eBidenergy.com - Internet Based Energy Analysis and Procurement

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ABSTRACT

Logical Energy Solutions (LES), in partnership with the New York State Energy Research and Development Authority (NYSERDA), has developed an integrated Internet based software system, eBidenergy.com, which allows commercial and industrial energy users to analyze and competitively procure their energy. As deregulation and restructuring move the electric utility industry towards retail competition, many end-users do not have the energy information management capabilities necessary to make informed decisions. While separate tools and services are available on- and off-line and through energy service companies, there is no single fully integrated solution to meet the needs of these end-users. This paper provides an overview of eBidenergy.com capabilities and applications.

Introduction

Deregulation of the U.S. electric utility industry has been underway for some time now and has the ultimate end goal of introducing competition to stimulate innovation and create choices for the benefit of end-use consumers. The pace of deregulation has varied for each state, with about half already engaged in restructuring with a goal of retail access and the balance having introduced or pending legislation, unsuccessful legislation or have studies underway. In each case, the actual time path has varied, with states having transition periods of as long as seven years, as is the case here in New York State.

As the process unfolds, the industry has undergone rapid restructuring. Under asset divestiture requirements, 65 gigawatts of capacity (11% of industry) has been sold or made available for sale over the past two years. In the past seven years, actual and pending mergers and acquisitions will result in consolidation of one-third of the industry. New economic actors (independent generators, marketers, aggregators and energy service companies) have emerged from a handful to several hundred. New market exchange platforms have been created. Since 1996, the volume of electricity traded has increased more than eightfold, and it is projected that by 2003, the monetary value of electricity trades (physical and financial) will be on the order of $2.5 trillion. All of this activity is being driven by the search for market opportunities and economic profits.

Just as quickly as end-use marketers have emerged, their ranks have also diminished as the realities of low profit margins, high entry costs and marketing difficulties became clear. End-users may expect higher prices and less choice until the transition to a fully deregulated industry is complete. It is important to note that most regulated utility restructuring plans enable competitive generation but leave transmission and distribution functions as regulated entities. For the typical end-user, only about 25 percent of their monthly electricity bill accounts for generation related costs thus reducing competitive opportunities. Since electrons are not differentiable, transactions are essentially commodity sales and the advantages to buyers and sellers only come with larger quantities and favorable time-of-use (i.e. peak or off-peak) load profiles. Energy marketers are able to offer the most competitive rates to users who have large kwh loads and kw demand peaks that occur outside of normal peak demand periods (10 am to 2 pm, weekdays). These customer profiles also tend to help balance out the marketer's aggregate profiles, which inevitably do include peak demands from other customers.

Only large end-users, with sophisticated energy information management systems capable of analyzing and managing interval energy usage (i.e., kwh, kw, load factor) are able to benefit

from retail access and be attractive customers to marketers.It is now only beginning to become apparent to other end-users that detailed knowledge of their current energy usage and costs and analysis capabilities are necessary in order to make informed decisions in competitive purchasing of electric utility services. Such capabilities include management of historical, real-time and forecasted interval energy use data for single and multiple facilities and solicitation of bids from energy marketers using appropriate energy use profiles. While separate tools and services are available on- and off-line and through energy service companies, there is no single fully integrated solution to meet the needs of these end-users.

Internet Based Energy Analysis and Procurement

NYSERDA has a long standing R&D program to advance innovative technology which helps end-users overcome limitations in their ability to manage building energy usage. To this end, NYSERDA has supported the development of an Internet based energy analysis and procurement concept, eBidenergy.com, which is designed to help fill capability gaps of many New York State end-users, particularly small businesses, public housing and education organizations, and enable them to benefit in a competitive energy environment.

eBidenergy.com is an integrated hardware and software solution for automating the local control, data acquisition and energy procurement associated with all energy-related systems found in buildings. The system will allow for top level aggregation of energy usage across multiple site facilities and for customers to procure natural gas or electricity on the open market. The system will be the first entirely Web-based package that can provide comprehensive analysis, reporting and procurement functions. eBidenergy.com is intended to provide benefits to end-users, having single or multiple facilities, in a deregulated environment, including: identifying and localizing of energy costs to specific end-use equipment or areas within facilities; billing of individual budget centers for energy use; making personnel more aware of conservation opportunities; and enabling informed decision-making on the procurement of natural gas and electricity based on real time information. eBidenergy.com consists of two functional modules, energy analysis and energy procurement, which are described in the following sections.

Energy Analysis Module

The energy analysis module allows an organization to characterize and evaluate its energy use in creative ways such as grouping by geographical location, time and patterns of usage, and organizationally, such as administration or manufacturing processes. The data can be organized to iterate possible clusters and groupings of energy usage at the department, divisional or corporate level, essentially creating an energy accounting system which can be related to output (i.e total Btu's per widget).

Remote monitoring and data acquisition is achieved through use of a variety of hardware options ranging from: low-cost utility and sub-metering grade (Webfoot, $75/meter, $475/point installed); utility approved, revenue grade (DR/87, $645/meter, $1,955/point installed); and power quality grade (Square D-Powerlogic, $2,500/meter, $6,015/point installed). All metered points require utility pulse initiators and existing or dedicated telephone lines. The energy analysis service is provided for a monthly fee per metered point that ranges from $0.50 - $1.25/day depending on polling frequency and total metered points. On average, the energy analysis services cost about 0.5% of customers annual energy expenditures.

By managing, scheduling, and evaluating alternative usage patterns and alternative on-site energy sources (i.e., cogeneration), the user can identify strategies for conservation, load shifting and energy cost budget allocations. Users can retain historical records of energy use patterns and apply them to a variety of analytical and visual methods. Energy usage data are updated automatically or manually from as many metered locations as the user deems necessary.

eBidenergy.com provides seven attributes to configure and analyze energy use data: Rate Design, Energy Profiling, Rate Analysis, Energy Comparison, Expression Wizard and Site Map

Configuration. Rate Design allows users to easily add or modify rate sets whether they are for regulated or special contract-based offerings. Energy Profiling allows users to visualize energy consumption data in a wide variety of formats including: time (15 minute through monthly); demand (min/max/coincident, load factor); usage and demand aggregation (sub-meter to master meter); time of use (peak, off-peak, mid-peak); and download preferences for third party applications. Rate Analysis allows comparison of different rate structures available to the user. Estimated Billing allows comparison of demand or usage between different periods (daily through monthly) and locations, and forecasts for the duration of the billing cycle. Expression Wizard provides customized mathematical operations such as: summing individual meters, or embedding seasonal variations and operation schedules for forecasting. Site Map Configuration allows the user to define how individual meters roll-up to the organizational level, and enables sub-aggregation comparisons and coincident demand scenarios.

Energy Procurement Module

The energy procurement module allows energy users and suppliers to come together in an efficient, competitive auction format, to buy and sell retail energy contracts. The energy user is able to post requests for proposals to buy energy specified by load profiles (hourly, daily, etc.), multiple sites, periods of time and other more detailed terms and conditions. Energy suppliers, qualified by eBidenergy.com, are able to browse and bid on any profiles of interest in a fully-automated, intuitive and easy-to-use online service that is available 24 hours a day, seven days a week. The module enables a large number of energy buyers and sellers to interact in an open and efficient manner. Buyers enjoy reduced cost and time spent preparing for and seeking alternate energy supplies, while suppliers enjoy reduced marketing costs. The energy procurement service is supported by a fee which is paid by the seller for each completed transaction.

eBidenergy.com provides five energy buyer attributes to facilitate preparation and solicitation of requests for bids: Locations, Energy Information, Natural Gas and Electricity RFP's, and Auctions. Locations allow the buyer to identify physical sites for delivery and attach use and demand profiles. Energy Information allows the buyer to specify all of the relevant energy usage statistics to an energy seller (billing days, usage and demand, peaks). This information is posted in a tabular spreadsheet format based on historical information derived from the Energy Analysis module and customized by the Expression Wizard (i.e., weather expectations, operation schedules, new equipment). Natural Gas and Electric Request For Proposals (RFP) allows the buyer to specify terms and conditions including distribution system, classifications, duration of the contract, type of agreement (term, spot) and pricing. Auctions allow the buyer to initiate new auctions and monitor status of existing auctions.

eBidenergy.com provides four energy seller attributes to facilitate response to solicitations: Browse Electric and Natural Gas Auctions, Review Open Bids and Auctions Won. Browse Auctions allows sellers to browse open auctions by state, each of which provides time remaining, current low bid and other detailed information. Review Open Bids allows sellers to review open auctions in which they presently have bids posted and comparisons to low bid. Review Auctions Won allows sellers to review auctions for which they have the wining bid.

Operational Status and Customer Benefit

eBidenergy.com has been up since October 1999 and as of March 2000, has secured ten large commercial and industrial customers, each having multiple facilities primarily in the Rochester, New York metropolitan area. A formal marketing program for new customers will commence later this year. Twenty qualified energy suppliers with national scope of presence are also participating on the sell side of the auction. Negotiations are underway with a global energy provider to introduce the service to European markets. No other web-based services are known to exist, which provide integration of energy analysis and procurement functions for the end-user.

One of the largest real estate management companies in upstate New York has been on the system since late 1999. The company experienced immediate operational savings by eliminating on-site meter readings and manual disaggregation of master-metered properties for billing purposes. Since tenants have been provided with interval usage data, they have been able to identify and act on specific electric loads to reduce their individual costs. The company has also been able to identify lighting and zone heating conservation opportunities in common areas, thereby reducing usage by 10 percent.

Another customer, a local economic development organization, was able to identify an unexpected peaking demand situation due to improper start-up scheduling.

A third customer, a large pharmaceutical manufacturer with eight transformers supplying its facilities, was able to identify a power quality/harmonics source which was interfering with its manufacturing process electronics.

To date, five energy procurement auctions for multi-month usage periods have been facilitated for a total of 100 million kWh of electricity ($2,200,000) and 400,000 therms of natural gas ($112,000). Energy cost savings for each transaction has averaged about 10%-15% below the customer's traditional sources.

Future Applications

NYSERDA is working with New York State government regional offices and school districts to help them develop improved energy management strategies and better utilize energy performance contracting services. In a pilot program, we are utilizing the eBidenergy.com platform to enable centralized monitoring and aggregation of utility accounts for these multiple facility organizations. NYSERDA is also investigating the application of eBidenergy.com in achieving aggregation in the low-income and public assisted sectors to improve energy affordability and improve efficiency.

Conclusions

eBidenergy.com has developed an internet based service which integrates energy monitoring and analysis capabilities with complete energy procurement functions. While eBidenergy.com has been operational for less than one year, it has secured several customers who have realized energy efficiency improvements as a result of improved energy monitoring and analysis capabilities and have also achieved commodity purchase savings of both natural gas and electricity. Pilot applications are being pursued in office, educational and housing facilities owned, operated or subsidized by New York State and local governments. eBidenergy.com is also pursuing partnerships for application in the European markets.

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