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IDAHO PUBLIC
UTILITIES COMMISSION

BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

May 5, 2003

In the Matter of the Investigation Of Time Of Use Pricing For Idaho, Power Residential Customers	)	Case No: IPC-E-02-12
	)	Response to Order No. 29196 Time-of-Use Rates
Filed on Behalf of the Citizens of the Sate of Idaho	)	Response to Order No. 29226 Notice of Public Workshop
BY:	)	
Tom D. Tamarkin 2737 Eastern Avenue Sacramento, California 95821 916-482-2000 & Patrick R. Clifford 5132 Montecito Place Boise, Idaho 83740 208-323-4201	)	

COMES NOW before the State of Idaho Public Utilities Commission, Messieurs Patrick R. Clifford of Boise, Idaho and Tom D. Tamarkin of Sacramento, California, who do hereby request, declare, and note for the record:

1.0 The Public Utilities Commission has made the determination that Time-of-Use rates may not be feasible or practical for residential accounts serviced by the Idaho Power Company due to the cost associated with a TOU compliant power meter.

2.0 The Public Utilities Commission has made the determination that Automatic Meter Reading (AMR) systems should be installed system wide by the Idaho Power Company.

3.0 Point 1.0 and 2.0 may be inconsistent given today's state-of-the-art technology. Should Idaho Power find it most cost effective to implement Automatic Meter Reading (AMR) through the adoption and installation of new electronic

communicating power meters, the incremental cost of including such new features as peak demand rate compatibility, time-of-use rate compatibility, theft of power notification, over and under voltage reporting, service outage reporting, etc., is negligible yet the very use of such features may provide the Idaho Power Company with overwhelming economic advantages far in excess of the operational efficiencies gained through standard Automatic Meter Reading (AMR.)

4.0 Clarification should be provided with respect not only to the results of any Automatic Meter Reading (AMR) Systems piloted or tested by Idaho Power Company in terms of cost savings, projected rate of return, and internal rate of return on invested capital but also the precise nature of such trials including system topology and component descriptions, type of accounts targeted for the initial tests, duration of tests, analysis methodology and the involvement of any third party consultants and/or vendors.

5.0 Idaho Power Company should be directed by the Public Utilities Commission to study and develop innovative solutions that combine the basic features of Automatic Meter Reading (AMR) with other more far reaching features such as consumer demand side energy management, power factor monitoring for local appliance preventive maintenance, and various value-added products and services. The Idaho Power Company can offer these solutions to consumers to help consumers reduce their power expenditures and generate new non-power revenues for Idaho Power Company. Such an approach may allow the company to enjoy the benefits of a system wide AMR deployment financed by third parties, and with no negative debt related financial impact on the Idaho Power Company.

6.0 Through incorporation by reference hereto, the attached "white paper" entitled <u>"The Benefits of Combining AMR, Energy Management"</u>, Utility Remote Account Access and Information Distribution" should be widely distributed to all Idaho Public Utilities Commissioners and remain attached hereto for archival and retrieval by any interested parties. The purpose of the aforesaid white paper is to create an awareness of the opportunities an AMR deployment can represent in view of toady's technology. The objective should be to encourage a relationship of partnership between the utility, customers, and the Idaho Public Utilities through the total transparency established by providing the customer immediate usage feedback and up to the second pricing and accumulated cost information through remote in-home displays which communicate to the modern utility meter.

Respectfully Submitted,

Dated this 5th day of May, 2003

Patrick R. Clifford /s/

Patrick R. Clifford

Tom D. Tamarkin

Tom D. Tamarkin

Attest:

Emily J. Tamarkin

Emily J. Tamarkin, Witness

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USCL
Corporation

The Convergence of Technology and Market Needs

The Benefits of Combining AMR, Energy Management, Utility Remote Account Access and Information Distribution

By:
Tom D. Tamarkin, CEO
USCL Corporation

Abstract:

As energy and utility service prices rise, increasing numbers of consumers are looking for ways to manage the amount of money spent on electricity, gas and water. The fundamental problem consumers have in managing their use of utility commodities, be it water, gas, or electricity, is that there is no practical way to tell how much of each product they are using and therefore how much they are spending at any point in time. Further, they do not know how much it costs to use a given appliance, maintain a certain household temperature, or water the lawn.

Utility companies have no way to know how much electricity, gas or water customers use in real time. They can not tell what the maximum peak amount of electricity, gas or water was used nor can they develop a corollary between time of service use and amount. The overwhelming majority of residential utility accounts are billed by taking an accumulation of services used over a thirty-day period of time. As a result of these metering limitations, consumers don't receive the benefit of flexible pricing options that more closely match their individual usage profiles.

Further, a utility typically obtains these accumulated monthly readings by sending a human meter reader to each and every account to visually inspect a local utility meter and manually record the readings in some type of hand held data terminal. Many residences have metered electric, gas and water services with local meters read once a month by different meter readers representing each utility service. This represents a significant cost to the utilities and their customers. There are also liability issues in these security conscious times.

Recent advances in microelectronics and communications technology have vastly outpaced the traditional installed means of metering, meter reading and billing. Today's technology can provide the consumer up to the second real time and accumulated energy usage and pricing information, provide the means to manage and control such usage, and automatically transport

this information to multiple utilities such as electric, gas and water. The same technology provides the utilities significant positive economic advantages based on new control ability, reduction of operating expenses and new revenue streams resulting from new value added products and services. Further, new financing alternatives are created which eliminates the necessity of the utility having to pay for the acquisition costs associated with the new metering equipment. Cash strapped utilities can use these advantages to help return to profitability.

Background:

In the mid to late 1990s it was generally accepted that deregulation was going to change the structure of electric utility services in many if not most states by giving the consumer the power to choose their electricity supplier. Customer choice and competition would stimulate suppliers to provide low-cost power and to introduce a variety of advanced and diverse services. Experiments with deregulation have not yet been fine-tuned to produce the anticipated results and more time is needed to study the viability and best methods of deregulation. One key advanced technology promoted through the initial steps of deregulation has proven itself. Utility companies nationwide have embraced Automated Meter Reading and even Real Time Metering and placed it on the top of their list of ways to reduce operating costs and improve the level of Customer Service.

The term Automatic Meter Reading or AMR has, unfortunately, been misused. Literally, the term implies reading an entire population of utility meters without human intervention and processing the resultant data leading to the preparation of the customer's monthly bill. Many sub-optimal approaches to incremental gains in meter reading efficiency have been labeled AMR over the years by vendors and users alike. These have been useful both in terms of furthering the state-of-the-art as well as in practical economic terms. In the twenty-first century, however, AMR must be truly automatic, without human intervention. This requires the local capture of meter data at the service subscriber's meter and the remote telemetry of the data via some type of networked communications. And, given the current level of data acquisition, microcomputing, and communications technology, AMR is naturally evolving into Real Time Metering or RTM.

Automatic Meter Reading (AMR) was first tested forty years ago when trials were conducted by AT&T in cooperation with a group of utilities and Westinghouse. After those successful experiments, AT&T offered to provide phone system based AMR services at $2 per meter per read. The price was four times more than the monthly cost of the human based manual reading system and the program was considered economically unfeasible.

In the early 1980s the trend began to replace card and pencil based manual reading systems with electronic hand held data terminal based systems. This was typically referred to as EMR or Electronic Meter Reading. This was the beginning of the gradual process towards meter reading automation. The use of a hand held data terminal by a human meter reader greatly increased accuracy, reduced re-reads and increased the number of meters read per route but still required routes to be walked by fleets of meter readers. In 1992 the first field trials were held in Garland, Texas and

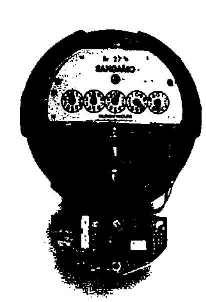
Dallas, Texas which implemented radio transmitters placed inside standard electro-mechanical meters and which were "read" by hand held terminals containing receivers thus allowing a meter to be read remotely, but not automatically, from distances up to several hundred feet away. This was the beginning of the current era of AMR. The City of Garland project implemented a "pole top" data collector which received signals from a plurality of meters in a local 2,500 foot radius and transmitted that "concentrated" information to the utility over a telephone line. A further contribution of the Garland project was the testing of an in-home display which provided the customer with real time feedback in kWh and dollars and cents as to his or her usage. Early studies showed that this real time feedback lead to a 10 to 20% reduction of the amount of electricity used by the customers who became actively aware in real time of the cost of their consumption habits.

Throughout the 90s, the major suppliers of hand held based EMR systems worked hard to reduce the cost associated with the integration of the radio transmitter technology in the utility meter and improve sensitivity of the receivers as well as the means to upload the data to the utilities. Since virtually all utilities now use some form of hand held system, it was generally considered to be conventional wisdom to migrate from the hand held EMR system to a semi-automatic *walk-by* or *drive-by* approach. Such approaches can greatly reduce the number of meter readers required but at the same time this approach lacks many of the economic, operational and customer service related benefits associated with true AMR and bi-directional communications.

Discussion of AMR Components:

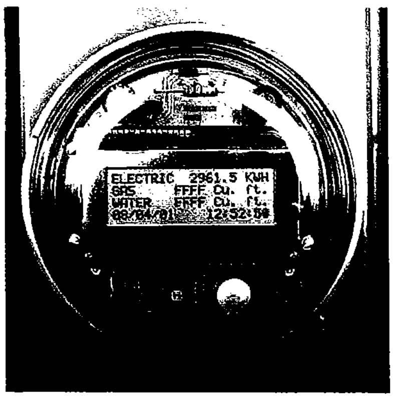
Any Automatic Meter Reading or Real Time Metering system consists of the following three primary components:

1. Meter with communications interface. Firstly there must be a local utility service meter. The basic meter measures consumption. Old electric meters tend to be electro-mechanical. New state-of-the-art meters tend to be entirely electronic with no moving parts. An electro-mechanical meter may be used in an AMR system if it has a sensing and communication interface added to it. These are commonly referred to as implant modules. Such an implant module has an internal power supply, sensor, processor, and communications interface such as a telephone modem or radio transmitter. The sensor is used to measure and track the movement of the electro-mechanical meter's spinning disk from which dial indications may be derived. There are natural limitations in terms of the granularity and resolution of the data that limit the use of the electro-mechanical meter as a data capture device for the real time presentation of instantaneous power use. For that reason the preferred AMR system will implement electronic meters. These are capable of providing highly accurate real time usage information as opposed to average usage integrated over a long time period. There are significant cost advantages associated with the use of electronic meters. Today's electronic meters are less expensive than



An example of a traditional electro-mechanical power meter with a radio transmitter implant module.

electro-mechanical meters coupled with sensors and communications modules. This relates to the fact that the electronic components in the meter forming the basic meter function are also used in the communications portion of the meter thus reducing overall component cost.



An example of a modern communicating electronic, electric power meter with RF based bi-directional LAN communications and internal residential gateway.

Gas and water meters may be coupled with encoders and communications devices such as radio transmitters which are battery operated and "wake up" once every few hours and transmit their data to a gate way. The gateway must have electrical power and a communications interface to the network. There is no more logical place for this gateway to reside than inside the electrical power meter since it has a natural source of power and the internal communications circuitry and infrastructure.

2. Communications System. A communications system or network is required for the transmission or remote telemetry of data and control signals between the customer's meters and the utility company. Typically such communications takes the form of telephone, power line carrier, radio frequency, cable television, cellular telephone, pager network, or low earth orbit satellite. The ideal communications media will be transparent to the service subscriber, bi-directional, and always available from either the meter or utility end of the loop. It must be readily available throughout the utility service area and low cost in terms of transaction fees or inexpensive to install and maintain if independent from a public access communications network. The trend in the industry is the use of Internet Protocol communications and transmission over the Internet.

3. Central office or utility back office system. This refers to the communications equipment and computer systems at the utility office used to receive the data as sent over the communications network, store it in data base format, and interface it to the billing system.

Selection of AMR/RTM Components:

The selection of AMR or RTM components must be made based on the following set of criteria:

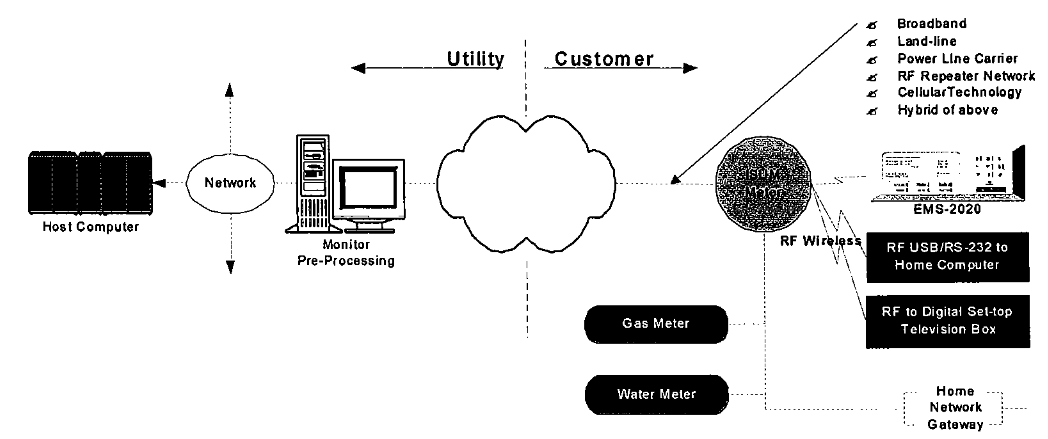
Economic Benefits:

The economic benefits gained by the utility through the reduction of operating costs and the generation of new revenues through the provision of new services. With older AMR technology such as implanted modules in electro-mechanical meters and *walk by, drive by* receivers, the benefits are limited to a reduction in meter reading costs through man power reduction and reduced rereads. Newer AMR/RTM technology blends a whole host of cost reduction and revenue generation opportunities by combining many functions beyond just meter reading. Examples include real time service outage reporting, tamper and theft of power reporting, introduction of variable rate tariffs (such as peak demand and time of use tariffs); remote service connect/disconnect;

improved cash flow from problem accounts, and a reduction of the wholesale cost of power during peak demand conditions through a reduction of peak demand through voluntary demand side management by consumers empowered with real time pricing and usage information.

Further, the utility can generate additional revenue through the sale of additional value added products and services such as electrical appliance preventive maintenance monitoring, security, medical alert and a myriad of additional products meant to add convienence and peace of mind to home owners and small business operators as well as generally increasing the perceived level of the utility's customer service.

Significant attention needs to be paid to the communications or metering gateway at the subscriber's location to insure that the major system components can be shared by multiple utilities such as electric, gas, and water. Just as multiple utilities currently share the cost of a common underground trench and right-of-way, sharing communications and infrastructure costs greatly reduces the capital expenses associated with the deployment and operation of the AMR/RTM system as they can be amortized over the long-term data transaction costs to two or more utilities.



Block diagram of a residential implementation of a Smart Utilities Meter utilizing internet protocols with RF wireless communicating with gas and water meters and an in-home consumer Energy Management Systems Display.

Growth Expansion and Component Life Cycle:

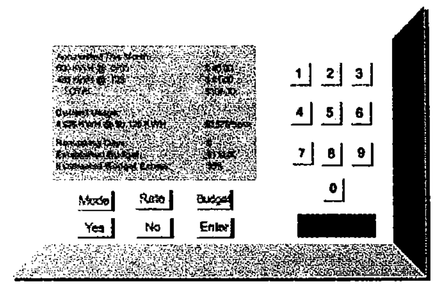
Emerging trends such as the movement towards in-home computer networks and residential gateways must be carefully analyzed, as these will have a significant impact on data communications carriers over the next few years. As more and more demand becomes apparent for these products, cheaper forms of high speed real time data communications will become available which may be integrated into the utility's AMR/RTM system. Therefore great care must be taken to select components having the appropriate life cycle requirements and which are capable of forward migration as technology progresses. As an example, an electronic meter must have a life expectancy of a minimum of twenty years in order to be considered for mass deployment. The meter should also be capable of supporting virtually all communication carrier technologies without having to be replaced or taken apart to be modified in order to support a future transition from telephone to RF to cable by way of example. One approach is to implement a standard short haul communication technique such as ISM band RF to a local gateway. As long as there is a simple and standard way to get data into and out of the meter, the meter stands as an anchor for its life cycle while other aspects of the AMR/RTM system such as the communications network are free to change over time as new services and technologies become available.

A utility must think beyond meter reading. The system components necessary to support automatic meter reading may be used to support a variety of other functions as well. Thus, the electric meter must be capable of supporting not only today's meter reading requirements but tomorrow's data and information services between the utility service and the customer through the link thusly established.

Value Proposition to the Constituents:

The relationship between the supply side (utility) and the demand side (customer) under the watchful eye of government regulation within the environment and community defines the constituents, each of which have unique needs which can be enhanced through an effective link based on the AMR/RTM system.

Consumer: ***The consumer must be empowered to make intelligent choices about the consumption of utility commodities such as electricity, gas and water.*** Cost of service and usage information must be provided in real time in a form easily monitored and understood. A car has a fuel gauge and a speedometer. A fuel pump at the fuel station has a dispensing meter at the point of delivery. Thus the car operator knows the price of fuel at the time of purchase and can make decisions on the use of his car based on his budget and ability. A home must have a fuel



A wireless in-home display providing up-to-the-second price and consumption information for electricity, gas and water usage is an essential tool for today's consumer.

meter and delivery price gauge as well. This takes the form of an in-home display and control panel monitoring electricity, gas and water use. This translates into an energy management system that almost invariably results in savings through the more judicious use of energy and utility services. Just as consumers will pay for various home improvements leading to energy savings such as insulation, improved thermal windows and state of the art Energy Star approved appliances, this tool becomes a product or service that is valuable to the consumer. The consumer should be charged for the tool. Financing should be provided. And education should be provided allowing the tool to be put into productive use by actually lowering the consumer's monthly energy bill even after the monthly finance charge.

Utility: ***The direct real time linkage or communications between the customer and the utility provides many benefits to the utility beyond just the reduction of meter reading costs.*** These include improved operations efficiency, improved customer satisfaction, improved cash flow performance, reduction of power acquisition costs in peak demand periods, reduction of transmission and distribution system maintenance associated with high peak demand periods, and the manifold benefits of controlling the peak demand use of multiple utility services such as electricity and water simultaneously. There is a direct, but often overlooked, benefit in controlling multiple utility service product consumption in peak time of use periods. This relates to the fact that both gas and water must be pumped through their respective delivery systems. This requires a great amount of electricity that is proportional to the load on the gas and water delivery network.

Additionally, the utility now has a direct communications link with each and every customer through which it may deliver new and creative value added products and services to the consumer. These will aid in the retention of consumer loyalty and customer satisfaction as well as in the generation of new revenues.

Regulating Authorities: ***Once the consumer and utility is directly coupled and consumers are fully cognizant of their purchase and usage decisions, the compliance function of the regulator is greatly enhanced.*** An enormous amount of information which may be used in the statistical profiling of accounts becomes a byproduct of the system and is easily archived and presented for use both in distribution load management and the regulation analysis capacities.

Further, once the proper type of state-of-the-art meter technology is installed, all customers are ready to implement future tariffs such as peak demand, time of use and real time pricing with no additional cost. The regulators in partnership with the utility may implement various incentive based rate programs in a control test fashion and then react very quickly with full deployment as the benefits become apparent. The incremental cost associated to incorporate full time of use and peak demand features in a low cost electronic meter with today's technology is negligible and from a technical standpoint is predicated on solid state memory cost at the integrated circuit component level and nothing more. Finally, having this metering technology in place makes the utility "de-regulation ready" if and when deregulation becomes an issue. Through the use of Real Time Metering, customers may be connected directly to alternative ESPs both in terms of pricing information and usage data from which the ESPs may properly bill.

Environment: ***AMR/RTM helps to protect the environment.*** Pollution is reduced by the direct impact of the elimination of meter reading fleet vehicles as well as the reduction of peak demand generation that often requires smaller fossil fuel peaking plants to be put into operation.

Community: ***The local community will benefit as the utility partners with private business to provide, install, and maintain new equipment.*** Creative entrepreneurs and business can aid the utility with its deployment through the provision of goods, services, and third party financing.

Conclusion:

The deployment of an AMR/RTM system by a utility offers great advantages and opportunities to the consumer, utility, environment, and regulatory authorities alike.

Cash strapped utilities looking for new ways to increase revenues and reduce operating costs should pay especially close attention to the opportunities afforded by AMR/RTM.

The needs of the consumer should be put at the top of the list when considering system topology and component selection.

By integrating key consumer benefits and functionality into the AMR/RTM system, a large portion of the system acquisition cost may be passed on to the consumer thus reducing or eliminating capital requirements on the utility. Through the use of third party financing and amortization over the utility bill, the consumer can actually reduce his or her utility expenditure through savings gained through conservation.

Today, the average utility customer's only contact with the utility is once a month when a bill is received, opened and a check returned. By providing a highly visible, real time, interactive interface such as a dedicated electronic display panel in the home, the utility has established the ability to communicate with the customer on a daily if not hourly basis. The utility is transformed from a faceless provider of an almost abstract commodity such as electrons or methane gas molecules, and an entity whose only purpose in the minds of many consumers is to collect monthly payments, to a dynamic and helpful part of every day life through the provision of information and value added services that contribute to the life style and entertainment of all its customers.

An AMR/RTM system starts with the meter. The meter must be versatile and support the future evolution of communications and data carriers. The meter should be both basic and yet support a multitude of features and functions to allow the utility to make the best use of its captive communications gateway located in virtually every house and commercial structure in its territory.

When a utility models the benefits and economic impact of AMR/RTM it should consider the following:

- Ability to pass on system equipment acquisition costs to consumer in a win-win fashion.
- Ability to provide the consumer with real time information on pricing, consumption and billing.
- Ability to implement future variable tariff programs such as time of use, peak demand and real time pricing without having to change out meters and equipment in the field.
- Ability to be real time pricing and deregulation ready without future changes in hardware.
- Ability to transition from one communications media and network to another in the future without changing the meter.
- Reduction of costs associated with meter reading.
- Reduction of costs associated with account turn on and turn off through automation.
- Reduction of costs associated with service outage reporting and automated service dispatch.
- Reduction of lost revenue due to old and progressively less accurate meters being replaced by highly accurate new meters.

- Reduction of peak demand costs associated with power acquisition at peak demand periods.
- Aggregation with other utilities to reduce equipment and infrastructure costs by sharing with multiple users.
- Generation of new revenue through the sale of VAPS delivered to the customer.
- Improvement in environmental impact through the reduction of pollution resulting from the lower peak power demands and elimination of meter reading vehicle fleets.

The preceding paper was written by Tom D. Tamarkin. Mr. Tamarkin is currently President & CEO of USCL Corporation in Sacramento, California. Mr. Tamarkin is past Vice President and General Manager of Datamatic in Richardson, Texas, an early pioneer in EMR hand held meter-reading systems. In 1989, Mr. Tamarkin was co-author and publisher of "The Complete Handbook of AMR" and developed the SAMREIM product (Software for Automatic Meter Reading Economic Impact Modeling which has been used by hundreds of utilities world-wide to determine present meter reading costs and model future costs based on various AMR methods. In 1991 Mr. Tamarkin formed the Tamar Company in Dallas Texas who developed the first radio based *walk by-drive by* AMR systems as piloted with the City of Garland, Texas and TU Electric in Dallas, Texas. In 1995, Mr. Tamarkin formed USCL Corporation now located in Sacramento where he resides with his wife Emily and son Jeremy. He may be contacted at USCL Corporation, 2737 Eastern Avenue, Sacramento, California 95821. 916-482-2000 tdtamarkin@usclcorp.com