The E-Business Revolution in Energy Services

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ABSTRACT

The e-business revolution has arrived in the energy efficiency and energy services area. Companies are using e-business approaches to compete electronically, sell services and products—including energy efficiency—to new and existing customers, strengthen relationships with suppliers, contractors, and customers, and provide better customer service.

Example e-businesses include the energy.com energy marketplace superstore, utility.com, the first virtual utility, a British site that allows users to calculate savings from different energy suppliers, Web-enabled bill aggregation tools and energy audits. Another site, EDMPro.com, provides a range of energy management services targeted primarily at commercial chain accounts, including bill aggregation, load profiling, and energy efficiency analysis. Energy-efficiency services offered via the Web include home energy audits, estimation of energy costs, aggregated purchasing of energy efficiency products, and building benchmarking.

This paper offers insights into the key steps involved in configuring an e-business, and demonstrates how e-business can transform, and is transforming the energy and energy efficiency marketplace. This paper provides an overview of energy and efficiency related e-business concepts, and includes examples.

Introduction

As the Internet and associated technology proliferates, the face of the traditional economy is changing. The Internet creates non-traditional competition opportunities, allows for the application of knowledge and intellectual capital, and alters the way businesses are valued. The energy services sector—including energy efficiency services—is being directly and dramatically affected by these trends.

A study by the University of Texas Center for Research in e-commerce reported that the Internet economy overall grew at an annual rate of 175% from 1995 to 1998, and by December, U.S. e-business was valued at $300 billion (AESP 2000). Forrester Research, Inc. found that utilities are second only to the computing and electronics industry in their potential to do on-line business. A related Forrester study predicts that 11% of retail electricity transactions will occur over the Internet by 2004 (AESP 2000). As the energy services sector embraces the e-business revolution, there are several key principles governing successful e-business orientation in this traditionally "bricks and mortar" industry. A key driver in the new energy services economy is knowledge. "We contend that the ability to transition from a regulated monopolistic utility to a knowledge-based, dynamic competitor will be the key characteristic of industry leaders over the next few years" (Credit Suisse 2000). This knowledge includes advising customers on energy efficiency opportunities in their homes or businesses.

Principles of E-Business

E-business broadly covers any aspect of energy and efficiency services that can take advantage of the Internet and information technology. In general, e-business goes beyond e-commerce, and encompasses four major areas:

- Branding and Reputation Management (e.g., brochureware);
- Customer Relationship Management;
- Revenue Enhancement (e.g., e-commerce); and
- Business Process Improvement (including knowledge management) and Cost Reduction.

Energy-efficiency services and products can relate to all of the above. For example, utility sties, which offer on-line home energy audits, help the utility manage their brand and reputation for caring customer services in the face of deregulation and customer choice. E-commerce (selling commodity or products over the Internet) is but one dimension of e-business. In the energy services sector, this has been an important and highly visible dimension. However, the full e-business revolution encompasses all business processes and the complete value chain, including customers, suppliers, employees, and allies/partners. Companies have typically adopted e-business in a phased approach.

IBM's perspective of this adoption process is a continuum (Gort 1999). The process starts with the establishment of a Web presence to create a low cost marketing platform. E-business is then applied to **existing** business processes. For example, customers can "interact" with the company through largely self-service processes, such as reviewing their bill on-line or conducting a do-it-yourself home energy audit. An evolutionary advance is to enable customers to "transact" with the company, such as on-line bill payment or purchase of energy-efficient products such as compact fluorescent lamps. The final phase in this continuum is for the company to redefine completely their existing business processes around the e-business model. E-business ceases to be an adjunct to the bricks and mortar company and becomes the essence of the new business model. Cisco Systems takes this model one step further, and "defines real-time organizations" and "Communities of Interest/Market Makers" (Hartman, Sifonis and Kador 1999).

E-Business Principles Applied to the Energy Sector

The energy services sector has evolved a variety of product and service concepts and delivery channels. Many of these offerings have been driven by industry restructuring in the electric sector and the advent of competition. However, even regulated wires companies have found the need to embrace improved service delivery driven by performance-based ratemaking, and other drivers, such as the need to deliver cost effective energy efficiency programs. Thus, e-business applications may be found on both the regulated and unregulated sides of the energy sector.

Energy companies may seek to offer retail commodity products, such as electricity or natural gas, specialized commodity products, such as green electricity, or value-added products and services, such as home security, telecommunications, or energy efficiency

services and products. In addition to these largely e-commerce applications, customer acquisition and customer service over the Internet are also important applications.

One convenient way to categorize e-business applications in the energy services sector is by market segment: business to business, business to consumer, consumer to business, and business to internal. Example e-business applications in each of these categories are shown in Table 1.

Table 1. Example Energy Services E-Business Applications

Business to Business	Business to Consumer	Consumer to Business	Business to Internal
Energy and News Portals	Sign-on Rebates and Discounts	Priceline.com Concepts for Consumer Price Bidding	Knowledge Management and Sharing
Green Energy Tariffs	E-Billing and Pre-Selected Bill Dates	Consumer Requests For Quotations	HR Services
Extranet Interface with suppliers, distributors and partners	Payment Options	Consumer-Initiated Aggregation	Automated Workflow Processes
Market Nomination/ Auctioning Services	Consolidated Billing		Service Routing Requests
Meter Display/Analysis	Internet and Application Service		Document Management
Billing Options	Negotiable Monthly Flat Rate		Extended Teams
On-line Market Clearinghouses	On-line Customer Service/Support		Supplier Procurement Chains
Energy Data Management and Outsourcing	On-line Account Management		
Outdoor Lighting Services	Information and Education		
Energy Commodity Trading	Insurance and Warranties		
Load Settlement and Balancing	Interactive FAQs		
Telecom Data Networks	Telecom and Cellular Service		
	Satellite and Cable Service		
	Multilingual Services		
	"Green Energy"		
	On-line Real Time Energy and Appliance Usage with Money Saving Suggestions		

As these e-business applications are being launched, lessons learned and critical success factors are being formulated. Critical success factors for obtaining and retaining customers through technology include (Seybold and Marshak 1998):

- target the right customers;
- own the customer's total experience;
- streamline business processes that impact the customer;
- provide a 360 degree view of the customer relationship;
- let customers help themselves;
- help customers do their jobs;
- deliver personalized service; and
- foster community.

E-business applications are being employed across all vertical segments of the industry. This includes wholesale, trading, T&D, and retail, as well as add-on services, such as energy efficiency. Therefore, "customers" may include traders, retailers, aggregators, trade allies, and other market actors in addition to the traditional "end-use" customers of utilities.

Examples of E-Business in the Energy Sector

The e-business revolution in energy services is characterized by the magnitude and diversity of applications. For example, a recent study by Chartwell includes 44 case studies, 53 vendor profiles, 100 utility/energy company surveys, and over 200 interviews (Chartwell 2000). Andersen Consulting reported that, of the utilities it surveys, the percentage that had Web sites rose from 10% in early 1998 to 95% in early 1999 (Anderson Consulting 1999).

A full survey of energy services-related e-business applications is beyond the scope of this paper. Table 2 provides an overview of selected sites and applications. This is followed by brief case examples of a small number of e-business offerings in the energy sector, with particular examples relating to energy efficiency services.

Table 2. Overview of Selected Energy Related E-Business Offerings

E-Business	Market	Value Segment	Description
Utility.com	B2B, B2C	Retail	Electricity, gas, and related services
Essential.com	B2C	Retail	Electricity, green power, gas, oil, propane and other household services
New Energy Ventures	B2C	Retail	Green power and on-line account management
Seattle City Light	B2C	Distribution Services	Energy efficiency services for customers
Houston Street	B2B	Wholesale Trading	Buy and sell wholesale commodity electricity
Enermetrix.com	B2B	Retail	Retail transactions for electricity and natural gas

E-Business	Market	Value Segment	Description
ElectricityChoice.com	B2B	Retail	Aggregates customers with similar load profiles into buying groups (cybermediary)
Energy.com	B2C	Retail	Retail customer acquisition for suppliers (cybermediary)
Nexus ENERGYSmart	B2C	Retail	Savings potential of energy-efficient appliances
Nexus EnergyGuide	C2B	Retail	Customer research of alternative suppliers (cybermediary)
Enercom Energy Depot	B2B B2C	Retail Distribution Services	Energy shopping mall Load Management Offerings
DTE Energy Buying Club	B2C	Retail	Customer Acquisition/aggregation
Green Mountain Energy	B2C	Retail	Green power
Enron	B2B	Wholesale, Retail, and Trading	Gas, electricity, and related services
PowerTrust.com	B2C	Retail	Gas, electricity, oil, and related services
Commonwealth Energy	B2C	Retail	Electricity, green power, energy efficiency products and energy management services
FP&L EDMPro	B2B	Retail	Account management for national accounts
Virginia Power	B2C	Pre-Retail	Preparing consumers for retail electric choice
Enmax	B2C	Retail	Electricity, deregulation education, and interactive rate calculator
Wisconsin Public Service	B2C	Retail	On-line new service request
ICF EnergyVision	B2B	Wholesale Distribution Services.	Web-enabled load balance and settlement
EPA ENERGY STAR® Buildings	Gov't Site	End Users	On-line energy efficiency benchmarking tool
C3 Communications *Purview*	B2B	Retail	Internet-based meter data acquisition and data analysis

E-Business Case Examples

In this section, we describe a selected number of energy-related e-business concepts. Our purpose is to demonstrate the variety of applications and approaches that is revolutionizing the energy services industry.

Utility.com

Utility.com characterizes itself as the first Internet electric company. In addition to retail electricity, the company offers natural gas, water, Internet services, telecommunications, and a whole house warranty on major systems and appliances. Customer acquisition is facilitated by a 10% savings offer on electricity and an Electronic Coupon worth $25. The company targets customers, investors, competitors, partners, and suppliers. Customers accept e-billing and on-line account management and support. The site promotes reliability and privacy, and answers frequently asked questions. In enabling electronic transactions, communications, self-service, and customer education, the company is targeted toward Internet capable customer classes. Costs are controlled significantly via the almost complete on-line operation of the business. (Some Utility.com employee business cards feature no address and no telephone or fax number, only the employee's name and their e-mail address). Utility.com's Web site was rated the number one energy site in 1999 by Andersen Consulting.

Energy Data Management (EDM) Pro

Florida Power and Light (FPL) sought to develop a competitive position in the deregulating retail energy market. To be a national player, FPL realized that they would have to sell energy-based products and services to large, geographically dispersed organizations that were both regional and national in scope. FPL developed EDM Pro to facilitate this market entry. EDM Pro is a dynamic e-business solution that equips large, nationally based clients (typically large chain operations) with the capability to manage centrally their energy expenditures. EDM Pro transforms energy bills into a Web-accessible system easily audited for savings and accuracy. Other Web-based services available to FPL customers through EDM Pro are energy efficiency analysis, load profile retrieval, bill consolidation, procurement strategy, and detailed reporting which facilitates energy management and efficient utilization across wide geographical areas.

Enermetrix.com

An evolving class of energy e-businesses is the so-called "cybermediary" or "infomediary." These businesses effectively act as a broker, bringing together buyers and sellers over the Internet. Enermetrix.com allows electricity and natural gas buyers and sellers to share up to date price and market information, and to execute on-line transactions. Transaction reports also can be generated on-line. Enermetrix has its own site, and provides services through affiliated utility sites and portals, such as SCANA Online Energy. According to an Enermetrix study of large gas customers in New York, those customers who

had already left their incumbent utility saved, on average, another 6% through their initial Enermetrix transaction, and almost 12% through their second transaction (AESP 2000).

HoustonStreet.com

Houstonstreet .com is a trading site for wholesale power trading, which recently went national from its northeast regional beginnings. The site is for registered traders only. Traders can post offers, make bids, counter, and recounter over the Internet site with real time trade support systems, such as credit ranking built into the system. Most similar trading functions have been historically handled by telephone.

Essential.com

The essential.com site bills itself as "Your Energy and Communications Superstore." The site is based on the premise of providing an on-line one-stop shop for all of the essential services needed to run a household or small business. It offers electricity, green power, natural gas, propane, heating oil, Internet service, satellite services, and telecommunications services. E-billing and payment and on-line account management and customer support are basic to the e-business model. Recently, Essential.com has offered customer acquisition incentives, including a $25 rebate, one year free Internet access, $100 off electricity, and six months free long distance basic service with 200 free minutes.

The Demand Exchange

Apogee Interactive's Demand Exchange is an e-business approach aimed at a particular market niche: customer-owned distributed generation that can be accessed as a peak load management resource. The site uses forward pricing and an auction process. Customers with backup generation, or who can otherwise curtail their load, can look at day ahead conditions and electronically offer to cut their peak demand. If the offer is accepted, the customer can share up to 50% of the avoided peak spot costs incurred by the supplier. The Demand Exchange has signed up 10 utilities with over 1,200 customers and an aggregated load management potential that exceeds 2,500 MW.

Wisconsinpublicservice.com

In a business to internal application of e-business, Wisconsin Public Service found that new natural gas customers often had to wait up to a month for new service because 11 different departments had to process each request. This process led to duplication, repeated calls to the customer, much paperwork, and frustrated suppliers. The utility implemented an Internet-based order tracking system to improve customer service and supplier satisfaction. The system produced a 60% return on investment and reduced service request processing time by 93%.

Energy Vision 2000™

As energy markets deregulate, suppliers and distributors must have the ability to balance loads on the system and reach financial settlement on the differences between load supplied and load actually delivered to customers. In addition, retail companies need the ability to cost effectively acquire and enroll customers, verify enrollments, offer pricing proposals, manage margins, and handle large customer billing. Energy Vision 2000™, developed by ICF Consulting, is a Web-enabled modular software system built using optimized data models and a dynamic data warehouse, which addresses these business processes. The system uses the Internet to facilitate the millions of complex transactions that deregulated utilities and energy service companies must process each day.

ENERGY STAR® Building Label

The ENERGY STAR® Building Label is an Internet-based commercial building benchmarking tool. Developed by the U.S. Environmental Protection Agency (EPA), the site allows building owners and operators to enter selected data about their building, including billing data. The tool then benchmarks the building against comparable buildings in terms of energy consumption, and adjusts the benchmark score for several key parameters such as climate zone, occupancy, hours of operation, etc. The score is reduced to a single number on a 1-100 scale. A score of 75 or above allows the building to apply for the ENERGY STAR® Label indicating the overall building's energy-efficiency credentials. The site allows building owners to maintain a password-protected area to store energy data and re-bench facilities at any time. The benchmarking feature promotes energy efficiency improvements in the office, retail, and school building type areas (with other building types to be added to the site).

Nexus ENERGYsmart®

ENERGYsmart® is an Internet system (also available in CD-ROM) designed to assist customers in making smart energy choices, from how they use energy in their homes to what appliances they buy. The system contains recommendations on reducing energy costs through smart energy management. By accessing the billing utility's billing systems, ENERGYsmart® also informs residential users how their energy use compares to that of similar homes (a powerful inducement to energy efficiency). Specific features of the system provide information on individual appliance energy usage and how much might be saved by consumers if they purchased new energy-efficient appliance models. The system contains a link to ENERGYguide.com, a secure electronic commerce site where consumers can purchase energy-efficient products to implement ENERGYsmart's recommendations. Thus, energy efficiency recommendations and products are being promoted and sold via an e-business application.

Conclusions

E-business is truly revolutionizing the energy services industry. E-business applications affect wholesale, retail, trading, energy efficiency, and load management. Internal business processes also are being radically altered. The Internet, and information and

communications technology advances have fostered a whole new business approach, leading to the proliferation of "new economy" energy services companies. In some cases, these firms are part of traditional utility companies, and in others, they are new startups. Energy efficiency is an integral part of many of these offerings. Most sites and tools related to energy efficiency appear to have one of tow foci. They are either "do-it-yourself" home or small business energy audits and savings tips (usually proffered by regulated wires companies), or offer a capability to track, benchmark, and understand your energy consumption. The latter service promotes energy efficiency, and is often part of choosing among alternative retail suppliers.

The convergence of technology and deregulation has created completely new business opportunities. However, with new opportunity comes new risk. As the energy services industry itself "shakes out," so will the e-businesses in the energy services sector. As technology continues its advance the only thing that is certain is that there will be continued change in the way we both use and transact for energy services, including energy efficiency services and products.

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