

To: City of North St. Paul City Council
From: Vivek Bhandari, Sathish Jayaraman, Maria McClintock, and Charlotte Wood
Date: 12/2/2013
Re: Smart Meter Installation and Use in North St. Paul

Issue:

The City of North St. Paul's municipal electric utility has recently implemented a smart meter installation program; however, the current program provides few benefits to the citizens. How could the City of North St. Paul modify their smart meter program to ensure that its citizens are able to benefit more?

What is the problem? Why is this a problem?

The City of North St. Paul's municipal electric utility has recently implemented a \$250,000 program that intends to install smart meters in approximately 4500 homes and 800 businesses within the city. The program has installed 151 residential meters and 52 commercial meters as of November 27th, 2013. The installation of these smart meters allows the electric utility to remotely access customer's electricity demand, voltage, and current. Unfortunately, the current program does not provide this data to North St. Paul's citizens, making their only benefits: enhanced outage restoration and more accurate energy use measurement, which are inherent to smart meter programs.

Smart meters can offer the ability to provide data to the consumer as well, allowing for more educated energy use. Usage information can be communicated to the consumer in a range of ways, such as through an online account or an in-home panel. Since this is not currently available from North St. Paul's municipal electric utility, the city is not maximizing the potential energy and cost savings.

Evidence:

Smart meters are digital electricity consumption meters that communicate the electricity usage of a home or businesses to the electric utility in greater detail than allowed by standard utility meters. Currently, the electrical system does not take advantage of the real-time capabilities available. Energy use is measured manually on a monthly cycle, forcing the homeowner to wait until the next billing cycle to determine if they need to curtail usage. The advanced technology provides smart meters the potential to deliver a range of benefits to a city's utility and its' citizens. The benefits that can be provided to citizens include: improved feedback of the customer's energy consumption in real-time and various time-periods of a day, week, or month; more accurate energy use measurements; customized tips for better energy management; remote thermostat control; and enhanced outage restoration. The smart meter program being implemented by North St. Paul's electric utility currently takes advantage of only two of these benefits, but more could be gained if consumers were further involved.

Smart meters will provide many benefits to the electrical utility of North St. Paul. They enable the utility to remotely access detailed usage data such as demand, voltage, and current. The utility can use these smart meter capabilities to more efficiently manage power outages, identify when meters are being tampered with, and gather usage data wirelessly, eliminating the need for a manual meter reader.

Other studies have shown that smart meter programs can reduce energy use by 5 to 20 per cent. However, for these saving to be realized the smart meters must also give consumers clear and regular feedback of energy use. These communication features can be in many different forms, with the information provided by email, through an online account, or from an in-home panel. An example of the technology available is SmartHub, which is currently in use by the Minnesota

Valley Electrical Cooperative. SmartHub allows users to manage their electrical account from their smart phone, monitoring usage, reporting service problems, and managing efficiency.

Effective smart meter deployment requires acceptance among a range of stakeholders, most importantly the consumers. By providing citizens with a way to better understand their energy use, they will be able to make more informed decisions, optimize their use of electricity and reduce their monthly electricity bill. This is further supported by the experience of utilities like the Sacramento Municipal Utility District who have been effective in the implementation of their smart meter programs, attributing their success to the provision of interactive technology features that allow two-way communication between the citizens and the utility.

Policy Alternatives

1. **Status Quo:** The status quo would allow the current smart meter program to continue as is, with the benefits predominantly provided to the electric utility, not the citizens. Because this provides very little incentive for citizens to adopt smart meters, there is a low incentive for North St. Paul’s residents to accept smart meters into their homes, possibly resulting in a disincentive to program buy-in. Additionally, this diminishes the overall benefit to the utility as the technology is not being used by the entire population.
2. **Install In-Home Display Panels:** In-home display panels would allow North St. Paul’s citizens to easily access a real-time, visual depiction of their energy usage within their home or business. Due to the ease of accessing the information, the user would not have to do anything other than look at the panel to see their energy usage information. This provides an effective way of educating consumers about the implications of their energy use habits, providing greater incentive for reducing energy demand. The in-home display panels could be implemented either directly through the electric utility or through a specialist installation company.
3. **Provide Online Energy Use Feedback:** Online feedback of a citizen’s energy usage is a relatively inexpensive mechanism of providing the information required to encourage energy conservation. By accessing their usage online, North St. Paul’s citizens would be able to become more educated about how their habits influence energy demand. Additionally, this option would allow homeowners to see when their family uses energy the most and what activities could be reduced to keep the electricity bill on budget before they go over. The online feedback could be facilitated through a system such as SmartHub.

Policy Alternatives	Cost	Outcome Equity	Potential Energy Reductions	Total
<i>Status Quo</i>	5	2	1	8
<i>In-Home Panels</i>	2	5	5	12
<i>Online Feedback</i>	4	4	3	11

Note: The rankings are on a scale of 1-5, with 5 being the best score and 1 being the worst

Figure 1: Criteria Ranking Matrix for Policy Alternatives

Recommendation

Based on the ranking of each policy alternative using the three criteria identified to be most relevant (See Figure 1) we recommend that the city of North St. Paul install in-home display panels to operate in conjunction with their smart meters. The recommendation of in-home panels is the most equitable option as it provides benefits to both the citizens and utilities without excluding certain groups. For example, with online feedback there may be citizens who would be excluded from participation if they did not have regular access to the internet while in-home

panels are accessible to everyone. The in-home display option also provides the most potential for energy savings because the panels allow for regular, easy access viewing by the homeowners. Pilot programs have shown that over 80% of in-home panel owners view their displays at least daily. Although the display panels are the most costly option, the savings the utility receives from no longer needing manual meter readers could be directed towards the installation of these panels. If the in-home panels prove successful, North St. Paul could later supplement their smart meter program with online or mobile phone feedback, as suggested in the second policy alternative.

References

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