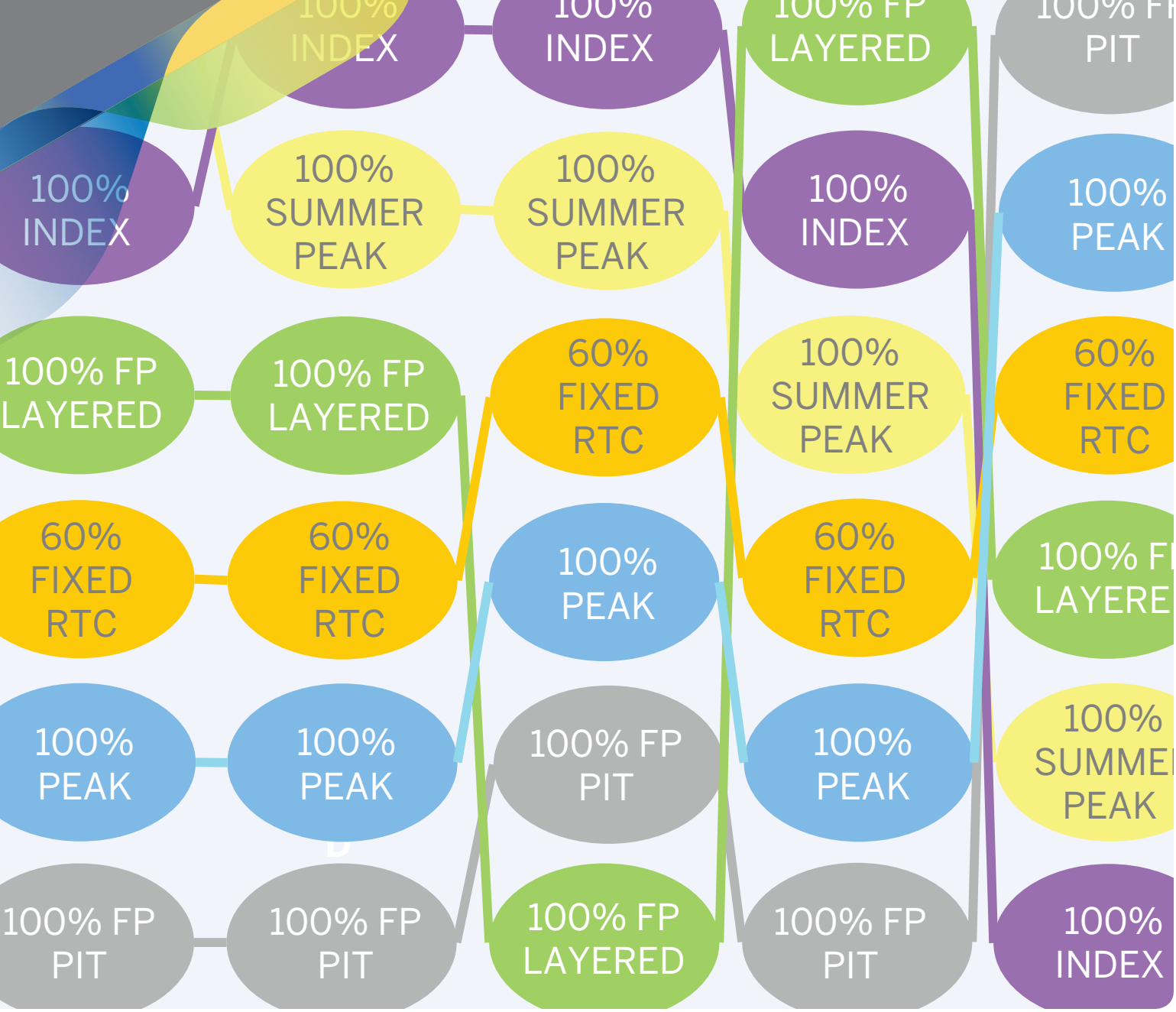

How Fixed Price, Index & Blended Strategies Performed Over 10 Years of Rising & Falling Power Markets

A Study of Electricity Procurement Strategies

A Constellation Whitepaper—October 2013

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A Study of Electricity Procurement Strategies

How Fixed Price, Index & Blended Strategies Performed Over 10 Years of Rising & Falling Power Markets

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—Contributing Authors & Researchers, Lev Goldberg and James Hua

A key benefit of competitive retail electric markets is that large and small business and government energy users have many choices in how they structure their electricity procurement programs. Customers in competitive electricity markets can select electricity contracts that range from monthly to annual to multi-year agreements and can choose from a range of procurement structures. Available structures include 'Fixed Price,' 'Index' and 'Blended.' In a fixed price structure a customer secures a 'fixed' price for their energy usage (also referred to as 'load'), whereas customers on an index pay a variable 'index' rate for their electricity. A blended structure fixes the price for a percentage of a customer's electricity load while the remainder of the load is priced at a variable index rate. This optionality has given customers in these markets unprecedented flexibility to align their energy cost strategy with corporate goals, budgets and fiscal calendars.

However, as with any rapidly evolving market, understanding electricity supply choices can be daunting. So, we embarked on a groundbreaking study to see how these different procurement choices might have performed over the rising and falling markets of the last 10 years. Our study evaluated the performance of six energy purchasing strategies over a 10-year period to determine which approaches would have helped customers manage both budget volatility risk and energy cost over time. While past performance is not indicative of future results, the results of this study should help energy users better understand their options and make more informed purchasing decisions.

Our study evaluated the performance of six energy purchasing strategies over a 10-year period to determine which approaches would have helped customers manage both budget volatility risk and energy cost over time.

Six Purchasing Strategies

In order to represent a broad spectrum of choices, we measured the performance of six representative strategies over the 10-year period from 2003 through 2012. The six strategies are represented in Figure 1 and are:

- **100% Fixed Price Point-in-Time (PIT):** The customer purchases at a single point-in-time, fixing the price for 100% of their load for two years, five months prior to power flow.
- **100% Fixed Price Layered:** The customer purchases in layers over time, fixing the price for 25% of their load every six months for two years.
- **60% Fixed Round the Clock (RTC):** The customer fixes the price for 60% of their load for a two-year term five months prior to contract start (i.e. January 2003, 2005, 2007, 2009, and 2011). 40% of hourly load is priced at a variable index rate.
- **100% Peak Fixed:** The customer fixes the price for 100% of the peak period load for a two-year term five months prior to contract start. 100% of off-peak load is priced at a variable index rate. (See page 8 for more about peak and off-peak periods.)
- **100% Peak Fixed -Summer:** The customer fixes the price for 100% of peak period load for the summer months every two years five months prior to contract start. All other load is priced at a variable index rate.
- **0% Fixed (100% Index):** The customer does not fix the price for any load and all load requirements are priced at a variable index rate.

Note: For the purposes of this study we assumed that the customer did not attempt to actively modify or deviate from these strategies over time to optimize price or risk in response to changing market conditions. The analysis also assumes that all purchases are for a percentage of hourly usage (or load) at a specific rate over a defined period of time.

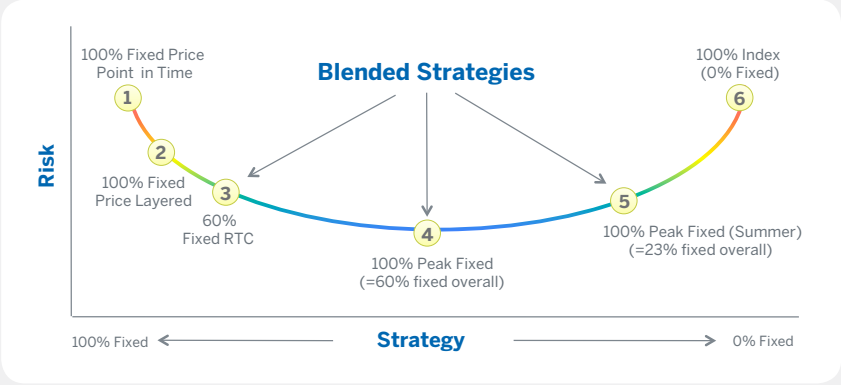

Figure 1: The Six Energy Purchasing Strategies Illustrated

Here we see a matrix of 100% Fixed, Blended and 100% Index options and corresponding risk plotted on the X and Y axis. The Y, or vertical, axis represents both timing cost and volatility risk, while the horizontal X axis shows the continuum of energy strategies running from fully fixed pricing to the left to fully indexed pricing to the right.

Risk and a Fixed Price Point-in-Time Strategy

While a Fixed Price Point-in-Time contract seems intuitively to be a conservative strategy, it is not without risk. Since no one has a crystal ball, by strictly focusing on price at one point in time and ignoring other factors such as price volatility, a customer will not know whether a fixed price contract was the lowest cost decision until it plays out over the term of the contract. As we see in the study, in some markets a Fixed Price Point-in-Time strategy results in higher total costs than Index and Blended strategies.

Comparing 100% Fixed Price Layered to 100% Fixed Price Point-in-Time

Retail electric prices rise and fall over time. The 100% Fixed Price Layered strategy, in which prices are fixed regularly over time, mitigates some of the timing risk faced when making one purchasing decision for all load for a defined period of time, as is the case in the 100% Fixed Price Point-in-Time strategy. In effect, the 100% Fixed Price Layered strategy allows for risk diversification by fixing prices over time, a feature not available in the 100% Fixed Price Point-in-Time strategy.

10 Years of Dramatically Rising and Falling Prices

The 2003 – 2012 period covers the full 10-year business cycle, from the economic boom times of the early and mid-2000s, through a time of economic weakness and recession that has characterized the last 5 years or so. The graph in Figure 2 tracks the annual median retail electric price of the six strategies from 2003 to 2012. As you can see, there were sizeable year-on-year price fluctuations and there were two starkly contrasting market periods.

2003 to 2008: Booming Economy and Rising Prices

The first period is 2003-2008 when the economy was booming and fuel prices were rising. During this period the median prices of the six strategies rose by over $40/Megawatt Hour (MWh), more than doubling.

2009 to 2012: Economic Weakness and Falling Prices

The subsequent period of 2009 – 2012 has been characterized by economic weakness, demand reduction and falling natural gas prices. In the more recent period, the median retail price of the six strategies fell by more than $30/MWh, or about 42%, from the peak in 2008. A takeaway from this data is that the competitive market conveys prompt price signals to customers as economic conditions change. Retail electric markets appear to operate like other commodities in which there is a supply/demand/price dynamic.

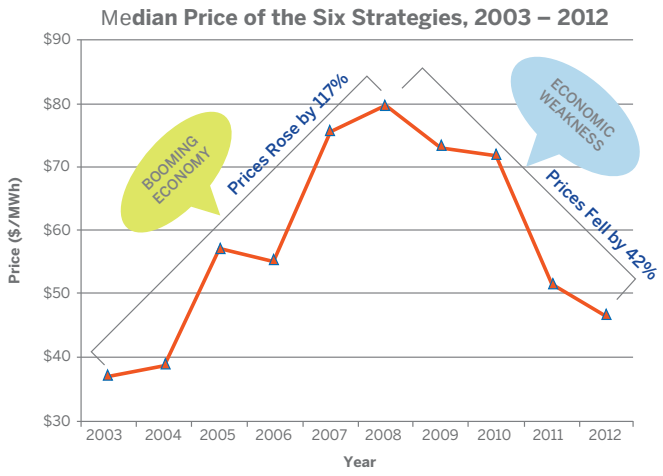

Figure 2: Median Price of the Six Strategies 2003 – 2012

There were sizeable year-on-year price fluctuations and two starkly contrasting market periods.

A Significant High and Low Price Range Over 10 Years

Now that we have seen the dramatic market movement of electricity costs over our 10-year time period, let's see how the six strategies compared. Figure 3 is the same illustration of the annual median prices of the six strategies but overlays the range of lowest to highest priced strategies in each year (bar graphs).

What do we see? The median price of the six strategies over the 10-year period was $59/MWh. Over the 10-year period, the highest price strategy in each year averaged $9/MWh, or 15%, above the median price. The lowest price strategy over the same period averaged $8/MWh, or 14%, below each year's median price. In other words, the overall average price variance between the highest and lowest performing strategies over the ten years was nearly 30%.

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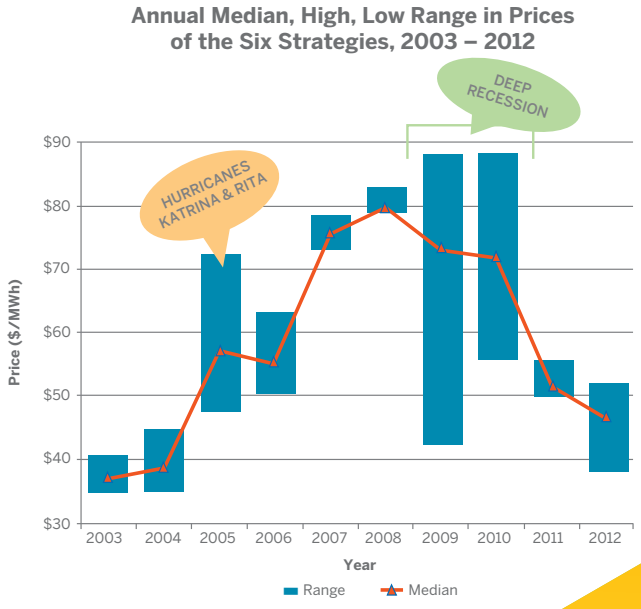


Figure 3: Annual Median, High and Low Range in Prices of the Six Strategies, 2003 – 2012

However, the range between the low and high priced strategies varied considerably across the 10-year period, as can be seen in Figure 4. For example, in four of the 10 years, the range between lowest to highest priced strategy was no more than $7.50 per MWh. In three of the 10 years, the range between the highest and lowest was between $7.50 and $15 per MWh. And, in three of the 10 years, the range between the lowest and highest priced strategies exceeded $15 per MWh.

Three years in particular (2005, 2009 and 2010) are notable for the greatest variance in terms of price range among the six options. In 2005, Hurricanes Katrina and Rita disrupted or destroyed energy infrastructure in the Gulf Coast region, creating a significant jump in electricity prices. In 2009 and 2010, the severe financial crisis in the United States sparked a deep national recession with profound global implications that are still being felt. Unforeseen events have had a significant impact over the past decade on the relative performance of the six strategies.

Range in low and high prices varied considerably over 10 years

Price Range Frequency, 2003 – 2012

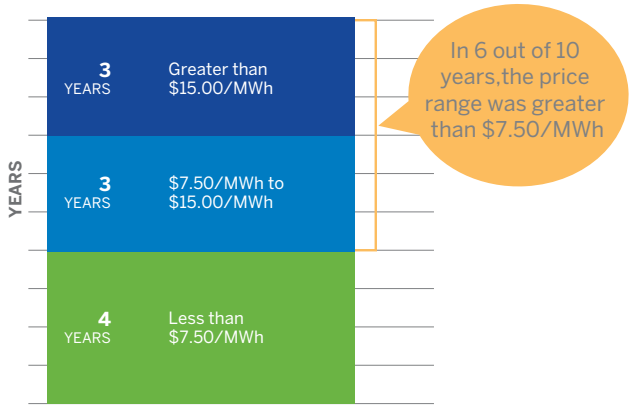


Figure 4: Price Variance Range Frequency

Unforeseen events have had a significant impact over the past decade on the relative performance of the six strategies.

Annual Comparative Price Performance of the Six Strategies

So, we now know that the price range between the highest and lowest price programs can be and often is significant (over $7.50/MWh in 6 out of 10 years). But how do the programs stack up against each other? To view how each strategy ranked versus the others in each of the 10 years, let's look at Figure 5. This illustrates the annual ranking of each strategy from low price to high price and shows us that:

No single strategy consistently produced the lowest price over the 10-year period.

100% Index pricing produced the lowest price in four out of 10 years, 100% Fixed Price Point-in-Time produced the lowest in four out of 10 years, the 100% Fixed Price Layered produced the lowest once in 2005, and the Blended strategy, whereby summer peak-only was fixed, was the lowest once, in 2011.

100% Fixed Price (Point-in-Time and Layered options) and 100% Index fluctuated from highest or lowest priced strategy in most years.

With the exception of 2003 and 2011, 100% Fixed Price and 100% Index occupied the highest and lowest price positions. Put another way, blended solutions didn't produce the highest or lowest prices in most years, falling somewhere between 100% fixed and 100% index strategies.

No strategy appears to be without risk and past experience is not necessarily a good predictor of future performance.

The relative rankings of all six strategies have changed over time, and in some cases quite significantly. For instance, 100% Fixed Price (Point-in-Time and Layered options) maintained the lowest price position from 2003 through 2006, and then occupied the highest position 2007 through 2012 with the exception of one year (2008).

Relative Price Performance of Strategies Has Changed Over Time

Annual Price Ranking of the Six Strategies from 2003 – 2012

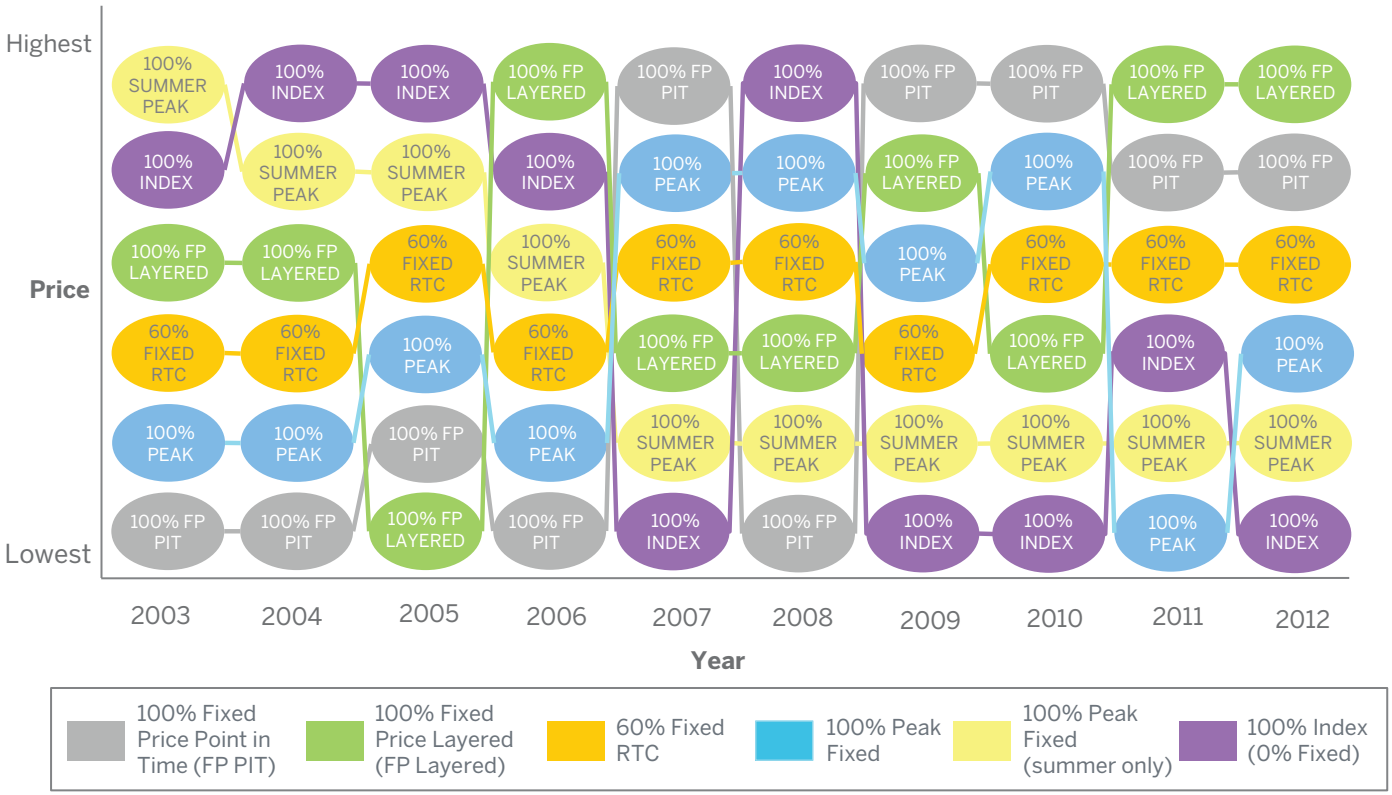


Figure 5: Annual Price Ranking of the Six Strategies from 2003 – 2012

The Key Takeaway

The key takeaway of these findings is that customers taking a 100% Fixed Price (Point-in-Time and Layered strategies) or 100% Index will have either hit the highs or lows in most years. And in many cases, the 100% Fixed Price Point-in-Time and 100% Index strategies would have resulted in significant price volatility in specific years. On the other hand, customers taking a blended strategy with a percentage fixed and a percentage on index would have produced a more balanced result (somewhere between the highs and lows).

Managing Energy Price AND Budget Volatility

Another discovery from this study is that different procurement strategies can affect two of the major concerns of energy buyers: energy cost management and price volatility management.

Energy buyers are constantly attempting to manage the dual goals of achieving long-term cost management while being able to accurately set budgets by flattening out year-over-year spend.

In many cases, however, there is a tradeoff between volatility and price over time. In Figure 6 we see how a 100% Fixed Price (Point in Time and Layered) compares to a 100% Index strategy, and in Figure 7 we see how a Blended (fixing summer-peak only) strategy compares to a 100% Index strategy. The results are quite interesting.

The 100% Fixed Price Point-in-Time strategy with purchases every two years resembles a series of step changes reflecting the single point-in-time purchases. The 100% Fixed Price Layered, where purchases are made regularly over time, significantly smoothed out year-on-year price fluctuations. The 100% Index, on the other hand, exhibited significant year-on-year volatility. The tradeoff in 100% Fixed Price (Point in Time and Layered options) and 100% Index is that while it appears that the Fixed Price strategies had lower annual volatility, they seem to have resulted in a higher overall price over the 10-year period.

In comparing 100% Index to the blended strategy (fixing summer-peak only), it appears that the blended solution was able to take advantage of the market movements but mitigated some of the big year-on-year price swings that dramatically affected the 100% Index, particularly in 2005 and 2009.

100% Fixed Price and Blended Strategies Compared to 100% Index, 2003 – 2012

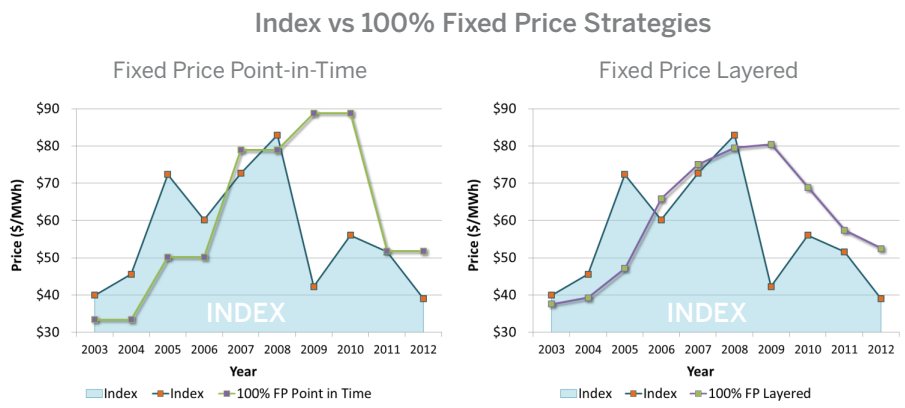


Figure 6: *Over the 10 years, 100% Fixed Price Layered had less annual price volatility relative to the 100% Point-in-Time option. Both Fixed Price options had less year-over-year volatility than 100% Index but had higher overall prices.*

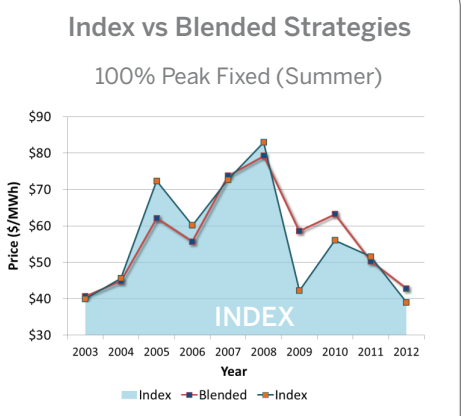


Figure 7: *The blended 100% Peak Fixed (summer only) strategy was able to track Index prices while reducing year-over-year budget volatility.*

In many cases, there is a tradeoff between volatility and price over time.

Blended Solutions: The "Sweet Spot" of Both Lower Volatility and Lower Price Over Time

When we look at the overlay of both price performance AND budget volatility for each strategy, we find some eye-opening results. In Figure 8 we see the average price of each strategy, depicted by the blue bar, and the corresponding annual volatility represented by the red line. As you can see, annual volatility for four of the six strategies landed in a narrow band, ranging from 22% to 30%.

Two strategies were outliers: 1) the 100% Fixed Price Layered option produced the lowest annual volatility among the six, and 2) the 100% Index strategy had an annual volatility outside of that range with a considerably higher rate of 33%. What this means is that over the 10-year period, budget volatility would have been relatively similar whether you chose the 100% Fixed Price Point-in-Time strategy or any of the three blended options. In other words, the 100% Fixed Price Layered approach would have been the best among the six studied for customers looking to mitigate budget volatility, whereas a 100% Index would have been their worst option.

Here's what else we learned:

- **100% Fixed Price options produced the highest prices.** The 100% Fixed Price options averaged $60–$61 per MWh over the 10-year period. Blended strategy prices averaged $1–$3 per MWh lower than the 100% Fixed Price options. 100% Index averaged about $4 per MWh below 100% Fixed Price options.
- **100% Fixed Price Layered option outperformed the 100% Fixed Price Point-in-Time strategy.** The 100% Fixed Price Layered strategy produced a lower average price with significantly less volatility as compared with the 100% Fixed Price Point-in-Time option.
- **100% Index produced the lowest price but with significantly greater volatility relative to other strategies.** The average Index price was the lowest by far of the six options, averaging about $56 per MWh over the 10-year period but with 33% average annual volatility. Blended strategies averaged $1–$3 per MWh higher than the 100% Index with lower average annual volatility.
- **Blended strategies have effectively reduced both budget volatility and price over the last 10 years.** Blended strategies had lower volatility relative to Index without sacrificing lower price potential compared to either of the 100% Fixed Price options.

Figure 8: 10-Year Average Price and Volatility by Strategy

Blended strategies have effectively reduced both budget risk and price over the last 10 years

Future Paths

The key takeaway from this study is how well blended strategies have effectively reduced both budget risk and price over the last 10 years. While past performance is not indicative of future results, the findings here suggest that customers may want to consider blended solutions as an option in developing their long-term purchasing strategies.

Note About Actively Managed Purchasing: This analysis did not attempt to evaluate the impact of actively modifying or deviating from the six strategies over time to optimize price or risk in response to changing market conditions. An actively managed approach utilizing market intelligence, MarketWatch price alerts, systematic procurement programs and other tools that allow customers to make informed decisions over time may produce even lower prices and volatility over the long term.

About Flexible Solutions: Constellation's Flexible Solutions is a procurement platform that can be customized to meet customer needs. The major benefit of a Flexible Solution is the optionality and customization it provides. With a Flexible Solutions program, fixed and index percentage increments can be set (from 100% fixed to 100% index and blended) and can be adjusted over time based on customer needs and market outlook. Options for blended strategies now include the ability to customize the blend for peak hours and for non-peak hours and the ability to set MarketWatch price alerts that let customers make immediate decisions to take advantage of market prices.

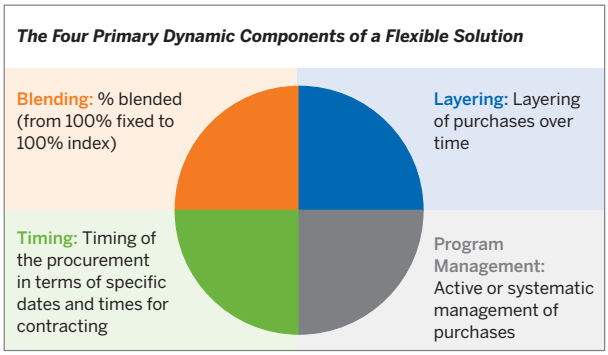


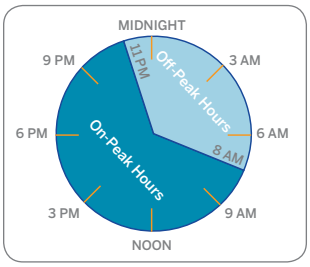
Figure 9: Constellation's Flexible Solution: A procurement platform that allows for optionality to best suit customer needs and market opportunity.

The four primary dynamic components of a Flexible Solution:

- **Blending:** % blended (from 100% fixed to 100% index)
- **Layering:** Layering of purchases over time
- **Timing:** Timing of the procurement in terms of specific dates and times for contracting
- **Program Management:** Active or systematic management of purchases

To learn more about Constellation's Flexible Solution, blended strategies, actively managed purchasing or simply how to determine which procurement program may be best for your company, contact Constellation at 866.237.7693.

Managing Your Peak and Off-Peak Energy Prices



Example of Peak & Off-Peak Hours

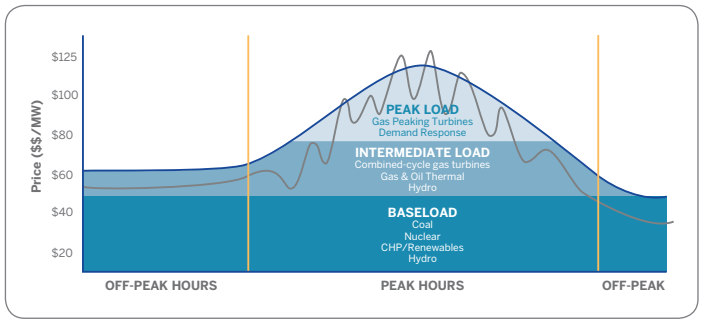


Figure 10

Using Constellation's Flexible Solutions platform, customers can employ a blended strategy for both Peak and Off-Peak hours. What are Peak and Off-Peak hours? Here is a quick explanation.

During 'Peak Hours' the price of electricity is higher due to higher demand from operations like heating, cooling and commercial and industrial operations that increase the strain on the electricity grid. During 'Off-Peak hours' (nighttime and early morning) less electricity is used and the strain on the grid, and the price, is lower. Peak hours are during weekdays only and exclude specific holidays. The actual times may vary from region to region or depend on the particular Peak/Off-Peak convention a supplier chooses to utilize. Customers should always look at the applicable definition when reviewing supply options from their suppliers.

Peak and Off-Peak electricity price is also influenced by the type of generation that is dispatched to cover the grid's electricity demand. (See Figure 10.) Different generation sources, which are deployed at different times to meet the varying load requirements, have different associated costs.

About the Authors:

John Domagalski

John Domagalski has 20 years of experience in supporting business growth initiatives, both in the US and around the world. John joined Constellation in 2004 with regional responsibility for retail energy pricing and product management. From 2009 to 2013, he managed the Products and Markets team at Constellation. This team worked on the development of new products and was the lead on new retail energy market entry and expansion efforts. He currently leads Constellation's Retail Analytics organization. Named to that position in 2013, he is responsible for new market expansion, competitive intelligence, and the analytics in support of the Retail organization's growth opportunities and strategic direction.

James Hua

James Hua has been with Constellation for seven years and supports i2i, Constellation's proprietary energy budget reporting and analytics program that helps customers make purchasing decisions, plan budgets, track performance, and refine their purchasing decisions over time based on risk/reward tradeoffs. James received his Bachelor of Science in Applied Mathematics from Shanghai Jiao Tong University and a Master of Science in Financial Mathematics from The University of Chicago.

Lev Goldberg

Lev Goldberg has 20 years of marketing and publishing experience. Located in Constellation's Chicago office, Lev helps commercial, industrial and public sector energy end users better understand their energy supply options, how to optimize their energy budgets and strategically buy, manage and use their energy. Lev joined Constellation in 2005 and has led regional and national marketing teams and initiatives.

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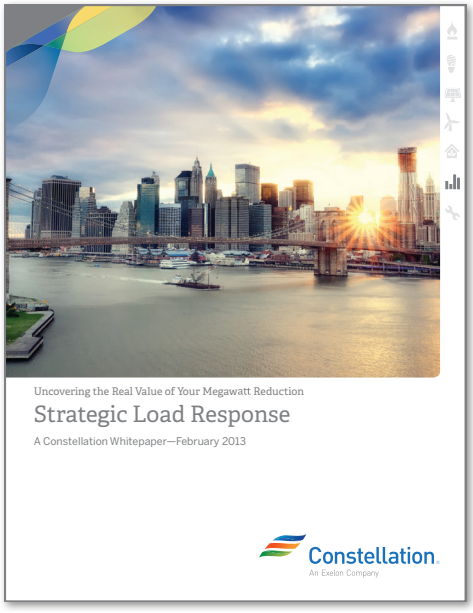

About Constellation

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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