

CAPCO

EVOLVING POWER MARKETS AND THE INTEGRATION CHALLENGE



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Global power markets are in constant flux as the flood of renewable resources continues unabated across almost all geographies. In the U.S., the total power capacity of renewables will double from 21% to 42% by 2050. The continuing growth and highly variable nature of non-dispatchable solar and wind generation energy assets have forced the physical markets to adjust by increasing the tenor and granularity of their operations to address rapid increases or decreases in power capacity. As such, in physical power markets with high levels of renewables, sub-hourly (and in many cases five minutes) scheduling increments and thousands of location-specific prices, or locational marginal pricing (LMP) prices, are increasingly common, particularly in the U.S. and European market regions.

In these markets, batteries and other storage assets (such as pumped storage) are becoming more common to buffer the mismatch of peak generation during afternoon hours and peak demand, usually later in the afternoon and early evenings. And as the EIA predicts U.S. battery capacity will grow from slightly more than 1 GWh at the end of 2020 to 59 GWh in 2050, the mix of generation and power storage deployed in these markets

is growing ever more complex and challenging to integrate and manage. As a result of the expected growth, developers and operators of utility-scale battery facilities continue seeking new strategies to maximize the value of those investments and optimize their commercial operations (i.e., capacity vs. ancillary services) within the market region in which they operate.

For energy traders, the carbon markets are growing more complex and volatile. Further complications arise with the ongoing development of renewable energy credits (RECs), emissions certificates, and other existing and emerging emissions-related products in the power markets. While these credit-producing renewable facilities or credit-consuming conventional generation products are usually related to the underlying assets, this area of trading and tracking is still emerging as a commercially traded market for various industries and companies that wish to offset carbon emissions. The accounting and optimization of these products are increasingly critical as regulatory mandates and reporting on carbon become more intensive, and carbon prices continue to rise.

MARKET INTEGRATION – POWER MARKET SOLUTIONS VS. ETRM

These software products, commonly referred to as power market solutions, may address multiple markets within a large geographic region, such as US ISO/RTO markets, but few can address markets across national boundaries such as those in Europe. Each market region, whether the ISO/RTO's of the U.S. (such as PJM or CAISO), the national or regional markets of Europe (UK, Germany, Nord Pool, etc.) or the Asia Pacific region (Japan, Australia, etc.), will have their own unique operational and commercial processes with different operating rules, data granularity, settlement practices, and communication protocols; all representing their unique mix of assets and regulatory goals. There is usually no one-size-fits-all software solution for managing commercial operations for companies operating in one or more of these sub-hourly markets.

With the deregulation of the power markets in the U.S. with FERC Order 888, many of the vendors of the established energy trading and risk management (ETRM) solutions, initially developed for the natural gas markets, attempted to add functionality to manage operations in the emerging power markets. These attempts were generally abandoned as the ETRM systems were architected initially to address the daily transaction capture, not commercial power trading and its inherent intraday transactions. Given the fundamental changes they would require addressing the highly granular and ever-changing rules found in the deregulating power markets, the costs and efforts to rearchitect them for managing transactions in real-time or hourly markets proved too costly and complex.

As the global power markets have continued to liberalize, new software solutions have been designed from the ground up to manage each new market's specific functional and grid operator communication requirements and capture hourly or sub-hourly transactions and data flows. However, as these power market solutions are primarily operationally oriented products (market communications, dispatch, tagging, and settlements), these systems are generally considered lacking risk management, reporting, and financial consolidation capabilities commonly found in ETRM solutions.

Though some of the power market solutions from vendors such as Adapt2, PCI, and OATI have continued to add significant new ETRM capabilities for power and fuels trading, their scope is generally limited to serving specific utility and generation markets. As a result, most energy trading organizations that own or operate power-related assets as part of a broad multi-commodity portfolio have both solutions — an ETRM product for capturing financial results and managing the risks and exposures associated with their power, fuels, and other energy commodity trading activities, and one or more power market solutions to address the needs of the individual markets in which they operate.

BRINGING IT ALL TOGETHER

Unfortunately, this bifurcated solution set, with the power market solution offering real-time, fast tenor, and capture of highly granular volume and pricing found in the intraday power markets and a forward-looking ETRM solution that captures and values the results of energy commodity trading activities, generally in the day-ahead and long-term markets, does not usually fit together well.

ETRM solutions were never architected to manage and calculate positions associated with the massive amounts of data flowing out of the real-time (sub-hourly) power markets. As such, there is no simple approach to capturing the results of commercial activities in those real-time markets directly in that ETRM solution. Integrating the two systems requires a complete understanding of how real-time activities will be managed, aggregated, and at what tenor (hourly, daily, or some other timeframe). The decision as to how to aggregate the power market data for passing results into the ETRM will depend on several factors, including:

- What level of data analysis will be required to optimize operations (sub-hourly, hourly, daily, or forwards)?
- How often will the PnL or risk metrics be updated (intraday, or daily)?
- From which system will power transactions be settled and accounted?
- How will power trading activities be accounted for in trading book structures?

Given the complexities of each market, it is virtually impossible to create simplified integrations between the power market system and the ETRM solution as the strategies, asset mix, and book structures will vary significantly among user companies. Addressing this integration challenge will require a clear understanding of the user's business goals and an integration layer that can do the appropriate consolidations before communicating those power market activities to the ETRM solution.

As the markets continue evolving and new assets (e.g., batteries) or commercial agreements (e.g., Power Purchase Agreements (PPA's)) are added to portfolios, it may be necessary to acquire functional capabilities beyond those in existing ETRM solutions. These capabilities will most likely be in areas such as data analysis, regulatory reporting, carbon tracking, and asset valuation & optimization. Though many commercially supported ETRM systems continue to add capabilities to address some of these emerging requirements, the effort associated with near-constant ETRM upgrades can be costly and disruptive as these capabilities become available. As such, Capco would recommend looking at third-party applications to address areas such as data analytics and carbon management and tracking solutions.

Identifying current and emerging requirements when developing an integration layer between the power market system(s) and the ETRM solution can help avoid costly future upgrades or replacements of an existing ETRM system as the business expands and new market requirements arise.

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ABOUT CAPCO

Capco, a Wipro company, is a global technology and management consultancy specializing in driving transformation in the financial services and energy industries. With a growing client portfolio comprising of over 100 global organizations, Capco operates at the intersection of business and technology by combining innovative thinking with unrivalled industry knowledge to deliver end-to-end data-driven solutions and fast-track digital initiatives for banking and payments, capital markets, wealth and asset management, insurance, and the energy sector. Capco's cutting-edge ingenuity is brought to life through its Innovation Labs and award-winning Be Yourself At Work culture and diverse talent.

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