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Serve Prepaid Customers Without Prepayment Meters

The Smart Grid Lets Utilities Offer Prepayment
Services with Little or No Extra Cost

Executive Overview

Prepayment for electricity, gas, and water is a way of life in many countries—and for good reason. It:

- Helps customers budget their utility money and ensures there are no unpleasant surprises when bills arrive.
- Helps utilities avoid bad debt without the need to collect and track deposits.
- Provides favorable utility cash flow. Typically, utilities receive revenue from credit customers a month or more after consumption. Prepayment revenue arrives in advance of consumption, permitting utilities to invest and realize a return on that revenue.
- Lowers utility risk when connecting customers without deposits or when reconnecting those who have been disconnected for nonpayment.
- Reduces paperwork and the associated costs of postage, paper, printing, and handling. With prepayment, there is no monthly bill.

Prepayment is popular where it is offered:

- In the U.K., which has a long tradition of offering prepaid metering as an option to any customer, utilities report that 15-20 percent of customers sign up.¹
- Northern Ireland Electricity, which has a new, customer-friendly prepayment system, has increased prepayment enrolment to 25 percent (175,000 prepayment customers out of 700,000 total customers).²
- At Arizona's Salt River Project, more than 50,000 customers (just under 6 percent) are prepaid.³
- In Ontario, Woodstock Hydro reports participation by 25 percent of residential customers.⁴

¹ Chartwell, *The AMR Report*, February 4, 2003.

² Energywatch, *Get Smart: Bringing Meters into the 21st Century*, August 2005.
http://www.energywatch.org.uk/uploads/Smart_meters.pdf

³ Chartwell, Carolyn Johnson, presentation on Salt River Project's prepayment solution, Webinar, July 2008.

⁴ Chartwell, *Prepaid Metering Report 2007, 4th Edition*, January 2007.

The Conservation Effect

Prepayment has gained increased attention in the last several years. The primary reason is that customers switching from credit billing to prepayment almost always reduce their electricity consumption.

- Salt River Project reports a 12.8 percent reduction in energy use when customers switch from credit to prepay.⁵
- Northern Ireland Electricity says that prepay customers use 4.9 percent less electricity than the average customer.⁶
- Oklahoma Electric Cooperative reports that customers lowered consumption 13 percent after switching to prepayment.⁷

Granted, customers electing prepayment are likely to be those most motivated to reduce utility bills. However, in the vast majority of cases, these customers were equally motivated under a credit billing system. What was missing was the immediate feedback of knowing 1) exactly how much power or gas they were using in near real time, and 2) how closely their consumption matched their planned budget.

The Prepayment Negatives

Despite all these advantages to both customers and utilities, and despite many requests for prepayment programs from consumers and their advocates, prepayment is not a widespread global phenomenon. Three major issues have slowed adoption:

High Cost

Today's utility typically views prepayment as a second, parallel metering and billing system largely separate from the system used for credit customers. U.S. cost estimates of \$225 to \$450 per

⁵ Jennie King, "M-Power: A Better Way to Keep Customers in Power," *Metering, AMR, and Data Management*, Energy Central, Jan. 18, 2007.

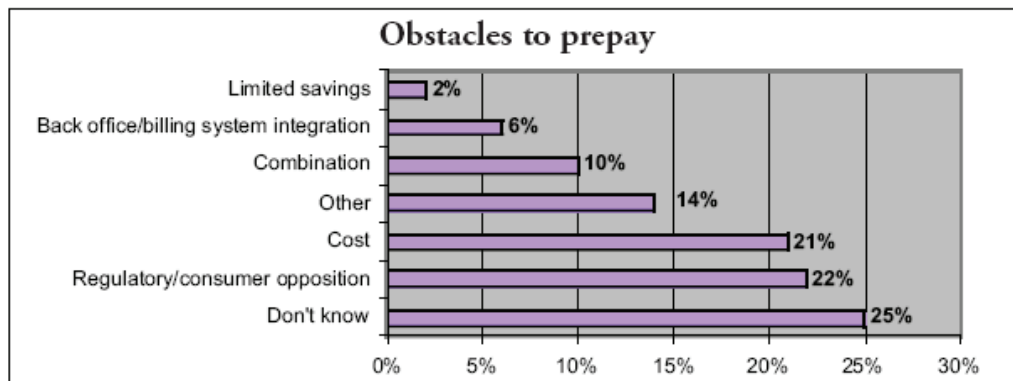
⁶ Chartwell, Mark Hall, "Prepay Metering's Impact on Customer Energy Usage," Webinar, July 2008.

⁷ Chartwell, Jonna Buck, Oklahoma Electric Cooperative, "Prepaid Experience," Webinar, July 2008.

prepayment participant⁸ are common—far more than the anticipated investment return to the utility from early payments plus reduction in bad debt.

The equation is different, of course, in jurisdictions that use prepayment for most or all customers. In South Africa, for instance, Eskom has typically implemented prepayment—using rechargeable cards and top-up kiosks—as it has expanded its grid to each new town and village. Such an approach may also be practical in regions now moving to metering after a long period in which gas and electricity were viewed as essential public services and therefore unmetered.

Utilities with long histories of credit billing, however, have frequently balked at the prospect of spreading the costs of implementing a new and expensive metering and billing system across all customers when only a few will benefit. Some regulators have expressed similar concerns.



Source: Chartwell, *Prepaid Metering Report 2007*, 4th Edition, January 2007.

Fairness

In some jurisdictions, regulators and consumer advocates have expressed concerns that utilities might force prepayment onto customers in low-income areas, thus stigmatizing customers whose positive history of bill payment may equal or frequently exceed those of their wealthier neighbors. This concern has faded as prepayment has become the payment method of choice for mobile phone and similar services.

A different fairness issue has arisen recently in the U.K. There are reports that retailers in this fully competitive market will agree to serve prepayment customers only at excessively high rates.⁹

⁸ Energy Insights, Karen Blackmore, *Prepaid Metering: Moving Beyond Collection Challenges into Customer Service*, July 2006.

Health and Safety

Health and safety concerns may restrict prepayment:

- When electrical service terminates in a prepayment system, appliances may still be “on.” If the person reinstating service fails to check appliances like stoves, a fire could result.
- Buildings with pilot lights need to maintain some gas flow even when prepayment deposits run out, lest reinstatement of service cause an explosion.
- For different reasons, water prepayment systems may choose to permit a minimal flow at all times, lest lack of water lead to a neighborhood public health crisis.
- Most jurisdictions have rules against utility disconnection of gas and electricity during the heating and air conditioning seasons. Customers could easily fall behind in payments during these periods, and catch-up payments may be difficult to administer in parallel with overall prepayment methodology.

These arguments have slowed the growth of prepaid metering. Today, however, the need for conservation plus new, less costly prepayment technologies are sparking a surge of interest.

The Low-Cost Business Process Revolution

Smart Grid software promises to revolutionize prepaid metering by significantly reducing or eliminating the vast majority of costs. With the subset of Smart Grid software generally called “Smart Metering”:

1. The utility takes any of its current rate structures and recalculates it so that it can be expressed as a price per kilowatt-hour. Virtually any rate can be calculated in this manner—two-tier rates that change after the consumption of, for instance, an initial 500 kWh; time-of-use rates; seasonal rates; budget rates, etc. For customers in arrears, utilities add pro-rated past-due amounts to current charges.
2. Customers initiate the program by depositing money in any amount into a utility account that is part of the billing system.

⁹ See, for instance, Martin Hickman, “Energy giants ‘prey’ on poor forced to use pre-pay meters,” *The Independent*, Sept. 6, 2008. It reports that British Gas charges prepayment customers “£567 a year [\$1,100 (U.S.)] more than wealthier customers on internet tariffs, a government-funded consumer group has found.” Not all utilities imposed such rates, however. The differential reported at Scottish Power was £172, and the Scottish and Southern differential was £167—more in line with probable costs to install different meters and use a non-standard billing application.

3. The utility's meter data management system receives and processes usage and feeds that information to the billing system.
4. The billing system uses that information to calculate the bill periodically—perhaps once per day. It subtracts each daily bill from the prepayment amount.
5. As the account balance approaches zero, the billing system initiates a message to the customer and sends it via an outgoing voice or text message, an email, or a website.
6. Customers make additional payments using any of the utility's existing payment methods.
7. When accounts reach zero, the billing system triggers the appropriate disconnection or restriction action—an order that meter data management sends back through the communication system to the meter.
8. Utilities remotely reconnect the meter when they receive a “top-up” payment.

Benefits

Using software to run prepayment rather than hardware has a number of advantages:

- Elimination of hardware costs—not just procurement but also installation, maintenance, and replacement.
- Extension of the program to all interested parties. There are no special meters. Any advanced meter will do, so long as it includes either remote connect / disconnect or flow restriction capabilities.
- The utility can use a single billing system for all customers, provided it has appropriate capabilities.
- Customers can use a utility's existing infrastructure for payments. Granted, some utilities may choose to offer tokens or smart cards, plus the ability to top them up. Others may choose to offer in-house displays.¹⁰ But neither is required.

¹⁰ Much of the current literature on prepayment suggests that utilities favor in-home displays. Some see these displays as part of every Smart Grid system. Others are looking at relatively simple prepayment displays that feature, for instance, a red/yellow/green signal that corresponds to the amount of the prepayment deposit remaining. Also available are more elaborate displays that show remaining balances and other account details.

Bells and Whistles

The paragraphs above describe a rudimentary Smart Grid prepayment system. Many enhancements are possible, including:

- Flagging of accounts for “critical need” or “lifeline” customers (who use, for instance, vital breathing equipment), so that disconnection does not endanger health and safety.
- Pay points—utility offices or third-party contractors—to accommodate cash customers. Such points can also serve customers who want to redeem unused prepayment dollars when they leave the area.
- Suspension of disconnects during adverse weather conditions that could prevent customers from getting to a pay point.
- A small amount of emergency credit—perhaps \$5—so that customers can avoid loss of service in the middle of the night. The overage amount can be immediately subtracted from the next payment—a system already in common use in “smart card” transit systems.
- Close monitoring of accounts to detect sudden spikes, and automatic customer alerts when sudden spikes occur. Customers who have elected prepayment to help them with budgeting may be particularly vulnerable to a neighbor who attempts energy theft or to a grandchild who has inadvertently left a door open.

Why Do Customers Want to Prepay?

Prepayment is especially popular with customers who:

- Have difficulty coming up with money for all the deposits typically required to rent a new apartment.
- Room with others and want to ensure that no one moves out without paying a fair share of the utility bill.
- Are on their own for the first time and who have no idea how much utilities will cost.
- Need to win the cooperation of children in reducing energy budgets. Children may be far more responsive to an in-home display showing little television time remaining than they are to parental admonitions to turn off unneeded lights.
- Need to ensure that they do not inadvertently exceed tightly budgeted amounts for utilities.
- Work in the cash economy.
- Do not have bank accounts.
- Own rental vacation property. Prepayment ensures that each renter pays an appropriate price for energy.

- Want to reduce energy use for either financial¹¹ or environmental¹² reasons. Prepayment provides a discipline that many customers find helpful.
- Pay clients' utility bills. A charitable organization can credit money directly to a client account or provide clients with non-redeemable payment tokens. In either case, the organization's donors are assured that the money is neither diverted to other purposes nor used for reconnect charges.

Summary of Benefits

For customers, Smart Grid prepayment means:

- No deposits.
- No monthly bills.
- Smaller payment amounts over time. Experience shows that customers frequently make weekly payments of \$10 or \$20.
- Easy consumption monitoring.
- Greater awareness and control of costs.
- No late payment or reconnection charges.
- Voluntary participation.
- No extra cost (because there's little or no special equipment).
- Dignity. Anecdotes indicate that this is one of the most important benefits of prepayment. Families struggling with bills can keep their relationship with utility companies entirely private. There are no utility crews pounding on doors and yelling about meter shut-offs in full sound and view of the neighbors. Disconnection is entirely under the customer's control.

¹¹ In a July 2008 Chartwell webinar on prepayment, Jonna Buck at Oklahoma Electric Cooperative cited the following letter to illustrate this point:

"I appreciate customer service recommending prepaid to use when we were in a bind. It has helped us to understand how much electricity we really use and to help us maintain a lower bill than being surprised when a monthly bill comes."

¹² It is important to note that low-income customers often have the most incentive to use the system to conserve. In general, it appears that the higher the prepayment penetration, the lower the conservation rate.

For the utility, Smart Grid prepayment means:

- Improved cash flow.
- Reduced credit & collections costs. There are no confrontations on the phone, no turning over accounts to collection agencies. And prepayment easily accommodates gradual payments of past-due bills without manual monitoring.
- Lowered write-off expense.
- Promotion of energy conservation.
- Reduced high-bill complaints.
- Increased customer satisfaction.
- No costs for extra equipment or infrastructure.
- Use of existing payment methods.
- No paper bills.
- Reduced disconnects/reconnects by field crews, with associated improvements in employee safety and productivity.

Time Has Come

Setting up new prepayment systems takes some effort. Utilities and their Smart Grid software vendors will have to weigh such issues as handling a potential flood of Friday “pay-day” top-ups, accounting for unused prepayments, permitting adult children or charitable organizations to top up accounts for others, integrating prepayment with automatic debiting, and training customer service representatives. Regulated utilities will also need to involve regulators and other stakeholders.

These obstacles, however, are far from insurmountable. And given the positive response from customers voluntarily signing up for such programs, it would appear that prepayment is a program whose time may finally have come.



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