

## Meter Readers to Follow the Milkman into Nostalgic Oblivion

By Fereidoon P. Sioshansi\*

The walking meter-reader, going from house to house in search of a number to punch into a hand-held device, is heading in the direction of the milkman dropping off fresh milk at the doorstep. And the reason for this evolutionary development is *not* to save the labor cost of walking from meter to meter once a month – as was once advertised by the proponents of *automatic meter reading* (AMR). The reason is that with the proposed restructuring of the electricity retail business, the meter reader has to take a read for an increasing number of customers once every hour, not once a month, and has to get the read to a central data center instantaneously – not in a matter of hours or days, as is currently done. Viewed in this context, AMR will gradually evolve from merely a nice thing to do, to a practical necessity.

This will not be necessary for all customers, of course. Nor will it happen over night – but gradually as happened with the now-extinct milkman in many countries. But as the cost of interval load metering and communications drops, and more and more customers are fitted with the new meters, the cost of reading the remaining customers' meters the old-fashioned way increases. At some point, it might make more sense to replace all the remaining meters and upgrade the network all together because there are many other benefits in doing so. In the short-run, most small customers can get by with their existing meters, and utilities (and competing retailers) will use representative *load profiles* for billing purposes.

The need for AMR is, of course, driven by the desirability to transmit variable energy prices, as determined by the *independent system operator* (ISO) and/or the *power exchange* (PX) to an increasing number of customers. Those who choose to do so, can modify their usage as electricity prices vary from hour to hour, and their response will be recorded and may be reported back to the PX in real-time to keep supply and demand in balance. Moreover, as time goes on, the bills of an increasing number of customers will have to reflect their actual hourly usage (720 per month) and the corresponding prevailing hourly prices. The old-fashioned, electromechanical spinning disk meters simply won't do. They either have to be retrofitted with inexpensive devices that allow the old meters to record hourly data, or in many cases, they may gradually be replaced with new *hourly load meters* (HLMs) that can be remotely read and have built-in two-way communication capabilities. Two-way communication would be particularly desirable for larger customers to transmit variable prices to them, and to report the drop or increase in usage back to a monitoring center (for billing purposes) and possibly to the power exchange (in case of large customers or those on interruptible loads) for purposes of keeping the network in balance.

Of course, once you establish a two-way communication network for AMR, the very same network can support many additional services and functions including *outage detection* and *service restoration*, *service turn-ons* and *turn-offs*, and

\*Fereidoon P. Sioshansi is a Senior Consultant with National Economic Research Associates (NERA), San Francisco, CA. This is an edited version of his article that appeared in the February 1997 issue of *EEnergy Informer*.

*energy management services*. Any why stop there? Why not read the *gas* and the *water meter*; verify credit cards or monitor parking meters, fuel tanks, traffic signals, street lights, security systems, vehicle locations, commercial washing machines, change machines and office equipment; provide home banking and shopping; access to the Internet; home paging – and you name it. Depending on the speed of the communication technology employed, and its range and band-width, the sky could literally be the limit. The question for people in the electricity business is how far to go, and if they decide to go too far, who should they partner with because it requires major investments and it is not clear who will recoup the investment and how.

While utilities and regulators argue over the implementation details of retail access, a number of entrepreneurial companies – some new and some old – are preparing for what promises to be a huge market. There are an estimated 116 million electric meters in the United States alone, with smaller numbers of gas and water meters. Even assuming a modest level of penetration into this market (only eight million are estimated to be fitted with AMR technology today) – and similar developments worldwide – means big business. The current estimated stock of eight million sophisticated meters with AMR capability is expected to more than double by the year 2000.

So what's holding the utilities back from investing in upgrading their meters and establishing the necessary AMR capabilities? The main culprit, as best as we can figure, is uncertainties about who should invest in upgrading the technology, and how to recoup the investment. Under traditional rules, utilities would have gladly made the investments, added them to their rate base, then would have recovered them through higher rates by captive customers. But since it is no longer clear who will serve the customers in the future; (i.e., the traditional utility or some new retailer), it is no longer clear who should make the investment, and who will pay for it. In this environment, utilities (like *Pacific Gas & Electric*) would rather pay a non-regulated vendor, such as CellNet a monthly fee for necessary services instead of investing their own money in the venture, as the CellNet story below explains.

### CellNet: The Little Company That Could

Among the aggressive marketers of the new technology is San Carlos, CA - based CellNet Data Systems. CellNet has developed a wireless system for network meter reading that provides instant, continuous readings of residential and business utility meters. CellNet figures that there are more than 230 million utility meters in the US and at least another 600 million in the rest of the world. Even a fraction of this market could keep CellNet busy for years to come. The company had 95 employees at the end of 1994. By the end of 1996, it had grown to 550. Its current customers read like a list of who's who in the U.S. utility business: PG&E, Kansas City Power & Light, Union Electric Co., Northern States Power Co., and Puget Power. The deal with PG&E, announced in November 1996 is typical: a 10-year contract for CellNet to install and operate a system serving about 100,000 meters – 55,000 electric, 45,000 gas – in PG&E's Delta District in eastern Contra Costa County in Northern California.

According to John M. "Mick" Seidl, CellNet president and chief executive officer, "Installation has begun and

should be complete by mid-1997." Like the technology employed by Itron, Metricom, and a few other vendors, meter reads from CellNet's meters are continuously transmitted on CellNet's radio frequency to a nearby pole-top controller, which collects data from meters within about a one-tenth- to one-quarter-mile radius. The controller in turn relays the data to a tower-mounted device called a cell master, which collects data from controllers within about a 2-to 5-mile radius and transmits that data over CellNet's radio band to the system controller, which is connected to the utility company's customer information and operation center. The company invests in the network and maintains it in exchange for a monthly service fee, generally \$1 per month per meter. The PG&E contract for 100,000 meters will produce about \$8 million to \$10 million in revenue over 10 years.

That should make CellNet hugely profitable? No so. As it turns out, the company's cash flow looks pretty dismal and even the company's rosy PR people admit that profitability is at least five to six years away. The reason is that the AMR business is an expensive, up-front infrastructure investment business. You have to build the network first before revenues from monthly customer reads begin to come in. CellNet, however, is optimistic.

### Conference Proceedings Transport, Energy and Environment Elsinore, Denmark, October 3-4, 1996

The Proceedings from the Regional European Conference, *Transport, Energy and Environment*, held in Elsinore, Denmark, are now available for the price of US\$ 50. To order copies, please contact:

Secretariat, Danish Association for Energy Economics  
c/o Lis Hartmark,  
Maersk Olie og Gas AS  
Esplanaden 50  
1263 Copenhagen K, Denmark  
Tel: +45-3363-4081  
Fax: +45-3363-4063

### Publications List

**Asian Energy News.** Monthly press review. Price: \$100.00. Contact: Center for Energy-Environment Research & Development, Asian Institute of Technology, PO Box 4, Klong Luang, Pathumthani 12120, Thailand. Phone: 66-2-524-5425. Fax: 66-2-524-5441. E-mail: lefevre@ait.ac.th

**Reinventing Electric Utilities: Competition, Citizen Action, and Clean Power.** (1997). 239 pages. Price: \$34.95. Contact: Island Press, Box 7, Dept. 2PR, Covelo, CA 95428. Phone: 202-232-7933. Fax: 202-234-1328.

**Cogeneration & Power Marketing Monthly.** Monthly newsletter. Price: \$294.00. Contact: COGEN Publications, PO Box 2303, Falls Church, VA 22042. Phone: 703-641-0613. Fax: 703-641-9265.

**The Economics of Global Warming.** (1997). 656 pages. Price: \$195.00. Contact: Edward Elgar Publishing, Inc. PO Box 330, Lyme, NH 03768. Phone: 603-795-2282. Fax: 603-795-2818. E-mail: kwright@e-elgar.com

**Conservative Environmentalism: Reassessing the Means, Redefining the Ends.** (November, 1996). 296 pages. Price: \$59.95. Contact: Greenwood Publishing Group, 88 Post Road West, PO Box 5007, Westport, CT 06881-5007. Phone: 203-226-3571. Fax: 203-222-1502.

**Energy Outlook.** (February 1997). NZ\$40. Contact: Conrad Edwards, Unit Manager, Energy Modelling and Statistics Unit, Ministry of Commerce, 333 Bowen Street, Wellington, New Zealand. Phone: 64-4-472-0030. Fax: 64-4-473-9930.

**Energy Greenhouse Gas Emissions 1990-1995.** Price: NZ\$45. Contact: Conrad Edwards, Unit Manager, Energy Modelling and Statistics Unit, Ministry of Commerce, 333 Bowen Street, Wellington, New Zealand. Phone: 64-4-472-0030. Fax: 64-4-473-9930.

### Calendar

**8-10 May 1997, Middle East Oil & Gas: Towards the Third Millennium.** Abbasi Hotel, Isfahan, Iran. Contact: Conference Organizing Committee, Room: 1102-1, NIOC Main Bldg., PO Box 1863, Tehran, Iran. Phone: 9821-6152599. Fax: 9821-6466961.

**25-29 May 1997, 8th Global Warming International Conference & Expo.** New York, New York, USA. Contact: Global Warming International Center, PO Box 5275, Woodridge, IL 60517. Phone: 630-910-1551. Fax: 630-910-1561.

**2-3 June 1997, Oil, Gas & Power: New Opportunities from Latin America's Booming Energy Industries.** La Jolla, California, USA. Contact: Institute of the Americas, 10111 North Torrey Pines Road, La Jolla, CA 92037. Phone: 619-453-5560. Fax: 619-453-2165.

(continued on page 32)

### Conference Proceedings 19th IAEE International Conference Budapest, Hungary, May 27-30, 1996

The Proceedings from the 19th International Conference of the IAEE held in Budapest, Hungary, are now available from IAEE Headquarters. Entitled *Global Energy Transitions, with Emphasis on the Last Five Years of the Century*, the proceedings are available to members for \$55.95 and to non-members for \$75.95 (includes postage). Payment must be made in U.S. dollars with checks drawn on U.S. banks. To order copies, please complete the form below and mail together with your check to:

Order Department, IAEE Headquarters, 28790 Chagrin Blvd., Suite 210 Cleveland, OH 44122, USA

Name \_\_\_\_\_

Address \_\_\_\_\_

City, State, Mail Code and Country \_\_\_\_\_

Please send me \_\_\_\_\_ copies @ \$55.95 each (member rate) \$75.95 each (nonmember rate).

Total enclosed \$ \_\_\_\_\_ Check must be in U.S. dollars and drawn on a U.S. bank, payable to IAEE.

**Calendar** (continued from page 31)

**3-4 June 1997, Euro Energy '97.** London, U.K. Contact: Business Seminars International, Ltd., Sussex House, High Street, Battle, East Sussex, TN33 0AL, U.K.

**9-13 June 1997, Inside Washington: Business and Public Policy - Focus on Energy and Environmental Policy.** Washington, DC. Contact: Karen Akers, The Brookings Institution, 1775 Massachusetts Ave., NW, Washington, DC 20036-2188. Phone: 202-797-6268. Fax: 202-797-6133. E-mail: kakers@brook.edu

**16-27 June 1997, Second International Training Program on "Utility Regulation and Strategy."** Gainesville, Florida. Contact: Pascale Parker, Program Coordinator, PURC, PO Box 117142, Matherly Hall 205, University of Florida, Gainesville, FL 32611. Phone: 352-392-6148. Fax: 352-392-7796. E-mail: purcecon@dale.cba.ufl.edu URL: <http://www.cba.ufl.edu/eco/purc>

**17-19 June 1997, Sub-Saharan Oil & Minerals.** Mauritius. Contact: Europe Energy Environment, Ltd., Johannesburg. Phone: 27-11-442-3230. Fax: 27-11-442-4198.

**2-4 July 1997, European Conference: VEE, EFCEE and IAEE: "The Integration of Central European, Baltic and Balkan Countries in the European Energy Economy."** Vienna. Contact: Peter Vander meiren, EFCEE, 35 Electriciteitsstraat/1105, B-2800, Mechelen, Belgium. Phone/Fax: 32-15-20-48-57.

**14-16 July 1997, Oil and Gas Education Initiative.** Dallas, TX. Contact: Mr. Allen Mesch, Director, Maguire Oil and Gas Institute, Edwin L. Cox School of Business, Southern Methodist University, PO Box 750333, Dallas, TX 75275-0333. Phone: 214-768-3692. Fax: 214-768-3713. E-mail: amesch@mail.cox.smu.edu

**7-10 September 1997, USAEE/IAEE 18th North American Conference.** San Francisco, California, USA. Contact: USAEE/IAEE Headquarters, 28790 Chagrin Blvd., Ste. 210, Cleveland, OH 44122. Phone: 216-464-2785. Fax: 216-464-2768. E-Mail: IAEE@IAEE.org

**12 September 1997, Energy and Security in Asia.** Massachusetts Institute of Technology. Contact: Michael Lynch Phone: 617-253-5806. Fax: 617-253-9330.

**11-15 November 1997, Fifth Chemical Congress of North America.** Cancun, Quintana Roo, Mexico. Contact: 5NACC Congress Secretariat, c/o American Chemical Society, Room 420, 1155-16th St., NW, Washington, DC 20036. Phone: 202-872-4396. Fax: 202-872-6128.

**8-11 December 1997, The Fourth Asian-Pacific International Symposium on Combustion and Energy Utilization.** Bangkok, Thailand. Contact: Energy Research Institute, Institute Building III, Chulalongkorn University, Bangkok, 10330, Thailand. E-mail: apisceu@eng.chula.ac.th

**16-21 December 1997, The Second International Non-Renewable Energy Sources Congress.** Kish Free Zone Island, Hormozgan, Iran. Contact: Ali Haghtalab, Congress Secretariat, e-mail: u10215@uicvm.uic.edu

**13-16 May 1998, 21st IAEE International Conference.** Quebec City, Canada. Contact: IAEE Headquarters, 28790 Chagrin Blvd., Ste. 210, Cleveland, OH 44122. Phone: 216-464-5365. Fax: 216-464-2737. E-Mail: IAEE@IAEE.org

**13-18 September 1998, 17th Congress of the World Energy Council.** Houston, Texas. Contact: United States Energy Association, 1620 Eye Street, N.W., Suite 1000, Washington, DC 20006. Phone: 202-331-0415. Fax: 202-331-0418. (<http://www.wec98congress.org>)

**19-21 November 1998, 7th International Energy Conference and Exhibition - ENERGEX '98,** Manama, Bahrain. Contact: Dr. W.E. Alnaser, Conference Secretariat, Dean, Scientific Research, University of Bahrain, PO Box 32038, Bahrain. Phone: 973-688381. Fax: 973-688396. E-mail: EA607@isa.cc.uob.bh

**9-12 June 1999, 22nd IAEE International Conference.** Rome, Italy. Contact: IAEE Headquarters, 28790 Chagrin Blvd., Ste. 210, Cleveland, OH 44122. Phone: 216-464-5365. Fax: 216-464-2737. E-Mail: IAEE@IAEE.org

**IAEE Newsletter**

**Volume 6, Spring 1997**

The *IAEE Newsletter* is published quarterly in February, May, August and November, by the Energy Economics Education Foundation for the IAEE membership. Items for publication and editorial inquiries should be addressed to the Editor at 28790 Chagrin Boulevard, Suite 210, Cleveland, OH 44122 USA. Phone: 216-464-5365; Fax: 216-464-2737. Deadline for copy is the 1st of the month preceding publication.

**Contributing Editors:** *Paul McArdle* (North America), Economist, US Department of Energy, Office of Policy, Planning and Analysis, PE-50, Washington, DC 20585, USA. Tel: 202-586-4445; Fax 202-586-4447. *Tony Scanlan* (Eastern Europe), 37 Woodville Gardens, London W5 2LL, UK. Tel 44-81 997 3707; Fax 44-81 566 7674. *Marshall Thomas* (Industry) 3 Ortlely Avenue, Lavallette, NJ 08735, USA Tel 908-793-1122; Fax: 908-793-3103.

**Advertisements:** The IAEE Newsletter, which is received quarterly by over 3300 energy practitioners, accepts advertisements. For information regarding rates, design and deadlines, contact the IAEE Headquarters at the address below.

**Membership and subscriptions matters:** Contact the International Association for Energy Economics, 28790 Chagrin Boulevard, Suite 210, Cleveland, OH 44122, USA. Telephone: 216-464-5365; Fax: 216-464-2737; e-mail: IAEE@IAEE.org; Homepage: <http://www.IAEE@IAEE.org>

**Copyright:** The *IAEE Newsletter* is not copyrighted and may be reproduced in whole or in part with full credit given to the International Association for Energy Economics.

*IAEE Newsletter*  
Energy Economics Education Foundation, Inc.  
28790 Chagrin Boulevard, Suite 210  
Cleveland, OH 44122 USA

NONPROFIT ORG.  
U.S. POSTAGE  
PAID  
Cleveland, OH  
Permit No. 1860