Using Data to Forecast, Plan and Manage Your Energy Spend

Strategic Energy Procurement

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—Andrew Singer, Vice President, National Accounts, Constellation

Commercial and industrial businesses and government agencies are actively looking for effective ways to reduce energy usage and costs. According to the 2012 Deloitte reSources study1, 90% of companies have set goals regarding electricity and energy management practices, and 85% of businesses view reducing electricity costs as essential to staying competitive. Harnessing energy data for strategic energy planning and management is key to any business or agency meeting their energy-related goals.

Employing a data-informed energy procurement plan can help companies mitigate the risk of price fluctuation, more accurately budget and forecast, and provide flexibility to lower their energy spend and energy consumption enterprise-wide.

Energy data is more accessible today thanks to the convergence of technologies such as automated building controls, advanced meters, and enterprise energy management software—with unprecedented access to real-time market prices and regulatory and legislative insight.

Many businesses struggle however to utilize energy data to gain insight and long-term control over energy costs in the procurement process. It can be challenging to access data in uniform formats, aggregate data from across multiple locations or systems, have the expertise and resources required to understand and analyze the data, and/or make the data actionable. As a result, energy decision makers may become unsure about knowing how much energy to procure, when to transact on an energy contract, and for how long.

This paper will discuss practical strategies for building an energy procurement program that utilizes energy data to mitigate price risk, allows more accurate energy budgeting and forecasting, and provides your business with the flexibility to optimize its enterprise-wide energy spend and energy consumption. Although the principles addressed can be applied to electricity and natural gas procurement and management, this paper will reference electricity examples and strategies specifically. In addition, it will answer the following questions:

• Why are some companies not optimizing energy data?
• What is strategic energy procurement?
• How are leading companies using strategic energy procurement to lower energy costs and energy consumption?

Many energy decision makers continue to struggle to utilize existing data to make informed decisions that can lower cost and consumption. Lowering energy cost and consumption can lead to increased savings, profits and financial returns. In order to understand the opportunities and strategies available, one must first understand what energy data is, why it is important, and how companies are using it to procure energy supply.

1. Deloitte reSources 2012 Study based on more than 600 online interviews with business decision makers.
What is Energy Data?
Energy data can fall into three categories: customer data, historical market data and future market data.

Customer Data
• Customer profile: The business goals, including financial, market, energy and sustainability objectives.
• Historical usage: How much energy the business uses, when that energy is consumed during the day or year, and at what price.
• Forecast usage: How much energy the business is expected to use in the future.

Historical Market Data
• Historical prices: Past energy prices during specific time periods in specific geographic zones.

Future Market Data
• Forward prices: Current prices for energy in the future in specific geographic zones.
• Energy market influencers: Any information or data that indicates how energy prices may shift for a specific period of time in a specific geography; this includes federal, state, or local energy policy. It also includes supply and demand indicators such as economic, geopolitical, technological and fundamental commodity supply.

Why a Strategic Procurement Plan is Important
Both energy demand and energy market prices fluctuate, and business budgets and goals change over time. An energy strategy that can be actively managed and dynamically deployed can take advantage of market movements and end-use operational flexibility to lower total cost over time.

Rigid, inflexible “set it and forget it” procurement strategies for energy supply can make it harder for energy managers to actively manage and document costs. Companies that follow a strategic plan can track budgets, reduce energy consumption, lower costs, and monetize their energy through load response programs and integrated energy efficiency measures. An enterprise energy program integrates energy procurement strategy, forecasting and reporting with a business or agency budget, energy cost reduction, and sustainability strategies.

The Four Steps of Strategic Energy Procurement
An integrated energy procurement strategy is comprised of four steps:
1. Analysis of your company needs and objectives
2. Development of a personalized strategy
3. Execution of the strategy
4. Maintenance—adjusting the program based on actual costs and market conditions, and management for ongoing effectiveness.

Step 1: Analyze your company needs
A strategic energy plan should be in line with your corporate objectives, goals and business risk profile. Successfully managing energy cost can help a company meet overall energy and budget goals such as cost reduction, energy conservation and budget benchmarking, in addition to additional goals including branding, environmental stewardship and employee satisfaction.

Different companies have different priorities, and a strategic energy program can help reach them. Companies also have different risk profiles and philosophies on risk management. Because a strategic energy program can affect other areas of your company (from finance and treasury to the production floor), understanding your company’s position on risk management at the beginning of the development process can save you from problems down the road and position energy procurement as a key player in helping meet overall company strategic initiatives. And the final aspect in the analysis phase is documenting your energy management resources. Determining your staff and resources available to input data, review reports, and compare and execute procurement options is a key component for choosing the type and quantity of data you want to utilize, as well as the resources and expertise of potential energy suppliers.

Your business objectives may include goals such as the following:
1. Overall cost containment
2. Energy reduction
3. Budget targeting
4. Sustainability
5. Profit margin
6. Manufacturing output
Comparing Energy Procurement Options

Comparing actual energy procurement scenarios is the best way to assess options and determine your perspective on risk management. By using forward prices and historical demand data, you can view multiple scenarios in which different percentages of your load are fixed versus index price. In the example on page 6, you can see five options for projected costs for a customer looking to purchase for a one-year term. The fixed percentages vary from 25% of the load up to 100%.

Visualizing energy data allows you to see that projected costs are lower as you increase the percentage of load on index rates, primarily due to the fact that fixed rates generally incorporate an embedded cost for the rate certainty (often referred to as Variable Load Cost). Option 3 (with 63% fixed) is expected to be $3,476 less than the 100% fixed scenario. You can also view potential high-case and low-case cost scenarios associated with each layering option. Because the 100% fixed option has no supply cost variability, it will always meet the expected cost (based on the assumption that the demand for the energy is the same as the historical demand). The options with a lower percentage of the load fixed have more potential for variance in cost than the 100% fixed benchmark due to exposure to the variable index market prices. Here is an example.

![Energy Strategy Planner—Budget Estimator](Image)

**Total Estimated Cost**

<table>
<thead>
<tr>
<th>Total Percentage Fixed</th>
<th>100%</th>
<th>81%</th>
<th>63%</th>
<th>44%</th>
<th>25%</th>
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</thead>
<tbody>
<tr>
<td>Total Expected Budgetary Cost</td>
<td>$362,143</td>
<td>$360,406</td>
<td>$358,668</td>
<td>$356,930</td>
<td>$355,192</td>
</tr>
<tr>
<td>High Cost Case (upsided risk)*</td>
<td>$362,143</td>
<td>$370,384</td>
<td>$378,625</td>
<td>$386,866</td>
<td>$395,106</td>
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<tr>
<td>Low Cost Case (downside potential)</td>
<td>$362,143</td>
<td>$352,658</td>
<td>$343,173</td>
<td>$333,688</td>
<td>$324,202</td>
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<tr>
<td>Expected Variance to 100% Fixed</td>
<td>($1,736)</td>
<td>($3,476)</td>
<td>($5,213)</td>
<td>($6,951)</td>
<td></td>
</tr>
<tr>
<td>Potential Budget Increase</td>
<td>$9,979</td>
<td>$10,957</td>
<td>$29,936</td>
<td>$39,914</td>
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<tr>
<td>Potential Budget Decrease</td>
<td>($7,748)</td>
<td>($15,495)</td>
<td>($23,243)</td>
<td>($30,990)</td>
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</table>

**Fixed Quantity Expected Costs:**

<table>
<thead>
<tr>
<th>Current Percentage Fixed</th>
<th>25%</th>
<th>25%</th>
<th>25%</th>
<th>25%</th>
<th>25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Fixed Cost</td>
<td>$91,321</td>
<td>$91,321</td>
<td>$91,321</td>
<td>$91,321</td>
<td>$91,321</td>
</tr>
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<table>
<thead>
<tr>
<th>Additional Percentage Fixed</th>
<th>75%</th>
<th>56%</th>
<th>37%</th>
<th>19%</th>
<th>0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Fixed Layers</td>
<td>$270,823</td>
<td>$203,117</td>
<td>$135,411</td>
<td>$67,706</td>
<td>$0</td>
</tr>
<tr>
<td>Total Fixed Layers</td>
<td>$362,143</td>
<td>$362,143</td>
<td>$362,143</td>
<td>$356,930</td>
<td>$355,192</td>
</tr>
</tbody>
</table>

**Floating Quantity Expected Costs**

<table>
<thead>
<tr>
<th>Percentage Floating</th>
<th>0%</th>
<th>19%</th>
<th>27%</th>
<th>56%</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floating Load</td>
<td>$65,968</td>
<td>$131,936</td>
<td>$197,904</td>
<td>$263,872</td>
<td></td>
</tr>
<tr>
<td>High Cost Case</td>
<td>$75,946</td>
<td>$151,893</td>
<td>$227,839</td>
<td>$303,786</td>
<td></td>
</tr>
<tr>
<td>Low Cost Case</td>
<td>$58,220</td>
<td>$116,441</td>
<td>$174,661</td>
<td>$232,882</td>
<td></td>
</tr>
</tbody>
</table>

†Total charges include average estimates of $0.0038/kWh of Market charges and $0.0023/kWh of UDCCharges. These are estimates only and may be subject to material changes at any time. It is recommended that customer supply CNE with their own UDC charge estimates. No Tax estimates are included.

Layering scenarios can also be viewed per month to allow you to plan for any specific seasonal demand changes you might expect (production schedules for manufacturers, tourist or convention bookings at hotels, heating, and cooling seasons, etc.) or allow you to plan your energy budget to match with financial timelines, including quarterly earnings reports. In the chart on the next page you can see both the expected energy costs per month (dotted line) and the potential high and low-range cost for each month. In the table on the following page, you can also see the forecasted on-peak and off-peak load (kWh) as well as the average peak demand by month. By reviewing this analysis with a knowledgeable and integrated energy provider, you can evaluate if you have options to shift your load and reduce energy demand. This can be accomplished with load response or energy efficiency programs which would allow you to lower your overall total energy cost.
Using Data to Manage Your Plan and Energy Spend

Once you determine the best option for your business based on this diverse set of data inputs, you can move onto tracking your budget and your plan.

Ongoing tracking of strategy performance over time makes managing cost and risk decisions considerably easier. Many companies monitor costs and usage on a monthly basis.

The monthly report should allow you to compare the forecast information to the actual results, and see how close your planned cost and demand are to the estimated figures. This will allow you to adjust your program as needed based on empirical and quantifiable results. In the sample below, you can see that for the month of August the sample customer had a forecasted consumption of 4,205,570 kWh and an electricity budget of $340,651. The strategy analysis shows the hedging strategy employed and the usage and cost associated with that particular strategy during that month. Comparing the actual energy demand to the forecast allows you to examine how your energy is being used. This is especially important for enterprise companies that have multiple facilities and multiple accounts.

When actual consumption varies greatly from forecast, you may be able to identify a change in a process, a problem with a thermostat or chiller, or an occupancy shift. You can also identify opportunities for load shedding through temporary means such as Load Response, or permanent measures such as energy efficiency programs. A variance to the budget report will show you on a monthly basis how your actual costs compare to the forecasted costs, and how your budget compares to the forecasted budget. It also reveals how your strategy compares to the average market settlement.

In Example 2, the customer’s August actual budget cost and consumption was slightly lower than forecast. What’s more, because their actual consumption was 115,293 kWh lower than the forecast consumption their actual budget ended up at 4% lower than their budget.

Many customers utilize these types of reports in strategy sessions with finance teams and senior leadership in order to monitor the management of one of their largest expenses. Data can be broken out at the state or account level for optimal analysis, which enables you to best manage your total energy cost components such as energy quantity and energy price over a specific time period.
The Value of Being Informed

Energy markets are complex and volatile. The factors affecting these markets are constantly changing, which can impact your opportunities, your risk and your benchmarks.

Energy prices are influenced by a host of diverse factors such as weather, energy fundamentals (generation output, rig counts, transmission infrastructure), macroeconomics (employment and manufacturing trends), and federal and state-level legislative and regulatory policy.

Customers who are informed on the key issues can be proactive about potential shifts in prices. This information equips them to lock in rates, layer in additional hedges, adjust energy usage, and participate in load response programs.

But who has time to manage all of this data? The next section answers this question.

Taking Data from Information to Implementation

With the overwhelming amount of data available, few energy management professionals have the time to review and process all of this information. Many lack the energy industry expertise required to make the data actionable on a consistent basis; even the largest companies have small teams (or sometimes just one individual) dedicated to energy procurement and management across multiple regions and facilities. Many medium and smaller businesses may not even have a dedicated employee responsible for energy cost management. To achieve the greatest benefit from using the available data, it is recommended that businesses work with an experienced energy supplier that has the following key requirements:

- Integrated energy expertise in power and gas supply, load response, energy efficiency, and on-site generation
- Proven experience managing contracts and project implementation in order to clarify all options and the implications of each option.
Understanding Energy Products

Various procurement options can be used to purchase electricity. In order to develop and implement a strategy however, the energy manager must understand each product. The most common electricity procurement options include fixed, index, blended, and index plus block solutions.

**Fixed price solutions** enable businesses to have budget certainty by securing a set price-per-kilowatt-hour during a designated contract term. The certainty comes with a cost, called a variable load cost which reflects the variable risk the energy provider must take on by offering a fixed price over a period of time. Fixed price solutions are straightforward and protect businesses from market volatility. However, these solutions do not offer the flexibility to benefit from reduced costs in declining markets. There is also a timing risk: a business may lock into a price that seems low at the moment, but that same price can appear high just days later if the market drops.

Through **index price solutions** businesses pay the varying market price of electricity each given hour. This hourly fluctuation provides businesses with the flexibility to adjust usage to take advantage of market dips. Since the customer is absorbing all the risk that the price will fluctuate, there is no variable load cost associated with this option. This hourly fluctuation can make it difficult for a business to accurately manage cost as it relates to the quantity that must be consumed for that particular hour. However, a business can take advantage of price volatility to competitively plan and manage the quantity of electricity consumed based on anticipated hourly prices. Manufacturers, for example, can opt to use more electricity during off-peak hours such as overnight.

**Blended or flexible index solutions** offer the potential rewards of both budget stability and purchasing flexibility by allowing businesses to fix varying load-following percentages of electricity usage up to 100 percent. All remaining electricity is purchased on Day Ahead or Real Time indices, depending on the wholesale market. By not locking in 100% of electric usage all at once, a business can actively and effectively manage energy costs based on market-driven opportunities.

**Index plus block solutions** enable a business to fix a certain volume of usage at a specific rate, leaving the remaining unfixed portion on the market-based index rate. Using this option, a business can layer usage in portions in order to optimize when and how much energy is used in response to market-based prices. The three options for fixing business electricity supply blocks include base standard wholesale block (7 x 24 periods), peak blocks, and off-peak blocks. Any unfixed portion remains on the market-based index rate chosen from either Day Ahead or Real Time indices, depending on the wholesale market.
Technology, Data and Energy Management

Today’s successful energy managers are no longer approaching energy supply management in the silo of pure commodity procurement. Achieving the lowest total energy cost over time requires viewing supply cost alongside demand-side energy reduction strategies and load response programs that can pay you for curtailing your energy usage. Viewing and understanding your energy usage in real time allows participants in load response programs to take advantage of the many options and optimize the monetization opportunities.

Constellation provides a multi-function, web-based platform called VirtuWatt. The VirtuWatt™ platform consists of three different modules that allow customers to maximize their value of participation through information, control and market interface. VirtuWatt™ Dashboard enables customers to see energy usage in one-minute intervals via the web or a mobile device helping customers develop and monitor energy usage strategies. The customer can monitor specific pricing and program details, and receive “time-to-act” market updates.

Constellation’s i2i program for electricity supply and MPS program for natural gas supply management help customers develop a strategy, implement it and gain control of their energy costs. The information and reports allow for ongoing strategic energy management that can be applied to a large enterprise or single-site businesses.

Energy managers have different priorities and needs from their energy procurement program—finding the strategy that helps you deliver the best value for your dollar and your available resources may not be easy. The diagram below (Example 3) illustrates the four basic types of energy supply procurement programs; Set it & Forget it, Systematic, Market Watch and Optimization. Each has benefits and tradeoffs related to personal involvement required and level of risk diversification.

The following case studies show how two customers implemented some of these strategies and contained energy costs.

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**The Energy Procurement Grid**

**Market Watch**
- Watch the market and lock in your load when it hits your desired price.

**Optimization**
- Integrate supply-side and demand-side efforts to lower consumption and total energy cost.

**Set it & Forget it**
- Sign a year or multi-year contract. Start reviewing your options prior to contract expiration date.

**Systematic**
- Lock in layers of load with a structured, automatic, time diversifying program that takes advantage of market prices.

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Example 3
For illustration purposes only.
Case Studies

Case Study 1: Real Estate Management

A national leader in real estate services wished to mitigate price risk that can arise from the purchase of 100% of electricity on short-term contracts while reducing the risk of locking into high prices. To accomplish this, the company enrolled most of its Chicago metropolitan properties in a program with a data-driven budget and procurement strategy that utilizes advanced algorithms, budget forecasting and reporting features. A rolling 24-month, 25 percent “quad hedge” layering strategy for electricity purchases was employed for the company’s participating facilities. This was implemented using a customized weekly price tracker that alerted the company to optimal purchasing opportunities. The metrics from these energy purchases were provided in the form of a Key Performance Indicator report on a monthly basis for all enrolled accounts.

The results: Over three years, the company benefitted from cost avoidance equal to more than $5 million or 20% less in comparison to a standard one-time, full-term purchase strategy. The ongoing quad hedge approach allows the company to mitigate risk associated with market volatility and optimize purchasing to take advantage of low market prices.

Case Study 2: Healthcare

A healthcare organization with a variety of medical facilities in Chicago required a customized energy procurement and Load Response strategy to lower costs and manage risks over time. The company used Constellation’s i2i to implement a procurement strategy utilizing an index and block solution to fix a certain volume of usage at a specific rate, leaving the remaining unfixed portion on the market-based index rate. Using this option, the company layered usage in portions in order to optimize when and how much energy was used in response to market-based index prices.

The results: The healthcare company’s purchasing strategy resulted in their actual energy spend matching their budgeted costs, allowing for more accurate financial planning and reporting (Example 4). Since the implementation of its load response strategy in 2007, the hospital system has received more than $1.6 million in financial incentives.
**About i2i and MPS**

i2i helps customers determine how much load to fix as part of managing energy costs, utilizing tools that help businesses analyze, develop, execute and maintain an active energy management strategy. The i2i tools enable customers to create customized energy purchasing plans that can be refined over time in response to evolving market conditions.

MPS (Managed Portfolio Services) help businesses that want to actively manage risks and costs in today’s natural gas market but do not have the time or market information necessary to achieve their energy goals. The Managed Portfolio Services team will develop and implement a customized energy strategy that meets the cost-related objectives of a business, even as those goals change.

Managed Portfolio Services has access to EnerPro, a comprehensive online energy management tool that provides information about the energy market to equip customers to make energy investment decisions. EnerPro allows you to view invoices and reports, provides access to general market intelligence data, and provides other essential information including regulatory updates and industry news.
About Constellation

Constellation, an Exelon company, is a leading competitive supplier of power, natural gas, renewable energy and energy management products and services for homes and businesses across the continental US. We provide integrated energy solutions that help customers strategically buy, manage and use their energy. Our customers, including two-thirds of the Fortune 100, rely on our commitment to innovation, reliability, transparency and service. That is the kind of value you and your communities can expect from Constellation.

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