Metering — time to catch up?

It might be a slight exaggeration to suggest that a Victorian would be completely familiar with today’s domestic meters for electricity, gas and water, but only by a few years. There are tiny changes: registers display numbers directly in place of a row of little clock faces; the bill is printed rather than handwritten in traditional copperplate style. The meter reader still calls every few months and writes down the latest reading in a little notebook. Only the name of his employer would seem strange to our time-traveller.

Many suggestions have been put forward over the years to improve the mundane but vital task of ascertaining consumption and billing the user. Trials have been made enabling meters to be read remotely, with tariff and consumption information also given to the consumer. In the case of electricity there is a benefit to be gained from this information by enabling the consumer to reduce his demand when the price is high, resulting in a higher load factor and savings in investments in capital plant. Opportunities for savings on the other services, where demand is steadier and the product more readily stored to meet demand peaks, would be less.

The public has never understood why it needs separate visits from gas and electricity meter readers to read their respective meters, often sited a few feet from each other. Often, no one is in the house during the day and each visit entails making special arrangements, to the considerable irritation of both the consumer and the utility concerned. The increasing use of estimated bills may relieve that particular problem, but estimates of readings are still disliked, particularly when the user believes (even if the belief is without foundation) that a previous estimate was set low to maximise income form the next bill, when it coincides with an increase in unit rates.

Four years of low rainfall have increased pressure to meter water in domestic premises, at least in the South-East of England. Every household uses water, virtually all use mains electricity and most use mains gas. The advent of water meters will result in three meters in place of two in the great majority of homes.

This change compels urgency in considering the means of metering and billing utility supplies into the next century. Meters are cheap, reliable and long lasting, more than 20 years ahead; indeed such a improvement must anticipate needs more than 20 years ahead; indeed such a programme would take that period of time to implement if existing meters were changed only at the end of their normal life expectancy.

The first prerequisite for automatic
monitoring of meter readings is to ensure that all meters have a facility for transmitting a signal proportional to consumption to an external device. Electrical engineers are familiar with meters employed for major consumers (or generators) utilising impulsing contacts for driving summation equipment, demand metering, remote data collectors for monitoring or onward transmission etc. Similar arrangements can be made for gas and water meters using optical or magnetic sensors. Taking water as an example, since more extensive water metering would be the trigger for long overdue change, the ordinary domestic meter can be supplied today with a facility for connecting a magnetic sensor to generate impulses proportional to consumption, at small additional cost.

The next and greater problem is institutional. Separate and independent companies provide electricity, water, gas, telephones and cable or fibre optics for high-capacity communication channels. Each service has its own regulating authority to ensure fairness in matters such as cost and quality of supply, but these bodies primarily serve the needs of the particular industry they monitor, and have a much lesser incentive to promote co-operation between industries. Of course there is a history of co-operation between utilities on day-to-day working practices through Joint Utilities Groups, but these relatively informal arrangements are unlikely to influence the long-term policy objectives of their respective employers.

So what forum exists to promote co-operation between the utilities at a sufficient level of authority and influence? Clearly the Regulators of each industry provide an adequate channel for influence, even for compulsion, within their areas of responsibility. It would seem appropriate that all of them should anticipate the possibility of providing common benefits to their particular customers who are, after all, mostly the same people — a factor which seems (from the consumers' point of view at least) to be overlooked.

Much discussion (but not much action) has taken place over recent years on the mechanics of transmitting information from metering back to the utility. The telephone network suffers from the disadvantage of significantly less than 100% service to all households, but the importance of this factor must surely be diminishing. Small radio transmitters of limited range able to send data to a passing vehicle offer promise for a low-cost interim solution. Mainsborne signalling or the use of broad-bandwidth cable systems are still a possibility. However, the same problem referred to earlier still intervenes, namely that individual utilities are seeking solutions to their individual problems of meter reading and billing. Inevitably the costs look relatively high when examined on that basis. From the consumers' point of view joint action with a single common means of sending consumption data back to the respective supplier seems both logical and cost-effective. Dividing costs at least two ways, probably three ways in the future, would have a considerable impact.

The hypothetical Victorian revisiting our world would see enormous changes, and would probably be struck most by the impact of information technology in our homes. The telephone system provides almost instant contact with anyone else near a telephone on the globe; radio and television provide an endless stream of information on news, sports, culture and entertainment from every country in the world, and even pictures from the furthest reaches of the solar system. We can pay our bills by picking up the telephone and speaking to a computer. Then the doorbell rings, and its the electricity meter reader, it rings again, this time for the gas meter, yet again for the water meter. It would seem scarcely credible.

Ian Forbes

Letters to the Editor

Electrical breakdown of insulating oil

Dear Sir — I refer to Dr. W.G. Chadband's article on the 'Electrical breakdown of insulating oil' (March 1992 PEJ, p.61). The article mainly refers to one aspect of the discussion meeting which took place at Savoy Place on the 17th June 1991, mainly the academic one.

I was a contributor to the meeting, and there was equal emphasis on the practical side as well as the Standards scene. For example, Dr. Chadband refers to the high standard deviation associated with the standard method (IEC 156). It was pointed out at the meeting that this high value of standard deviation is not acceptable and examples were given of the work with which IEC TC10 WG4 is currently involved which seeks to address this. The revision of IEC 156 is well under way and will be shortly published for public comment. This revision addresses a number of the shortcomings of the current method.

Further work is continuing both in the UK and abroad to try to reduce the high standard deviation by, for example, looking at new electrode geometries in order to try to reduce the uncertainty of the result. It is hoped that a means will be found of measuring the acquired electrical strength (that due to contaminants) as distinct from...