems," he says. "There were tons of outages, tons of problems, and to think that we're not going to have hiccups along this path is just naive. We need to embrace the fact that we're going to have problems."

That can't happen if smart grid PR is based on glossy but vague promises about increased efficiency and lower cost. All parties must craft realistic messages that focus on the inevitability of smart grid implementation, warts and all.

"Ignore the consumer at your own peril, whether you're a regulator, a politician, or a utilities executive," says Don McDonnell, managing director of the McDonnell Group. "This is a very tricky political dynamic that has to be ventured into quite deliberately, because it's not a simple thing to change people's behaviors." -SA

mistrustful and downright angry consumers will be when the bubble finally bursts. Selling customers a bill of goods probably isn't the best way to begin a multi-trillion dollar investment cycle.

Moreover, embedded in the cost-lowering delusion is a presumption of choice, a notion that smart grid is an elective option for the industry. In reality, the industry has been living on infrastructure investments made in the 1960s and '70s, and eventually all of it will stop working. In the meantime, utilities are always expanding capacity to accommodate customer needs. It makes no sense to install obsolete equipment, so naturally companies are pursuing a modern technology path. In this context, the "smart grid" buzzword has become a distraction.

"We need to upgrade our grid, we need additional generation paths, and yet everybody runs around and says smart grid will lower costs?" Hickman says. "Everybody who knows anything knows it's only going to slow the acceleration of cost. It's not about lowering cost. This infrastructure has to be upgraded."

Still, because rate increases are always a toxic topic, there's an

### More Than Meters

Many utilities have focused their communication efforts about smart grid—to both customers and regulators—extensively on AMI. This makes sense, because meters are the aspect of the smart grid that affects customers in the most direct and tangible way, and regulators gravitate to the new efficiencies and options they offer. Further, many utilities are seeing measurable payback from their smart meter installations.

"Companies are getting real benefits today," Munday says. "In 2009, Salt River Project saved 82,000 labor hours, not counting meter readings. They avoided driving 443,000 miles and burning 43,000 gallons of fuel. They reduced personal injuries by 39 percent and vehicle accidents by 10 percent. They reduced overdue bills, and are now connecting and reconnecting people in hours instead of four days like they were before. Typically people are happy with it, because they're seeing greater

benefits than they planned for in their business cases.”

But even though the number of angry customers is infinitesimal compared to the many millions of customers served, some companies have found themselves in a battle they weren't entirely prepared to fight—by virtue of focusing attention on AMI.

“Smart metering has given smart grid a black eye in some cases recently,” McDonnell says. “Not to pick on any specific utility, but some utilities have kind of led with their chin on this issue.”

Talking only or mostly about metering leads consumers to believe that smart meters represent the sum total of smart grid, and as a result their skepticism gets projected onto much broader initiatives that they don't understand or don't know about.

Fears about new technology are of course basic human nature, and smart meter concerns run the gamut. Skeptical customers express fear about everything from meter data security—that criminals or Big Brother authorities could use the information to spy on them—to purported health effects of wireless signal waves. In a less regulated industry such as telecom, such concerns are always a small fly in the ointment, but in the utility sector a very small but vocal fringe can have a real impact on the policymaking process. (See “99.9 Earns ‘F.’”)

“It's total Chicken Little syndrome,” Hickman says. “You've got all these people out there talking about privacy and security issues for meter data. But we do billions of dollars of financial transactions on the Internet every day, and you don't think that this problem's already been solved to protect meter data? People who are beating this drum and are making this an issue should be tarred, feathered, and shot. This is such a non-issue in our industry.”

Perhaps even more significant is the fact that debate over smart meters can overshadow other aspects of the smart grid that are far less likely to attract any kind of controversy.

“Utilities might have a significant amount of mundane but very important distribution automation work that needs to be done to improve the reliability and efficiency of their network, and that's not always real sexy,” McDonnell says. “It doesn't make for good headlines, and it can be harder to sell to regulators because they gravitate to the higher-visibility pieces of the smart grid.”

And the transition to AMI naturally leads to questions about consumer engagement, pricing models and market structures, all of which carry political baggage and imply behavioral changes that customers will resist. “Presumptions about behavior change need to be carefully examined, because blowback is not only possible, it's likely,” McDonnell says. “You're not going to make everybody happy with market structure changes. In fact, you're going to make some people very unhappy.”

Implementing AMI will no doubt stir up controversy, because most consumers aren't yet interested in time-of-use rates, home area networks and the like. Engaging them on these

**“We need to get in front of it and explain that rates are going to go up, but we're going to give you tools. We need to be more transparent.”**

*Kevin Cornish,  
Enspira Solutions*

“Right now we've got a whole bunch of people refusing to take the first step, because every issue that could conceivably be thought up hasn't been addressed,” Hickman says. “We'll never have all the answers, but we've got to start moving forward.”

#### **Lessons From Canada**

Not surprisingly, utilities are reluctant to discuss their smart grid problems. We contacted several of the utilities that experi-

issues will be a generational issue for utilities, and it's proved to be a bigger distraction than many utilities expected it would be. “Everybody is bent out of shape talking about residential meters,” Hickman says. “But what's more important is for networks to get built so that utilities can make the switches, reclosers, fuse laterals ... make all of that stuff smart.”

Although customers' concerns have nothing to do with substation automation, for example, controversies over smart metering add to uncertainties and delay the whole process.

## **Dos and Don'ts of Smart Grid Communication**

- **DO** emphasize improvements in reliability, power quality, and environmental performance.
- **DON'T** promise cost savings if bills are likely to increase over time.
- **DO** deliver a simple and transparent message, *i.e.*, Smart grid investments cost money, but they're necessary and worthwhile.
- **DON'T** count on behavioral change. The business case should work whether customers get engaged or not.
- **DO** distinguish between smart metering and smart grid generally. Too much emphasis on metering could delay reliability investments.
- **DON'T** expect to make everyone happy. A few cranks will make more trouble than millions of happy customers. Be prepared for objections—both legitimate and irrational. -MTB

enced smart grid setbacks in 2010, and most of them declined to comment. However, one utility that would talk is farther along in its smart grid efforts than probably any other in North America, and its experience to date offers some insight into how companies can coax the smart grid into reality.

Ontario's Hydro One has already deployed 1.2 million smart meters, covering almost all of its 640,000 square-kilometer service area. Of those, 1 million are now on the utility's communications network, and it's currently reading 900,000 meters remotely. Hydro One is also migrating 100,000 customers to time-of-use rates, and will complete the transition by June.

Ontario enjoys a clear advantage over many U.S. utilities, in the form of strong provincial mandates to get off coal, integrate renewable generation and better manage demand. That has removed a lot of the investment case that U.S. utilities have to make to regulators—but Hydro One still has to sell smart meters—and higher prices—to consumers.

"We were given a strong push on smart metering to get customers price signals so they understand what the true cost of power is," says Rick Stevens, Hydro One's director of development strategy. "We were able to launch our programs really in support of that mandate."

Hydro One's first action was to take a step back and take a broad view of the mandate, asking what it meant to each component of infrastructure, IT and communications. Once the company settled on a plan of attack, it immediately started educating consumers.

"We started bringing in consumers, saying, 'we're delivering the government's mandate, we're starting with smart meters, it's about getting price transparency in your hands so you can help us de-stress the electricity system and improve the environment by allowing us to reduce peak demand and get off coal,'" Stevens says. "We've played that message out to them consistently."

From the beginning, Hydro One's message was clear, concise and firm: This is happening, it has to happen, here's why, and here's what you will be asked to do. Explaining the environmental aspect of the mandate was part of it, but Stevens adds that being clear that aging infrastructure absolutely needed to be replaced was key to establishing a sense of urgency.

Once the need for investment is established, the smart aspect is easier to justify: Infrastructure has to be replaced, so why not do it with tomorrow's technology instead of yesterday's? The emphasis was squarely on the role of smart meters as a vehicle to communicate cost signals—either to encourage consumers to invest themselves in a comprehensive conservation effort, or at least to understand power costs.

Historically one could boil consumers' engagement with electric utilities down to two words: reliability and cost. Nothing about smart grid is remotely that simple or concise, so adding a third leg to customer awareness is a challenge under

the best conditions. Certainly strong government backing makes things easier in Ontario than they are almost anywhere in the United States, but there's still a lesson in the clear and consistent message the utility is sending to its customers. It's an unflinching message of necessity, not a dance around hard questions or a promise of pie-in-the-sky returns.

**"The government is talking about the need for infrastructure investment, and we're talking to customers about it."**

*Rick Stevens  
Hydro One*

happening. But the effectiveness of utilities in explaining the associated complex concepts, new value propositions and, yes, higher costs to consumers will have a major effect on how long it takes and how much it costs.

"There are some elements of what different people call smart grid that are going to have bumpy times in the short term," Causey says. "Eventually the grid will become more automated, more efficient and more right-sized for demand, but a lot of the things just aren't going to work in the short term. You can't do all of this stuff overnight."

Elster's Munday adds, "It's a journey. You learn as you move forward. As long as you keep focused on serving the consumer, the smart grid does deliver benefits."

That evolutionary path, however, makes it difficult for utilities to hone their smart grid message, and many utilities are learning the hard way that customer communication can be as difficult as the most demanding technical problems. In fact, talking about technical issues on a national scale is practically moot, given all the variables in regulation, climate, markets and infrastructure around the country. But the communication problem is a universal nut that every utility must crack.

"The bottom line is we need to take care of our infrastructure as a country, because the northeast blackout cost us almost 1 percent of our GDP—one blackout," Hickman says, "We know what we need to do today, and we can't let a bunch of distracting conversations cause us not to take the first step forward on the path." ■

"Rates are going up,"

Stevens says. "The government is talking about the need of infrastructure investment, and we're talking to customers about it. We've made the investment, and we're going to give you the price transparency."

#### **Honing the Message**

It's worth saying again; the smart grid is already being built, and that construction will continue. Smart networks, AMI, demand response, home energy management—it's all