“Big Data” describes the anticipated but massive increase in the volume and complexity of data under management. Within utilities, it is directly associated with major changes to business models or operations.

Sources of data explosion
The drive toward decarbonization, decentralized operations and energy efficiency is responsible for swelling data volumes along the power and utility value chain.

This is because in generation, the sector is shifting from centralized management of relatively few large-scale thermal or nuclear power plants that are nearing retirement, to a decentralized model that includes, potentially, millions of small renewable generation assets. Each of these new assets has to be monitored and managed which, in turn, increases data volumes. And, of course, renewable generation is largely determined by weather conditions, which creates increased demand for accurate weather forecasting data, too.

The impact is felt on the trading floor. It used to be relatively easy to keep track of maintenance schedules, downtime and outages at a small number of thermal, nuclear and hydro generation plants. However, the rise of a bigger, broader and more diverse range of generation assets is increasing the size and complexity of the portfolio. This means an abundance of data that has to be factored into utility trading decisions.

In transmission and distribution, energy efficiency and reliability requirements are leading to an increase in intelligent electric devices to monitor and optimize performance. These devices produce data (such as sensors and monitoring equipment) and require data (control units) and sit on both the IT and electrical networks.

The retail world is also contributing an ever-increasing volume of data. Meter readings will escalate from, say, once a month, to once every 30 minutes. That’s 48 readings a day, for every meter, each generating data for time-of-use billing and demand-management purposes.

Further down the line, the wide-scale adoption of electric vehicles will impose other data demands on already over-burdened utilities. And as other devices and demands come on line, utilities will innovate further, increasing the volume and variety of data.
The risks of not managing data
Every event that occurs within a utility either produces or is informed by data. Properly harnessed, it enables utilities to transform their operations and to seize competitive advantage.

However, failure to capture and analyze available data quickly can adversely impact decision-making.

In transmission and distribution, for instance, data on asset performance and maintenance influences plant retirement decisions and directs investment. Misinformed decisions could prove very costly.

On the trading floor, power transactions that are inadequately hedged due to poor data analysis or management could result in massive trading losses and, potentially, enormous exposure for the business.

On the retail front, data errors in billing and metering result in poor PR, as well as a loss of consumer confidence in the brand.

Failure to manage ever-growing data volume is potentially catastrophic. So what can be done about it?

Bringing data under control
In this era of Big Data, the survival of utilities hinges, critically, on its management. However, IT departments worry that the impact of this massive explosion in data has not yet filtered up to top-level management.

On a scenario basis, businesses need to start understanding the ongoing data management implications of all current and planned major capital projects and smart initiatives over the next five to 10 years. This will provide a baseline for ascertaining data load and for prioritizing resources and spending.

Businesses also need to gear up for greater convergence between operational technologies (those associated with engineering operations) and IT-run business systems and networks. Both are critical to the evolving industry and traditional organizational boundaries will need to flex. Crucially, utilities have to recognize that Big Data is too big a challenge for IT to sort out single-handedly. Existing business processes are undergoing massive change, and operational management has to participate in handling the Big Data challenges and in understanding rather than offloading the issues, to enable effective transformation.

A backward step?
Here’s a conundrum. Right now, cloud computing is the big new thing for data management in the IT world. It involves shifting masses of data from millions of devices onto a few centralized data centers around the world. It is IT’s answer to reducing the costs, complexity and unpredictability of data management.

So why, then, are utilities moving in the exact opposite direction?

The industry is effectively migrating from a cloud-like structure, where a few large power stations deliver energy right into homes and offices, to a decentralized and highly distributed set-up for production and supply.

Already, there are more than one million separate solar installations in Germany, accounting for in excess of 24GW of installed capacity, more than the installed capacity at the world’s largest single power plant, the Three Gorges Dam in China.

This is all laudable. Yet every installation comes with its own metering and data management issues. The trade-off, it seems, is greener energy in return for more data, more complexity and higher costs.

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