

# Data Criticality in Evolving Markets

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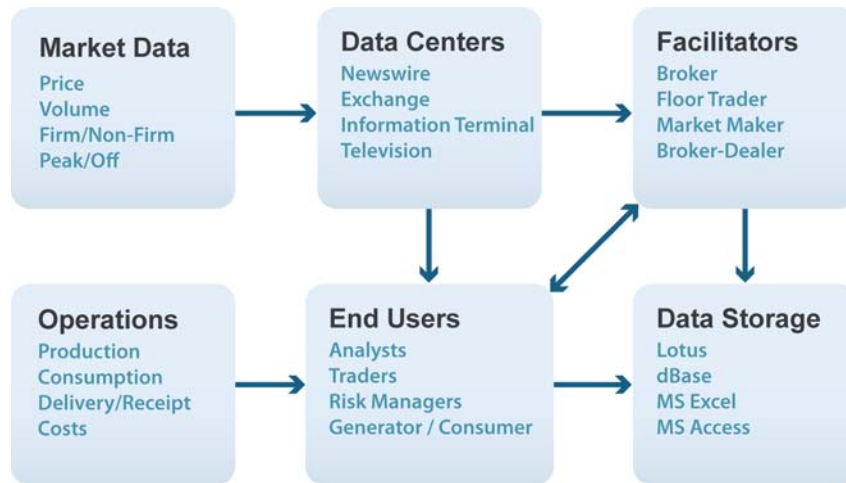
## Data Criticality in Evolving Markets

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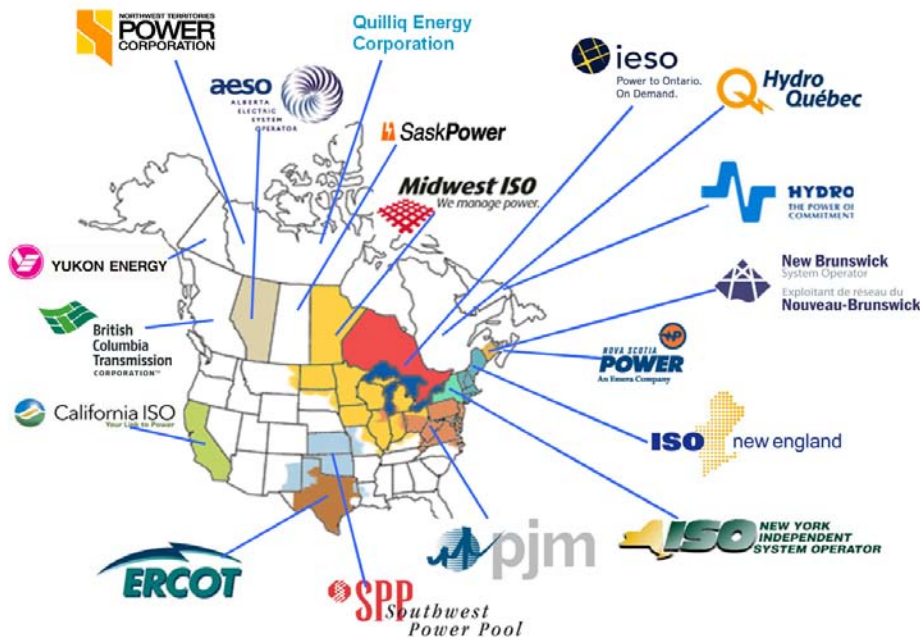
As commodity markets evolve in tandem with advents in communications technology, the criticality of data management becomes a lynchpin of corporate success or failure. Advanced analysis on market movement can lead to substantive market gains, while an inability to assess risk in a timely fashion can hinder corporate responsiveness, stagnate growth or result in unmitigated risk. Corporations must be able to collect, validate, harmonize, analyze, report and distribute massive amounts of market data (often in real time) to value and mark trades and to dynamically manage market risk. Intra and end of day data management processes which feed enterprise trade and risk systems are now mission critical components of any organization that actively trades in open markets. Energy trading, with electricity as a prime example, showcases the growing challenges of managing data in evolving markets.

For many years, electricity markets throughout North America have been in a constant state of transition. The advents of wholesale competition and power marketing can be traced back to a Federal Energy Regulatory Commission (FERC) experiment in 1987 that saw the formation of the Western Systems Power Pool (WSPP). WSPP membership facilitated trade between franchised utilities creating inter-regional trade efficiencies; the need for standardized product definition and price indexing materialized soon thereafter. In the early days, pricing was by way of splitting the savings and self-reporting; products traded were essentially a 2 X 2 matrix of peak / off-peak hours for firm / non-firm power. Market transparency was minimal and audit ability almost non-existent; except through the reporting to FERC. It was still very much a handshake and a mark-the-blackboard power trading environment. Furthermore, the telecommunications and information technology industries were still in their infancy; many of the relics of information exchange for commodity trading were, by today's standards, primitive and almost absurdly inefficient: end-of-day fax bulletins of settlement prices; phone calls to brokers for "real-time" prices; data terminals exclusive only to large-scale corporate trading entities. In essence, the old paradigm of data flow and management was severely limited by 1) the amount of readily available data, 2) the transmission capabilities for data, and 3) the costs of data storage and maintenance.

## Data Flow/Management Paradigm in the Mid-1990's



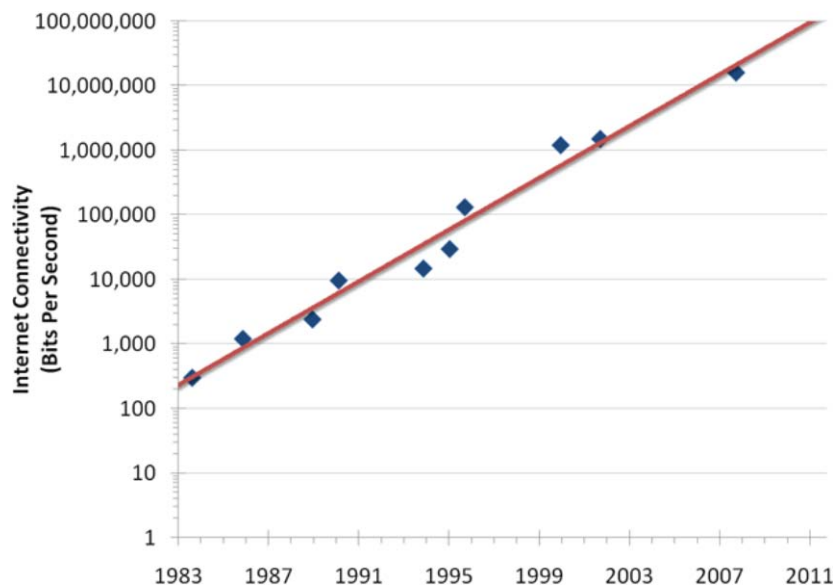
Today, the data flow and management paradigm for power markets has radically changed. First, electricity markets are described by a complex of Independent System Operators (ISO) and Regional Transmission Operators (RTO) that span much, but not all, of North America. Oddly, most of the west remains without an ISO like operation, whereas almost the whole of the eastern markets is described by interconnected ISOs. In all, there are 19 transmission operators in North America. The Independent Electricity System Operator (IESO) was one of the first markets to open; following shortly behind the Power Pool of Alberta (AESO) in 1996, the California ISO (CAISO) in 1997 and PJM in 1998.



As the markets continue to evolve, the total volume of data grows exponentially and the products become both more complex and discrete. Simple standardized, exchange-traded contracts have evolved to include increasingly complex contracts (futures, forwards, options, and swaps) which cover a wide range of commodities and energy-related items (power, gas, coal, transmission rights, emissions, and even weather). As the geographical pricing points in power markets become smaller (recent conversion of CAISO, ERCOT markets from zonal to nodal markets) and data requirements easily increase by several orders of magnitude. And coming up on the industry horizon, smart metering initiatives require nodal pricing and load information that may apply to areas as small as an aggregate of thousands of customers, or in some cases a node may describe a single large client account.

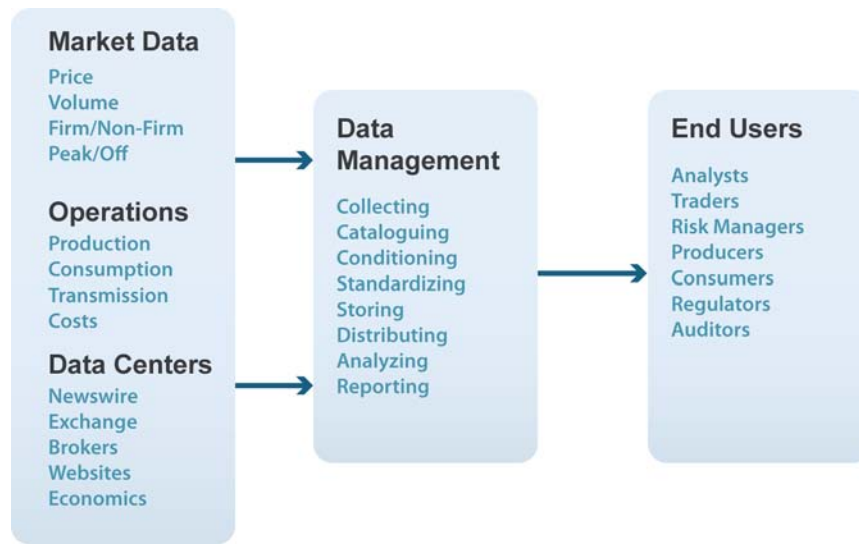
ZE PowerGroup Inc., a strategic consulting and software development firm in Vancouver BC, has built its ZEMA™ Data Management and Analysis Suite to capture, store, report on and distribute the mass of data available in the market. ISOs publish a variety of reports ranging from real time data on Pre-dispatch and Dispatched Market Clearing Prices (MCPs) to hourly and daily data on Transmission Rights, Outages, Trade flows between zones, Settlement Charges, Demand and Supply for regions within IESO control areas, and many others. In 2009, ZE will have scheduled and processed four trillion points of data. It is expected that the number of records added will more than double for 2010.

Accounting for all the transmission operators, exchanges, brokers, government agencies and so forth in the North American energy industry alone, ZE adds almost 10 million records daily. One can imagine the annual growth. Fortunately, the growth in data requirements has occurred in lockstep with the exponential improvements in data transmission and storage, to



the point where hardware is no longer the limiting constraint. However a significant gap still exists, due to the lack of means to systematically and intelligently harness the power of today's advanced telecommunications infrastructure to capture the mountains of readily available market data in order to facilitate increased efficiency (physical and economic) in the power markets. Managing systems to be able to effectively collect millions of data points a day is a highly technical task in itself. However, the issue beyond simple data collection is to determine how corporations analyze and extract intelligence from the data - what are the correlations, trends, spark spreads, heat rates, volatilities, forward curves, mark to market, value at risk - the data combinations are boundless. Consequently, a streamlined data management paradigm is vital to the success of any energy market participant.

## Data Flow/Management Paradigm Today

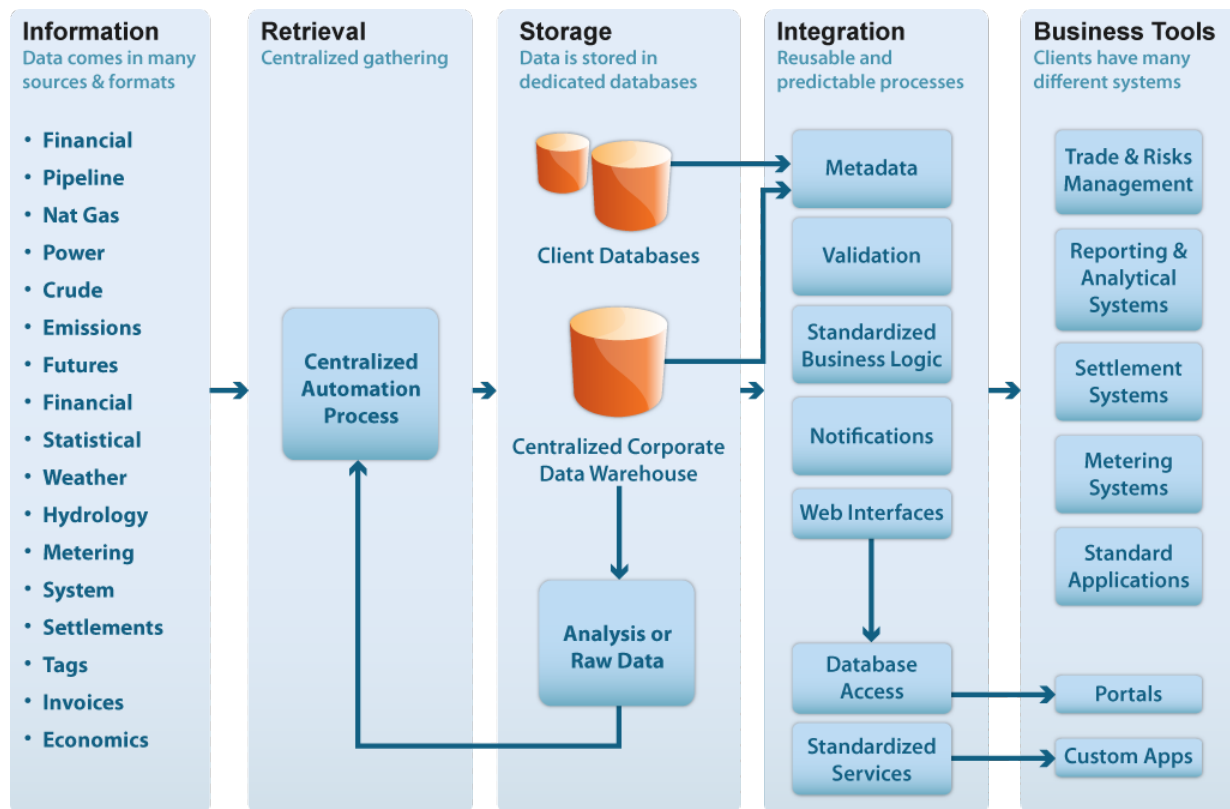


It is easy to see how data begins to dictate the required operating condition to support data capture and integration. Notwithstanding the need for systems to support trading, risk management, settlement, scheduling, accounting and reporting, there are also regulatory requirements for data handling built into SEC's Sarbanes-Oxley Act, FERC Adoption of FASB Asset Retirement Standard and NERC Cyber Compliance Standards to name three. One can quickly see how data governance is mission critical.

### Market Data → Metadata → Accessible/Useful Data

There are several complexities associated with collecting and managing data, particularly from when doing so from a multitude of sources. First, the variety of data of interest for market participants ranges from capacity and load reports, to prices, to data without common unit of measurement like outages. Second, the format of data varies widely, not just between ISOs, but between all the myriad of public and private data vendors. Data can be sourced from multiple locations (FTP, HTTP, HTTPS, email, local disk, etc.) in multiple formats (html, Excel, text, PDF, etc.)

To effectively and intelligently manage and organize this wide variety of data, ZE has to configure its data parsing technology to be able to catalog report types based on individual peculiarities of each observation; each report's units and product types will be assigned into a specific and logical category applicable to the specific commodity. The source data is then organized into a logical and sound structure which can be referenced via display output. The ZEMA software leverages its complex proprietary metadata architecture to accomplish this task. Metadata describes all the necessary attributes that allows the intelligent cataloging and referencing of data. Without the Metadata layer, the hundreds of millions of data points that a corporation must maintain becomes inordinately difficult.



The data management task is an ongoing function. Market structures are constantly in flux and new products and initiatives are always being introduced. Market participants need a range of resources to support their market activities beyond the front, mid and back offices. Data managers and support persons to manage systems are a requisite to success. Standardized and flexible technology is necessary to ensure that the interfaces between the entire enterprise energy trade and risk management (ETRM) are seamless. The greatest challenge that ZE eliminates for is the need for its clients to resolve the linkage and supply of market data with business systems.

### Build, Buy, or Rent?

The key question for market participants will be to build, buy or rent a solution. The answer to the question is a matter of scope of operation, available budget, available skill and risk tolerance. Unfortunately, forgoing data management is not an option, and each day of delay adds cost because the amount of data and products grows progressively. The first step in the “build or buy” determination process is to specify a clearly defined scope of market and business operation. Next, the data needs and the internal data trail need to be mapped. Most companies are surprised by the depth of data they use and how widespread the use can be. Often the same data is being collected manually or through ad hoc processes across several departments without a true understanding or ownership by the corporation. The scoping will allow the corporation to assess the criticality, needs of the users, and provides greater transparency around data flow and internal processes.

Thereafter the corporation can determine the cost of the solution and assess whether it has the near term resources and technology to build, and the long term resources to maintain;

recognizing there will likely be unanticipated challenges considering the large scope. Integration of technical requirements and business need is often a cliffhanger, taxing corporate resolve. When building complex systems there is an extended time to market, the effort must be sustained and managed; resources must be dedicated and cannot be allowed to lose focus. Maintenance costs and resources must be allocated annually.

ZE has been building its software for ten years and has logged probably one hundred person years in the development. ZEMA is continuously adjusted to new market demands. The sustained effort can be impossible for a small company, while large companies may choose to put their efforts in the areas of their core competencies. ZE has found that most of its happy clients are those who attempted or considered building a solution on their own and found that an out of the box flexible solution is less costly and involves less risk; the obvious caveat is as long as all defined needs can be met.