

Bridging Transformation Enterprise - Wide



CITIE
Cambridge Technology Enterprises

Innovation in the Utility Industry

How the Utility Industry can respond and thrive through innovation in the face of new challenges and technologies

Enterprises often find it difficult to develop and deploy strategic solutions that improve bottom line results. With Cambridge Technology Enterprises as a partner, Fortune 1000 companies are devising solutions that align business strategies and advanced technologies with corporate goals and market opportunities.

- Real-Time generation of operating, financial, and regulatory metrics allows for improved management and credible communications to customers, regulators, and financial markets...
- Integrated views of disparate projects, systems, and jurisdictions, tying together data from multiple sources such as GIS and AMR systems, correlating data to create actionable information for managers...
- A field force that can interact and collaborate dynamically while mobile to respond rapidly to outages, and solve service problems on-the-spot...

Business Innovation Services,

Cambridge Technology Enterprises

Innovation in the Utility Industry

Today, both public and private generators and distributors of electricity, gas, and water are facing many challenges: an uncertain economy, operating under significant environmental and operational regulatory regimes, and increasing competitive pressures. Regulatory oversight and the entire notion of corporate governance has been brought to the forefront due to recent events, leading to the disclosure requirements of the Sarbanes-Oxley Act, requiring increasing visibility and transparency of operations. In addition, there is a paradigm shift occurring in the industry, as single jurisdictions, stovepipe systems, and individual services are transforming into multi-jurisdiction, enterprise-wide systems, and bundled services as a result of new market and technology opportunities.

The IT systems currently in place were designed to meet the needs of a different era, and innovation is necessary in order to gain real business advantages. Technological developments such as mobile computing, cellular and wireless networks, the Internet, and new standards such as XML provide enterprise-wide opportunities for operational improvements, tying together stovepipe systems and multiple jurisdictions. Responding to these challenges presents opportunities for innovation. In many states regulatory restructuring has split the utility industry's vertically integrated value chain, moving regulated monopolies into competitive markets, creating new opportunities for growth and acquisitions. Collecting accurate operational data enables credible communications to regulators, customers, and financial markets and also provides information that can improve internal management.

There are innovative ways that utilities are reacting to these demands, creating new systems that leverage existing IT investments to directly address business challenges, and meeting goals of revenue growth and increased profitability.

Drivers of Industry Change

There are several drivers of the current situation facing the industry. Most important is the restructuring and deregulation occurring in many states. In addition, there is a renewed focus on the environmental impacts of energy generation, as the public re-awakens to the need for alternative energy sources. The current business climate itself also provides a management challenge to the industry, with new emphasis on regulatory compliance, corporate governance, and accounting credibility. The Sarbanes-Oxley Act requires firms to provide information on measuring, auditing, and verifying their operations, something existing IT systems may not support. Finally, there are recent technical developments, such as GIS, AMR, and mobile devices in and around the industry that are enabling a new round of operational improvements.

Regulatory Restructuring - Electricity

In order to create commodity markets for electricity and natural gas, regulators are breaking the vertical linkages between the pieces of the value chain, mandating access to transmission, and allowing new entrants into generation and retailing.

So far, 24 states in the US have adopted retail competition; several others have plans to restructure. In addition many EU countries are going through a similar period of regulatory upheaval.

This change is not happening as quickly as was expected. The publicity of California's problems and later the exposure of Enron's problems gave a black-eye to deregulation. This "power crisis" has delayed the restructuring efforts of some other states.

These events are not the end of deregulation although they do highlight difficulties of making such a transition. Problems experienced by California are being analyzed and changes are being made. Temporary rate caps in some states have been extended. These are measures intended to solve transitional problems -- moves to market-based rates are still occurring in Massachusetts and other states. Restructuring is continuing.

New Acquisitions and Growth Opportunities

Companies now have the ability to look beyond their original regions and original services for profit opportunities. Those that have successful strategies and systems will be in a position to acquire weaker companies and grow around the country. Already by 1999, diversified activities accounted for 43% of total shareholder-owned electric company operating revenue. There are many issues associated with mergers and acquisitions -- simply combining the data from the many IT systems can present real challenges, apart from finding ways to understand, integrate, and act on these multiple systems and multiple jurisdictions. It may be desirable to merge customer interfaces and present "one face" to the customer for multiple regions or services.

Regulatory Oversight and Market Structure Changes

Aside from deregulation itself, there is currently a strong focus on the performance of utilities, compliance with regulations, and the need for overhaul of regulatory systems. Regulatory Relationships have become increasingly important in driving both the structure of the industry, strategic options for utilities, and their growth. The experiences of California, and the energy trading markets, as well as recent power grid difficulties has given regulators and the public renewed license to examine the performance and capabilities of utilities, resulting in a need to be able to supply credible data to have an impact the regulatory change process.

Operational Improvements

"Traditional" management challenges such as capacity use and planning, problem and project management still exist, and are no less important. New management options are enabled by the increased ability to transmit information within and without the enterprise. In fact, in order to simply remain viable business, many companies will need to focus their efforts on making significant improvements to their existing process.

- ➔ **Capacity Utilization and Planning** " determine to the 'gross' margin, and therefore to a large degree the relative profitability of a particular utility company. What is the return on assets from power generation? Can this be improved? How? -- These are all questions that will be paramount for generators in the face of competition. Being able to operate efficiently in a power market will involve both high-utilization rates, and the ability to successfully plan and time the creation of new capacity. Utilization rates are increasing, as summer capacity margins have declined by 4% annually
- ➔ **Response Systems and Problem Management** determines the level of service that can be provided to the customer, as well as impact revenues and costs. Time that the system is down is lost revenue. The costs of resolving problems can also spiral out of control, as assets are hurriedly 'thrown' at problems. The ability to pre-empt problems, as well as quickly react with the right assets and information will be a real advantage.

Increasing Importance of Customer Relationships

Previously, there was no need for utilities to compete for their customers. Regulated monopolies were the norm. Currently, the idea of deregulation and competitive markets pressures utilities to improve customer service and the quality of services delivered. Commercial and industrial customers are turning to energy intermediaries, putting additional pressure on utilities. Finally, well-managed accesses to customers present opportunities for utilities to bundle services and provide value-added products through their existing channels.

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Innovation

Utilities will need to innovate for one reason: In the future, they will need to compete for their customers. They will be able to do this by competing in one of two ways, on service, or on price. In either case, innovation will be necessary to distinguish themselves from their competition in ways that can provide real business advantages. Any firm can increase service by increasing spending; the key will be to find ways to improve operations while spending less than competitors.

Many innovations were tried by utilities during the frenzy of activity of the late 90s, including such exotic services as data over power, fiber networks, and telecommunications services. Many of these businesses failed to take hold, but they were often based on pervasive misconceptions, such as the projections of the imminent need for bandwidth. Even clearly advantageous new ventures such as energy trading ran in to problems due to the excesses of the age.

Drivers of Innovation

Despite these growing pains, several new technologies have established themselves, providing a solid foundation for a quantum leap forward in the potential capabilities of utilities, and driving forward a new era of innovation. There are three primary technological enablers of the current innovations in the Utility Industry today:

- ➔ **Widespread Internet adoption** provides the ability to easily connect electronically with suppliers and customers in a way that is not reliant on costly proprietary systems such as EDI. At this point, most organizations are connected to the Internet, allowing for an unprecedented ease of communications and information flow.
- ➔ **XML standards** provide the means to connect data from disparate sources by providing a standard for data interoperability, substantially lowering the cost of integration. XML is the glue that enables intra- and inter-enterprise information sharing.
- ➔ **Mobile devices** allow communications, data access, and information sharing for remote operations and field services.
- ➔ Rapid advances are occurring in the capabilities of these devices, and the steady development of cellular and wireless networks have made remote access nearly ubiquitous.

XML is a markup language developed to structure and identify information. This allows data to be shared via common standards, identify a numbers on a Web page as things like "Price" or "Quantity" in a way that can be meaningfully interpreted by other programs. XML schema have been developed for many specific industries and purposes. Once a scheme is defined, when different systems want to share information, they only have to build one interface to the XML scheme, rather than to each different system. This reduces the amount of effort needed to share data, and provides new opportunities for information sharing and access. In a nutshell, XML does for data sharing what HTML did for document sharing.

"One of the fundamental rationales for deregulation or restructuring of formerly monopolistic industries is the concept that a market-based structure will induce creativity, leading to the creation of services with regulators and monopolistic producers would not have anticipated or provided."

Federal Energy Regulatory Commission, State of Markets 2000 Reports, Section II, page 1

Areas of Innovation

Collectively and alone, these technological drivers are enabling innovations in several areas that are improving the operations of utilities, such as:

- ➔ **Customer Service:** Utilities can present a single on-line face to the customer, pulling data from multiple sources and services. Currently, 36% of utilities are actively deploying Web Services². Electronic bill presentation and payment holds promise for improving the delivery and accuracy of complex bills to C&I customers. E-Bills not only control delivery costs, but can be embedded with analysis tools and interactive information not available with paper bills. Additionally, customer information can be used to target additional services such as load control and energy audits to appropriate customer segments, based on their activities and needs.
- ➔ **Field Services:** Wireless networking and mobile computing technologies are being employed by field services, providing the ability to link operations in the field with the rest of the enterprise. Scheduling and dispatch is just the beginning of the benefits. The field force can be integrated with enterprise data, and dynamically collaborate with enterprise employees. This provide the field force with access to trouble tickets, GIS, outage, billing, and other data in real-time and on-the-spot - enabling a true feedback loop between system management and problems resolution.
- ➔ **Business Activity Management:** There is a need for accountability and visibility into enterprise and individual business unit performance. As a result, utilities are developing systems that can integrate data from multiple sources, such as financial databases and operational data (e.g. SCADA) to provide real-time consolidated operational data. This enables the use of metric driven management - for strategic planning, it is necessary to track progress toward specific goals at every management level. It also provides credible data and transparency to regulators, customers, and shareholders. These innovations hold the promise of true enterprise asset and project portfolio management.
- ➔ **Operational Dashboards:** Utilities are able to improve the efficiency of their operations through the development of operational dashboards, providing line managers with operational data in an integrated and consolidated form. Currently many systems are capable of producing enormous amounts of data, application of business intelligence to this data improves management and operational control, and provides the tools for correlation of data points to pre-empt developing problems. This real-time understanding of operations in their particular business area provides the "how" of actually moving toward goals of cost reduction and efficiency improvement.

The Left-Hand Right-Hand Framework for Innovation

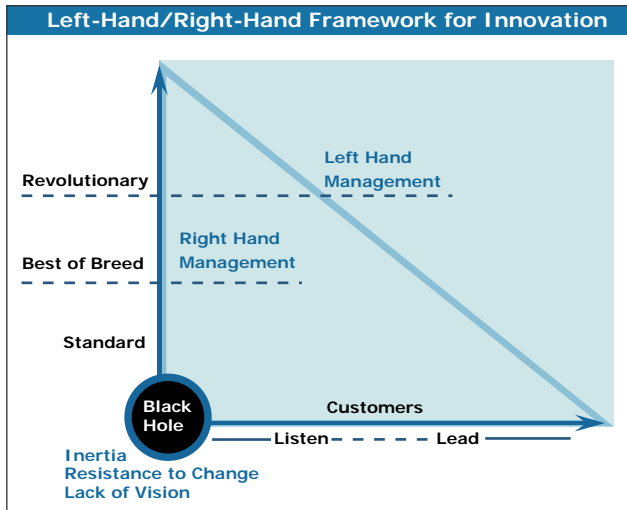
Individual instances of innovation are not enough in order to meet strategic goals. Instead, a plan for incorporating continuous innovation within the organization is necessary. These efforts at innovation need to be balanced between projects that have immediate impact on current operations, and those that are higher risk, but create opportunities for future growth. It is necessary to understand innovation portfolio in order to properly manage risks and maintain alignment with strategic goals.

Cambridge Technology Enterprises uses a framework for understanding innovation that has two types of innovation. Innovations are categorized as Right-hand or Left-hand ideas. Right-hand innovations are incremental improvements in things that are already being done by the organization, such as optimization of existing processes or edging into related product areas. These are things that are intended to improve today's operations.

¹ Energy Information Administration, Form EIA-411, "Coordinated Bulk Power Supply Program Report."

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Left-hand ideas, however, are innovations for the future, representing entirely new product or services types and new business models. These are the products and services that the organization will be dependent on five to ten years into the future.



Each type of innovation has different characteristics, and needs to be understood, judged, and led according to different criteria. Right-hand innovations need to be consistent with the current practices of the organization, and can be judged using traditional hurdle rates, or other existing metrics. Innovations in this space belong to the realm of managers, where risk management is the key. Left-hand ideas however, are by their very nature risky, and must be judged according to their potential. This is the space for visionary leaders, who can see past the current obstacles toward what could be possible. A viable business model will need to be developed to integrate a left-hand idea into the organization, and profit from it. This framework will be used to examine two case studies of utility companies that are innovating today, and the innovation plans they developed in order to meet their specific strategic goals.

Case Studies

A large integrated utility company in Florida set improving customer satisfaction as a strategic goal. Their customer satisfaction is measured by the American Customer Satisfaction Institute study. This metric bundles measures of service quality, pricing, and customer service. Working backwards from this goal, they decomposed the capabilities involved, and then generated a portfolio of ideas to address improvements in each of the required capabilities. For example, on the right-hand, they took advantage of the Internet as an opportunity to provide electronic billing to their commercial and industrial customers.

This provides cost savings in their current operations, as well as the ability to provide superior service due the interactive information possibilities of the e-bills.

The result of this particular project - built within 90 days is \$1.25 M in annual savings at a 10% adoption rate.

Field Force and Transparent Utility

A large, multi-jurisdiction utility based in the mid-west had two goals. They wanted to improve the efficiency of their field operations as they had identified problems translating designs into completed construction. They also needed a way to provide information to the public that would be believed and allow them to respond to recent problems in the media and with regulators. For their field force, the solution was a collaborative system for new hookups, providing designers access to information on best practices for their designs, a right-hand innovation. Equipment could be selected based on price, performance, and availability data. And the design itself is specified with GPS and GIS data, as well as digital photos and commentary. Field units have access to data and other employees to facilitate on-the-spot problem resolution. Result is better designs, more efficient use of field crews and equipment, and faster problem resolution.

The need to improve the sharing of data with customers and regulators resulted in a left-hand innovation. The solution was to create a "Transparent Utility". Data from multiple sources is integrated into summary information, and shared using a publish-and-subscribe model for information sharing. This allows internal users to get access to actionable information in an appropriate form -- plant managers have a view of their individual plant with multi-plant comparison information, while senior executives have rollup views of multiple jurisdictions. This system also allows for controlled access of credible information for customers, regulators, and financial markets. The result will be increased public trust, better access to financial markets, and improved regulatory relationships.

Conclusion

There are both competitive and regulatory challenges facing the utility industry. Changes in the market structure are introducing competitive markets and competitive pressures that did not previously exist. Increased regulatory oversight and public demands for both information and higher performance are beyond the limits of existing information systems. To be successful in the current markets, and be prepared for changes that come in the future, utilities will need to innovate.

Currently, due to technological advances, there are opportunities to turn existing challenges into opportunities. Utilities are innovating in several areas, taking advantage of advances in the networking, wireless communications, and XML data standards. The Internet is being used to provide detailed billing and customer service for commercial customers, while wireless technologies are providing field forces access to enterprise data and collaborative problem solving. Technologies such as XML provide the ability to tie together data from stovepipe systems, monitoring and correlating business activity to turn enterprise data into actionable information in real-time, and further improve operational performance.

These innovations were developed through the Left-Hand Right-Hand Framework for Innovation, a tool to plan a portfolio of innovative projects to meet specific strategic goals. The model balances innovations to improve current operations, and innovations that enable long-term growth - both of which are necessary for an organization to maintain real competitive advantages.

Innovations to Improve Delivery and Customer Service

