

Jeffrey Beal
QLD

15 December 2004

The Presiding Commissioner (Mr Neil Byron)
Australian Government Productivity Commission

Dear Sir

Submission to the Public Enquiry into Energy Efficiency

I am a residential electricity consumer who is particularly well informed about use, measurement, control and billing for electricity; but I am also frustrated because there doesn't seem to be any body representing my interests to government or utilities. I have only today learned of the existence of your enquiry, so hope this submission is not too late for your consideration.

What do I hope to achieve?

The basis of my submission is that I want to promote the use of Smart Meters programmed to display bill and usage information, so I can use this for managing my spending on energy ie "housekeeping". This will become a central element in an integrated approach to helping residential customers cut energy waste, cut their bills and save the environment in the process. I intend to show how a basic engineering theory of "negative feedback control systems" illustrates the required elements of a coherent and integrated approach to energy conservation and energy efficiency improvement for residential customers. In my researches to date, I have found no real evidence that this has been tried anywhere in the world.

What are my credentials?

My background includes being;

- an electricity metering and electricity supply engineer with 25 years experience,
- a former senior manager of a very successful contestable metering business run by a large electricity utility, and the manager responsible for development of products utilising the capabilities of modern smart meters, then deploying such products widely to business customers in eastern Australia, and
- a residential electricity customer who is frustrated by utilities, governments, business and special interest groups who simply ignore my needs – information and empowerment to manage my energy use and resulting bill.

I have also attached two documents. The first is a detailed letter sent in May to the Queensland Government highlighting areas that I believe are impediments to achievement of my goals as a customer. I have to say that I was delighted to receive a response from the office of the Minister for Energy and was called to a meeting with Department of Energy officials. That was only a month ago and there has not been contact since. It is likely that the meeting was not timely enough to allow my concerns to be considered and raised during the recent public hearings. Hence, this letter presents another approach.

The second attachment is a letter sent to the Editor of "The Courier Mail" in Brisbane just two weeks ago. I did not expect it to be published but hoped instead to draw

some interest and perhaps foster the publication of some articles in future aimed at teaching people something about how the electricity industry actually works and encouraging a cooperative approach between customers, utilities, government, et. al.

As you can see, I am not prepared to stand on the sidelines waiting for someone else, possibly less informed, to advocate my interests and those of like customers.

What is a Smart Meter and what do I want it to do for me?

A Smart Meter is an industrial grade computer that is programmed to measure and record energy consumption for utility billing purposes. Most present Interval Meters are “really dumb” smart meters! What I want is to have the Smart Meter on my premise programmed to calculate and display my electricity bill as it rises hour by hour. This is a trivial exercise for modern meters, adding just a few dollars to the cost of a meter. But that information is critical to me if I am going to manage my electricity bill ie reduce energy consumption and demand. Let me explain using the theory of negative feedback control systems.

What is a negative feedback control system and what is an example?

Nearly all natural and man-made systems incorporate feedback from output to input so that the output of the system behaves well; we get the desired results, with little variation, most of the time, in a controlled way. Such self-regulating systems are ubiquitous in nature and widely present throughout the creations of mankind, but they are usually embedded so their existence is not apparent. What I want to do is expose this and convey how the theory can provide an important framework and model for achieving energy conservation and energy efficiency, and I will apply it to the situation of a residential electricity customer because that is close to my heart.

But first, a simple example of a negative feedback control system will help develop understanding - driving a car down a good road, on a clear day, with little traffic. You approach a 60 kph speed sign and note your speedometer shows your present speed as 75 kph. You recognise the need to slow down by 15 kph and decide that braking gently is an appropriate response. You apply your foot to the brake and the vehicle braking systems respond to slow the car down. You check the speedometer occasionally and keep your foot on the brake until the speed of the car falls to about 60 kph. Then you take your foot off the brake and move it back to the accelerator to resume normal driving.

Figure 1 below is a standard model for negative feedback control systems. There were five elements operating in the above example;

- the speed sign set a goal,
- the speedometer gave constant feedback on present speed,
- you assessed the difference and decided whether to slow more or stop slowing,
- your foot and braking system of the car did the work of slowing down, and
- you understood the meaning of the speed sign, the speedometer, the capabilities and operation of the braking system, and knew how to analyse the problem.

These are the things represented on the diagram, although the knowledge element is understood.

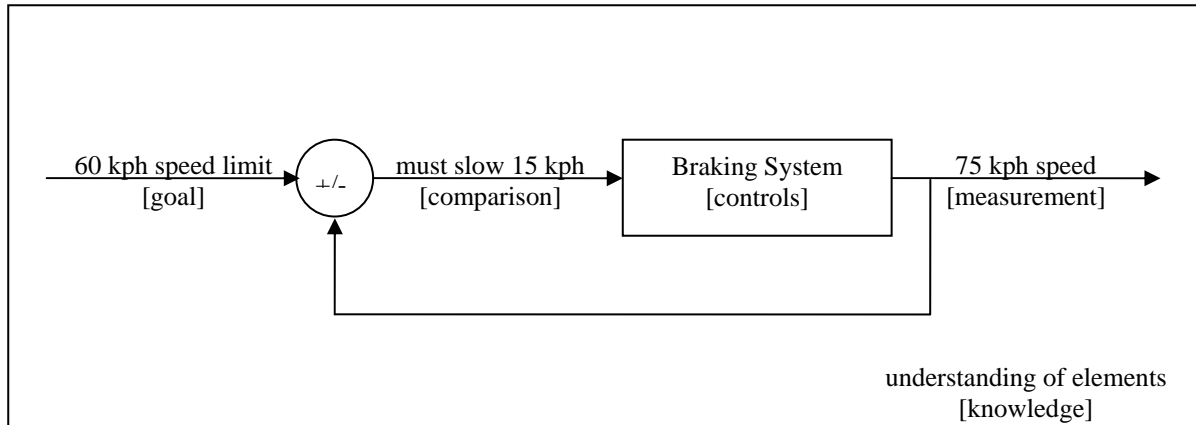


Figure 1: Negative Feedback Control System Model of Car Braking

Now all engineers know that without every one of these things, the system cannot be in control eg;

- without speed signs as goals, drivers could drive cars at any/many speeds,
- without speedometers, even responsible drivers could get speeds very wrong,
- without deciding what response is needed, there is no controlling input to the braking system,
- without using the braking system there is no speed reduction, and
- without understanding what the speed sign means, or the speedometer is displaying, or whether hard or soft pressure is required on the brake pedal, then the correct decisions cannot be made.

All elements have to work together to provide a functioning whole. The theory is very well developed and applied in engineering practice, and it can provide powerful insights if we use it to model what is required to achieve stable, sustainable, energy management. For example, engineers use the theory to explain how time delays in feedback loops can cause breakdown or instability, how external factors can affect the operation of systems, how high levels of gain and responsiveness in the controllable devices can actually help make the system more stable and reliable, etc. But these are things for more advanced discussion.

How can we apply the principles to help customers manage their energy use?

The same five elements apply when a residential customer wants to get their electricity bill (and indirectly their electricity usage) under control. To simplify the diagram for non-technical persons, I have translated the elements onto a more easily communicated “energy star” in Figure 2:

- Incentives in the form of tariffs (or usage benchmarks) – inputs to set goals.
- Education about specifics – essential but basic knowledge.
- Measurement - bill and usage information.
- Controls - the action items.
- Verification - comparison and decision-making tasks.

How does this apply to my vision for residential customers? The following is a summary (but note that I have changed the order to aid understanding).

- **MEASUREMENT:** My smart meter is programmed to show my bill [\$] as it accumulates hour by hour. The meter also shows two other useful parameters ie yesterday’s Average Daily Consumption [kWh] and present Power [kW].
- **INCENTIVES:** I have an idea of what I am prepared to spend for electricity each day [\$], and time-of-use (TOU) electricity tariffs let me vary my usage and still

make my budget. I also would like to beat the Average Daily Consumption for customers like myself (my contribution to saving the planet).

- CONTROL: I use timeswitches and some relays that are remotely controlled by the electricity utility to do most of the day-to-day control actions needed, but I also pay a bit more attention to some good habits.
- VERIFICATION: I check the bill at my meter every now and then (maybe once a week) and look at how Yesterday's Energy Usage compares with benchmarks to make sure my automated controls and habits are still working for me.
- EDUCATION: I have learned about kW's and kWh's and how they relate to my appliance usage. I know generally how my electricity bill is calculated and know enough about TOU tariffs to understand when lowering usage can make good savings. I understand how timeswitches and remote control of some of my appliances by the electricity utility can make this automatic and convenient. I know how to use the other measures Average Daily Consumption and Power to occasionally check my own usage and compare it with that at other times or with other people.

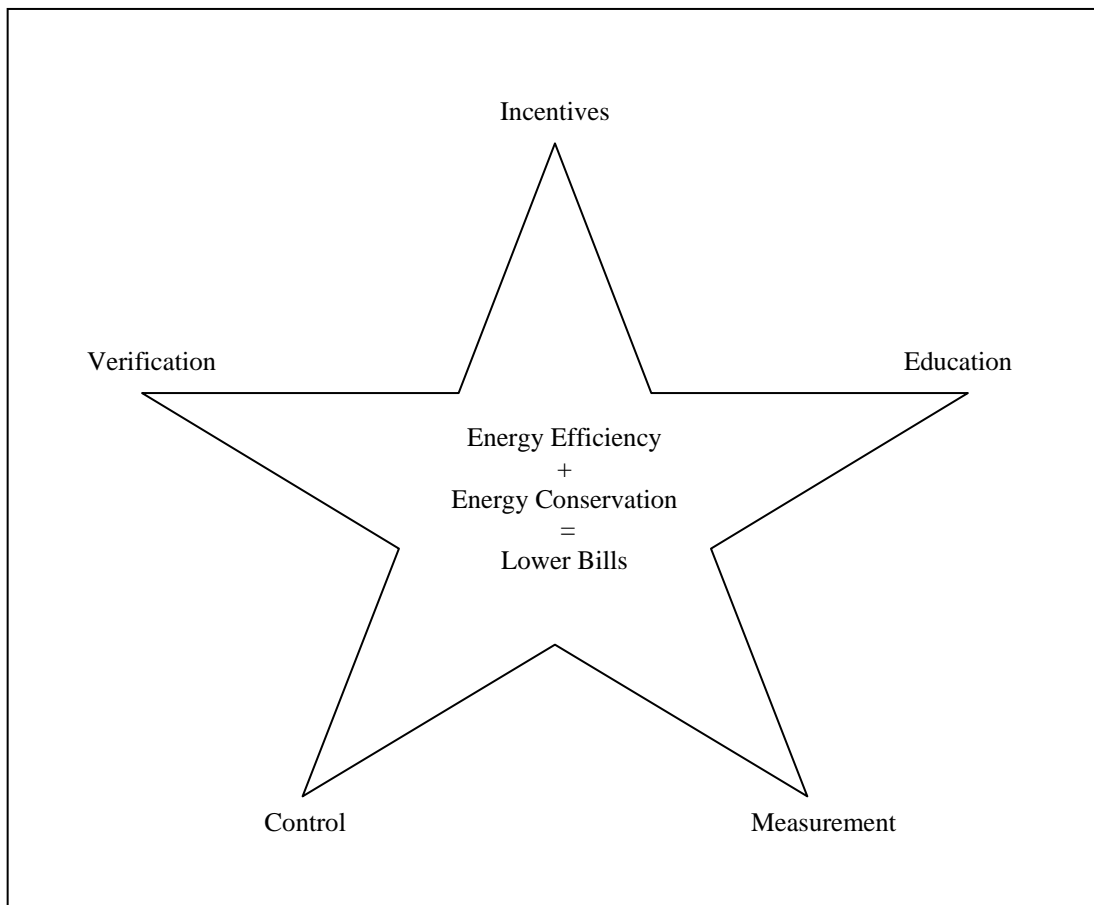


Figure 2: Energy Star – Necessary Elements for a Functional System

Energy management in residences is really not very hard to do IF all the elements are in place. Sadly, my researches have shown only piecemeal approaches being used – nothing like the systems level approach required. I have a strong belief that many people will take action that conserves energy and will take an interest in energy efficiency once they have meaningful, timely measures that let them become involved! Until now, the absence of such measures has led most customers to act as though energy usage is something they can't manage and the bill is something that just has to be paid when it arrives.

Specially programmed smart meters can change this mindset WITHOUT costing very much at all. The few quantities mentioned are enough in my opinion to develop interest, allow targeting of relevant education and information for customers, and also be useful for some diagnostics. About Grade 5 education is all that is required.

Frankly, it is a no-brainer! Will everyone respond? Probably not...or at least not all at once. This should be seen as more of a departure point than a destination, a focal point for meaningful dialogue and practical solutions to gravitate toward. The old adage "what you don't measure, you can't manage, and don't value" is really sound.

What can you do?

I have a very practical and customer-focussed orientation, and a lot of experience in doing what "can't be done". Talk to me...I know how to make this happen! I have thought about a lot of the issues and objections raised. Advocating the use of Smart Meters for customer benefit will help customers take charge of their electricity bills/usage. Most of what is required involves just the following;

- utilities must include information needs of customers in meter specifications,
- governments should allow a marginal increase in cost of meters to support this,
- utilities could start rollout to new customers then phase-in existing customers,
- government and utilities should provide leadership and funding for meter manufacturers to innovate further without taking large commercial risks,
- government and utilities should promote the good sense in everyone eliminating electricity waste and help customers do this with better targeted information and helpful control services, and
- we all need to be patient as we learn to make the best of the new capabilities.

This can be a reality without much cost, and could start well within a year. I am already working to this end...but it is difficult when there is no "voice for the customer" to get public attention and the support of government, utilities, media, consumers, etc.

Let's also be frank with ourselves. Utilities and governments earn income from my using energy. If I cut energy use, utility incomes fall because their revenues come from total energy sales. However, their costs are more linked to time of energy use (demand), and I presently have no time-of-use signals to encourage me to shift my discretionary load. Hence, it is understandable that there is a real fear by utilities and governments that cuts in residential energy use will not bring equivalent cuts in energy demand, so utility profits will plummet and dividends to government owners will follow. That is the common belief, but I am far from convinced. I know of at least one example where a business chasing a small percentage demand reduction got an unexpected but greater percentage energy saving. Anecdotally, the demand-related cost avoided by the utility could have been higher than the energy-related revenue lost. The relationships aren't simple! I think it is possible, with a proper formulation of the whole energy management system for residential customers, that we could get marginal revenues and marginal costs tracking better so that profit and dividend impacts on utilities and governments are less exposed by "good" energy management by customers.

I would explain in more detail if I could. However, I am employed by ENERGEX Ltd in an area closely related to this subject. I am not authorised to reveal information and am subject to confidentiality, conflict of interest, intellectual property, etc

provisions in my employment contract; it would be disloyal and risky for me to reveal details. Perhaps you could assist this? I would be happy to help.

Yours sincerely

Jeff Beal

Attachment 1: Letter to Hon Geoff Wilson (state member for Ferny Grove) and ultimately passed to the Qld. Minister for Energy. It explains some of the issues I believe are impediments to implementing plans that could assist residential electricity users cut energy waste, cut their bills and save the environment. A copy of the letter was also given to Hon Arch Bevis (federal member for Brisbane).

Attachment 2: Letter to the Editor of "The Courier Mail" urging them to take an active role in raising the public's awareness of the complex operation of the electricity industry and imploring them to take a role in building a cooperative approach between government, utilities and customers.

J N Beal
QLD

05 May 2004

The Member for Ferny Grove
The Hon Geoff Wilson MP
3/6 Nepean Ave
ARANA HILLS QLD 4054

Dear Sir

SMART METERING, TIME OF USE TARIFFS AND MEDIA REPORTING

I have followed recent media reporting about the above with much interest, and am writing this letter as one who is keenly interested in reducing my own electricity bill. Because I am also a professional engineer and metering specialist employed within the QESI, I have a sound knowledge of metering, tariff and billing issues.

What I hope to encourage is your advocating Smart Meters with electricity utilities, for customer benefit. Because you are no doubt very busy, the following summarises the key points of a more detailed letter attached.

Key Points:

- I am keenly interested in reducing my electricity bill.
- Smart Meters are a key element in achieving this.
- I am a metering engineer so am well informed about what Smart Meters can do.
- Few people outside metering groups understand the potential of Smart Meters.
- I believe I waste electricity but have no useful tools to help me monitor/reduce it.
- Utilities ignore my needs when they purchase cheap meters, for just their needs.
- Smart Meters are powerful computers and can be programmed to do more than just meter energy and display readings that are useless to me.
- I believe that Smart Meters can help me save money, help the environment and cut electricity waste right now. Side benefits for utilities are a bonus.
- I would like politicians to advocate my interests and assist electricity utilities in trialing, learning and deploying Smart Meters for customer benefit.
- Government, utilities and customers can work together to cut energy waste, help the environment and save money for everyone in the process.
- Electricity waste is much more prevalent than people think, and “good housekeeping” can eliminate much of this.
- Display of bill amounts (rising \$ like a taxi-meter), Average Daily Consumption (kilowatt-hours) and Power (kilowatts) on Smart Meters will facilitate knowledge and then waste reduction practices by customers.
- Only a limited amount of education (about grade 5 level) is required – easily delivered by utilities through bill mailouts.
- We can save \$\$\$ AND help the environment. Some people have saved 25%.
- No special skill or knowledge is needed, mostly just “turn-off, turn-down, buy better” practices. Utilities can give good advice.
- When we can easily check energy usage and our bill at the meter (at any time we choose), then we have the basic information needed to know our usage and change it if we want. This timely feedback helps reinforce good housekeeping.
- Politicians can influence utilities to include customers’ needs in their purchasing decisions. The meter is on my house, and a meter reader enters my land to take

a reading, so is it too much to ask that for just a few dollars more, the meter purchased be useable by me to help me reduce my electricity bill?

- I believe TOU tariffs will be better for me too as long as they are simple to understand and don't change too often. This benefit is on top of waste reduction.
- Many utilities around the world have tried many approaches, but I know of none trying anything like this simple, customer-focussed and integrated proposal.
- I think utilities will be supportive but unlikely to initiate it themselves given other pressing priorities and possible 'fears' that revenues (and EBIT) might plummet.

I reckon my interest in saving money is fairly universal so I commend this proposal to you. I am happy to assist further. Please telephone [telephone no removed] or email [email address removed] for further information.

Yours sincerely

Jeff Beal

ATTACHMENT - DETAILED LETTER

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05 May 2004

The Member for Ferny Grove
The Hon Geoff Wilson MP
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I have followed recent media reporting about the above with much interest, and am writing this letter as one who is keenly interested in reducing my own electricity bill. Because I am also a professional engineer and metering specialist employed within the QESI, I have a sound knowledge of metering, tariff and billing issues.

Smart Meters – Widespread Unawareness of Their Potential:

In my experience, few people outside specialist metering groups have a good appreciation of what Smart Meters are, how much they differ from other meters, and what great potential they offer. I believe there is a need for education and improved understanding so that everyone (politicians, media-persons, bureaucrats, utility managers, customers, etc) is aware of the benefits they can bring to customers and utilities alike. I could offer some help in this area.

My Personal Interest:

Just so there is no doubt, my primary interest is to cut my electricity bill. To do this;

- I need information on how much electricity I am using (whenever I want to know),
- and I want advice on what simple actions I can take to cut use,
- and I want to see the effect of my actions as soon as I take them,
- then I want to occasionally check that bad practices aren't creeping back,
- and I want to compare my use with yesterday, last month, last year, relatives, friends and neighbours.

Why? I am convinced I waste a lot of electricity, but how can I know? Brochures titled "Helpful Energy Savings Hints" are part of a solution, but not the critical part!

To better control my electricity usage, I need to...measure present use, change some behaviours, measure again, see improvement (reinforce behaviours), get lower bills.

Do you know that no electricity meter being used in Australia helps me? That things could be different with just a few simple changes to meters? Do you also know that an electricity meter manufacturer in S.E.Qld. already has meters that could help many small business customers for just a few dollars extra cost per meter, and new meters nearing release can help residential customers like me? Other manufacturers could provide similar products with just a bit of push from the electricity industry. Unfortunately, the general mindset of electricity utilities entrenches lowest cost purchasing, with utility needs solely in mind (ignoring customers' needs), and little appetite for imagined 'new technology' risk.

Smart Meters offer me a real solution. If you want to know how, read on...

What Do Existing Meters Do Now? Who Uses Them? What Do They Cost?

ATTACHMENT - DETAILED LETTER

Most existing meters on residential premises simply measure energy consumption, accumulate it and display the running total on a register on the front of the meter. Most registers are a series of dials, hard to read by untrained persons, but more recent registers look like the odometer in a car, and some even have electronic displays. In all cases, the register displays the cumulative consumption since the meter was purchased – the same way a car odometer displays cumulative distance travelled since the car was built. However, existing meters don't have an equivalent of even a trip-meter or speedometer found in every car, let alone any more useful quantities found on modern cars like fuel consumption, average speed, etc.

Utilities send meter readers to read the meter registers every three months for residential customers. The utility determines consumption over the period by subtracting the last reading from the current reading. The bill is then calculated by applying the tariff rates to the consumption.

For all practical purposes, it is only the utility that uses the meter. Most customers would find it too complex and too inconvenient to use existing meters to estimate power consumption at any point in time, or determine energy consumption and energy costs over a period of time.

This need not be so! With just a few low cost changes, Smart Meters can provide simple, useful and timely information for customers to use as they choose.

The following shows indicative costs for different meter types used at residences. Most customers actually have multiple meters and other equipment installed as well, and these costs are but part of the total metering cost.

cost of a Basic Meter	< \$35
cost of an Interval Meter	< \$70
cost of a Smart Meter	< \$90
cost of installation	< \$20 (similar for all types of meter).

Many people are surprised at the low incremental cost of Interval and Smart Meters; most expect hundreds of dollars. Industry observers also expect Interval and Smart Meter costs to tumble rapidly with volume.

In reality, the costs of the meters are a small part of the total cost for utilities to meter and bill customers (typically \$70-100 pa). This is one reason that many utilities are moving towards no longer specifying outdated Basic Meters for their main metering.

What Could Smart Meters Do? Who Would Use Them? What Would It Cost?

Smart Meters could display a few standard quantities that would help customers know how they are using electricity and how their bill is growing viz;

- Current Bill (rising \$\$\$ displayed like a taxi-meter),
- Average Daily Consumption (kilowatt-hours/day), and
- Current Power (kilowatts).

There are many other possibilities, but focussing on just these few will help education efforts. I prefer not to be too prescriptive at this time about how they are displayed, as different meter manufacturers could use different approaches.

These three quantities displayed at the meter will give customers the means to occasionally check how their bill is going, how their usage compares with previous periods or with other people, and how turning appliances on/off affects the electricity being used at any moment. Add some basic education provided by utilities, and customers become empowered to take charge of their electricity usage and bill.

ATTACHMENT - DETAILED LETTER

If the capabilities are procured at time of purchase, and setup during installation of meters, the incremental cost to support rollout of this “customer information service” could be in the order of \$10 pa. This is small compared with household electricity bills (typically greater than \$800 pa, but mine is \$1200 pa despite the fact I have gas water heating). With savings in the order of 10%-25% being experienced when customers manage their electricity use, it makes sense to provide it as standard for all new premises. Retrofits to existing premises would be more expensive (due to recovery costs of removed meters) but trials could help drive costs down.

The key point is that requirements for these items must be included in utility specifications for meters. Innovative meter manufacturers must be encouraged to spend the few extra dollars per meter to provide these features, and the features must get considered during tender evaluation. Supply of residential meters is a high volume, fiercely competitive business with contracts won on small price differences. Unless manufacturers are confident of remaining competitive, they will not make investments that increase the cost of their meters; offers of meters to utilities then drive to the lowest common denominator – utility services only, no customer services.

There are devices that perform a similar function; a recently publicised one is the ‘Cent-a-Meter’. It operates completely independently from the electricity meter. Its advantage is primarily the convenience of having a display located inside the house eg kitchen. Its principal disadvantage is that it requires an electrician to fit it, and it costs over \$100. What I am proposing is a much lower cost approach (even though a little less convenient), with a wide rollout and utility provided education campaign.

The rest of this letter provides further information in support of the proposal.

What is a Smart Meter and How Does it Differ from a Basic Meter?”

The term Smart Meter was introduced to distinguish electronic meters from electromechanical meters (the type with a spinning disk found on most houses – now called a Basic Meter). There are many differences between Smart Meters and Basic Meters. The following are a few of the key differences.

- Smart Meters can profile electricity use (a series of half-hour values showing how customers use electricity over time) whereas Basic Meters just accumulate electricity used (a running total). “Interval Meters” are Smart Meters that do nothing more than profiling; they are the cheapest/dumbest of all Smart Meters.
- Smart Meters have an easy to read digital display (generally numeric but some can display alphabet characters or special symbols like \$ signs). Most Basic Meters have displays that are difficult to read and prone to error even by experienced meter readers; they are just not friendly/useful to customers!
- Smart Meters are industrial computers, programmed to measure and record energy; they can do very much more depending on their software programming and what interfaces they have to the external world. Smart Meters is a wide category needing buyers to make careful choices about features to meet their needs. If the “buyers” are electricity utilities serving only their own interests, what chance is there of making a choice that also helps me, the customer?
- Smart Meters can also have inputs and outputs that are programmable. These allow sensing and control functions to support a range of potential services for customers eg control of customer loads like hot water systems and pool pumps.
- Smart Meters can be made with provision for future remote communications so that information can be exchanged between customers and electricity utilities to support new customer services. This is achievable through programming, and the addition of a few dollars worth of parts. The provision can be very cost effectively made at time of purchase.

ATTACHMENT - DETAILED LETTER

These are just a few of the key differences. What I have found even within my own utility employer is that engineers and managers who I talk to are usually surprised at what modern Smart Meters can do. Again... few people outside specialist metering groups know what Smart Meters can do or how they differ from Basic Meters.

My Belief:

I am convinced that Smart Meters and some basic education of customers (about fifth grade level) can **save money for electricity users, help the environment, and cut electricity waste**. The fact there will be side benefits for utilities as well is a great bonus.

What Would I Like?

"To enlist politicians' (and green groups') support for Smart Meters."

I want to help win support from politicians (and green groups) for trials of Smart Metering solutions. I would like them to engage the media, public, bureaucrats and utility managers in ways that assist deployment of Smart Metering so we can learn how best to achieve benefits for customers, the community and government. Note that I said "best" because there is no doubt in my mind that some customers will make good gains because they are motivated to do so, while others will need a bit more support to achieve worthwhile and sustainable benefits. We have to learn what is really required rather than guess at it.

The Story:

"Government, electricity utilities and customers working together, using Smart Meters, to cut energy waste, help the environment and save money."

Smart Meters can let customers know every day how much electricity they are using and how much their bill is rising as a result. Customers can decide if and how they want to respond. Isn't this a boon for those managing a budget?

This is very different to the present situation. Most customers act as if they have no control over their electricity bill. What limited feedback they get (a bill every three months, and limited information on that bill) is too late for them to respond.

By giving people daily information (to use or not use as they choose), many people will be able to take action to achieve their objectives (lower bills, lower usage to help the environment, less waste, participation in efficiency competitions, etc).

To achieve this, meters will display some quantities not previously shown;

- \$bill amount as it rises (possibly even \$ associated with yesterday's usage),
- ADC (average daily consumption in kilowatt-hours), a figure already reported and graphed on present electricity bills, and
- Power (in kilowatts).

All of these are simple to understand. The bill amount is obvious. The last two quantities are like the distance (kilometres) you drive in your car each day, and the speed (kilometres/hr) of the car at any point in time. Some simple education will help people understand how to affect these quantities.

More quantities can be displayed for those who want to manage their energy use even better. Greenhouse gas equivalents (CO₂) can also be displayed.

ATTACHMENT - DETAILED LETTER

Key Message 1: (Save \$\$\$\$ AND Help the Environment)

“Most of your bill results from multiplying your energy usage (kilowatt-hours) by the tariff rate (cents per kilowatt-hour). If you lower your kilowatt-hours, you save money! You also cause less greenhouse gases to be released into the environment.”

Reducing energy usage is not generally hard given the real waste that is presently occurring; some people have made savings in the order of 25%! Savings of this size are much greater than achievable through competition on prices alone, but the latter will ADD to any bill savings anyway, so is there no incompatibility.

Key Message 2: (No Special Skill or Knowledge is Needed)

“Your electricity utility can give a range of suggestions to help in this area, but many fall into the general category of eliminating wasted energy ie when you aren’t getting any value from it. Simple examples are turning-off computers (and modems and printers etc) overnight, turning-off incandescent lamps when no-one is using them, turning-down on-times for pool pumps during winter, turning-down thermostats on hot water systems in summer, buying better appliances when they need to be replaced eg Star-Rated appliances and compact fluorescent lights.”

There are many sources of simple information that explain how and why various methods reduce energy, and how other non-electricity measures can also have big effects eg replacing tap washers on dripping hot water taps, installing efficient shower heads, installing roof insulation or ceiling ventilation, etc.

Key Message 3: (Manage Electricity Usage using Low-Cost, Convenient and Timely Measures of Usage)

“The key to reducing energy usage is to know how much you are using now, and see what happens when you change some simple things like those mentioned above. Smart Meters can be programmed to display the current bill amount (\$), Average Daily Consumption (kilowatt-hours per day), and Power (kilowatts). This can be provided at the meter for just a few dollars per year. After a short initial learning period, you only need to check occasionally to make sure waste isn’t creeping back.”

Customers can check which appliances are “energy guzzlers” by noting what happens to Power when they turn appliances on and off. This helps identify those few appliances where minimising their “on-time” keeps total energy use down. For example, a Power of 1.2 kW that jumps to 2.3 kW when a pool pump is turned on shows how important it is to run the pump for the fewest hours necessary each day. Likewise, the Average Daily Consumption that was 16 kWh during Autumn, then rises steadily to 20 kWh during early Winter could indicate electric heaters are being left on, or hot showers are being had for longer times.

Average Daily Consumption shows the effect of all appliances in the household using energy over a day. Lowering this number directly lowers bills!

Even though I am a professional metering engineer, I too have difficulty knowing how my electricity usage is going, and where the opportunities are for saving money. My friends, relatives and even metering colleagues all experience the same problems. Using the Basic Meter on my residence to monitor usage is clumsy and inconvenient. With the simple quantities mentioned above, just a small amount of education and some occasional reinforcement (publicity campaigns), all customers can be empowered to take charge of their electricity consumption, and reduce bills even with existing tariff structures. The secret is timely feedback on usage, and education. Imagine driving your car without a speedometer, or driving blind, yet present approaches require electricity customers to do exactly this!

ATTACHMENT - DETAILED LETTER

What Can You Do?

Meters are generally purchased only with the electricity utility's benefit in mind ie recording accumulated consumption and displaying it on the meter for reading by the utility's meter readers. I would like you to challenge utilities to take account of customers' needs more (I have a strong motive to save on my own electricity bill and I reckon this is fairly universal). With minor program changes and slightly better displays that can show alphabetic characters (rather than just numbers), Smart Meters could display quantities that are actually useful for customers.

What is needed is for governments, utilities, manufacturers and customers to come together, articulating the motive and encouraging the means for all customers to better use energy without reducing either the quantity or quality of services that people want. The fact that the environment is helped as a byproduct makes this simply "a good thing to do!"

The technology is available. The market exists (even if not recognised consciously). What is required to start the process is some slight redirection of utilities' mindsets and some support for marginal increase in spending to ensure Smart Meters with appropriate capabilities are used instead of present Basic Meters.

Interestingly, nobody installing so-called Smart Meters has been doing this! In fact, the Interval Meters being installed around the world by some utilities might as well still be lumped with Basic Meters for all the real value they deliver to customers.

Time of Use (TOU) Tariffs:

I haven't said much about time-of use tariffs. These are an important part of an integrated approach with Demand Side Management initiatives (and Smart Metering) for customer benefit, not just utility benefit as many people mistakenly believe. Tariffs are a more complex and potentially contentious area that needs constructive debate. My belief (and one shared almost uniformly in the metering community) is that TOU tariffs are practical, cost effective, and equitable ways to provide incentives for all customers to reduce their electricity bills. I still hope that the fear and self-interest that seems to pervade many discussions might yet fade.

Alternative Proposals:

I have watched for years the efforts of organisations as they have implemented part solutions for utility-based reasons. Part solutions are like giving a car to a person unable to drive. Likewise, utility-based solutions win little support from customers who must take actions to achieve the desired benefits, without getting any benefits themselves. It is my belief that with strong customer focus and integrated efforts, we (government, utilities and customers) can achieve worthwhile outcomes for all by focussing efforts on reducing waste of electricity in end uses.

If You Want More Information:

Please contact me by telephone 0419 657 041 or email jb007@energex.com.au. I would be happy to help. I believe this is a big positive step that can be taken by electricity utilities and government to promote "good" for everyone.

I have written this as a private individual because I generally find it hard to get attention from influential people in my organisation; they have many pressing matters that already command their attention, and their 'minders' do a good job in helping them keep focus on those matters. Nevertheless, I am pressing where I can to have

ATTACHMENT - DETAILED LETTER

the message and potential solutions heard; it is just frustrating and slow. I certainly intend no disloyalty to my organisation or government. I just seek better customer outcomes.

Your help could prove pivotal!

Yours sincerely

Jeff Beal

Jeffrey Beal
QLD

29 November 2004

The Editor
The Courier Mail
GPO Box 130
BRISBANE 4001

Dear Sir

Electricity Customers' Needs Lost Among the Headlines

In all the reporting about Energex's management and the state of its network, I reckon electricity customers' needs have been lost among the headlines.

Sure I want the lights on, but I also want to cut my electricity bill, cut my energy waste and save the planet. Could the Courier Mail, Energex and government cooperate to chase these goals?

Most householders have no idea what it takes to keep the power on behind the wall socket, nor have much idea how to cut their energy waste and their electricity bills. Education is essential. Getting the message out is a challenge. Potential loss of revenue frightens both Energex and the government.

The Courier Mail has wide reach and could be part of a solution. Champion householders' interests! Teach us what is really involved in getting electricity to our homes, how costs are incurred, and foster raised awareness of our energy usage.

Energex and government, "Ask us, help us, reward us for eliminating energy waste!" Many of us want to help, to be part of a solution, to waste less energy. We know this is worth doing. But we are forgotten while "headlines" distract everyone with blame, and constructive debate is hijacked by words that frighten us like tariffs.

Let's pursue some balance, positive stories, inclusive roles, something we can all go after – waste elimination.

Yours sincerely

Jeff Beal (Ph:[tel no removed])

PS: The attached pages implore The Courier Mail to take an active role in moving the government, Energex and electricity customers towards "waste elimination" [energy conservation and energy efficiency]. Specifically, a series of articles to raise awareness and understanding of real electricity industry issues, stripped of the politicking and economics that is hindering progress.

Please consider.

Who am I?

I am an electricity customer but not your typical electricity customer. I am also a long-standing relatively senior professional engineer and manager within Energex. I have considerable knowledge about how electricity utilities operate, what is practical and what is possible. I am also covered by an Executive Contract with explicit confidentiality, intellectual property and conflict of interest restraints. For these reasons, I almost didn't send this letter. What I have to say, if attributed to me, could be very damaging to my employment. I fear I am already suffering as a result of a letter I sent earlier this year to my state MP (Mr Geoff Wilson) who subsequently passed it to the Minister for Energy. This resulted in my participation in a meeting chaired by Mr Geoff Wilson and attended by senior Dept of Energy officials and minders for the Minister for Energy. As you will no doubt understand, Energex has some reason to be less than happy with me already.

Have I got your attention? Then there are a few riders I will place on what follows. I intend no disloyalty to Energex, nor do I intend to breach my Contract of Employment. So I can not and will not provide confidential information. Instead, I will take the stance of a particularly well informed electricity customer who is looking after my own best interests (as an electricity customer), even though this could conflict with Energex and government interests in some areas. What I hope to do is direct your attention to certain areas that I believe need exposure (not an expose), and promote a role for the Courier Mail in leading government and Energex out of the current morass in which they seem to be mired.

If it will help to have a copy of the letter mentioned previously, please contact me and we can discuss my making it available to you.

What is my concern?

There are so many muddled issues being directly or indirectly referred to in the media at present that I genuinely believe that **customers' needs have been lost among the headlines**; I have attached a letter to the editor that you may choose to publish, or not. Some of what is being reported is just plain wrong. Most of what is being reported sounds plausible, but is still substantially wrong or simply irrelevant to constructive discourse. Too little that is being reported is right and on point. The result is that issues that need to be seriously considered are being hijacked, and attention is being seriously distracted. I have watched helplessly and with enormous frustration as supposedly knowledgeable leaders continue to rule out possible solutions to the problems facing the electricity industry, and create in the process an ever-increasing straitjacket for utility professionals to operate within.

Let's get our heads out of the sand! We first have to start by rebuilding trust between the community and Energex and government through **candidly and openly discussing real issues**. An important question for me then is - who champions householders' interests? Who represents me to Energex and government? Who promotes my needs? I don't know. If there is someone responsible already, they should be sacked because I reckon I am getting a lousy deal at present. I am also not interested in "pretend solutions" like Full Retail Contestability, something that is popular with many regulators (the "choice is good" adherents).

Lets start by educating everyone about how the electricity industry really works, so there might be some awareness, understanding and tolerance for some unpalatable options, rather than simple, comforting but ultimately unproductive rejection of workable solutions. Who knows, there might even arise some genuinely creative solutions. At present, debate is effectively stifled because **most people have no idea what it takes to keep power on behind the wall socket**. This is an observation made in a 2003 EPRI document titled "Electricity Sector Framework for the Future". EPRI is the peak R&D body for the electricity industry in the USA and its report was produced after extensive consultation with more than 200 stakeholder groups across all areas of government, industry, academia, utilities, suppliers, customers, bankers, etc. The EPRI document is a mammoth work so I will quote just a few key points [with my comments in brackets] to illustrate some of their conclusions;

Electricity is a service enterprise relying on the world's most technically complex and precise infrastructure. [Maybe professional engineers and managers should have more say in decisions?]

Electricity has unique characteristics like - it can't be practically stored in any quantity, it flows according to the laws of physics not contracts, it travels at the speed of light and cannot respond to busy signals, and its delivery over networks involves complex and instantaneous functionality.

[Too many people pursue pretend solutions that may be politically or economically acceptable but do little to address real underlying problems.]

It was repeatedly underscored by many stakeholders that successful progress in the electricity sector depends on concerted leadership from the industry itself, with a compelling vision and action plan around which stakeholders can coalesce, and which bipartisan public policy advocates can promote from their “bully pulpits”. [Doesn't this seem a long way from where we are at present?]

If you want my summarised version of the EPRI document, I can make it available. I can point you to a lot of other public material as well, and give an experienced professional's comment about most of it.

Why am I telling you this?

In simple terms, because neither Energex nor the government is telling us, (for whatever reasons). It is really important that customers have their awareness and understanding raised (at least temporarily), so that the industry rebuilds trust and regains respect. Only then can trained, experienced utility professionals get on with the job of finding and implementing solutions to real problems, even if some turn out to be a bit uncomfortable. [Aside: My personal view is that things are not nearly as dire as some would have us believe, but we have to get moving on solving the real problems before they do get really dire.] A difficult example, air-conditioning, illustrates an important point. Some media reporting would have people believe that utilities want to turn off customers' air-conditioners on the very hottest day in summer. This gets everyone's ire up. In truth, I don't think any utility engineer wants to do this at all, BUT as professional managers they have a duty to explore alternatives to massive network building programmes lest they be accused of gold-plating and taking a low-risk path. Sadly, the anger hijacks our thinking and the very reasonable question “Why do you want to do this?” never gets asked, let alone a reasonable answer heard.

What can The Courier Mail do?

You have reach to very many electricity customers. You have a degree of independence that neither Energex nor the government will be granted at present without appearing reactive and defensive. You also have professional reporters to convert the information to a readily readable, even entertaining form to draw and hold interest. You have an ability to create an agenda to lead government, utilities and customers down a more considered, sustainable and ultimately better path.

What sort of education would be helpful?

The kinds of education I am proposing cross a broad spectrum.

- Tell people about how electricity is made and delivered and used and who has what roles.
- Tell people about where all the assets lie, without ignoring their own investments in household wiring and electrical appliances (which accounts for probably more than all generation, transmission and distribution assets combined).
- Tell people about energy units like the kilowatt-hour; it sounds like a small thing and is charged at only about 12 cents, yet it has the energy equivalent to a one tonne car being crashed from about 300 kph, or lifting a 100kg person 3600 m into the air.
- Tell people about how wires and transformers have physical current ratings so loads must be kept within limits to prevent the lines from melting, or sagging down to unsafe levels.
- Tell people about how these ratings are effected by weather eg reduced on hot days, and how time lags make these limitations persist even after the sun goes down.
- Tell people about how electrical energy is now bought and sold in markets where supply and demand factors (sometimes not even in QLD) can cause prices to jump 100 to 200 times from just a few cents per kilowatt-hour to \$10.00 per kilowatt-hour, and tell them how the utility has to manage a very complex set of financial transactions to insulate customers from these price spikes.
- Tell people about how the cost of electricity varies over the time of day, day of week, season of year and varies with weather and other factors.
- Tell people about how present tariffs work and why the simple averaged tariffs that were workable in the past (when usage patterns were fairly stable) are becoming unworkable as load patterns change substantially with customer takeup of new appliances.
- Tell people about how Energex has controlled customers' hot water loads for 50 years and how this is an essential tool for keeping loads within network ratings, and responding fast to price spikes.

- Tell people about how implementing some ‘green policies’ like solar and gas hot water are serving a green agenda but reducing utilities’ abilities to manage load, further adding to the ‘build more network’ pressures.
- Tell people about the limitations of solar power and wind power and all the other fashionable green sources of energy.
- Tell people about what big business is doing with smart metering and load control technologies and how rapid advances in technology are bringing some of these same benefits to householders and small businesses.
- Tell people about what they can do to manage their own electricity bill and reduce the energy waste that is probably the largest growth industry in this State, and how a bit saved at the end of the line eases pressure all along the system.
- Tell them about how the pursuit of energy conservation and energy efficiency in end uses is a necessity if many of the emerging technologies eg photovoltaics and fuel cells, are to have any chance of affordable rollout in the foreseeable future.
- Tell people about how ‘keeping the lights on’ is just one measure of performance for utility managers, and how the electricity networks have to deliver other services and standards as well eg clean power.
- Tell people about tariff equalisation policy and community service obligations and other performance criteria.
- Tell people about how electricity customers are a large market with different segments and different needs eg some want comfort at any cost whereas others want to budget their spending.
- Tell people how the “battlers” who can’t afford air-conditioners are subsidising those who can afford them, and how average tariffs that distort the true costs of providing service can be quite inequitable.

Enough?

Can we cooperate for the good of all?

The business of running an electricity industry is really complex and highly inter-related. I know this, but I am an aware customer, so I want to promote things that are both good for me and good for all. I think this can be done. What we need to do is encourage a cooperative approach from all concerned. Acting together, we are all better off, even if none of us gets the absolute best result. Recall the scene in the movie “A Beautiful Mind” where Russell Crowe shows how he and his friends are all better off by chasing the four pretty girls rather than all competing for the one stunningly attractive girl? It’s the same principle.

Will you accept the challenge?

You can play a key role, lead the government and Energex out of the wilderness of the present standoff, division and damage. Champion the cause of the householder. Provide a conduit for information from government and utilities; mend bridges. I detect a better desire to do this now than at any time in the last decade. Build a movement centred on “waste elimination” [energy conservation and its little brother energy efficiency] because this is politically neutral and it is hard to justify energy waste in any form. Let people know that success will hurt utilities and government in the short term, mainly through lower revenues, and probably cause some heartache for utility engineers, but it is simply a good thing to pursue and worthy of everyone’s effort.

How about it? A series of articles perhaps? I am prepared to assist, and I am sure that once going there could be a lot more assistance provided from the utilities and government. What a wonderful Christmas gift to Queenslanders!

PS: I don’t want to get into trouble with my employer Energex, but I reckon my interests as an electricity customer could be served much better in both the short and long term if someone champions my interests and facilitates cooperative action and education as a first step in helping me cut electricity waste, cut my electricity bill and help the environment as well. I have specific ideas about how to do that if you are interested.

Jeff Beal
[tel no removed]