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## **Smart Metering and Communications**

Western Indiana Rural Electric Membership Corporation (WIN Energy REMC) is a rural electric distribution cooperative located in southwestern Indiana. On August 8, 2005, the Energy Policy Act of 2005 was signed into law. Under this new law, electric utilities that sell in excess of 500 million KWH in retail electric sales are required to consider the standard under PURPA Section 1252. The clear intent of this law is to promote renewable energy and energy efficiency.

Conventional meters typically measure only total consumption and collect or provide no information about when energy is consumed. There is no standard definition for “smart metering”, but the term typically refers to devices that: (1) identify consumption in more detail than a conventional meter, including energy usage during defined time intervals, this basic function is typically applied to residential and small commercial accounts, and (2) meters with enhanced communication capabilities that allow energy information to be captured and transmitted between the utility and consumer and perhaps other parties such as power marketers, energy managers, ISO, etc. on a real-time or near real-time basis via a network connection which is usually associated with commercial and industrial accounts. Smart meter capabilities may include time-of-use data, load shapes, how fast a commodity is being consumed, outage notification, power quality monitoring, sub-metering capabilities for appliances or other devices, pre-programming options, graphics, prepayment options, and other features. Some smart meters offer a display that allows consumers to monitor consumption in monetary terms rather than kWh.

Reliable and accurate communication of data is perhaps the most critical technological problem or issue facing smart metering. Many manufacturers produce smart meters, and most meters can communicate through various means including radio, telephone, wire (power line carriers), local computer networks, or satellites. Maintaining reliable and accurate communications with meters may have special challenges in rural areas.

## **Real-time pricing**

Real-time pricing refers to retail energy prices that are set for a specific time period on an advance or forward basis and change according to price changes in the generation spot market. Prices paid for energy consumed during these periods are typically established and known to consumers a day ahead (“day ahead pricing”) or an hour ahead (“hour-ahead pricing”) of consumption. The Midwest Independent System Operator (MISO) operates the wholesale power market in this region. MISO currently publishes hour-ahead and day-ahead prices on its web site, and that information is available to any interested users. MISO would presumably provide the basis for real-time pricing from members and Hoosier Energy. Advance knowledge of prices may allow consumers to vary demand and usage in response to market prices and manage energy costs by reducing consumption or shifting usage to low cost periods.

Real-time pricing is a type of “dynamic pricing”, which reflects that costs for generation, market power, transmission, and other inputs vary by time of use. Other examples of dynamic pricing include time-of-use (TOU), critical peak, and coincidental peak pricing.

“Real-time pricing” and “time-of-use pricing” are sometimes used interchangeably, but there are important differences between the options. As noted, real-time pricing is typically based on hour or day-ahead prices in the spot market, and rates change on an hourly or daily basis to reflect market price changes. TOU pricing also refers to energy prices that are set on an advance or forward basis for a specific and pre-defined time period, but TOU prices typically change only two or three times per year. Examples include summer and winter rates, or off-peak rates during pre-defined daily hours or on weekends. TOU prices are also known to consumers in advance, which may allow them to vary usage or reduce consumption to reduce their power bills.

Hoosier Energy does not currently offer a real-time pricing option for members. Hoosier Energy’s current wholesale tariffs offer a TOU feature by guaranteeing that demand charges will not be billed during traditionally off-peak hours from 11:00 p.m. to 7:00 a.m. daily. This pricing feature has allowed some members to promote electric thermal storage (ETS) heating at affordable rates for consumers.

## **Background & Discussion**

Utilities have traditionally shielded consumers from wholesale power markets. That responsibility became more challenging, but perhaps more valuable, to consumers following wholesale deregulation that led to frequent and volatile price swings and price spikes. It continues to be challenging as market prices, fuel, environmental improvements, and other costs have escalated. Traditional utility prices (rates) to consumers typically do not vary within a billing period and usually do not differentiate between high or low cost periods. Consumers pay the same average-cost based rates regardless of when power is

used, including usage during peak periods and other times when costs to the serving utility may be very high.

Advocates of smart metering and real-time pricing (including meter manufacturers, power marketers, and some regulators) point to the mismatch between utility costs which vary by time of use and consumer rates based on average costs as contributing to higher peak demands, higher average costs, and mediocre results from load shifting and curtailment programs. They suggest that consumers who are unaware of higher market prices, or who are not immediately or directly affected by those prices, can not and will not change behavior or usage during high cost periods. Supporters suggest that consumers are used to making purchasing decisions based on price information, and ought to be able to make similar decisions about electricity. They note that smart metering and real-time pricing allow consumers to make these decisions; utilities should not presume to know what choices their customers want; and utilities should inform consumers about price options, and then let consumers decide when and what to buy. Smart metering and real-time pricing may also have appeal to utilities in part because it offers a built-in response to high bill complaints.

Several utilities, states, and provinces have conducted pilot projects to test smart metering and real-time pricing options. Results have been mixed. Some projects report 10% to 15% reductions in energy usage when households have access to information about energy consumption, while others report about 5% reductions. Pilot projects often require a consumer to pay an additional monthly fee to offset the higher costs of a smart meter and communication systems, and fees reduce savings from shifted or lowered consumption. The value of smart metering and real-time pricing is only as good as the decisions they bring about, and that value is minimal if consumers do not participate in these programs or change usage as a result. It appears many consumers may not want to take time to monitor or manage energy usage, change their behavior, or make purchasing decisions about electricity if savings are insignificant. That may be especially true if monthly bills based on hour-ahead or day-ahead pricing may be higher in some months than bills based on standard rates. We were unable to identify any utility that has adopted smart metering and real-time pricing on a widespread basis.

It has also been noted that retail deregulation represented an attempt to provide consumers with direct access to power markets and control over power purchasing decisions. Those experiences generally resulted in higher rates, consumer confusion and complaints, and dissatisfaction among residential and small commercial consumers. Public pressure continues to grow in many deregulated states for utilities or government agencies to once again shield consumers from market forces.

## **Other Issues & Topics**

The cost to members to buy, install, and maintain smart meters may be significant. There are no national standards for smart meters, not all meters are compatible, and metering technology is rapidly evolving. The industry has not adopted a single communication standard or protocol.

Distribution and G&T billing systems may need substantial modification, or new billing systems may be needed to support smart meters and real-time pricing options. This raises the question of who should pay the cost of special billing systems?

Smart metering and real time pricing may be an attractive option for commercial and industrial accounts with resources to monitor and manage energy usage. Commercial and industrial accounts could gain potentially larger savings in demand and energy costs.

Smart metering and real-time pricing appear to offer a real capability to reduce demand and energy costs if consumers use the technology and adjust usage during high cost periods. All consumers may benefit from these savings. Should utilities subsidize smart meters?

Considerations other than economics might make smart metering and real-time pricing attractive among consumers and to utilities as a means to manage demand, help conserve energy, avoid or defer the need for new generating plants, or use energy more efficiently. Should more attention be focused on these positive outcomes in considering smart metering?

Creation of specific special rates are both time consuming and costly. At this time, WIN Energy REMC has had no requests for this type of rate. Since costs change over time, it is not a prudent use of resources to create a rate for a non-existing member. The above dissertation outlines WIN Energy REMC's ideas on how a rate design would be accomplished based on the information available at the time of this writing. If and when WIN Energy REMC is approached concerning this type of service, WIN Energy REMC is willing to work with the member within the guidelines stated above and the regulatory obligations applicable at that time.

Links to this documents and to the Library of Congress website listed above will be available on the WIN Energy REMC website at:

[www.winenergyremc.com](http://www.winenergyremc.com)