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SUBMISSION

Cost benefit analysis of smart metering and direct load control

Phase 2 Reports

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Phase 2 Reports

1. Introduction

1.1 Smart metering CBA

Total Environment Centre (TEC) welcomes another opportunity for input to the smart metering/DLC analysis, and we refer to our previous communications on the subject.

TEC's primary concern is that in its current form the CBA aims to capture only modest greenhouse emissions reductions. In doing so, it falls short of enabling the far greater emissions reduction gains that are available with the use of the right technologies, tariffs and demand management incentives. We are also concerned that the carbon pricing models used in Phase 2 are based on very conservative scenarios which do not reflect the prices expected under the Emissions Trading Scheme which is to commence in 2010.

We also strongly believe that further trials are essential. In particular, we recommend that a 10% target for overall reduction of (average, base-load) consumption is adopted and trials are developed and carried out to ascertain the best route to achieve this.

We also believe that trials are need to test the conclusions to date, in particular regarding variations between jurisdictions and government policies required to maximise the benefits and ensure protection of consumers. We support the recommendation from the WA Council of Social Services that, "the goals of smart meter implementation be better defined and articulated, so as to provide a benchmark against which other options may be judged." (Phase 2 Submission, p. 5) This is of relevance not only for consumer impacts but also for optimising potential greenhouse benefits, since the stated objectives for the rollout are so far do not match the consultants' recommendations. The proposal for the establishment of working groups to continue the process has not yet clearly articulated procedures for reviews.

We also note that the investigation so far has been limited to residential consumers. Considering that commercial and industrial users consume more electricity as a proportion of the total, we urge the MCE to initiate a similar investigation regarding these users. To only apply smart metering to residential customers represents a lost opportunity to maximise greenhouse benefits.

The reports for Phase 2, which incorporate further research and analysis, have not substantially affected our position on the requirements for such a rollout. TEC is still primarily interested in the potential for reduction in emissions of greenhouse gases due to the over-consumption of fossil fuel generated electricity. The main change in the consultants' position is that a Home Area Network (HAN) should be included in the minimum functionality, which we support because of the extra features that would allow.

1.2 Greenhouse benefits

The results of the CBA indicate there are probable benefits for electricity businesses from a distributor-led rollout of smart meters of the minimum functionality. This should lead to increased efficiency arising from a variety of factors, and therefore a reduction in electricity demand with consequent reductions in greenhouse emissions. What is not clear is the degree of these potential reductions. Nonetheless, a more efficient system with greater certainty for demand forecasting and a probable benefit of reduction in emissions is a worthwhile endeavour.

TEC's concern, however, is the maximisation of greenhouse benefits from the rollout, which relies on the inclusion of specific features, since otherwise there are only modest emissions reductions to be gained. If managed properly, smart metering may form an effective part of a suite of programs and policies to address the reduction of greenhouse gas emissions. It is also worth noting that the carbon pricing models in Phase 2 are based on conservative scenarios. It is clear from the reports and experience elsewhere that maximum greenhouse benefits rely on:

- Adequate and ongoing promotion of the programs
- Adequate and ongoing consumer education
- Adequate provision of information to consumers about prices, carbon costs, emissions and consumption rates
- A range of time of use tariffs being offered by retailers
- The facility for remote cycling or shutting down of home appliances, such as air conditioning and pool pumps; this area too has had little investigation here, with most of the focus being on air conditioning units and most of the testing being done in South Australia.
- Promotion of embedded generation – generation based on non-fossil fuels is clearly going to give greenhouse benefits, and this has not been seriously grappled with in this CBA. As a first step, at least the facility for import-export metering has been included in the minimum functionality.

Some of these points rely on specific features being included in the functions, in particular a home area network (HAN), direct load control (DLC) features, in-home displays (IHDs), and dual elements for measuring generation. We address these below, as well as the question of demand response.

2. Home area network

TEC supports the consultants' recommendation for the inclusion of an interface with a HAN for each meter. Maximising greenhouse benefits is dependent on additional features above the smart meter alone – such as DLC and/or provision of IHDs – and for these, inclusion of a HAN is essential. A HAN does not in itself allow communication between the meter and attached appliances or an IHD; it is, however, a prerequisite for that communication to occur. Including a HAN in the minimum functionality at least gives the capacity for such communication in the future. The costs of retrofitting a HAN to customers who wish to install an IHD or participate in DLC could be prohibitive and it makes business sense to install them in the beginning, considering it appears to be a small extra cost. Future government policies in response to climate change imperatives

are likely to favour and/or promote these functions and it would be a mistake to miss the opportunity to allow for this facility from the beginning.

NERA notes that this feature has a positive net benefit even at the low end of the estimates, with a low demand response plus DLC capability. With a high demand response plus inclusion of an IHD the benefit was positive.

3. Direct load control

Meters – whether smart or otherwise – are not prerequisites for DLC. It depends on the appliance (air conditioners, pool pumps etc) having the functionality for remote communication of some kind. South Australia has been trialling DLC as a tool for demand management, with some success. It is interesting, however, to note that **reductions in consumption are substantially increased if there is a smart meter in the equation** as well. Where there is no smart meter, the overall benefit from DLC only is lower, because there are no price signal or conservation impacts. It may be a cost-effective solution but does not adequately address climate change concerns.

4. In-home displays

It is clear from the many trials here and elsewhere that IHDs are a primary necessity for maximising consumer information and greenhouse benefits. Without IHDs the meters are not particularly smart and only offer the potential to deliver incidental greenhouse gas reductions. An IHD is so far the only genuine avenue for consumers to receive information on their usage and impacts – a meter sitting outside a residence with no internal communication will give them minimal extra information since they will still be dependent on the three monthly accounts from the retailer. This gives no direct feedback about real-time consumption.

If COAG and the MCE are serious about the smart meter rollout bringing about reductions in electricity consumption[1], then a way around this problem must be found. TEC accepts that IHDs will add to the costs of such a rollout, and although there is purported uncertainty around how much greenhouse benefit IHDs would deliver, EFA's report for TEC, **Advanced Metering for Energy Supply in Australia**, shows that average energy use – and base-load emissions – could be reduced by up to 10%, which is equivalent to 19 million tonnes of greenhouse gas emissions per year. If this reduction was achieved, it would reduce Australia's total emissions by 3.5%. The more conservative estimate based on EFA's report was a 4% reduction in average energy use, but maximising any benefits depends on installing IHDs.

At this stage, if the consultants' recommendations are followed, there will be no consequent rollout of IHDs within the general smart meter rollout. If this is the case then other routes for installation must be pursued if COAG and the MCE wish to meet the goal of users being able to manage their demand. Time of use tariffs will not succeed in this respect on their own, and in any case there is no indication that these tariffs will be

[1] As is stated in the recent Regulatory Impact Statement: "The initial driver for investigating smart meters was to reduce demand." (RIS p. 29) and COAG's goal was, "to allow the introduction of time of day pricing and to allow users to better manage their demand for peak power …" (RIS p. 11)

mandated nationally; it is even unclear whether they will be mandated at a jurisdictional level. Therefore there is no certainty that retailers will pass them through to consumers.

5. Import/export metering

TEC is pleased that the facility for metering net import or export has been included in the minimum functionality for meters. A number of jurisdictions are looking at feed-in tariffs for on-site generation (or co-generation). While some of these are leaning towards net measurement, others (for example, the ACT) are considering payment for gross production of renewable energy. TEC strongly supports the facility for tariffs to support renewable energy production, and notes that it should refer to the gross amount generated at the site.

Unfortunately, the minimum functionality only refers to the net figures, and we are disappointed that there has clearly been no proper consideration of the potential for the meters to measure gross production. It is obvious that a different meter could be installed on sites where gross production is to be measured (that is, a meter with two elements) and members of the MCE have responded to communications from us in that vein; that is, the rollout does not prevent installation of gross measurement meters where required. This is a flimsy argument, since clearly a standard meter may be installed at every household which would then require replacement by a dual-element meter; and who would pay for the new meter? This would become yet another barrier to distributed generation, adding to the many that the MCE is already attempting to reduce. TEC urges that this question be more closely examined in the light of complementary climate change policies.

6. Demand response

The degree of greenhouse benefits, apart from those relating to a more efficient system, clearly rely on the extent of demand response, that is, changes in consumers' consumption of electricity in response to information on prices and/or environmental impacts. A number of factors affect this: the "conservation effect" as the consultants have called it (they have allocated a 3% loading for this) where people reduce consumption overall, not only in peak periods, specifically to address climate change and pollution concerns; the amount and kind of information consumers are provided with; price signals; and consumers' financial priorities.

There are discussions of the degree of response that could be expected under various scenarios within a smart meter rollout, and Australian and international trials have been canvassed for results in the hope that this degree could be quantified. EFA/TEC's report[2] gave a potential of 4-10% overall reduction in consumption, but figures from other reports and trials vary. It is clear that before the "conservation effect" is written off, with the effect that the importance of IHD's is minimised, more trials are necessary across Australia to pick up local variations.

We support a recommendation from the St Vincent de Paul Society and the Consumer Utilities Advocacy Centre (Phase 2 Submission, p. 4) that the MCE should: "put in place

[2] Energy Futures Australia (2007) *Advanced Metering for Energy Supply in Australia*, Total Environment Centre.

milestones that allow for review and update of the modelling as relevant information becomes available to market participants …", which would assist their recommendation that, "a formal process for review be developed and articulated to further inform the cost benefit analysis." However, once second best technologies are installed, for example, not-so-smart meters without IHDs, such reviews will be too late. We therefore recommend that a 10% target for overall reduction of consumption is adopted and trials are developed and carried out to ascertain the best route to achieve this.

As regards critical peak pricing, apparently there was minimal interest shown within the focus groups about this. It should be noted that the focus groups represent a small sample of the population, and the main purpose of focus groups is to highlight trends within a population but not quantification of those trends. This finding is unreliable, and we point to the increasing take-up of GreenPower that may not have been predicted from focus groups. As of December 2007 there were over 724,000 business and residential GreenPower customers across Australia[3], which represents a substantial increase over the previous year, and this trend is more than likely to continue. There are many consumers who are deeply concerned about environmental impacts and are willing to pay a higher price for their electricity, in particular to counter dangerous climate change. Our point is that the findings of this CBA are not in fact a good indicator of how deeply the conservation effect may bite, particularly over time.

There is also a fundamental flaw in most of the discussions about time of use tariffs, that is, that their sole purpose is to encourage load shifting in the form of knee-jerk responses to peak pricing. By virtue of being a vehicle of informing customers about the fluctuations in electricity price, they may also encourage load reduction. Just as there is variable evidence in the Australian trials that load reduction will occur, there is similarly variable evidence that it will not occur. The virtue of an IHD is that it can inform a customer not only about prices (to which demand may be relatively inelastic) but also about carbon costs and greenhouse emissions, which may elicit more interest and, potentially, a much larger response. So far discussion in this process has centred around simple flat, off peak, shoulder and critical peak tariffs, but other countries have found a range of designs for these tariffs.

Some low-income earners in the focus groups also suggested that TOU tariffs could assist them to reduce their bills further as such tariffs would give them more control over their total costs. For those unable to purchase more efficient appliances or better insulate their homes, for instance, by receiving information on their actual patterns of use they are given greater control over their consumption. Demand response is also likely to increase over time, as electricity prices continue to rise and as people deliberately select better replacement appliances and so on. Ideally schemes for appliance replacement or insulation upgrades will be established and existing schemes expanded, but smart meters can be a useful adjunct if promoted adequately.

Concern for the environment has rated highly in innumerable polls across Australia for many years – electricity consumption is not solely about peaks and prices. We agree with NERA that there must be a proper education program about smart meters and tariff

[3] From the *National GreenPower Quarterly Status Report, December 2007.*

structures, particularly on the potential for ameliorating dangerous climate change. All the evidence suggests that greenhouse gas reductions will be facilitated by consumers being properly informed of the potential for reducing environmental impact.

As NERA points out in the Overview report, to enhance demand response the future policy framework should include: “designing education programs about the introduction of smart metering and associated innovative tariff products …” (p. 205), and, “any mandatory rollout of smart meters [should] be accompanied by an education and information program targeting energy efficiency. For environmental benefit purposes there will need to be an ongoing information program …” (p. 206).