

Improving Data Aggregation and Analysis to Address Challenges of an Evolving Energy Market



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EXECUTIVE SUMMARY

The major North American energy markets, including natural gas, power and oil, have undergone massive changes over the last decade. New sources of supply enabled by technical innovation have created market imbalances and have spurred billions of dollars of investment in processing facilities, pipelines, export facilities and power transmission systems in order to better align those new supplies to the markets they serve.

Additionally, with the easing of export regulations, investments in energy export facilities and increasing overseas demand for US LNG, liquids and crude oil have resulted in a tightening connection between US and foreign energy markets. And while these new energy market structures are generally seen as a net positive for market participants, the increasing influence of global market developments has created significant uncertainty around future market direction and price formation across most energy commodities.

Absorbing these many new energy sources and the resulting massive growth in supplies has created new markets, hubs and trading locations; and have increased the sources, granularity and velocity of market data that flows into energy trading floors across the industry. Identifying and collecting the appropriate sources of data and information is a critical first step in developing the insights and actionable information necessary to succeed in these challenging and constantly evolving markets.

However, without a sophisticated analytics capability to convert that data to timely, relevant and actionable market and operational insights (i.e. early warnings

of potential supply bottlenecks or inventory changes, timely identification of shifts in your intraday P&L, non-optimized physical assets, etc.), the flood of data arriving at your doorstep will overwhelm your existing resources and your team's commercial and operational decisions will be based on data and information of increasing vintage.

Fortunately, advances in web-based technologies have enabled a new generation of tools and solutions that can accelerate the analysis of huge data sets from multiple systems and data sources - allowing the earliest possible identification of market moves, emergent opportunities and impending risks. One such solution, Eka Analytics, utilizes apps that can be configured by business users to mix and match different data sets from divergent sources and perform real-time analysis to answer their organization's most critical and timely questions. With support for all types of analytics from simple aggregations to advanced predictive models, energy companies using this solution can gain a competitive advantage by optimizing operations and strategies to take advantage of both rapidly emerging opportunities and longer-term market developments.

INTRODUCTION

The North American energy markets, influenced by both domestic and international developments, are undergoing a rapid evolution that has and continues to challenge energy commodity producers, processors, and traders. Driven by technical innovation, regulatory intervention and globalization, the changes occurring have impacted the entirety of the energy supply chain - establishing new pricing correlations, increasing operational complexities and creating new markets and trading hubs...and, by extension, created vast new pools of data and information that must be considered when formulating market strategies and trading decisions.

Despite these challenges, for those properly equipped with the tools and applications that can capture, analyze and support real-time decision making, there are any number of new opportunities to profit in this complex environment.

In this white paper we will examine the ongoing changes and the resultant challenges in a few of the most rapidly evolving North American energy markets, and discuss an approach to address those challenges through sophisticated real-time data aggregation and analytics.

NATURAL GAS – NEW SUPPLIES AND GROWING GLOBAL PRICE INFLUENCE

Beginning around 2010, the North American natural gas markets experienced a massive restructuring of supply which has reshaped and redirected a significant portion of the country's delivery infrastructure, created an almost persistent oversupplied condition, and has changed many of the sources, types and channels of data on which traders rely.

With the advent of long-reach horizontal drilling techniques and massive hydraulic fracturing, a wealth of supply has been brought on-line from fields that were otherwise uneconomic to produce, including the hugely prolific Marcellus and Utica shales, which combined now account for more than 23 BCF of the US' total daily production of 70 BCF. The resulting shifting of supply to the Northeast US from the Gulf Coast has redirected pipeline flows and rewritten pricing relationships that have existed for more than two decades. With new pipelines and new processing facilities under constant development in the Northeast, price development at the emerging trading hubs in the region are in a state of flux and pricing forecasting is a constant challenge for traders.

With the establishment of new and increasingly liquid trading points in the Northeast, the Gulf Coast trading locations, such as Henry Hub, are becoming disconnected from the large gas markets in New England and the upper Midwest. With redirected gas flows and the breakdown of many of the historical basis relationships that had existed between Henry Hub and much of the Eastern and Midwest US markets, many traders have been forced to formulate new strategies and

uncover new market opportunities.

Spurred in large part by an oversupplied market and low prices, investments in new gas export facilities increased - including LNG liquefaction plants for exports to the global markets, and new pipelines to service growing demand from the newly liberalized Mexican natural gas market. With the opening of the Mexican markets to wholesale competition, increasing US gas exports to Mexico are providing near term price support for the oversupplied Gulf Coast region. With exports reaching 4 BCF/day at end of 2016 and increasing to an estimated 5 BCF/day in 2017, planned capacity additions in late 2017 and 2018 could see, in total, as much as 9 BCF/day moving south if the Mexican market demand continues to increase.

Beyond exports by pipe, the development of LNG export facilities, including the now operating Chenier facility at Sabine Pass (which is now a reliable consumer of about 900MM/day and is expected to increase to 1.5BCFD prior to year's end), the US has become a significant player in the global LNG markets; and in the process has effectively connected the domestic market to global natural gas prices. With additional

facilities and process trains coming online in the next two years, total takeaway via LNG could reach as much as 4-5 BCF/day.

Should the forecasted growth in export volumes occur, supplies in the Gulf Coast region could tighten and significant price volatility could result. As such, increasing exports will impact the broader North American gas market - implying that all traders, whether or not they ship gas to Mexico or trade LNG directly, need to remain abreast of these market developments, including regional supply and demand balances, projected and actual export volumes, and even price movements at the emerging global LNG trading hubs in Europe and Asia.

Aside from exports, the increasing reliance on natural gas for power production, including baseload generation, has not only increased domestic natural

gas demand, but has also forced greater operational coordination between the gas and power markets. FERC Order 809, implemented in April 2016, added an additional intraday gas scheduling cycle to address a mismatch between intraday generation operations and the fuel purchases and deliveries on which the plant operators rely. Though improving operational flexibility for generators, natural gas schedulers' and traders' workloads have increased, and have made timely market data and operational flow information an imperative for maintaining profitable operations. Given the additional scheduling cycle and the shorter windows for intraday adjustments, gas shippers must react quickly to pipeline cuts - analyzing supply and market impacts, and identifying alternatives for optimizing flows or trading in or out of imbalances in their intraday positions. Without this type of analysis and full visibility of the value of the alternatives, a day's profitability could vanish with a single pipeline cut.

INFLUX OF RENEWABLE ENERGY IS CHALLENGING OPERATORS AND TRADERS

The influx of renewable energy resources, including wind, utility scale solar and distributed solar have challenged grid operators in maintaining market stability and impacted traditional power generators. According to the EIA, in March 2017, wind and solar sources exceeded 10% of the total electric power generated in the US for the first time – up from the 7% contributed by wind and solar for the full year 2016.

As these renewable resources are highly variable, and their output will rise and fall with conditions that can't be controlled, their increasing contributions

are forcing grid operators from New York to California to develop new operational strategies, tools and markets in order to ensure grid stability. While the

operational and market changes being contemplated are in various stages of development, it's almost certain that most or all will require the implementation of sub-hourly bidding and dispatch to cope with the variable nature of renewables.

The Western US, where states like California and Nevada have seen huge growth in solar capacity, has been particularly impacted by the influx of renewables and, as a result, new markets and operating standards are being developed to address the challenges, including the western energy imbalance market (EIM) as part of the CAISO. With seven power providers currently participating, the new imbalance market better coordinates generation and operations involving wind

and solar sources by awarding bids in 15 minute intervals and dispatching generation in 5 minute periods.

This increasing granularity in power trading and operations will produce massive new streams of data that must be incorporated and analyzed in order for generators and traders operate profitably. With the development of the LMP markets over the decade, power markets have been throwing off tremendous data streams, and now with the movement to sub-hourly markets to better incorporate intermittent renewables, power market participants will be increasingly challenged to capture and analyze huge streams of data in their daily operations.

INCREASING EXPORTS OF PETROLEUM LIQUIDS

According to the EIA, since the US began allowing exports of domestically produced crude in late 2015, the US has attained the position of being one of the largest global exporters. Driven in part by excess inventories along the Gulf Coast and cheap tanker rates, US crude exports reached 1.1 million bbls/day in February of 2017 and have averaged over 900,000 bbls/day from January through June of this year. While many market experts are at odds of whether exports will maintain these levels, or whether this is just opportunistic trading based on current oversupplied conditions, clearly the new ability to export crude is creating unique opportunities for US producers, traders and merchants.

Whether identifying and locking in a favorable price spread between the US and an overseas market, or taking advantage of an opportunity to optimize asset utilization via physical swaps, profiting by trading do-

mestically produced oil and products in today's markets requires global insights and information; and given the span of the global oil markets, the sources of data and information are virtually limitless. In fact,

it's increasingly common for today's leading oil trading companies to track and monitor tens of thousands of data points daily - including prices, ship movements, and tank volumes at overseas terminals (up to and including drone based monitoring of the floating roofs

on storage tanks). While the collection of such data streams can be daunting in itself, the ability to quickly analyze that collected data for true market insights can be almost impossible without an advanced analytics solution.

ACHIEVING VISIBILITY INTO A CONSTANTLY CHANGING MARKET

Whether driven by technical innovations, such as massive hydraulic fracturing or advances in renewable energy and energy storage, by regulatory changes allowing exports of domestically produced crude, or evolving global trading patterns and activities, the North American energy markets of today have fundamentally changed. Each new market change or innovation creates additional streams of data, including multitudes of new prices, operational flow data and market intelligence; and the tools and analytics necessary to compete effectively must change as well.

The impacts of these influences can only be measured by accurate and timely data, arriving via dozens or even hundreds of channels, both internal and external. Assessing the impacts and adjusting trading decisions to limit downside risks and ensure profitable operations requires rapid data collection and analysis.

In this environment, any process that creates latency in your businesses information flow, such as manual data compilation, complex reconciliations or reports that require hours or days to run, can and will invariably, result in lower profits, missed opportunities and increased risks.

EKA'S APPROACH TO ACCELERATING ANALYTICS AND DECISION MAKING

Eka Analytics is an analytics solution that leverages the latest web-based technologies to aggregate data and information from both internal and external channels and, via app-based statistical modelling, quickly analyzes data to provide rapid market insights and identification of opportunities and risks. These apps enable companies managing crude and refined products,

natural gas, natural gas liquids (NGL), liquefied natural gas (LNG), power, coal, and biofuels to optimize their operations, reduce costs and improve operational performance and profitability.

Eka Analytics consolidates information from multiple sources including pricing servers, gas scheduling software, ETRM software, ERP, CRM, treasury, and spreadsheets; and quickly processes and analyzes large volumes of data for improved market insight. Users can, without IT intervention, mix and match different data sets from divergent sources and perform real-time analysis to provide answers to their organizations most critical questions. With support for all types of analytics from simple aggregations to advanced predictive models, energy companies can gain a competitive advantage by optimizing operations and

strategies to take advantage of both rapidly emerging opportunities and longer-term market developments.

Currently deployed at a number of leading energy businesses, Eka Analytics is a proven solution to accelerate data analysis and information flow in rapidly evolving markets. Eka's customers are leveraging the system's capabilities to optimize facility and equipment operations, resolve bottlenecks in supply chains and quickly identify misaligned positions impacting P&L...all at a fraction of the time required using legacy processes.

SUMMARY

While the North American energy markets have always been a challenging environment in which to operate, current and ongoing market changes are increasing their complexity and are presenting unprecedented challenges to all participants. Technical innovation, regulatory intervention and increasing globalization are continually forcing energy market par-

ticipants to "up their game", and improve their strategies, processes and systems. In this environment, deploying the right systems, including a sophisticated analytics capability to quickly consolidate data, identify risks & opportunities and help optimize operations, can be the difference between profit and loss.

ABOUT EKA

Eka is the global leader in providing cloud-based Smart Commodity Management software solutions. Eka's analytics-driven, end-to-end Commodity Management platform enables companies to efficiently and profitably meet the challenges of complex and volatile markets.

The company's best-of-breed solutions manage commodity trading, enterprise risk, compliance, procurement, supply chain, operations, logistics, bulk handling, processing, and decision support. Eka partners with customers to accelerate growth, increase profitability, improve operational control,

and manage risks and exposures.

Eka is a team of 315 staff with offices in the Americas, Asia, Australia, and EMEA, serving a rapidly growing global client base across multiple commodity segments.

For more information about Eka, visit www.ekaplus.com



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ABOUT

Commodity Technology Advisory LLC

Commodity Technology Advisory is the leading analyst organization covering the ETRM and CTRM markets. We provide the invaluable insights into the issues and trends affecting the users and providers of the technologies that are crucial for success in the constantly evolving global commodities markets.

Patrick Reames and Gary Vasey head our team, whose combined 60-plus years in the energy and commodities markets, provides depth of understanding of the market and its issues that is unmatched and unrivaled by any analyst group.

For more information, please visit:

www.comtechadvisory.com

ComTech Advisory also hosts the CTRMCenter, your online portal with news and views about commodity markets and technology as well as a comprehensive online directory of software and services providers.

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