Improving Utilities Collections Through Predictive Analytics

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Introduction

Every year, utilities write off millions in bad debt caused by customers who don't pay their electricity bills. Opportunities exist to reduce this annual expense.

Typically, the utility seeks to pass those bad debts along as additional costs to the rate payers who do pay their bills. Or, the losses are absorbed by the company's shareholders. Utilities are facing increasing pressure from shareholders and regulators alike to minimize those losses, even while providing utility services to consumers who are not likely to pay.

The pressures are intense. Most regulatory bodies understand electricity to be a basic necessity that must be provided, so they are reducing or eliminating any offsetting deposits the utilities can require from customers. They also are requiring utilities to take more proactive steps with their customers before disconnecting services. In some cases, regulators are not allowing bad debts to be rolled back into the rate structure, a situation affecting shareholder value, the utility's balance sheet, and ultimately, the utility's credit rating.

In summary, utilities are increasingly finding themselves in a position where they do not have the ability to turn away customers who are not likely to pay their monthly utility bills; yet they face very substantial, negative results if nothing is done. In this environment, identifying and predicting the conditions when a customer may have trouble paying their bills and then developing plans for helping those customers keep their accounts current is a real necessity.

Utilities need to explore how they can better develop their budgets to allow for bad debt reserves. Better budgeting benefits the financial well-being of the organization and its shareholders, improves the relationship with regulatory bodies and increases the goodwill received from positive public relations.

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The Purpose of This White Paper

This white paper intends to describe how utilities can use predictive analytics to optimize their bad debt collections by:

- Enabling the company to understand which customers are more or less likely to pay in a timely manner.
- Identifying situations and scenarios where particular customers might have problems paying.
- Developing plans to mitigate the impact those conditions may impose.
- Focusing primarily on residential customers for these types of business analytics, and also applying the same logic and business rules to industrial and commercial customers.
- Developing systems that identify a "theft of service" (fraud) model and profile usage patterns to identify abnormal data for further investigation.

Strategies and tactics for improved collections that have proven successful in other industries can be adapted to the particular constraints of the utility industry. Understanding the challenges and identifying the opportunities to use advanced technology solutions provide utilities with ample reason to consider bill collection optimization.

Situation Overview

Several internal and external factors are driving the need for bill collection optimization, including:

- **Reducing yearly bad debt reserves to augment cash flow.** Utilities are seeing real need to improve their models for cash flow expectations by gaining more comprehensive and event-responsive views of their potential bad debt exposures. The failure to understand and plan for bad debt situations could affect recovery efforts during rate case hearings, as well as everyday business operations.
- **Maximizing return on investment in newly implemented smart meters.** North American utility companies will implement 20 million smart meter devices in 2010.[1] As such, they will want to explore every possible avenue for speeding their time to investment recovery by maximizing the use of new data coming from the smart meters and an automated meter reading infrastructure. Incorporating smart meter data into a collection optimization effort makes sense as one way to increase return on investments in smart meters.

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1 *North America Utility Industry 2010 Top 10 Predictions,* prepared by IDC Energy Insights, January 14, 2010, Page 11. "Full-scale deployments of smart metering will continue in 2010 – exceeding 20 million meters/15% market penetration by year end."

- **Responding to the effects of economic downturns.** Public utility commissions, such as the California Public Utility Commission (PUC), have considered whether to stop utilities from requiring customers to pay deposits to reestablish service regardless of payment history. Utility initiatives for prepayments for service are receiving discussion at other PUCs. And PUCs are demanding that the utilities demonstrate more reasonable care in their disconnect notification efforts.

Today, many utilities still employ the traditional methods of making decisions about the likelihood for payment based primarily on human judgment. Utilities have an opportunity to implement high value methodologies based in statistical models that predict the likelihood of defaults among customers who have already been accepted (behavioral scoring), and predict the likely amount of debt that can be expected to be recovered (collection scoring).

Bad-debt scoring fundamentally means applying a statistical model to assign a risk score to an application or an existing account. It also refers to the process of developing such a statistical model from historical data. Bad-debt scoring requires measuring the accuracy of one, or many, such statistical models and monitoring the effect that score-based decisions have on key business-performance indicators.

Collection scoring is performed because it provides a number of benefits – all based on the ability to quickly and efficiently obtain fact-based and accurate predictions about the likely ability of individual applicants or customers to pay. The marketing of various payment options can be streamlined based on bill pay history. As smart meters and a smart grid enable more services, this feature will be highly coveted by utilities.

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Reasons to Implement Collection Optimization Solutions

New economic and regulatory forces are requiring utilities to maximize the efficiency of their business operations. Utilities should work to improve their collection capabilities for the following reasons:

- **Bad debts can reach into the tens and hundreds of millions of dollars depending on the size of the utility, affecting long-term cash flow projections and investment rates of return.** Even small reductions to bad debt write-offs can reap significant improvements to the bottom line. A 5-10 percent reduction in bad debt write-offs would quickly return the cost of the new information technology solutions needed to produce those returns. The payoff, though, would likely be much higher and recur every year after the initial investment.

- **Smart meters may add even more capabilities and improvements.** While utilities' current focus is the effective installment of smart meters, they must look for new ways to use the torrents of new data expected from smart meters. For example, smart meters could allow the utility to become flexible on the days that they bill people, possibly coinciding with the customer's payroll periods. Or, smart meters can enable more creativity for customer payment plans. Also, if the utility's systems are set so that they have earlier notice when a customer's usage pattern is changing, they can more proactively address a concern for a future high bill. This can help the utility resolve high bill complaints, reduce the possibility of a bad debt situation, and add an opportunity for the utility to interact with the customer in a positive framework.
- **Regulators want utilities to be proactive in favoring the interest of consumers.** Introducing proactive measures to improve relations with customers who are at risk of nonpayment will help utilities allay interveners' concerns in rate case hearings.
- **Regulators are reviewing utilities' abilities to require deposits.** Regulators are increasingly viewing deposits as additional burdens to customers already struggling to pay bills. Utilities must look for alternative ways to protect themselves from nonpayment.
- **Optimizing allowances for bad debt. Utilities reserve millions of dollars for bad debt write-offs.** That's money they cannot use for any other purpose within the utility. Correctly modeling the amount needed creates implications for the availability of money to help fund operations, be invested or augment cash flow. If too little is set aside then cash flow and accounts receivable projections are affected, requiring cash divestitures from other areas.[2]

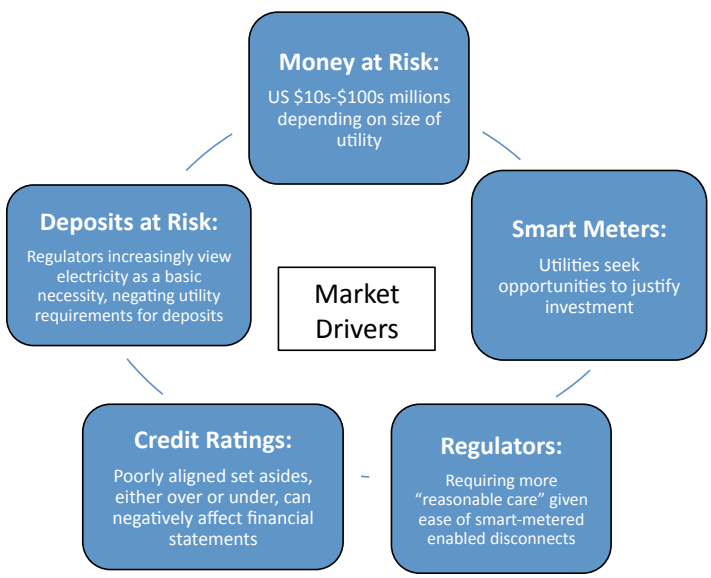

Figure 1. Economic and regulatory forces require utilities to improve collections.

2 Keep in mind that the Allowance for Doubtful Accounts is included in the Current Liabilities section of a balance sheet. According to the allowance method of handling bad debt losses, write-offs of charge accounts considered uncollectible are debited to Allowance for Doubtful Accounts. The Bad Debts Expense account is reported on the income statement in the Operating Expenses section. Allowance for bad debt expense recording for uncollectible accounts, etc., should be posted under operating expense of the income statement. Sales minus Cost of Goods Sold, minus Operating Expense totals Net Income.

Challenges to Collection Optimization

As with any major change in the way companies do business, there are many hurdles associated with implementing technology systems that enable the collection process to be optimized. These include:

- Adjusting business processes to PUC mandates that favor customers and yet still make financial sense to the utility.
- Evaluating the correct level of deposits needed from new applicants for new accounts.
- Accessing the internal and external data needed to enhance market segmentations for setting different payment terms.
- Distributing information efficiently throughout all customer-facing business functions and credit systems (such as originations acquisition, account servicing and collections).
- Having inconsistent or incomplete in-house strategies to share data for more complete proactive billing techniques (e.g., the inability of several departments to establish level pay plans that align with a customer's ability to pay across all seasons).
- Lacking plans that add data from smart metering systems to bill collection optimization analysis models.
- Understanding how external factors may affect bills and payments (e.g., how extremely hot weather may cause bill spikes and inability to pay among certain customer segments).

The Right Technology Can Improve Collections

In combination with well-defined business processes, the adoption of technology for predictive analytics can have a significantly positive impact on an organization's ability to enhance collections efficiency. Given the multiple market drivers, utilities have the opportunity to employ advanced technology to overcome existing data challenges and optimize their ability to collect from customers. The core technology foundation for collections optimization is:

- **Data mining** that utilizes all data available to inform intelligent systems.
- **Algorithms** for analytics and adaptive modeling for a better bill collection operation.
- **Sampling, exploration, modification, modeling and assessment** statistical methods to identify variables needed for developing models to predict outcomes.
- **Robust reporting**, including graphics and visualization techniques to help modelers identify variables and segments.

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Utilities already possess tremendous amounts of data that can be used to create their own advanced, customized bill payment plans for the purpose of optimizing their collection rates. The benefits of doing so in a utility context include:

- Creating a comprehensive system for assessing and managing usage behavior, and enabling more dynamic pricing models.
- Converting credit data into a reliable and profitable source of information and knowledge that can be applied to other operations.
- Discovering additional operational inefficiencies that can be corrected.
- Enabling the future smart meter era to cross-sell and up-sell new energy market products and services like home health care monitoring, home security services and others.
- Familiarizing utility business operations with the concept of balance points between risk and benefit, driving more operational excellence.
- Reducing the need to raise rates to offset bad debt write-offs, adding to returns on investment for investors and reducing the need for building additional generation facilities.

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Business Value of Improving Collections at the Utility

Implementing new processes and technologies will come at a cost for most organizations. Fortunately, the benefits resulting from improved collections are quantifiable and often significant. They include:

- **Lowering day sales outstanding (DSO)**. Lowering bad debt will lower DSO, an important financial measure for investors.
- **Improving top-line revenue.** Collecting on bad debt will drive top-line revenue.
- **Improving credit ratings.** Reducing bad debt improves credit ratings and lowers the interest paid for various debt instruments the utility might use in its business operations.
- **Optimizing allowances for bad debt.** Today, utilities set aside millions of dollars on their balance sheet to mitigate bad debt write-offs. Reducing or more accurately predicting this amount has real ramifications for cash flow projections and investments within the utility.
- **Increasing regulatory allowances for bad debt.** Most utilities are allotted a certain amount of bad debt they can incur and pass on to customers in the form of higher rates, through their general rate case and regulatory/cost-of-service models. Such determinations by regulatory bodies affect earnings per share.
- **Increasing the accuracy of forecasting for accounts receivable.** Currently, forecasting for accounts receivable is based on views of 30-, 60- and 90-day nonpayment records. Utilities are looking at who is already late. Optimizing collections should also view external factors – such as consumption data, future rates, climate zones, etc. – that might prevent or slow someone from paying in the future.

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- **Complying with new regulatory dictates.** Utilities will need to show "reasonable care" with regard to efforts to disconnect service to non-payers, despite the ease of disconnect enabled by smart meters. Utilities will need to show interveners and regulatory bodies that they have a framework in place for notification of disconnection and opportunities for consumers to mitigate the disconnection.
- **Modeling with analytics.** Utilities should be able to consider in advance the effect of the economy or expected weather events on their customers' abilities to pay.
- **Improving public relations.** When faced with the loss of utility service, most disconnected customers find the means to pay for reconnection fees and fund the deposits needed to reestablish credit. These customers also end up sustaining the costs imposed by the service disconnection, such as food spoiled without refrigeration, time and money spent going outside the home for hot water and food, and lost wages from time spent at home dealing with the disconnection. Of course, the utility realizes considerable cost as well: Reconnect fees do not cover the actual costs for sending trucks to disconnect and reconnect, or the administrative overhead needed to initiate – then resolve – the disconnect. By proactively working with customers to prevent disconnection, utilities reap cost savings and goodwill from positive public relations.

Customizing Treatment for Each Customer

The first step in implementing a collection optimization solution is realizing that the advanced statistical technology solutions available today allow utilities to understand every customer as an individual account that is likely to fall within different market segmentations, allowing for the customization of rules, plans and payment opportunities.

After developing business rules with the utilities, technologies exist to make predictions about likely customer behavior and create payment options for certain customer segments. These technologies might match electricity usage data with other external data about customers or even economic and weather conditions to determine when appropriate "treatments" (intervention options) are required.

Such "treatment plans" might consist of relevant intervention options to offer to particular customers. As the utility learns more about each customer, they can develop proactive call lists and call scripts for outbound call center customer service representatives (CSRs) to use for offering these plans.[3] The following are typical plan options available to the utility:

3 This process might repeat itself each week with another quarter of the customer base. Business analysts would monitor the results to determine when their model accuracy had declined to the point of needing "rebuilding" (model management).

Twelve-Month Averaging

Customers who have difficulty making payments during spiking summer or winter months might be offered plans that average their yearly usage and set monthly payments that are equalized.

Energy Efficiency Offers

Using available technologies that match one customer's usage with comparable accounts could allow the utility to determine whether certain customers have higher-than-average bills, based upon the size and type of their residence. If those customers begin to fall behind or make partial payments, the utility might view this as an opportunity to proactively contact them with offer of an energy efficiency program aimed at helping to reduce their bills, and thereby improving the probability of payment.[4]

Government Assistance Programs

If customers have repeated difficulty paying their bills, utilities can educate customers about various low-income and government-subsidized programs. Utilities should work to identify customers who would benefit from these programs and recommend them.[5]

Disconnect/Reconnect Opportunities

Disconnections occur when all else fails and customers do not pay their bills in a timely manner. Usually this is a concern for low-income customers who attempt to juggle their finances to meet electricity and other bills.

- Many statistics show that 70 percent of low-income customers who are disconnected are reconnected within 48 hours because they find some way to pay their bill. Given this fact, utilities should prioritize which customers are more or less likely to reconnect during this 48-hour window and focus on the ones more likely to pay.
- After identifying those most likely to pay, the utility might send a vehicle with a customer-friendly representative to the customer location – to optimize the operational expense of shutting off service and reducing DSO.
- While smart meters and an automated metering infrastructure will allow utilities to remotely disconnect customers, utilities need to demonstrate to regulators that they exerted a reasonable effort to educate the customer on options available to them to keep their service current (see examples above). The utilities must demonstrate reasonable care in these situations.
- In the absence of advanced metering infrastructure (AMI), the utility directs customers to payment centers, kiosks and other places to pay their bills.

4 Higher-income households are more likely to respond to such offers and utilities could utilize property tax records or other external sources to identify such candidates.

5 For example, CARE (California Alternate Rates for Energy) provides qualifying low-income residential customers a 20 percent discount on their gas and electricity bills. CARE participants are exempt from recent electric rate increases. To qualify, a residential customer must have an annual gross income (before taxes) of less than $23,400 for a household of 1 or 2 persons, $27,500 for 3 persons, $33,100 for four persons and $5,600 for each additional household member.

Optimizing Debts Sent to Collection Agencies

By seeking to identify customers as individuals, the utility should strive to identify the 30 percent of customers who never reconnect within 30 days. In this case, utilities typically sell the bad debt to third-party collection agencies for pennies on the dollar, offering an opportunity for utilities to maximize those sales. Utilities can use collection optimization technology systems that more accurately value the book of their customers, and then sell any bad debts to the collection agency in a segmented offering that reflects the likely ability of the customers to pay.

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SAS®: The Right Solution for Collection Optimization

SAS solutions have been tested and proven in other industries to be effective in optimizing collection efforts:

- **SAS solutions enable access to lots of different types of data.** SAS solutions can use data in any format, from anywhere in the business to inform a variety of analytical tools that work together for optimizing collections. Data mining is most effective when it is part of an integrated information-delivery strategy that includes data gathered from diverse sources, including the Web, call centers, surveys, customer feedback forms and transactional point-of-sale systems. To that end, SAS solutions provide access to more than 50 file structures, and include a file import facility for easy access to Microsoft Excel, comma-delimited files, SAS and other common file formats (relational or otherwise).
- **SAS solutions build algorithms for developing business insights consistently.** Robust data mining algorithms (i.e., neural network, k-means clustering, categorization and regression trees, etc.) provide reliable and scalable insights into a variety of types and volumes of customer data. SAS advanced analytics match the right forecast, regression, or clustering technique to fit the variability of your data.
- **The SAS Analytics workbench gives modeling capabilities to utilities.** SAS' data mining process encompasses five primary steps: sampling, exploration, modification, modeling and assessment (SEMMA). In each step, you perform an array of actions as the data mining project develops. By deploying nodes from the SEMMA toolbar, you can apply advanced statistics, identify the most significant variables, transform data elements with expression builders, develop models to predict outcomes, validate accuracy and generate a scored data set with predicted values to deploy into your operational applications.
- **Viewing the results in meaningful ways.** SAS software provides robust reporting and advanced data visualization. Results can be shared through Web portals, standard PDF documents, or integrated with Microsoft Office products.

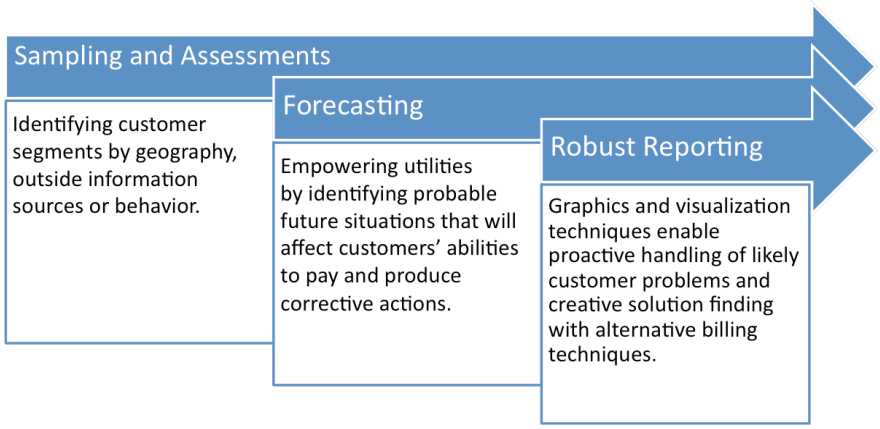

Figure 2. SAS solutions drive better bill collection operations.

Conclusion

Many coincidental factors will make bill collection optimization a necessity for the forward-thinking utility. The new era of smart meters will usher in expectations for returns on investments. Ongoing economic concerns will affect consumers' abilities to pay. Regulator and intervener concerns about the provision of electricity as a basic necessity of modern life will continue no matter the economic environment. Shareholders will demand the best possible financial performance from utilities. Utilities will need every cash flow improvement option available to them on the table.

SAS has many years of experience working in a wide range markets (e.g., financial services and telecommunications) that use new data inputs to their advantage for activities such as credit scoring and bad debt modeling. Indeed, there are striking similarities between the use of SAS technology within the financial industry and utilities' needs for improving collection processes.

SAS can offer one federated view of all the information that's available to the utility. In fact, SAS' most applicable strength may be its proven ability to access other business systems to pull and push data, and convert it into forecasts, reports and analysis. In turn, this information may be used to improve bill collections and drive ROI on smart meter investments.

Utilities can start now in setting a framework for the use of smart meter data by seeking to improve collections, making them ready for the smart meter revolution.

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About SAS® for Energy and Utilities

With SAS Analytics, energy and utilities companies manage environmental stewardship, leverage smart grid investments, optimize operations, control costs and evaluate market and business risks.

- More than 500 energy companies worldwide rely on SAS for critical business applications.
- Forrester has recognized SAS as a Leader in Predictive Analytics and Customer Data Mining (Q1 2010).[6]
- Hundreds of sites use SAS Intelligence Storage, which hosts data warehouses in excess of 30 terabytes.
- SAS technology can access more than 200 data sources.
- SAS is database agnostic; therefore, it can implement the data store on major database platforms like Oracle, DB2 or Microsoft SQL Server, as well as many others. This enables utility companies to keep their existing hardware investments.
- SAS is known for analytic data management capabilities and has a proven technology that will provide minimal risk to utility companies. SAS can deliver a large data management solution based on best practices used around the world in other industries.

SAS is the leader in business analytics software and services, and the largest independent vendor in the business intelligence market. Through innovative solutions delivered within an integrated framework, SAS helps customers at more than 45,000 sites improve performance and deliver value by making better decisions faster. Since 1976 SAS has been giving customers around the world THE POWER TO KNOW®.

6 Kobielus, James, *The Forrester Wave™: Predictive Analytics And Data Mining Solutions, Q1 2010*. February 4, 2010. http://www.sas.com/news/analysts/forresterwave-predictive-analytics-dm-104388-0210.pdf

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