

# DOES TIME-OF-USE CAUSE US TO LIMIT OUR POTENTIAL?

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The Federal Government, State Governments and U.S. Utility companies are sorting through the “Goliath” of Automated Meter Reading. AMR concepts have grown into AMI, AIM and now AMM. The Federal Energy bill provided motivation and generic requirements; “Manage Energy, give the consumer control over their usage and reduce overall costs of energy consumption and energy generation.”

Deregulation is driving the restructuring of the electric utility industry in the U.S.; this is providing the momentum for developing low-cost Automatic Meter Reading (AMR) solutions. The federal mandate requires reading meters more frequently, in turn making the manual meter reading techniques currently in use obsolete. Use of the existing infrastructure via modems or pagers costs substantially more than customers are currently paying for meter reading, creating an extensive barrier to AMR market entry. Therein lays the need for the new telemetry technology.

The utility world is being transformed with new legislation pushing forward the evolution of Demand Response, Open Access and Dynamic Pricing. The AMR eruption over the last ten years has caused a myriad of new terms, new approaches and new concepts. This demands an understanding of the market needs, the path that will achieve the greatest return for the investment and a technology that exceeds expectations.

Several Utilities are putting proposals before the PUCs of several states utilizing Time-of-Use technology. Time-of-Use technology time stamps the usage of energy with regards to pricing structures established against energy demand during certain time windows. The consumer then has the option of modifying their usage within these time windows to obtain certain pricing, if they know these time windows ahead of time. The consumer then analyzes their monthly bill to see if any reductions were gained using the TOU windows to reduce energy con-

sumption and can adjust for the next month. The pricing structure can fluctuate with these time windows on an ongoing basis due to demand compared to the demand used to initially set up the pricing.

Several emerging technologies are already antiquating system designs presently installed in the field. A cost effective system, with meter reads every 15 minutes, outage monitoring, remote connect and disconnect, grid monitoring to virtually eliminate rolling brown outs and black outs and consumer interaction on energy consumption habits 24 hours a day. This is Real Time Smart Metering.

Real Time meter reading records the energy usage of a consumer as it is being

used, and allows the consumer to view, over the internet, their usage and energy costs in a real-time scenario. At any given point in their monthly usage, they can view the accumulating energy bill as it is happening. Consumer awareness is the key in Real Time technology, to gaining energy efficiency and energy control, allowing the modification of the demand based on energy generation capacity. Consumer involvement at this level is paramount. TOU allows minimal interaction with the consumer as their energy bill is being accumulated.

The Energy Efficiency and Conservation Incentive Act of 2001

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## AMR time-of-use

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allows consumers to ask the utilities to provide them with a meter that allows “consumers to manage their purchase, sale or use of electricity... in response to energy price and usage signals”. The Energy Policy Act of 2005 only requires TOU pricing to be updated “at least twice a year”. The EECIA also allows reimbursement of the cost of the meter/installation of at least \$30 per meter to the utility. The EECIA goes further to allow, “The price and usage signals are readable on AT LEAST a daily basis”. TOU does not allow this aspect in a short response time window for the consumer.

Compare this to the Smart Metering Promotion Act of 2001. This goes further to define the requirements to be “inter-connected in a manner that permits the reading of energy price and usage signals on AT LEAST AN HOURLY BASIS”.

Let’s compare this to a fuel gauge in your car. The fuel gauge shows you the fuel remaining as you are using it, and the tank of fuel cost you so many dollars. This gives you an idea of how many miles you can continue until the fuel (which cost you an average price per gallon) runs out. You know the energy required; you could watch its usage as you go up and down hills as the demand (cost per mile in miles per gallon) fluctuates, more on the uphill side, less on the downhill side. You can anticipate when the amount of fuel you have decided to use will last, and determine if you want to spend more for additional fuel to finish the trip. You are able to make decisions

such as canceling the trip, modify your travels to eliminate the demand fluctuations of up and down hills to flatter routes, or shorten your trip to conserve fuel. You can make these decisions as you are driving, with up-to-date information. As you drive, you notice the price to refuel goes up or down depending on the price changes of fuel as you travel through different price locals.

Now envision the fuel prices changing as you drive and how this will impact your decisions, understanding the fuel supply is changing as others stop to fuel up. Oh, remember the fuel suppliers are making a profit off your decisions, and your awareness of this changing demand and price allows you to determine when to use the fuel as the price fluctuates. You can stop half way through the trip and wait until the price comes into your comfort zone, or choose to continue, because you know what the prices are at that time. Now, assume you tell the fuel suppliers ahead of time (and all other travelers do the same), based on your travel history, of how much fuel you plan to use. The fuel suppliers can arrange for better pricing and anticipate usage of all travelers to let their fuel generators know how much they will need ahead of time and pass this cost savings on to you. The opportunity for a bad decision using Real Time is very limited.

Compare this to Time of Use, where you don’t plan your trip and route ahead of time. Without a fuel gauge, you plan when you will be going through the different fuel cost areas, analyze the landscape to determine whether your miles per gallon will be more or less than the base miles per gallon, depending on how hard your engine has to work to develop the power



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to navigate the hills and valleys. You have a determined amount of dollars you want to spend for fuel. The fuel prices can change from the base fuel price, but you don't know when or what they will be, because you don't know what the supplier is paying for the fuel you will buy. So you can plan your trip on general knowledge of mileage, pricing and usage, but you do not have any way to update your decisions as you go because you planned it all on pre-described time windows, usage in those time windows and fixed pricing within those windows. If there are several more travelers than anticipated, consuming more fuel than anticipated that drives the price of fuel up while you are driving and impacts the supply of the fuel, you may well run out of fuel or money to finish the trip or it will cost you more than you anticipated in an "excise" cost to make up for the difference, and another problem is the supply may not be there. Also, the average fuel used within those time windows limits the ability to predict usage to any degree by the fuel generators. Hindsight will determine if the decisions were either good or bad. All this WITHOUT a fuel gauge! Until you get your monthly fuel bill. Then you can modify your future trips, but all the disadvantages of the first trip still exist.

Can you develop a monthly budget for expenses based on average dollars per month, when you receive funds on a daily basis and are billed on a daily basis? Would you not need a daily budget in order to avoid not having funds (energy) to pay the daily requirements? So do the energy generators and energy providers. They must know the details in order to eliminate costly over purchases, under purchases, over and under demand with the cooperation of the consumer. Utilizing "hindsight" information does not give the needed planning and response windows necessary to effectively and efficiently plan from the generation side nor allow for energy usage modification from the consumer side.

Real-time meter records, not only show how much electricity is used, but also when it is used, as it is used. This provides a full array of energy services to the utility industry, including consumption reports, which will allow end-users the ability to view real-time data and give them the ability to instantly evaluate and provide cost savings.

Actual usage data allows the utilities to better manage long term energy generation plans, energy purchases (overages and underage), as well as potentially eliminating rolling black outs and brown outs, such that have been experienced in California, New York and most recently, Denver. Why would you plan on using TOU when Real Time technology exists and in some cases, may be more cost effective?

Real Time improves the ability for the consumer to determine energy management, gives a greater ability to control

energy generation needs and energy purchase requirements to the utility, increases awareness of energy conservation as well as a broader opportunity to make choices about energy consumption, all the while, allowing cost savings on the consumers' billing, and cost reductions by the utilities.

The advantages of Real Time over TOU, in energy saving and energy conservation over the long term could easily translate into major savings to the consumer, increased awareness to the need for energy conservation by creating intimate involvement by the consumer, more accurate predictions of energy generation needs, reduced costs of added transmission grids and erection of generation facilities, accurate purchase quantities based on a modified demand history as well as reduced environmental effects of energy generation and eliminate black outs and brown outs.

Why would we, as a nation, go in the direction of TOU, when a more sensible, higher advantaged and cost effective option exists? Time-of-Use technology cannot match the Real Time technology in its short term and long-term benefits. How can we argue against available information that provides meter reads and reports on time electrical consumption data at 96 reads per day (15 minute meter reads) or 2,880 meter reads per month all with consumer involvement? The on time interval data is anticipated to play a key role in energy conservation, power distribution and on-time energy purchasing.

The Energy Bill of 2005 states that the utilities are required to offer you a fuel gauge (i.e. real time or near real-time information). Are we going to spend implementation dollars to use TOU and then switch to Real Time, when the Energy Bill timeline runs out for the utilities or wait until the apparent increased savings of Real Time are recognized? The time this takes will mean missed efficiency gains and lost cost savings. It makes sense to take a hard, honest look at the proposals and the technology available, in order to secure an energy efficient and energy conserving future for our country.

We need to move ahead with the best available technology, spend tax dollars and consumer energy rate dollars on the technology that makes sense in the long term.

Shortsightedness in the proposed use of

TOU may prove to be a mistake. Time will tell. We may have to reinvent the wheel once again, as real time technology proves itself. We, as a nation, cannot afford this time nor money, with the advent of Demand Response opening the doors to Direct Access and Open Access to begin the transformation to a nationwide transmission grid, where any consumer can define their energy sources, and affect the energy consumption and distribution nation wide.



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