

Balancing Vision



The utility of the future

+ AUSTIN ENERGY'S TAKE
By Andres Carvallo

→ THE QUESTION THAT MOST UTILITIES ASK IS HOW to get to “the utility of the future.” However, you must start with defining what the future is. I see the future as building a utility that is customer-driven, integrated, interactive, optimized, distributed, secure and self-healing. The utility of the future is:

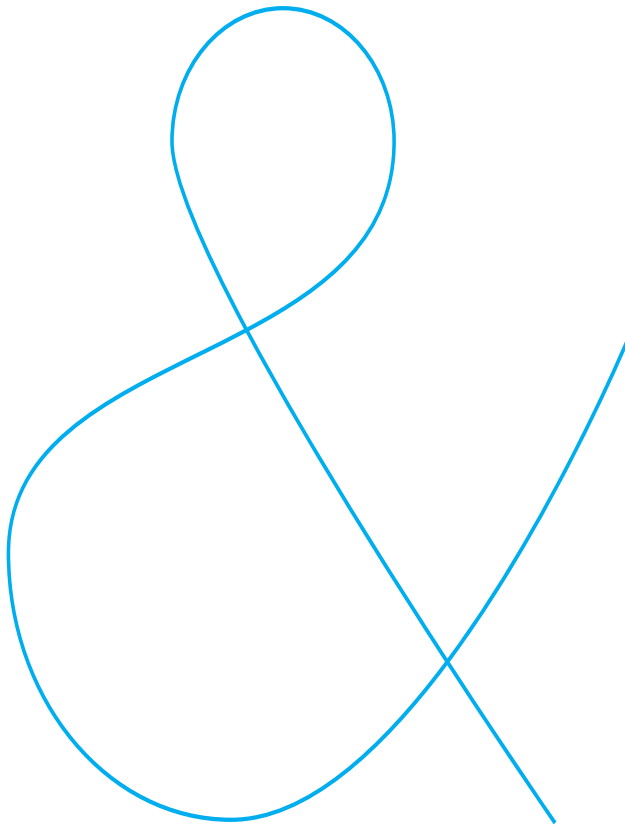
- ❖ One that is capable of decoupling the physical delivery of the electrons from the commercial transaction of the who, how and when of payments
- ❖ One that understands that generation sources will be distributed and not entirely under the ownership of the utility
- ❖ One that excels in managing all the elements of the grid as a well-orchestrated and self-healing system
- ❖ One that offers its customers with services and plans that realize true sustainability to its maximum capacity while eliminating waste to deliver it all at affordable prices

Once you have defined the future state, then you must assess the current state in writing and with a signed agreement of the executive team. After nailing down the current and the future states, next comes a gap analysis and a plan of action for initiatives that will drive the transformation. That execution plan should be a collaborative effort from key stakeholders. And after the plan is agreed upon, you can declare execution and get to work. Remember that it is a journey.

AUSTIN ENERGY'S JOURNEY

At Austin Energy, our formula leads with enterprise architecture, followed by deploying smart meters, automated metering infrastructure—with a two-way communications network—and a meter data management system that integrates with the billing

Illustration by Neil Webb



Today



system, outage management system and marketing/conservation systems. We follow that closely with a distribution management system and integrate all elements to our supervisory data acquisition and control system and energy management system. As the technology and process transformation takes place, the policy and marketing teams must prepare to enable new services, programs and pricing offers for all customer types.

What are some of the benefits to our customers? There are many among them:

- ✎ **Faster notification and restoration times from outages**
- ✎ **Better understanding and management of bills through usage information via a Web portal**
- ✎ **Ability to participate in energy efficiency and demand response programs**
- ✎ **Reduced inconvenience by no longer needing to unlock gates and tie up dogs for meter reads**
- ✎ **Improvements in timeliness and accuracy of billing with fewer estimated bills**
- ✎ **Remote service turn-on and shut-off**
- ✎ **Access to real-time meter reads through a call to customer service or via data on a home energy display or Web portal**
- ✎ **Manage appliances via Web portal**
- ✎ **Ability to participate in other tariff options**

And the benefits to the utility? A few include:

- ✎ **Reduced operating costs (e.g., fewer truck rolls)**
- ✎ **Improved outage management—ability to quickly determine if power is off or on**
- ✎ **Reduced number of delayed and estimated bills**
- ✎ **Reduced energy theft**
- ✎ **Lower procurement costs**
- ✎ **Improved load profiler**
- ✎ **Improved distribution load management and planning**
- ✎ **Greater historical load and usage data**
- ✎ **Better asset management and maintenance**
- ✎ **Time-of-use, prepaid, and flat bill pricing programs**
- ✎ **Reduced need for additional generation and transmission capacity**
- ✎ **Support any market price-responsive tariff requirements**

THE VISION: A DAY IN 2015

Let's fast forward to 2015 and share a day in the life of Ms. Small Commercial Owner (SCO). First to arrive, Ms. SCO opens up shop and goes through her daily routine, but her routine has shifted since she grew more aware of her consumption, and increasingly, of the potential for conservation. She no longer walks through the building, turning on all the lights

and pushing down the thermostat setting to get the building cooled off after it warmed up overnight. The building is already pre-cooled according to a predetermined electricity conservation plan and her utility system is programmed to turn lights on and off according to a schedule based on room occupancy.

Instead, she heads straight for the computer to log in to her utility system and prepare for her weekly staff meeting at 9:00 a.m. As she begins to scan the different screens to track the performance of her business to its preset electricity goals, she can't help but recall how much things have changed in the six months since she began taking control of her business electricity use. Her company has already dropped its electricity bill by 20 percent, progress that had eluded her before she had the utility system working in the background on her behalf. She has already incorporated the good news about her new conservation-oriented workplace in the latest marketing collateral—anything to get an edge on the competition—and the new solar panels that just went up last month. Already, the sun is inching up in the sky and the dial on the computer screen is whirling away, running counterclockwise as the numbers tick down, not up. One could even say that her business has added a new profit center, given that she is using her rooftop to generate electricity.

As Ms. SCO heads to lunch, she glances at the utility system. It glows green. She knows that it will move to yellow as the end of the month comes near, giving her and her staff more incentive to be more mindful of consumption in order to meet their monthly goals.

First to show up, last to leave, such is the life of the small business owner. It doesn't take nearly as long to shut down the office by clicking through computer screens as it used to walk around the building and inspect light switches, systems and so forth. No longer strictly reliant on a mental checklist, now she quickly reviews the utility system that monitors operational status as well as up-to-the-minute energy consumption levels, comparing them to preset goals based on best practices and industry norms. Thanks to the utility system, electric expenses have been transformed from one of the hardest to manage line items on her income statement to one of the easiest.

Nighttime is the major off-peak cycle in any utility service territory; it's when electricity rates are the lowest. Charging forklifts and other battery-driven equipment—a category that now includes plug-in electric hybrid vehicles—is best accomplished overnight to avoid the high spikes in energy consumption that can prove costly under electricity rates that include a demand charge.

Andres Carvallo is chief information officer at Austin Energy.



▲ Andres Carvallo

Get there

+ BUILD A ROADMAP WITH BOTH SHORT- AND LONG-TERM VISION

By Stephen Hadden and Mark Gabriel

THE HEADLONG RUSH INTO AN “INTELLIGENT infrastructure” has created an interesting dilemma as expectations far outpace today’s reality and bump up against the coincident need for massive infrastructure investments in transmission, distribution and customer technologies. These expectations, promises and desires are driven by regulators, vendors and those in the industry who recognize the potential for bringing computing, communications and intelligence to the electric and gas system.

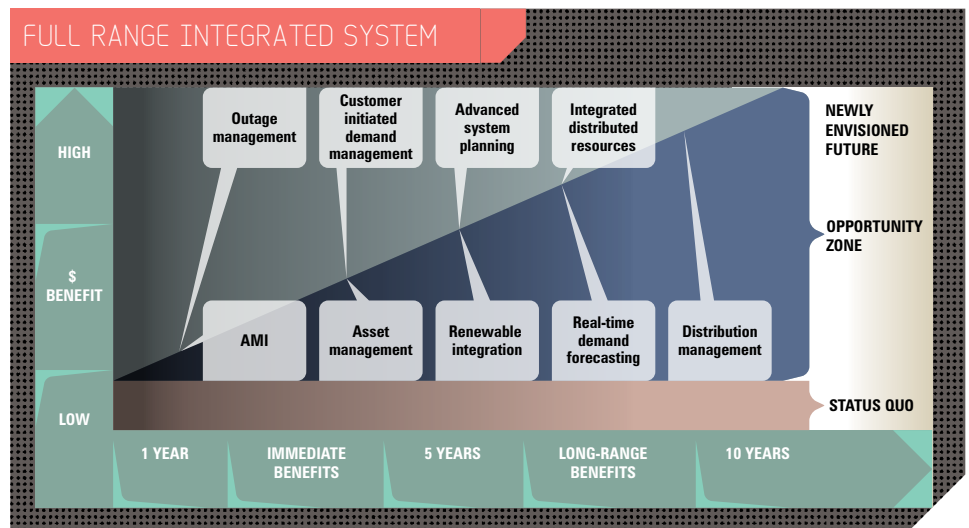
The inherent challenges and opportunities necessary to achieve a smarter grid are as old as the utility business itself. The various functions responsible for maintaining reliability, customer interfaces, generation dispatch, information technologies and operations are housed in different organizations with varying goals, responsibilities and—most critically—budgets, both in capital and operations and maintenance. Similarly, developing a smarter grid requires not only technological applications, but also broad process and organizational applications.

In creating a roadmap to smart grid, an organization must first align its desired goals with technological realities. It is important to distinguish between vaporware and actual technologies that can be leveraged to achieve nuts-and-bolts solutions. Some of these can deliver high-tech results even today. This is critical. While putting “smart” in the grid might require 20 years of focused effort, it is important to appreciate what can be accomplished now. Executing a roadmap strategy that relies on a long-term investment with only distant benefits may be difficult to realize if it challenges short-term cash flow.

This is not to dismiss the potential benefits of emerging systems. After all, the future is where we’re trying to go. But utilities so caught up only in a long-term vision could miss immediate opportunities. For example, advanced metering infrastructure that primarily supports billing and customer

service can also enhance outage management and identify tree-line contacts in advance of failures. Advanced, remote-controlled relays can answer arc flash mitigation challenges. System efficiency can be improved through phase balancing and customers can be engaged in active demand response. These actions can highlight crucial elements of security, quality, reliability and availability, and provide the tools that will be necessary to implement longer-term goals.

That means it is also important to avoid the opposite mistake. Investments made today—even those that accrue short-term benefits—should ultimately be capable of servicing a longer-



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term future. Taking steps that position the utility to improve overall grid efficiency, reduce carbon emissions or respond to an advanced metering infrastructure (AMI) mandate could be longer-term goals. Preparing to take advantage of those technologies just emerging over the horizon is another. This balance defines a successful, no-regrets roadmap strategy—one driven by the imperative to generate value and quality in daily operations while anchoring strategic planning, capital budgeting and prioritization in support of the longer transition to a grid of the future.

The ideal place to start developing a roadmap is actually at the end point. A utility should envision it, and ask the question: “How did we get here?” Next, they should trace actionable steps back to where they are today. In identifying those actionable

steps, though, the leader must also be mindful of the context of the regulatory environment to ensure that proper financial incentives and recovery mechanisms are in place.

A roadmap tied directly to capital budgeting and strategic planning equips organizations for the future—one that will inevitably change over time. The roadmap should be individualized to each company. Creating one is not painful, though it may require a particular way of thinking. It will also require discipline on the part of management to avoid being distracted

by side projects that threaten to derail the utility from the path it has started down to achieve a smart grid.

Building a smarter grid will require a significant effort that meshes short-term tactics and long-term strategies, but the result will be a roadmap to success.

Stephen Hadden is a vice president with Plexus Research, an R.W. Beck company. Mark Gabriel is a senior vice president with R.W. Beck.

VISION

STRATEGY

REALITY

Big vision, prudent steps

+ SEATTLE CITY LIGHT'S ON THE MOVE TOWARD TOMORROW

By H. Christine Richards

➔ EACH UTILITY HAS ITS OWN VERSION OF WHAT IT MEANS to build a smarter grid and ultimately a more intelligent utility, Seattle City Light included. But this utility offers some important lessons. Seattle City Light is thinking big, but realizes that it can't have everything it wants today. Let's take a closer look at where this utility wants to be tomorrow and the prudent steps it is taking today to get there.

SEATTLE CITY LIGHT'S VISION

The first thing that came out of Seattle City Light's smart grid discussion was the need for advanced metering infrastructure (AMI). However, Seattle City Light realized it needed more than just AMI. "It would be a mistake to equate AMI to smart grid," said Michael Pesin, strategic technology advisor, Seattle City Light. "AMI is one of the biggest, if not the biggest component to the smart grid, but by itself it doesn't constitute the smart grid. A smart grid for Seattle City Light is a portfolio of technologies designed to provide operational, financial and environmental benefits by integrating modern energy and information technologies with electrical power delivery, generation and consumer electrical systems. Smart grid does not emerge from a single rollout of a revolutionary technology, but from strategic planning and targeted investments all aimed at a long-term vision," he said.

Seattle City Light's vision for a more intelligent utility goes beyond metering to reach consumers and transmission and distribution systems. On top of AMI, key components of Seattle City Light's vision include:

- **Smart substations.** Seattle City Light is interested in not only automating substation functions, but also collecting more data and making better use of the already available substation data. "Smart

substations would include such things as real-time monitoring and condition-based maintenance, so you know exactly what's happening with the equipment. It will help us use our available resources more efficiently and at the same time increase system availability by avoiding failures," Pesin said.

- **Distribution automation.** Beyond the substation fence, Seattle City Light would like to introduce more automation to its overhead and underground distribution feeders. The most obvious benefits of this effort include automatic fault location, isolation and service restoration.
- **Plug-in vehicles.** Seattle City Light believes that electric vehicles are coming and wants to be ready for them. Seattle is looking at control charge technologies and ways for these vehicles to be integrated into the power system and effectively interact with the utility company.

GETTING THERE TODAY

Vision and reality, however, are two different things. "It would be great to do everything today and be done, but the reality is we need to take steps," Pesin said. Aside from pilot projects with smart substations and distribution automation, Seattle City Light is focusing its efforts on a significant AMI project and investing in outage management, asset management and other utility IT systems.

THE AMI PROJECT

Seattle City Light already did a small project that tested 500 two-way communication meters in 2006 and 2007. The success



of that project and strong business case encouraged personnel to look at a broader deployment. In fact, Seattle City Light will propose a deployment of approximately 400,000 meters for its entire service territory. “Everyone needs to have access to smart meters in order to ultimately have a smart grid,” said Carol Dickinson, AMI program manager.

After building the final business case in 2009, Seattle City Light intends to get the deployment under way in 2010. The utility proposes that the deployment begin with 5,000 to 10,000 meters in order to work out some expected operational challenges. After that period, Seattle City Light seeks to install 130,000 meters per year for three years.

Right now, under Dickinson’s leadership, the utility is undergoing an education about smart meters. With a background in billing and metering, Dickinson has been sowing the seeds for more advanced meters for a while. “We are moving from an electron business to a data management business,” Dickinson said. “We are looking at how AMI, smart meters and the smart grid fit into Seattle City Light.”

David Gallimore, a project manager with Seattle City Light, is helping Dickinson realize that vision. Gallimore is not from the utility industry, but specializes in managing complex projects.

Dickinson and Gallimore lead a significant group of stakeholders within the company—including a 24-member advisory board and an eight-member core RFP team. They also receive input from personnel from across the utility and the city.

On top of the collaboration and education within the company, Seattle City Light is reaching out to learn from other utilities’ experiences with AMI. “What could really hurt us is that we don’t know what we don’t know. This is where meeting with other utilities has been helpful,” Gallimore said. “These utilities have been generous on what has worked and what hasn’t worked.” Dickinson added: “When we visit them, we try to take a cross-section of meter, IT, communications and security people. What struck everyone on our team was that it’s all about business process, which is helpful in due diligence. These utilities focused on starting with the customer and their ability to serve the customer and then on how technology can support their ability to serve customers.”

Back at Seattle City Light, personnel are identifying those business processes impacted by AMI and the benefits that they can achieve. “In doing the business process redesign, at last count, we identified 50 processes that are created or modified because they touch AMI,” Gallimore said. Added Dickinson:

“We have really tried to look at this from a conservative, reduce rates and not increase rates standpoint. We found that this project could actually reduce rates.” Immediate benefits for Seattle City Light would include automating the processing for move ins and move outs, reducing the number of calls to the customer service center and giving customers more flexibility in billing.

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TRADITIONAL IT INFRASTRUCTURE

Even as Seattle City Light eyes a significant AMI deployment, the company is also working to install and upgrade more traditional IT infrastructure that will support its AMI and smart grid systems. This is where Seattle City Light can move from

smart grid to a broader intelligent utility. For example, Pesin pointed out “AMI is not required for OMS [outage management system]. You can do OMS without AMI. But AMI gives you so much more data and makes your OMS so much more efficient that it makes a lot of sense to coordinate these efforts, like any other effort.” Other systems include distribution management systems, work and asset management systems, and customer information systems. Seattle City Light is looking to take on these systems a piece at a time as part of a strategic roadmap. “At the end, no matter what approach you take, it has to be integrated with your IT systems. So we’re looking for the integrated solution that can be implemented over time,” Pesin said.

FINAL THOUGHTS

Although some of these efforts are nothing new, Pesin pointed out that the advantage of working on these initiatives in the context of a smart grid vision is better coordination among these new activities. “What happens at many utilities is that there are many projects going on at the same time and they’re very good projects, but people, for instance, who implement substation automation don’t talk to people who implement metering systems,” he said. “Having this vision to work toward allows you to tear down the silos and create one common approach for the entire electrical system whether you’re in generation, transmission, distribution, substation, metering—everything has to be looked at from that point of view, and it helps a lot.” X

MEET MICHAEL PESIN, SEATTLE CITY LIGHT’S “SMART GRID ARCHITECT”



Title STRATEGIC TECHNOLOGY ADVISOR

Background Pesin has been in the electric utility industry for over 25 years. During his career, he worked in different parts of the electric utilities and directed a number of projects in the areas of generation, substation and distribution automation. Currently, he is responsible for new technologies at all divisions of Seattle City Light. “From the technical perspective, the idea of a smart grid incorporates elements of power engineering, sensing and control technology, information technology, and communications. You need to have an expertise in these areas in order to be able to build a smarter grid. But you need a lot more than just technical expertise. Smart grid is the biggest change that is happening to

electric utilities in a hundred years and it affects every aspect of this industry.”

Department FINANCE. “Seattle City Light went that way because we have a power production group and we have power delivery and all these groups will benefit from smart grid technologies. So rather than create competition between these groups, I’m on the outside.”

Approach Strategize to get everyone behind the concept. “I see a lot of support for the smart grid idea in the organization. Everyone is working hard to succeed at their projects. It’s just that historically many of the projects have been done in their own silos. Everybody can benefit from the coordination of their efforts based on a strategic vision.”