

Critical imperatives for the modern utility industry:

Strategic vision, transparency, accountability,
and agility will determine the success of power
and utilities companies

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Utilities adapt to market uncertainty by knowing how to respond to change

The heart of the matter

Market and regulatory
forces drive utilities to
launch huge capital
investment projects

Utilities make huge capital investments to build shareholder value

The success of today's utilities will be determined by those who are agile, transparent, accountable, and strategic visionaries. In light of regulatory mandates, these attributes are critical for utilities to effectively and confidently engage with public utilities commissions (PUC), protect and enhance shareholder value, reduce their long-term carbon footprint, and develop a renewable energy strategy based on new or changing regulation, location, and access to natural resources.

Investor-owned utilities (IOUs), municipal utilities, and utility cooperatives are under pressure to use alternative energy sources (wind, solar, nuclear, etc.) to reduce the carbon emission footprint of an existing power generation infrastructure that relies on coal for more than 50 percent of electrical production. They also are asked to develop and implement intelligent energy distribution and management systems by deploying advanced metering and smart grid technologies. This is occurring as customer demand for energy continues to rise throughout the United States. According to the US Energy Information Administration, electricity demand is expected to increase 26 percent during the next 30 years.¹

To meet these requirements utilities will have to make significant capital investments in new and enhanced generation facilities, transmission and distribution infrastructure, and core information technology (IT) systems. Because of the economic environment, many PUCs and other regulatory agencies may take extra care in deciding whether initiatives will cause significant rate increases for consumers. Economic uncertainty also makes raising capital from traditional private-sector resources to fund major projects more difficult.

In short, IOUs face an interesting paradox as they address conflicting mandates to:

- Modernize existing infrastructure and introduce new technology to meet changing environmental and energy efficiency objectives
- Minimize the impact that capital investments associated with such enhancements will have on customers

One potential escape route from this conundrum is to place the financial burden of capital investments onto the shoulders of shareholders. But in a free market, this introduces risk that can alter the investment profile of IOUs. As the risk profile shifts, so will shareholder dollars. If the return on investment (ROI) picture becomes less predictable, shareholders could leave the IOU market and invest in lower risk investment structures.

It is the position of PricewaterhouseCoopers that success in the current environment will be determined by industry leaders who are:

- **Strategic visionaries** and anticipate new demands, construct innovative ways to tap new sources of energy, and field fresh business models that satisfy industry stakeholders
- **Transparent** and use effective tools and controls to manage change and show stakeholders and regulators how initiatives are implemented and how they affect the assets and business processes that underpin current and evolving operations
- **Accountable** and provide project costs, benefits, and a comprehensive audit trail of initiatives with timely, complete, and accurate reporting
- **Agile** and able to shift gears and adapt to new, unanticipated imperatives and technologies that disrupt prevailing business models

¹ <http://www.eia.doe.gov/oiaf/aeo/electricity.html>

An in-depth discussion

Utilities respond to market changes by gaining insight into operating issues

Power and utility industry leaders evaluate current business operations in search of operational insight

Within the next few years, a wide array of federal, state, and local requirements and strategic objectives are expected to be introduced. These regulations will be driven by a desire to reduce consumer costs in a difficult economy and address long-term environmental and climate change issues. IOUs will be expected to respond to these regulatory mandates and information requests with unprecedented levels of detail.

Carbon footprint mandates and related regulations

Although many states and regions have set requirements for renewable power standards, a national policy on this issue continues to unfold.

The entire sector, for instance, is weighing the implications of the Waxman-Markey bill in the House of Representatives. Known as the American Clean Energy and Security Act (ACES), this comprehensive energy bill includes a cap-and-trade global warming reduction plan designed to reduce economywide greenhouse gas (GhG) emissions 17 percent by 2020.²

Other ACES provisions include renewable energy requirements for utilities, studies and incentives regarding carbon capture and sequestration technologies, energy efficiency incentives for homes and buildings, and grants for green jobs.

In February 2009, Congress signed into law the American Recovery and Reinvestment Act (ARRA). This legislation provides approximately \$83 billion in tax incentives, loan guarantees, and government grants for investments in energy-efficient technologies and renewable energy programs.

These incentives may be a precursor to a more comprehensive US energy policy, with renewable energy and a cap-and-trade climate change proposal featured as prominent components. A cap-and-trade policy would regulate emissions of greenhouse gases through a process in which suppliers of fossil fuel and other covered sources of GhGs would be required to submit government-issued allowances based on the emissions of their respective products.

As the legislative debate continues on how best to cut carbon emissions, some power and utility companies are looking at federal tax incentives and grants to offset investments in costly infrastructure projects that are mostly optional today but could soon become mandatory. Rather than delay, many power and utility companies see federal stimulus grants as an opportunity to jumpstart their energy initiatives. There is also a presumption that regulators expect utilities to access these incentives to mitigate raising customer rates to pay for the investments.

The final outcome and disposition of the cap-and-trade policy debate is very much in flux. A Senate draft of climate change legislation released September 30, 2009, allows the EPA to set GhG emissions performance standards for new coal-fired power plants, as well as major emissions sources that do not fall under a national carbon cap.

As the legislative process continues, there is a great deal of concern and uncertainty among utilities that depend primarily on coal to fulfill demand for electricity because EPA mandates on GhG emissions could have a major disruptive effect on supply.

If a cap-and-trade policy becomes a national standard, many utilities will resort to renewable energy technologies, such as solar and wind energy generation. This technology, however,

² <http://www.opencongress.org/bill/111-h2454/show>

is not cost effective in all regions, so some may have significant difficulties meeting the mandate.

Another alternative, nuclear-based power, will play a role in the emerging energy policy at both the federal and state levels, but its role remains unclear. Although several utilities are developing plans to expand their existing nuclear utility capability, building the supporting infrastructure is expensive and time-consuming. It is not yet clear whether nuclear power generation will receive financial and regulatory support from federal and state authorities seeking to reduce GhGs.

In today's highly fluid regulatory and legislative environment, it behooves power and utility companies to take a broad look at their alternatives because soon they will be required to develop a comprehensive strategy on how to meet alternative energy requirements and reduce their carbon footprint in a way that is cost-effective for consumers. The right solution will depend on where they operate, what resources they are able to access, and projected energy demands.

Smart grid technologies

Few technological initiatives in the power and utility sector have received as much public attention in recent years as the smart grid concept. Smart grid is a term that refers to the modernization of the electric system by integrating new information and communication technologies that expand the flexibility of the utility infrastructure and provide greater opportunities for improved load management.

The benefits associated with the deployment of smart grid technologies are potentially great. Smart grid technology can improve grid reliability by reducing the frequency and duration of power outages as well as the number of power quality disturbances. Smart grid technologies also can help bring down the price of electricity by introducing a higher level of interaction between consumers and their utility company. Notification, monitoring, and management tech-

nologies at the customer site work in tandem with the energy grid so that companies and consumers can see how they use energy and develop strategies to use resources more efficiently, ultimately lowering their energy costs. The smart grid concept is viewed by local, state, and federal policy makers as integral to advancing national energy and environmental objectives.

As a result, many power and utility companies are moving forward on advanced metering and smart grid initiatives. These power and utility leaders recognize the potential for this technology to increase organizational agility and flexibility as new demands are placed on their energy infrastructure and new regulatory mandates are imposed on the industry.

As with any new technology, there are risks that must be managed. Smart grid technology can be defined and deployed in many ways, depending on population density and the demand for the utility's resources. Some utilities may see a clear business case for providing its commercial customers with advanced meters. Others may move forward with systems that make dynamic rate structures and payment processes possible so that customers can modify their load more effectively. Still others may decide to pursue a more basic approach to introducing intelligence into their system. Because regional needs vary, a single national solution for all service providers may not be appropriate.

Meanwhile, the technologies associated with the smart grid concept are evolving rapidly. This means newly developed capabilities supersede recently deployed technologies, which introduces the risk of interoperability problems or unmanaged obsolescence. Managing the life cycle of smart grid technology must therefore be transparent and carefully coordinated with regulatory authorities.

To combat—or at least mitigate—this uncertainty, the Energy Independence and Security Act (EISA) of 2007 tasked the National Institute of Standards and Technology (NIST) with “primary responsibility to coordinate development of a framework that includes protocols and model standards for information management to achieve interoperability of smart grid devices and systems...”³

Also, the 2009 ARRA law has allocated \$10 million to NIST through the Department of Energy (DOE) to carry out responsibilities assigned under EISA. In addition, NIST is allocating \$5 million in ARRA funding for this purpose. The funding supports collaborative efforts to develop a comprehensive framework for a nationwide, interoperable smart grid for the US electric power system.

In sum, there is complexity involving new technologies, regulation, funding sources, and business strategy that power and utility companies must carefully manage to successfully define, develop, and deploy effective smart grid technologies.

Associated infrastructure and legacy systems

The implications of new regulations and technological developments affect virtually every element of the power and utility sector infrastructure. In many jurisdictions, and for many years, new investments in transmission and distribution facilities, lines, poles, pipelines, substations, enterprise IT, communications, etc., have been reduced or deferred because of rate caps that prevent IOUs from recovering capital outlays. However, as infrastructures age and fail to meet changing demands and minimum performance requirements, continued deferment no longer is seen as a viable option.

According to one study, the US power and utility sector needs to invest between \$1.5

trillion and \$2 trillion between 2010 and 2030 to maintain current levels of reliable energy service for customers throughout the country.⁴

This includes upgrades and new investments in new generation capacity, including natural gas, coal, nuclear, and renewable energy. Nearly 40 gigawatts of renewable capacity is needed to meet projected state requirements. More significantly, the study found that capital spending to upgrade distribution and transmission facilities nationwide may surpass investment in new generation.

It is also interesting to note that some utilities are home to extremely mature legacy enterprise computing and networking technologies. The good news is that most of these have proven successful. The not-so-good news is that support for the most mature hardware and software is waning. Also, systems that were installed 10, 20, and even 30 years ago were not designed to work together or to handle the high volume of data required by smart grid applications, new energy tariffs, and billing requirements. This makes it difficult to share information, identify critical trends, and make adjustments to key systems and operations when important developments are identified.

Still, decisions to move ahead with new investments must be made carefully. It is important for IOUs to clearly understand how PUCs and other governing bodies will handle requests to recover major infrastructure investments.

New competitive or customer demands

Stakeholders look for ways to introduce competition into the power and utility sector, which makes customer satisfaction scores increasingly important as a key performance indicator (KPI) for utilities and regulators. The power and utility sector must also contend with a customer base that expects extremely

³ <http://http://www.nist.gov/smartgrid/>

⁴ <http://www.brattle.org/NewsEvents/NewsDetail.asp?RecordID=568>

high levels of service. Consequently, it is important for utilities to meet those expectations by minimizing disruptions and optimizing service call responsiveness—all while keeping costs down.

Meanwhile, states mandate that utilities empower individual consumers to help manage their energy consumption. For example, California may offer a preview of the environmental rules and regulations that many utilities may soon encounter.

The California Energy Commission (CEC) recently approved dozens of changes to the state's building energy efficiency standards for new construction, commonly known as Title 24. The updated rules are expected to cut California's peak energy demand by 129 megawatts (MW) in its first year, according to the CEC. Among the updates for new homes are requirements for insulated, heat-reflecting windows and "cool roofs," which are 40 degrees cooler than an existing roof during a hot afternoon. "Cool roofs" reduce demand for air conditioning, which can cut a homeowner's electricity consumption by as much as 20 percent. These new standards are scheduled to go into effect on January 1, 2010.⁵

Strategic vision

For years the requirements to run an effective and reliable utility operation were fairly straightforward. Utilities were asked to develop a capacity to serve the energy needs of their communities, establish a cost-effective way to fulfill demand requirements, and determine a rate to charge consumers that would fund capital investments and provide shareholder value as the result of a negotiated agreement with the PUC.

Traditionally, the process of securing PUC approval was possible as long as there were no major shocks to the rate of growth in the pricing structure. The name of the game was to maximize the distribution of inexpensive energy to consumers.

In today's environment, successful power and utility companies need a strategic vision that harnesses the insight necessary to shift from a largely reactive and tactical posture to a proactive posture that leverages a growing number of critical variables. This will be critical for:

- Engaging effectively and confidently with PUCs and customers
- Protecting and enhancing shareholder value
- Reducing long-term carbon footprint
- Determining the most effective renewable energy strategy based on new regulation, location, and access to natural resources
- Achieving the projected results of demand response and energy efficiency programs
- Continuing to meet the utility's obligation to serve its customers

Over the next months and years, the power and utility sector will face serious questions from legislators, regulators, shareholders, customers, Wall Street, and the media. The more information and context utilities can offer its key stakeholders, the more control and influence they can have over their destiny and their ability to successfully navigate their enterprises through this transition.

⁵ <http://www.energy.ca.gov/title24/2008standards/index.html>

Key strategies will have to be developed to track and document current processes and more accurately analyze markets, policy developments, and integrate climate-change challenges into corporate strategy and plans.

As utilities go through this process, specific attention should be paid to developing forward-thinking positions on how to:

- Determine whether utilities should adjust their organizational structures in the context of shifts in the sector
 - Enhance the allocation of financial resources from shareholders and customers, as well as any monies that may become available as a result of federal or state incentives
 - Assess options for an emissions trading strategy and for developing a response to international cap and trade policies such as those being debated under the Waxman-Markey bill, ACES
 - Consider tax implications of large capital investments; by improving structuring and tax planning strategies, utilities can maximize cash flow and free up cash to help finance new capital projects
- Evaluate alternative strategies to recover the costs of new capital investments (e.g., rather than seeking to place the costs of new capital projects into rate base)

Access to capital is one of the key points to consider when setting a strategic vision. Utilities should remain realistic about their ability to obtain the necessary capital. Regulatory uncertainty, together with a jittery financial services sector, raises new questions about how utilities can acquire capital.

According to a July 2009 assessment of the sector by Moody's Investor Services, analysts believe utilities will see available borrowing capacity decrease, possibly as much as 25 percent to 30 percent. The analysts also expect that the cost of capital will be significantly higher than the power and utility sector has been used to paying.⁶

Consequently, where utility executives may have dealt with one or two banks in the past, they are now facing consortiums of banks that require more due diligence and have more stringent approval processes.

⁶ Notes on the Moody's Analysis of the Utilities Industry

Transparency/accountability

In today's power and utility sector, lack of transparency often inhibits strategic planning and jeopardizes a utility's ability to fully recover its reasonable costs in ratemaking proceedings. It is difficult to develop a strategic vision if IOUs cannot clearly see the "real-time" state of their operations and share their observations credibly with regulators and key stakeholders. There are two challenges in this regard that utilities must address:

- There may be a significant lag time between when data is collected and when it is reported to executives, who are charged with managing processes and communicating with stakeholders.
- It is difficult, in many instances, to capture key changes in market and operational conditions so that executives can make informed decisions. This is because "siloed" systems do not provide visibility into all the critical activities in an aggregated and unified format.

Both of these scenarios represent types of opaqueness—or lack of transparency—that inhibit the full and unfettered exchange of views, plans, and strategies with stakeholders, including investors, regulators, and consumers. To investors and lenders, lack of

transparency often is associated with lack of accountability, and therefore represents a source of significant risk.

Changing political and regulatory environments are driving critical changes in how power and utility companies operate. For example, as regulators assess the impact that smart grid infrastructures can have on customers, they will demand detailed information on how processes are likely to change. This means power and utility companies must provide a high level of accountability over how current operating procedures perform, and they are often required to provide ongoing reports on how new processes and technology deployments affect energy usage patterns among businesses and consumers. Utilities will be under growing pressure to develop systems and procedures that report on new and changing processes and to quantify their impact on customers and shareholders.

PUCs and shareholders also need to understand the impact that renewable power sources have on the short- and long-term financial risk. Utilities must develop robust business cases and provide before-and-after-scenarios of how their businesses will operate.

Agility

Much about the future of the power and utility sector remains unknown. Although local, state, federal, and international energy and environmental initiatives are in flux, decisions made by these regulatory and political bodies will have a tremendous impact on utilities.

Most utilities must also manage a broad range of systems that provide critical support operations. However, many of these systems do not work together and do not provide executives with a unified and current view of operational conditions. This hinders the ability to respond to new developments on the competitive or regulatory front.

Organizations that succeed in more dynamic environments need comprehensive systems in place to allow them to develop contingency plans for sudden changes in the

regulatory environment that affect short- and long-term shareholder value. Examples of such developments include:

- New cap-and-trade policies on how to manage emissions in a compliant manner
- Financial justification and investment option assessments as utilities are challenged to bring new alternative energy sources onto the utility grid
- Specific mandates on how to deploy smart grid technologies in the most cost-effective manner
- New strategies for negotiating with the more complex requirements of PUCs

Utilities must deploy enhanced enterprise systems and also create streamlined business models and operating systems that are nimble and responsive to a dynamic utility industry.

What this means for your business

Utilities adapt to market
uncertainty by knowing
how to respond to change

Enhancing business efficiency by becoming strategic, transparent, accountable, and agile

In many respects, today's utility companies are between a rock and a hard place. The pressure is on to modernize existing infrastructure, install smart meter technology, and meet stringent environmental and energy requirements. Pitted against a critical need to spend billions on capital investments, utilities are pressured to keep costs in check so that customers are not hit with huge rate increases.

To thrive and succeed under these conditions, utility companies must be able to adapt to changing market and regulatory forces. Organizations will also have to harness market and operational insights to respond to changes and anticipate and prepare to influence their fate as much as possible.

This is why PwC believes it is critical for power and utility executives to develop and master the disciplines of:

- **Strategic Vision**—by developing a clear understanding of potential scenarios and creating contingency plans so that executives can tackle issues proactively.
- **Transparency**—by developing, automating, and implementing effective controls and processes so that executives and stakeholders have an ongoing and comprehensive understanding of both internal operations and market opportunities.
- **Accountability**—by providing stakeholders and regulators effective reports and access to predefined internal information. For certain programs, this can be done through monthly and quarterly reports.
- **Agility**—by putting in place the management structures so that new business practices can be put into effect as quickly as possible in response to new developments.

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To have a deeper conversation about how this subject may affect your business, please contact:

David Etheridge
Utilities practice leader
(415) 498-7168
david.etheridge@us.pwc.com

Steve Lechner
Capital project services leader
(415) 498-6596
stephen.p.lechner@us.pwc.com

John McConomy
Utilities transaction services sector leader
(267) 330-2184
john.mcconomy@us.pwc.com