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Revenue Assurance for Energy: Using SAS® Solutions to Leverage Corporate Intelligence to Fuel Effective, Forward-Looking Decisions in Volatile Markets

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ABSTRACT

Leveraging 30+ years of SAS leadership in business analytics, this presentation shows how SAS solutions arm various energy sector participants with the needed intelligence to manage earnings and risk. The presentation also addresses how risk, customer, financial, and operational intelligence enable companies to do the following tasks:

- more efficiently manage energy supply
- improve work management
- reduce overall operational costs
- enrich customer satisfaction

We also discuss how advanced metering infrastructure (AMI) provides a treasure trove of valuable data, and how SAS handles the exponentially larger volumes of real-time data and bidirectional data flow in an efficient and timely manner, which enables utility companies to add millions of dollars to their net profit.

INTRODUCTION

Energy and utility companies operate in a unique climate of risk, uncertainty, and volatility – a climate where the challenges are intensifying daily. These organizations work relentlessly to improve overall profitability by doing the following:

- focusing on business excellence
- driving costs out of the business
- managing risk and avoiding excessive leveraging

Across all sectors of the energy and utility industries, companies must make reliable decisions amid hundreds or even thousands of variables. These companies must accurately predict retail demand, protect delivery systems, minimize regulatory disallowances, and sustain good credit ratings – all in an environment sharpened by deregulation. They must also improve profitability by controlling supply costs and enhancing operational efficiency. At the same time, they must balance two corporate objectives that are often distinct: operational excellence and customer satisfaction. The fact is that even small improvements can have a significant impact on overall profitability. For example, accounting for the overall economics, a 1% improvement in either revenue forecasting or risk management can translate into an increase in overall profitability worth millions of dollars.

Although revenue leakage is a growing problem that cuts into profits, oil and gas companies can realize big benefits by leveraging corporate intelligence. For upstream operators, leveraged intelligence provides opportunities to make better use of their aging assets and diminishing reserves, while reducing exploration and development costs. Leveraged intelligence helps downstream operators optimize transportation and security logistics as well as optimize their huge investments in refinery and distribution facilities. It also helps them to manage the uncertainty as to where and when market demand will appear.

Only those companies that effectively implement revenue assurance programs that maximize service and energy-offering profit margins will reduce their losses, increase their operational efficiencies, and increase their overall profitability. A sound revenue assurance program includes the use of the following:

- risk intelligence
- customer intelligence
- financial intelligence
- operational intelligence

Companies that leverage all four types of intelligence receive compounded business benefits. SAS offers advanced analytics solutions in all four of these areas, giving energy and utility companies a competitive advantage in a highly volatile and unpredictable market.

RISK INTELLIGENCE

Energy-commodity volatility has become a mainstay in the marketplace in the new millennium. Significant energy-commodity price movements are the norm rather than the exception. These significant events, or trends, include the following scenarios:

- The natural gas market is very seasonal with a tendency toward higher volatility in the winter months when demand is greater.
- In the crude oil market, geopolitical events, pipeline breaks and refinery turnarounds or accidents can upset the supply-and-demand balance.
- Both natural gas and crude oil markets can be impacted by severe weather events, hurricanes, and so on.
- Increased volatility and unpredictability in the price of gas, power, and other energy commodities is expected to continue and has increased the pressure on energy providers to purchase energy at the best price while effectively meeting demand.

These trends require better risk intelligence and forecasting tools that can more closely capture data related to these events. SAS Risk Solutions for Energy meet that need, helping companies compete in an ever-changing marketplace.

ENHANCING RISK MANAGEMENT PROCESSES

AG Energy is an eastern Canadian natural gas and electricity aggregator with a rapidly expanding membership. The company found that its need to manage risk grew exponentially as the expanding membership demanded enhanced services. As a result, AG Energy outgrew the capabilities of its spreadsheet environment and required more sophisticated and flexible deal-capture tools. The SAS solution AG Energy opted for, RiskAdvisory BookRunner® (a deal-capture application), enables the company to capture the details of energy transactions and enhance risk management processes (including credit monitoring and real-time market-to-market functionality). BookRunner is expandable, so it can grow with AG Energy's business. BookRunner also accommodates the fact that many IT organizations are upgrading their existing applications from closed-form solutions on single computers and servers to service-orientated platforms that are available through the internet, intranets, or extranets and that are accessible through Web browsers. This software solution can also be upgraded further or customized in real time, providing substantial cost savings.

IMPROVING RISK ANALYTICS

Energy companies conduct risk-management analyses on the following factors to enable informed decision making that will increase shareholder value:

- risk-factor sensitivities
- scenario/what-if investigations
- at-risk measures
- counterparty exposure assessments
- economic capital calculations

Companies might also use these analyses to do the following:

- establish credit-risk procedures to mitigate counterparty exposure
- gain an enterprise view of the market, credit, and operational risk
- implement best practices in corporate governance in order to evaluate risk both qualitatively and quantitatively

In the spring of 2004, Brazil's electricity market was opened to commercial transactions, allowing companies to sell to many industrial and commercial contracts. As a result, the need for companies to fully capture and understand the risks inherent in this new business venture was critical. Electricity contracts in the Brazilian market are non-standardized compared to contracts in North America, which has a system of formal exchanges and many legal rules in place to protect both the buyer and the seller. Brazilian electricity transactions are largely non-standard physical deals with many flexibilities dependent on volumes and prices during the life of the contract.

CPFL, one of Brazil's largest publicly owned electricity companies, recognized the need to fully capture and understand the inherent risks created by this new business model, so the company investigated SAS risk solutions

as a way to meet this need. As a result of its investigation, the company is in the process of implementing three SAS solutions to help improve risk analytics and to optimize its electricity portfolio:

- RiskAdvisory BookRunner: This energy trading and risk management (ETRM) solution helps companies to monitor, measure, and optimize risk.
- SAS® Risk Dimensions®: The RiskAdvisory team realized that the flexibilities inherent in Brazilian deals mirror North American options contracts in their risk profile and, subsequently, they were able to show the client's risk team the value that SAS® Risk Dimensions® can provide.
- SAS® BI Server: SAS BI Server supports all activities from simple reporting to sophisticated analytics and administration, all in an integrated and interoperable environment. This solution delivers powerful analytic capabilities, enabling users to seamlessly integrate analyses of the past into accurate models and forecasts of the future. Users can then make timely, fact-based decisions.

Another energy company that is using SAS Risk Dimensions is Entergy, based in Texas. Entergy is using SAS Risk Dimensions to quickly identify trends and contributing factors that affect unacceptable risk exposure. As a result, Entergy can now identify its most profitable customers, products, and services through data management and risk aggregation. Using good risk intelligence, Entergy discovered that 50% of its revenue comes from a profitable group of customers, products, and services. Knowing this has enabled Entergy to reduce risk exposure and to better protect portfolio losses.

SHARING COMMUNICATION ENTERPRISE-WIDE

Communication across an enterprise is crucial to good decision making, strategic planning, and optimizing business opportunities. To facilitate good enterprise-wide communication, companies need solutions that enable senior management, risk managers, and analysts to access a data warehouse and to communicate operational risks across the entire enterprise. SAS® Web Report Studio generates analytical results that can be accessed via Web browsers across an enterprise. It is an easy-to-use query and reporting application specifically designed for general business users who want to view, author, and share reports on the Web. As part of the SAS®9 Intelligence Platform, SAS Web Report Studio enables more users than ever to access the power of SAS. This capability empowers decision-makers to be self-sufficient, and make faster, better business decisions while freeing up IT staff and minimizing administrative overhead.

As another example, a government agency responsible for royalty revenue accounting and budget forecasting used a process that was decentralized and lacked repeatable, auditable, and secure attributes. Analysts spent an inordinate amount of their time (80%) on data collection and integration versus analysis. All models resided in a Microsoft Excel spreadsheet environment, resulting in a multitude of calculation code with every cell having the potential to conceal errors that could corrupt outputs. The agency opted for a SAS BI platform and related tools (including SAS Web Report Studio), and migrated the existing revenue forecast model to this platform. As a result, the agency now has tools to manage data, build analytical models, publish reports, and conduct ad hoc reporting quickly, all within a secure environment.

MEETING REGULATORY REQUIREMENTS FOR HEDGING PRACTICES

Compliance with the Sarbanes-Oxley Act requires that energy companies meet strict regulatory, accounting, and shareholder reporting standards related to hedging practices. Ongoing changes to accounting and regulatory requirements demand increased levels of visibility and enhanced controls since boards of directors and executive management are held personally accountable for their actions or inactions. The RiskAdvisory division of SAS has received many inquiries for regression analysis capabilities around hedge prices/values to underlying physical prices. This is done for accounting purposes to allow for more favorable tax situations if hedge prices are closely correlated to the underlying physical price. Energy companies have large volumes of data, which makes regression analysis very cumbersome. Large amounts of price data and multiple time period calculations make BI ideal for this type of work.

KEEPING PACE WITH FUTURE RISK FACTORS

Many risk factors will continue to impact the energy sector in the future, driving companies to implement a stronger risk management framework. Analysts anticipate that climate change, an aging workforce, and infrastructure obsolescence -- as well as continued market volatility -- will spawn investment in energy and information technology to better manage exposure and identify new opportunities. Companies will also need to ensure that they have the capabilities to meet increased accounting and disclosure requirements and regulatory standards.

The energy marketplace continues to attract more participants, forcing companies in this space to dedicate more resources to the management and control of their market risks and credit exposures in this potentially broader network of counterparties. In anticipation of this continued appetite for better solutions in the volatile environment, SAS® Risk Solutions for Energy will continue evolving to meet these needs.

CUSTOMER INTELLIGENCE

The ability to accurately predict future energy loads forewarns and arms an organization with the intelligence that is required to manage earnings and risks. Customer intelligence ensures that the savvy utility company integrates all key target audiences in the customer marketing process, facilitating a better understanding of the commercial, industrial, and retail customers' energy needs. A strong customer-intelligence solution provides several benefits:

- insight into commercial and retail customer usage patterns and future energy requirements based on attrition, population growth, and changing demographics
- forecasts on customer retention and loyalty that help you develop appropriate marketing strategies to do the following:
 - determine when customers might switch to another energy provider
 - determine why customers leave
 - encourage increased customer loyalty and profitability through better and more timely offers
 - help determine the best use of marketing resources
- more consistent customer dialogue across channels
- more effective customer care centers that control costs while meeting customer needs
- the ability to reduce loss by detecting fraudulent energy usage.

SAS[®] Marketing Automation leverages change in customer demand. It helps improve response rates and revenues from your marketing efforts by enabling you to easily manage sophisticated, timely, personalized customer-communication strategies based on unique energy and energy service needs. Built specifically to meet the needs of key members of the marketing process, only SAS Marketing Automation provides comprehensive data management, campaign management, and advanced customer analytics in one integrated, easy-to-use solution.

The SAS Marketing Optimization solution provides customer intelligence that enables energy companies to do the following:

- create and benefit from reliable, high-value customer intelligence in fast-moving markets.
- gain a panoramic customer view. Such a view ensures that revenue forecasts, marketing, integrated resource planning, or demand-side management (DSM) campaign execution are based on a common, uniform view of opportunities and threats.
- maximize return on marketing campaigns.
- improve customer acquisition and retention.
- rapidly achieve significant and measurable return-on-investment (ROI).
- identify the true cost to serve by individual customer and customer segments.

The following sections discuss the issues related to customer intelligence and describe additional SAS solutions that are used to solve these issues.

FORECASTING FUTURE ENERGY AND SERVICE REQUIREMENTS

Without reliable customer intelligence, overall energy needs must be serviced by supply options that add millions of dollars to energy rates each year. So, in addition to all of the other benefits, a strong customer-intelligence solution provides the conservation impact data that a company needs in order to analyze how to meet future energy and service requirements efficiently, reliably, and at the lowest reasonable cost.

Integrated Resource Planning (IRP) is a process in which energy companies evaluate the full range of possibilities (including energy conservation and efficiency) for providing adequate and reliable service at the lowest possible cost. IRP encompasses traditional generation, transmission capability planning, and gas supply planning, but it is much broader than that. IRP considers both demand-side and supply options to ensure that adequate capacity exists to meet increases in demand. The result of IRP is a plan that most economically maximizes efficiency and customer satisfaction. Such planning is fundamental to the North American strategy for reducing billions of dollars of incremental energy costs yearly. Accuracy forecasts and customer-specific intelligence isolate the timing and the magnitude of future conservation opportunities that will not need to use existing transportation and distribution infrastructures. Conservation enables states and provinces to reduce annual energy requirements by tens of millions of dollars and reduce the capital investment that is needed to create, transport, and distribute energy.

Changes in future energy demands are not uniform across customers. Changes in demand vary significantly, driven by several attributes:

- revenue class
- the age of the home
- whether the customer is a new construction customer or conversion customer
- what type of end users are downstream of the billing meter
- efficiency of the equipment that is used

Each unique combination of these attributes defines a unique customer segment. Members of a unique customer segment have a common rate-of-change in demand.

Forecasting at the customer-segment level produces the most accurate forecast. SAS® Forecast Server is an excellent solution that significantly improves forecast accuracy by providing utility companies with the following benefits:

- forecasting demand at the customer-segment level, which produces the most accurate forecast
- enabling weather measures to be tailored to segment and to account for variations across billing cycles
- incorporating independent drivers (such as weather, baseload profiles, energy prices, and economic indicators) and isolating the impact of change at the segment level.

Not only does SAS Forecast Server improve the accuracy of forecasts; it also enables you to distill segment forecasts down to the ZIP-code level, helping you isolate the following information:

- where incremental infrastructure is necessary to support the higher demand.
- which communities must be targeted for your Integrated Resource Planning (IRP) /Demand-side Management (DSM) program and how much load must be conserved to eliminate the need for incremental infrastructure. This information maximizes the value of your IRP/DSM efforts because the program is targeted to communities that truly need it.

Past DSM efforts failed to achieve the expected benefits because the IRP/DSM program was not targeted to communities that truly need it, nor was it targeted to individuals who truly have an opportunity to conserve with minimum investment.

You can overcome this issue using SAS Forecast Server and the SAS® Campaign Management and other optimization solutions that isolate which DSM programs will deliver the greatest benefits, while accounting for any execution constraints.

You gain the following benefits when you use SAS Campaign Management and other optimization solutions (while assuming constraints):

Revenue Enhancements (where applicable):

- Service and churn decrease: 20%-30%
- Win-back increase: 25%-33%
- Renewal-rate increase: 5%-15%
- Acquisition/prospect increase: 27%-45%
- Campaign-conversion increase: 20%-50%
- Cross-sell/up-sell rate increase: 3%-25%
- Share-of-wallet increase: 3%-25%
- Overall retention-rate increase: 50%-200%

Cost Reduction/Avoidance (where applicable):

- Customer satisfaction increase: 3%-10%
- Contact-center cost reductions: 20%-50%
- Field optimization: 10%-20%
- Exception processing decrease: 10%-15%
- Expense-per-convert decrease: 30%-60%
- Mailing-cost decrease: 10%-40%
- Marketing-overhead decrease: 8%-10%
- Campaign-cycle time decrease: 50%-70%

RETAINING CUSTOMER LOYALTY THROUGH APPROPRIATE MARKETING STRATEGIES

Open access in retail energy markets enables customers to choose their energy provider. Therefore, utility companies that have not implemented a sound customer intelligence program are threatened with the possibility of decreased customer loyalty, increased acquisition costs, loss of customer revenue, and decreased profitability. Utility companies must also forecast additions, by area, to determine the overall load they will be required to serve in the future. Leveraging community forecasts enables utility companies to isolate which communities must be targeted for the IRP/DSM program and to quantify how much load must be conserved to eliminate the need for incremental infrastructure. By using target communication and marketing, utility companies can bundle energy and services offerings to account for customers' specific needs and their ability to conserve. This capability will maximize the value of the IRP/DSM effort since it is targeted to communities that truly need it.

Using the knowledge derived from a demand-side management program, you can deliver more targeted customer communications that help you to do the following:

- decrease attrition
- acquire new customers
- increase revenue from existing customers
- promote conservation programs

You need accurate and reliable customer segmentation techniques, without which you cannot effectively target or understand customers with respect to their energy-related values, needs, or likely future behavior.

As discussed in the previous section, changes in future energy demands are not uniform across customers, and changes in demand are driven by various attributes, including the amount of change that has been realized relative to peers. Each unique combination of these attributes defines a unique customer segment. Members of a unique customer segment have common needs, and they will behave quite similar over time.

Customer segmentation and data mining enable you to group common customer behavior. Companies that do not use these techniques are not optimally successful at executing strategies for improving the efficiency of marketing campaigns and customer profitability. Lack of success in these areas impacts customer satisfaction. Ultimately, lack of successful strategies increases cost and decreases revenue by missing opportunities to communicate using the most effective channels and to offer additional energy products and services.

The business impact will vary, depending on the following factors that must be isolated in order to identify and target customer intervention for conservation or up-selling opportunities:

- population
- technologies
- behavior
- market conditions
- economic conditions
- production efficiencies

CREATING MORE EFFECTIVE CUSTOMER CARE CENTERS

The most effective customer care centers are those that control costs while meeting customer needs. Implementing a contact center performance-management solution results in the following benefits:

- reduced average call-handle time
- increased quality scores
- reduced staff attrition and absenteeism
- increased productivity
- increased sales and reduced administrative costs

A strong customer intelligence solution supports three main goals in a customer care center:

- forecasting overall demand to ensure that you have the appropriate personnel to handle support calls. SAS Forecast Server can help you to anticipate the call load so you can adequately staff your customer care center.
- communicating a clear set of performance goals and measuring performance against these goals to help employees focus and understand what matters. SAS[®] Analytics provides the tools to assess which employees are exceeding expectations and which ones are not.
- assessing where efficiencies are required overall in the customer care center. SAS analytics solutions can help you streamline call-center processes

DETECTING FRAUDULENT ENERGY USE

Fraudulent energy use has become easier to commit and more difficult to detect. Theft of electricity by people who divert, bypass, or tamper with power connections or meters results in higher rates and potentially unsafe conditions. Such fraud is a world-wide problem that costs electric companies and rate payers millions of dollars annually.

Customer intelligence gathered using SAS data mining capabilities helps energy companies stay one step ahead of the perpetrators by providing a knowledge infrastructure that creates consistent and reliable analysis of usage

patterns and transmission levels versus delivery. SAS[®] Enterprise Miner provides automated access to intelligence that uncovers and prevents costly crimes. SAS Enterprise Miner enables energy companies to do the following tasks:

- monitor energy flow for suspicious behavior
- analyze data to identify new patterns of transmission versus usage
- set fraud alert engines
- manage potential fraud cases efficiently, from detection through notification of the authorities

FINANCIAL INTELLIGENCE

Deregulation causes the unbundling of any or all three of the functions (generation, transmission, and delivery) of the power markets. When these markets deregulate, utility companies that have been quasi-governmental entities must now operate in a competitive environment. These companies begin to deal with many new variables, such as customers switching to other providers, unknown load shapes, and the need to develop a more flexible infrastructure. Energy and utility companies in this situation or any other situation need a sound financial intelligence program to address such issues.

ASSESSING OVERALL BUSINESS AND REGULATORY RISK

Without financial intelligence, companies cannot assess corrective actions that are necessary to reduce overall risk. For example, to reduce overall business risk, companies need financial intelligence in order to accurately answer the following questions:

- Will earnings expectations be met? At what level of certainty?
- What are future cost exposures? Are forecasts isolating these exposures?
- How is cash flow impacted based on various weather scenarios?
- Are existing contingencies (if any) sufficient to offset business risks?

In any given quarter, the facts of such an assessment can have an impact on shareholder value that is worth millions of dollars.

To reduce overall regulatory risk, financial intelligence is required for an accurate assessment of the following questions:

- Are variations in normalized forecasting results increasing uncertainty for rate-making purposes and ongoing reporting requirements?
- Is existing intelligence sufficient to reduce risk of regulatory disallowances and validate prudent decision making?
- Are the underpinning forecasts increasing shareholder risks?
- Do those forecasts truly reflect weather risk, the cost of service, and changes in customer behavior?
- Are rate payers adequately informed of the magnitude of risk? Consumers must have a sense of the magnitude of risk in order to assess an appropriate hedging strategy.

Lack of evidence related to these situations can cost shareholders million of dollars based on any given significant regulatory decision.

A financial intelligence program consists of a set of tools to help answer those questions. A strong program provides the following financial management and planning capabilities that enable finance professionals to move beyond simple accounting to become a trusted advisor in all aspects of the enterprise, including the following:

- strategy formulation and execution
- consolidation of financial data across business units
- periodic and year-end financial results reporting
- Sarbanes-Oxley and other compliance reporting
- management reporting for lines of business
- effective, proactive, and predictive planning along with collaborative budgeting
- accurate measuring of costs by activity, by process, by energy product/service, and by customer

SAS FINANCIAL INTELLIGENCE SOLUTIONS

SAS provides a unique financial-planning environment that can assess risk and threats when modeling cost and revenues. SAS Financial Intelligence solutions centralize and integrate revenue models, risk models, cost-of-service models, supply models, and financial planning into one environment. You can use these solutions for budgeting and rate-case financial reporting, as well as to gather evidence that supports your decision making.

With these solutions, you have the ability to make strategic and operational decisions that maximize profit and reduce costs. You can also streamline processes by determining the cost of activities and the profitability of products, customers, and suppliers. The SAS solutions go beyond typical activity-based management tools by

combining visual business modeling with advanced reporting, analysis, and data management. SAS offers a complete, end-to-end activity-based management solution that gives you the following advantages:

- You have the ability to easily share the true costs of activities across the organization so that decision makers can make more informed cost control and profitability decisions.
- When you are designing rates, you can provide the necessary cost-service evidence studies.
- Customers are able to gain a better understanding of their purchases and suppliers, which helps you to do the following:
 - make better strategic sourcing decisions
 - reduce enterprise spend
 - consolidate spending to strengthen overall purchasing power
 - reduce supplier risk
 - align your procurement strategies with corporate goals

SAS solutions also enable customers to create a single unified repository for all compliance documentation, spanning the entire range of SOX compliance requirements (including Sections 301, 302 & 404).

RELIANT ENERGY: USING SAS® SOFTWARE TO ADDRESS REORGANIZATION ISSUES

A long-time SAS client, Reliant Energy (a US-based company), went through a major reorganization as a result of deregulation. To retain its shareholder value during the reorganization, the company needed to maintain contact with all of its business units, and especially across commodities and customers. However, they experienced a number of problems during this time:

- They had difficulty in linking disparate sources of data from multiple general ledgers or from multiple systems.
- Employees were spending too much time verifying error-prone Excel worksheets.
- The distribution of financial reports was time consuming, and the staff was frustrated by the amount of time it took to get department feedback on planning and budgeting.
- People were also frustrated with slow response from the IT department on requests for special reports or analysis.

Reliant Energy decided to implement SAS software to address these issues. Reliant used SAS software to develop a series of applications that provide remote access to the company's data, bringing the computing power of SAS software to the desktops of more than 50 employees in the Wholesale group.

Reliant Energy's Wholesale group gathers and stores historical and forecasted information from its generation assets, customer usage records, subscription databases, and other sources. Stored information includes electric load data, weather data, and electric and gas price data. The Wholesale group uses SAS software to model and analyze this data, regardless of team-member location.

ABB POWER TECHNOLOGIES: USING SAS® SUPPLIER RELATIONSHIP MANAGEMENT TO ENHANCE PROCUREMENT PROCESSES

ABB Power Technologies, a worldwide power and automation technologies company, is using SAS Supplier Relationship Management to enhance its procurement processes. SAS Supplier Relationship Management has enabled the company to do the following:

- reduce enterprise spending.
- create complete spend transparency. Company leaders are taking a holistic view, applying tools broadly across their spend base to provide better visibility.
- consolidate and prioritize suppliers.
- set, measure, and manage optimal procurement strategies.

ABB has benefited greatly, even down to its subsidiary levels, from current and reliable spend analysis on suppliers obtained through SAS Supplier Relationship Management. SAS Supplier Relationship Management also provides real-time compliance dashboards that measure, monitor, and report key performance indicators associated with Sarbanes-Oxley and other compliance mandates. With access to these indicators ABB can be certain that it complies with these mandates.

OPERATIONAL INTELLIGENCE

IDC's Energy Insights report, *Worldwide Energy Industry 2007 Top 10 Predictions* (idc.com/El/getdoc.jsp?containerId=EI204793), makes the following prediction:

The aging workforce will continue to be a major challenge for the energy industry. Upstream oil and gas companies are expected to be harder hit by this issue and will look to IT solutions to address the problem (work and asset management; process automation). Utilities are expected to focus more on non-IT issues such as long-term staffing plans, retraining, etc., but the leading utilities will adopt IT solutions for work and asset management.

IDC also predicts that aging assets and associated reliability concerns will drive intelligent power-grid technology investments. Transmission and distribution asset owners will invest in advanced information and engineering technologies for the operation and maintenance of the grid. In addition, utilities will include intelligently distributed energy resources and demand response programs in their portfolios.

These predictions indicate that energy and utility companies are going to require exceptional operational intelligence to address these issues. *Operational intelligence* aids an organization in managing its operational processes to achieve higher shareholder confidence and greater business value.

OPERATIONAL INTELLIGENCE AND AUTOMATED METER READING TECHNOLOGY

Utility companies are always concerned with the operational aspects of their businesses: equipment failures, increasing service costs, revenue loss during down time, and the need to leverage asset information across the organization. These companies need to develop measures for minimizing unplanned equipment outages, ensuring that technicians have the right parts and skills when repairing or maintaining assets, and so on. Many companies have invested in *automated meter reading* (AMR) technology in order to eliminate manual data entry errors, to reduce inaccurate bills, to lessen the need to access premises, and to substantially cut the number of meter-reading personnel.

However, these companies need operational intelligence to realize the business benefits that AMR technology can provide. Cash-strapped utility companies are experiencing increasing pressures to increase profitability and reduce costs. A sound solution to such utility problems is automated meter-reading systems. AMR systems are designed to dramatically reduce operational costs and also to meet the new regulations that make demand response and outage management features necessary. Utility companies expect to save at least as much as the cost of the whole AMR system over the lifetime of the system. Operational intelligence enables these companies to leverage the vast information collected from AMR systems so they can understand consumption patterns and the costs tied to them. This data fuels earnings by taking risk, customer, financial, and operational intelligence to the customer level. Utility companies can then target customers, networks, and interventions in order to maximize efficiency and overall profitability. The core benefit of AMR is that it enables utility companies to bill using a time-of-use rate structure, which charges customers based on the true cost of service for their energy consumption. The expectation is that time-of-use rates will lead to at least a 5% - 10% demand reduction, on average, per customer in less than 2 years, which translates into millions of dollars in reduced energy demand per state and province at minimum.

Utility leaders want to keep their profitable, high-consumption customers. They strive to maintain this valuable base load that, in turn, contributes to utility companies' bulk buying power and cash flow. Enlightened utility executives want to strengthen ties with these customers because of their importance to the core business — and because they could be a source of new revenue through the purchase of enhanced services.

In the world of competition and deregulation, utility companies must understand their customers on an individual basis. The fact is that the cost of energy is not uniform; the more that is being used within any given market, the higher the cost. Therefore, companies need the advanced analytics capabilities of operational Intelligence to match cost to the services that are provided to individual customers.

Combining AMR data with operational intelligence provides some major benefits:

- Customers are charged only for the energy and infrastructure that they actually use. AMR enables utility companies to use economic incentives to alter customer usage. The adoption of creative pricing options, which reflect the cost of providing service to each customer more accurately than straight rates, creates an environment in which individual energy-usage information, sub-metering, controllers, energy-management systems, on-site generation, and other products and services now have increased value. Proper pricing also creates a value environment that promotes the sale of enhanced services and enables new revenue. Through real-time pricing, customers can take advantage of low, hourly, wholesale power prices the majority of the time. Customers can also mitigate up-side price exposure through demand-side management measures, on-site generation and risk-management tools such as futures and options — or through voluntarily interrupting their usage. If an interruption at a certain time would be costly, it might be more cost-effective for the customer to purchase the high-priced power and continue to operate. The important point is that real-time pricing allows customers to choose from a number of available business

options and decide the best way to handle up-side price variations in a manner that is the least disruptive to business. At the same time, these customers can take full advantage of the down-side price variations

- Armed with this knowledge and intensive usage profiles, power providers and distribution companies can improve their understanding of customers, determine whether their companies are profitable, and identify which services and products can assist the customer and bring in new, ongoing revenue.
- Operational intelligence ensures that there is sufficient capacity to meet peak demand. Depending on where growth will occur, there might not be sufficient capacity to support expected growth. A strong operational intelligence solution can enable you to forecast future load growth at ZIP-code level, to enable peak hour growth to be matched to infrastructure capacity. Results from these efforts indicate growth is widely divergent, which means that there are broad implications for construction, operations, and maintenance on their existing energy distribution assets (such as poles, and wires, or mains and services). Managing these distribution assets is a major driver to ensure that the rate base is effectively managed to grow earnings. Using geographic information system (GIS) software to view peak-hour growth relative to capacity indicates where the greatest capacity constraints will be. By meshing this knowledge with intelligence that isolates which customers have not conserved (relative to their peers), you can identify customers for whom DSM programs will have the greatest conservation impact.. Targeted conservation with the greatest capacity constraints translates into a reduction by millions of dollars in capital investments.

Analytic knowledge gained from this powerful measurement and communication platform (AMR) gives utility companies greater control over load management and provides the basis for billing customers differently based on peak and off-peak energy usage. A Cap Gemini study estimates that the savings are so significant, and they cross multiple service areas. The following list provides the best estimates of improvements you can expect using AMR data with operational intelligence techniques:

- Collections: 15-25%
- Demand management: 2-22%
- Load forecasting: 9-14%
- Tariff and regulatory: 1-4%
- Outage and restoration: 3-8%
- Asset management: 4-19%
- System control: 4-11%
- Settlement: 2-4%
- Safety: 2-5%
- Vegetation management: 3-7%
- Billing and customer care: 2-7%
- Field-work management: 3-7%

Operational intelligence also benefits utility companies by helping them to maximize the performance of assets:

- Operational intelligence gives you the capability to predict and set alerts for equipment failures. It consolidates and reports on the vast amounts of data produced in field service operations so companies can measure the cost and effectiveness of their field services.
- Proactive management of your field service organization reduces unplanned outages and optimizes field service efforts. Operational data can alert companies as to when scheduled preventative maintenance calls should occur to prevent unplanned repair calls and potential failed equipment situations. Such data also provides information on inventory and tools required by the service technician and the necessary skills that will be required of the service technician for each service call. That information helps technicians to complete service calls the first time.

SAS OPERATIONAL INTELLIGENCE SOLUTIONS

SAS Operational Intelligence solutions connect an organization's strategy and execution by providing focus, communication, and collaboration across the entire organization. These solutions provide a toolkit that helps facilitate crucial business activities such as the following:

- managing tangible and intangible assets that are important for the financial health of the organization
- making informed decisions about capital portfolio investment options and resource allocations
- predicting outages and failures so you can to optimize maintenance efforts and minimize service disruptions
- building teamwork across the entire organization
- establishing operational focus and efficiency
- developing an effective IT resource strategy, including necessary security
- managing human capital investments strategically
- tracking, analyzing, and reporting on enterprise-wide key operational metrics

As mentioned earlier, operational intelligence gives you the capability to predict and set alerts for equipment failures. SAS Operational Intelligence solutions can consolidate and report on the vast amounts of data produced in field service operations so companies can measure the cost and effectiveness of their field services. SAS solutions leverage your existing operational systems and infrastructure while deploying key information to those who need it

the most – those in the field – through wireless capability from our partners. You can also use the SAS solutions to analyze data and determine the root cause of product defects so you can address those defects before they surface to customers.

CONCLUSION

To be competitive in today's market, energy and utility companies must isolate the intelligence gaps that exist in their businesses and prioritize their investments based on the impact these gaps have on their overall profitability. Only those energy supply-chain participants who *effectively* execute revenue assurance programs to maximize their service and energy-offering profit margins will be able to reduce losses and increase operational efficiencies. Without revenue assurance, business risk and regulatory risk will erode any competitive advantage. However, with such a program, companies retain their competitive edge. In addition, the savings generated by implementing such a program goes right back into the profits. Business intelligence solutions from SAS encompass a broad set of tools to help companies achieve effective execution and navigate successfully through the areas of risk in the energy and utility sector.

CONTACT INFORMATION

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