

E-Business Platforms in the Electricity Supply Industry

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Energy industry companies are poorly equipped to manage their exposure to the new risks inherent in a market environment. Through internal networking, as well as through the Internet, companies are increasingly able to improve critical business processes by more efficiently using both human and capital resources.

All over the world, the electricity supply industry is going through a period of unprecedented and momentous change. After a century of government ownership and heavy regulation, companies suddenly must become competitive in an increasingly global marketplace. Efforts to restructure have resulted in fragmentation of the industry's long value chain. Generation and retail supply have become competitive while transmission and distribution often remain regulated. With the removal of regulated rates of return and other past practices, the competitive portions of the industry are increasingly exposed to risk. Many existing players are poorly equipped to deal with new risks such as price volatility. New players have emerged to trade electricity and natural gas and to take advantage of arbitrage opportunities where none existed before. At the same time, technological advances in generation, communication, and end-use are fundamentally changing the make-up of the industry.

Incessant pressure to reduce costs, improve customer service and offer more customized services has resulted in many mergers and acquisitions. The cost of maintaining the infrastructure and investing in information technology has increased the significance of economies of scale to the disadvantage of smaller players. Likewise, pressures to maintain low prices and support diverse customer needs increases the importance of economies of scope. This, coupled with the convergence of the utility and telecom industries, has forced many companies to become multi-service utilities.

These developments all represent significant risks for incumbent players. At the same time, they offer new entrants opportunities that did not exist until a few years ago. To thrive in this dynamic marketplace, today's energy companies must cut costs, reduce time to market for new products and services, and adapt their business processes. In addition, they must successfully attract new customers while retaining existing ones.

E-Business Opportunities

To maintain their competitiveness, companies in all industry areas are moving quickly to capitalize on the Internet as a medium for conducting business. The growing importance of the Internet has created a multiplicity of new opportunities in the electricity supply industry, as in other sectors. However, it also represents a major threat for traditional operators, who in the past may have been slow to change. None of these companies can afford to ignore the potential of e-business.

E-business is not just about enabling business interactions over the Internet. Internal networks are equally important. Companies that implement e-business need to automate all their core business processes across multiple systems and extend these processes to trading partners where appropriate. The main goals of e-business are to make critical business processes faster, more effective, more dependable and more responsive to changing conditions. All these improvements are relevant to the electricity supply industry.

For these companies, e-business introduces the potential to achieve most or all of these goals:

- Gain end-to-end visibility and control of information across the extended enterprise
- Obtain a 360-degree view of the customer
- Develop closer relationships with key partners and customers
- Set up and change partnerships quickly and flexibly
- Cut time to market for products and services.
- Reduce administrative costs
- Respond rapidly to changes in regulatory and business environments.

The Implementation Challenge

Typically, companies first consider e-business when they have a simple integration problem to solve. For example, a company may want to make their CRM process more effective by creating a data-oriented enterprise application integration (EAI) program to consolidate customer information.

Alternatively, they could implement a data-oriented B2B program that will send orders to a vendor. Then, as its business requirements become more complex and more sophisticated, it can build on previous integration work to use e-business more comprehensively.

However, it is by no means easy to complete the transition to e-business. Even interim solutions can be labor-intensive and time-consuming. The process of integrating the company's internal information systems can require a great deal of effort if it involves a heterogeneous assortment of packaged and custom applications. The same applies to automating all the processes that coordinate interactions with customers, employees and trading partners. Furthermore, business managers need to continuously analyze these processes in real-time so that they can adapt them to support the changing needs of customers. Business processes also have to be tied to the company's information infrastructure. High levels of security and reliability must be maintained when exchanging business information.

To meet these challenges, companies need a comprehensive e-business platform to support real-time business interactions over both internal and external networks. A comprehensive platform makes it much easier to automate core business processes across multiple systems and to extend them to trading partners. Scalability is an important feature, because the complete process is built up gradually, often from small beginnings.

Elements of the E-Business Platform

The implementation of an e-business platform involves several elements. For most companies, it begins with enterprise application integration. EAI consists of an internal middleware layer that connects business applications across the local-area network or intranet regardless of data format. It ensures that data can move between these applications easily.

EAI can be used to link core business applications in areas such as marketing, customer service, procurement, finance and human resources. It provides an effective way of aligning multiple enterprise resource planning systems, whether these are independent applications or different versions of the same application. It is equally applicable to newer applications such as risk management tools, portals, forecasting tools, geographic information systems, executive information systems or workforce dispatching tools. EAI is often used to achieve a "single view" of customers

or business areas, and it may be used with portals that provide a common user interface to heterogeneous systems.

EAI is a cost-effective approach to integrating applications that are currently either completely independent or integrated using expensive point-to-point links that are difficult to maintain. Indeed, reduction in integration costs is one of the key benefits of EAI. It is estimated that 70 percent of all code written today consists of interfaces, protocols and other procedures to establish linkages among various systems. Typically, 30 percent of a company's IT budget is spent on building, maintaining, and supporting application integration. EAI can reduce application implementation costs by one-third and ongoing maintenance costs by two-thirds.

B2B integration extends the scope of EAI to encompass the exchange of data with external business partners and suppliers. The medium for this exchange is of course the Internet, or in the case of an electronic data interchange solution, the value-added network. Most financial transactions are likely to use EDI or XML standards, and there may be a need to convert transactions from one of these formats into the other.

A variety of B2Bi applications are available for the electricity supply industry. They support integration with a wide variety of entities, including procurement exchanges, energy exchanges and financial exchanges, as well as customers, suppliers and other partners. They can support data exchange with government agencies, industry groups, other companies and other industries. In some cases, they may be accompanied by the implementation of an electronic storefront for customer, partner, or employee self-service.

Neither EAI nor B2Bi have the ability to control and manage the flow of information from a central point. The underlying applications merely move data as instructed; they have no understanding of the overall business process. Because of this, most e-business platforms require what is known as business process management (BPM).

BPM provides the intelligent business processing logic that is required to coordinate and monitor the transfer of data. Although it is possible for companies to create their own bespoke applications for BPM, this involves lengthy development periods, complex coding, and is usually very expensive. The alternative is to use a BPM tool that can graphically define and then control the flow of data among

internal and external applications. Should the processes involved need adaptation or fine-tuning, only the graphic model – and not the underlying data structures – will need to be changed. Effective use of BPM enables very large volumes of business transactions to take place quickly, securely and at low cost.

For power companies, BPM can help to automate processes such as procurement, transmission reservation, scheduling, balancing, outage management, maintenance management, billing, settlement, environmental compliance and project management. It can also automate whole groups of processes such as offer-to-order or order-to-cash.

EAI, B2Bi and BPM are the three core elements of a successful e-business platform. Many platforms also incorporate a fourth element – the ability to perform real-time analysis. In contrast to traditional analytical tools that can only process historical information, RTA solutions provide access to information from the entire suite of integrated applications and subsystems at any point in time. RTA is often associated with closed feedback loops, which drive variations to business processes at run-time in order to accommodate a change in requirements.

E-Business Platforms in Action

The usefulness of e-business platforms to companies in the electricity supply industry is best illustrated by a specific example. Demand response (DR) is one area whose future development is likely to depend on the implementation of these platforms.

DR is a short-term response to the capacity shortages and transmission bottlenecks currently affecting the electricity industry in many areas, especially in the United States. It refers to the ability to buy back capacity from customers with discretionary loads when demand is high. DR offers an alternative to rolling blackouts or system collapses due to unmanageable peak usage, and programs are currently being implemented in several states.

For most customers, DR is only cost-effective if a service provider takes responsibility for most of the systems and processes involved. The DR service provider (DRSP) combines the buying volume of several customers and works as a middleman to provide a packaged service. Revenue is generated when the DRSP reduces the aggregate load of its customers given a signal from the ISO (or equivalent) to curtail load during emergencies. The ISO may offer a reward per MWh of load that is shed.

For a DRSP to succeed, it must use complex procedures in order to serve a large number of customers. Moreover, these procedures must be effectively managed; in practice, automation is the only option. Consider, for example, the process of buying back “megawatts” (load available to be curtailed) from a large number of customers, each with a unique set of requirements. As energy prices rise or are about to rise, the DRSP must be able to communicate with hundreds or even thousands of customers, instructing each to curtail certain loads according to pre-established procedures and agreements. The DRSP must work its way through the customer profile database, shedding some discretionary loads automatically, while enticing participating customers to shed other loads voluntarily. Some of this may be done in real time, and some with 24- to 48-hour advance notice. Advance warning is particularly important for price-sensitive loads. Critical loads, on the other hand, are never curtailed. The DRSP must be able to distinguish among the different loads for each customer, which may vary by the time of day and the energy’s price.

Throughout, the DRSP must receive and verify feedback from the customer, re-assess the situation, and inform the ISO of how much load has been curtailed. The process is an iterative one, being repeated every few minutes during critical periods. At the same time, the DRSP must constantly monitor the ISO’s prices, which may be adjusted upwards or downwards several times an hour. Sophisticated real-time coordination with other entities, such as power traders, power resellers and the distribution company, may also be required. If the DRSP is offering ancillary services in addition to basic load shedding, the situation becomes more complicated. More processes need to be coordinated if some customers have their own back-up generation capacity, which they use to sell back into the grid when prices are high.

At agreed-upon intervals, the DRSP must settle with the system operator. To do this, the DRSP must produce a detailed record of the amount of load curtailed every hour and the corresponding bid price. Depending on the service arrangement, this information forms the basis for billing the ISO. At the same time, the DRSP must also settle with its customers.

Commercial success in DR is critically dependent on the ability to manage complex business transactions among multiple

participants in real-time. The information infrastructures of the DRSP and other parties involved must be capable of achieving the required degree of coordination – a challenging and highly complex task involving both internal and external processes. First and foremost, the DRSP’s metering, billing, and settlement processes must be capable of dealing with thousands of customer accounts in a timely and accurate manner. In addition, sophisticated supervisory control and data acquisition (SCADA) systems are required to monitor customer demand and customer compliance with curtailment instructions. Because each customer has a unique load profile and service requirements, the DRSP’s systems must be able to support “one-on-one” CRM.

The fact that prices and loads need to be managed in real-time creates a requirement for dynamic, instantaneous communication. The communication platform must be robust enough to handle large volumes of traffic in a secure, uninterrupted manner. Communication protocols among the players must be standardized to allow rapid, low-cost implementation. Otherwise, transaction costs alone may negate the potential cost savings.

Flexibility is important for several reasons. Because of the different tariffs, regulations and market structures, systems will often need to use different business rules in different locations. DRSPs must also be able to adapt their business processes quickly in response to legislative and other external changes. Also, because they operate in a competitive environment, DRSPs will be obliged to continually innovate and enhance their service offerings and other aspects of their businesses. Before the development of the Internet, it would have been impossible for the companies in the DR value chain to meet these requirements. However, companies today have the option of implementing e-business platforms, which – with the incorporation of specific DR tools – meet all of these needs. Some suppliers now offer DR tools in the form of off-the-shelf application connectors, pre-built DR business process templates, or standards-based partner interaction models.

An Evolving Industry

Several leading power companies are now implementing e-business platforms. For example, one major transmission and distribution utility on the West Coast has recently deployed an e-business platform as the foundation for an “information bus” that connects

business-critical applications for outage management, power management, and distribution management. The new platform enables information from these disparate applications to be shared throughout the enterprise. Some power marketers are now using e-business platforms to integrate systems for credit management, power trading, gas trading, and risk management, and to interact with energy exchanges. Similarly, a small number of retail energy service providers are integrating applications for customer care, contract management, and billing, and exchanging data with generation companies, distribution companies, and exchanges.

Despite these exciting developments, the industry as a whole has been very conservative in its approach to e-business technology. Most of the applications in use are limited in scope and do not make full use of the technology’s capabilities. Companies in other industry areas, such as telecoms, have been subjected to competitive pressures for much longer and are making far more sophisticated use of e-business platforms. For example, many leading telecom service providers use e-business platforms to support convergent billing and CRM for voice and data customers. They are seeing many benefits, including:

- A single view of customers across product lines
- Flow-through service provisioning
- Effective management of operations in multiple regulatory jurisdictions
- Customer self-service
- Convergent billing of energy and telecommunication services
- Integration of operational support systems and back-office systems

Companies in the power industry now require similar applications. With e-business platforms, they have the opportunity to automate their processes to a degree that was not possible in the past. These platforms support the seamless integration of computer systems and business processes throughout the electricity value chain. Leading players are therefore carefully studying the experience of the telecom industry in the hope that they can pinpoint the optimal route to competitive success. At the same time, software companies are hard at work developing integrated systems tailored specifically for power companies. These will ensure that change in the electricity supply industry can be viewed as an opportunity as well as a challenge. ■