Wholesale Demand Response Options

EnergyAustralia Network broadly supports the Discussion Paper's proposed policy directions in the area of wholesale demand response options. However, this support is contingent on avoiding options that undermine existing initiatives in the area of retail and network product development. It is also critical that any new initiatives adequately compensate Local Network Service Providers (LNSPs) for lost revenues due to centralised or third party demand response activity.

International Demand Response Lessons

Two successful examples of wholesale demand response programs that the Working Group may want to consider operate in the US states of New York and Georgia. Both programs are centrally administered, and feature well defined participation parameters. In particular, both programs feature a day-ahead and hour-ahead price signal and commitment period that aligns with wholesale market operations. It is worth mentioning that the success of both programs was dependant on prevailing wholesale market behaviour; low prices and volatility led to low interest in demand response.

Australian Wholesale Market Issues

Australia's gross pool market framework, with its companion contract market, and particular price behaviour present significant structural challenges to launching a successful demand response program along the lines of international pioneers. Studies have shown that customer demand response capability is driven by predictable pricing patterns, and that Australian wholesale energy pricing patterns will make developing any demand response program a challenge under current arrangements.[2]

One Canadian academic went so far as to say,

> "Australian power markets have erratic pricing patterns and very high volatility that is not related to load or weather; the markets show high variation from year to year and season to season. Planned demand side management would be difficult to impossible to achieve in these markets."[3]

Cross-purpose price signals from the National Electricity Market (NEM) is one of the main reasons behind EA Network's pursuit of an exemption to the NSW M.O.R. 3 – requiring interval data to be settled in the market – during the rollout of meters to our network customers. To the degree that prices and system load do not correlate, it will be difficult to integrate wholesale and network demand management and pricing objectives.

While the discussion paper makes mention of the "ability to capture the economic benefits of reducing load during high price events and network congestion" it should be noted that the value of user participation is more generally available for high price events than for network constraints.

Network versus Market Response

The demand participation paper focuses on the effect of demand participation on the wholesale pool price. In order to be of value to networks, a demand side aggregation facility would have to be targeted at deferring specific CAPEX. It should also be recognised that the benefits available from the user side would be only temporary in nature, generally resulting in a deferral rather than a permanent avoidance of CAPEX.

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[2] Y.Li and P.C. Flynn, "Deregulated Power Prices: Changes Over Time", University of Alberta Study, 2004

[3] Ibid, page 7

Investing in Demand Capacity

EnergyAustralia is committed to developing and encouraging cost-effective demand management initiatives which address environmental, network and retail market driven requirements.

EnergyAustralia's commitment is demonstrated through:

- Reorganisation of network planning and capital governance processes;
- New pricing and tariff initiatives;
- Roll out of interval meters to selected residential and commercial customers;
- Initiating and supporting projects under the NSW Greenhouse Abatement Scheme;
- Providing information and conducting investigation on network constraints and demand management opportunities;
- Conducting "Learn by Doing" initiatives to test the viability of Demand Management (DM) options and barriers to their implementation.

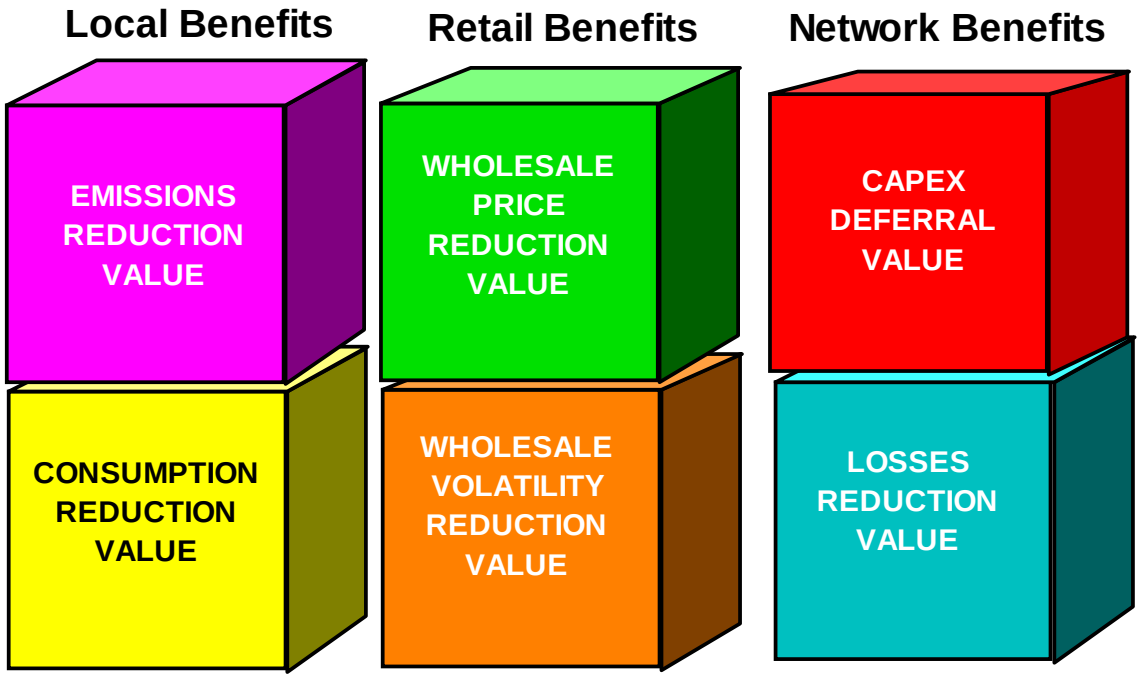
One option under consideration for development is a trial of air conditioning cycling, similar to those in operation in the USA, which could potentially remotely operate air conditioning compressors and shut them down for short periods during demand peaks.

Interval Meters

EA Network is encouraged by the Working Group's interest in exploring the costs, benefits and obstacles of widespread adoption of interval metering. While EnergyAustralia has recognised the importance and benefits of interval metering, industry feedback suggests that many view the forces unleashed by interval metering as a Sword of Damocles, which threatens to overwhelm all stakeholders. As such, Energy Australia urges national policymakers to ease this complex but necessary demand side reform by recognising and allowing for required investment costs in people, processes and technology.

Interval meters represent the foundation of the as yet unfinished demand side of the electricity market reforms which were commenced over a decade ago. They will ultimately provide the necessary retail market infrastructure for achieving a range of industry and policy objectives such as Full Retail Competition (FRC), congestion pricing, demand management, increased efficiency and enhanced competition. However, the range of potential benefits these retail market developments represent are decentralised across the entire NEM value chain (see Figure 1), meaning there is little hope for an economically efficient level of ad-hoc investment. Without appropriate regulatory encouragement, insufficient investment in interval metering is likely to occur, requiring significant unnecessary supply side investment.

Figure 1
Decentralised Benefits
Undermine Economically Efficient Outcomes



Making the Case

Unchecked peak demand growth patterns driven by increasing penetration of air-conditioning load represents a significant challenge to the National Electricity Market's (NEM) near-term reliability and longer-term security of supply. Evidence for this can be seen in the electricity and network shortages linked to increasing air-conditioner demand that have already struck Western Australia, South Australia and Queensland in 2004. Meeting expected future load growth exclusively through supply side measures is expected to cost over 30 billion dollars over the next 10 years alone[4].

Calls for Further Study

A much-mentioned alternative to this possible future is predicated on demand side alternatives to ever-increasing investments in network and generation. Yet despite overwhelming international evidence in support of cost-reflective pricing and the interval meters that support it, most calls for demand-side solutions accept that more Australian-based research is still needed prior to a widespread meter rollout.[5] Ironically, companies like EA Network who are leading Australia into the next phase of market reform are faced with sceptical stakeholders who resist investing in interval metering systems and interfaces on such a limited basis. Another related issue is the economies of scale necessary to bring down the costs of interval meters. Interval meter costs will remain relatively high until a significant rollout occurs.

Problems with Piecemeal

The integrated nature of producing and delivering electricity to end users, from wholesale and risk management on through to Networks and Retailing, means that significant change in any single area can generate upstream and downstream costs. Many considerations of interval metering projects are limited to the immediate costs of equipment and labour; but this is probably only a fraction of the total

[4] ESAA Press Release 14 November 2003

[5] References to selected reports are attached as Appendix I

cost to the industry. The more limited the initial interval meter rollout, the smaller the scope for allocating the associated overheads, and the less likely the project will be able to realise a net present value. Allowances for these investments in the regulated standard offer will help industry preparation and acceptance of interval meters.

Significant Barriers Exist

In the brief section allotted, the Discussion Paper does an admirable job of touching on some of the major issues stymieing wider penetration of interval capable meters. Based on its own experience rolling out interval meters to around 28,000 network customers consuming 40-160MWh per annum, EnergyAustralia has identified a more comprehensive set of obstacles in Table 2. If the Working Group proceeds with another interval metering study, EnergyAustralia recommends that resolving these issues on a national basis be explicitly included in the scope of work.

Table 2
Significant Barriers Facing Interval Metering

Project Barriers	Regulatory Barriers	Institutional Barriers
Decentralised Benefits	Side-Constraints	Data Deluge
Metering Rights	Uncertainty	Increased Complexity
End-User Education	Recovery Period	Price/Load Mismatch
Facilitation Costs	Foregone Sales	Increased Competition
	Investment Headroom	Low Retail Margins
	Tariff Approval	

Positive Reinforcement Possible

EnergyAustralia expects the rollout of interval meters and cost-reflective pricing to the most advantaged customer segment will leave the remaining customers relatively worse off. This in turn will increase the pressure on the remaining customers to move away from settling on the net system load profile (NSLP). A relatively more expensive starting point will bolster the case for moving the second and subsequent groups away from profiling. Furthermore, systems and process investment costs sunk from the first group will reduce the marginal costs on the second and subsequent segments. As long as operational and public relations issues are handled appropriately, this process could continue until only the most peaky, expensive to serve, or small customer segments remain.

Catering for Social Objectives

Interval metering supports cost-reflective pricing that will untangle the web of existing cross subsidies. While strongly supporting community service obligations protecting our most vulnerable customers, EnergyAustralia believes these are best provided through explicit payments and not as part of general pricing policies, where they can have a market distorting effect and limit the ability of networks and retailers to effect tariff reform. EnergyAustralia therefore supports the Working Group's efforts to identify and mitigate the impact of unwinding existing cross-subsidies in the profiled market.

Although there is still much work to be done, preliminary results from analysis undertaken from sample meters indicate that around 80% of customers in NSW consuming less than 15MWh per annum would be better off under the EnergyAustralia time-of-use network price if they did not change their behaviour at all. A comprehensive pricing strategy is being put into place by EnergyAustralia to ensure that prices for remaining 20% of customers will be gradually adjusted. Further study will be undertaken to identify the main drivers of disadvantage under cost reflective pricing.

While EnergyAustralia takes great care in the design of its network tariffs to avoid unintended consequences, there is always a risk, in any reform such as this, that some customers may be disadvantaged by the move to cost reflective tariffs. EnergyAustralia supports the concept that the most vulnerable members of our society should be protected; however, EnergyAustralia is strongly of the view that this support should come from Government, acting in its role as Government, rather than from the electricity distribution (or retail) business.

Invest in No Regrets Options

EnergyAustralia cautions against locking industry into a particular technology by setting restrictive conditions on the rollout of interval meters. For example, using slightly less expensive time-of-use meters could be more costly in the long run due to expensive reprogramming costs, and will certainly reduce industry flexibility when reacting to shifting consumption patterns. The meters EnergyAustralia has selected as part of its rollout to customers between 40-160MWh per annum must be read manually, but contain ports that will allow them to be remotely read when it becomes economical. Regulators should encourage flexible technology solutions wherever possible even if they are slightly more costly.

The Discussion Paper broaches the idea that low cost remote control technology may provide the market with a relatively predictable load response similar to NSW's offpeak controlled load hot water system. While there has been little interest from energy intensive appliance manufacturers to date, EnergyAustralia believes that establishing more cost reflective prices on the back of interval meters will provide the economic opportunity for technological innovation in this area. EnergyAustralia currently supports innovative technological solutions with discounted tariffs, pilot projects and dedicated staff.

Energy efficiency measures, usually driven by environmental requirements, also have a long-term impact on peak demand growth and potentially price levels and volatility, and should be considered and encouraged as a measure of user participation.

Retail Pricing

Whilst most issues raised in this section are a matter for retail market participants, one point EA Network would like the Working Group to acknowledge going forward is the industry cost associated with rolling out interval meters and moving away from load profiling. As mentioned in the section on interval meters, the original investment in the meter is a fraction of the total costs to industry and it is imperative that these costs are treated equitably by regulators. If these costs are not fully accounted for in subsequent regulated price reviews then competitive market participants will not be able to invest in the necessary changes, forcing existing players to avoid customer segments with interval meters or preempting others from entering.

APPENDIX I

Selected Examples of End-User Price Response

1. Baladi, S. Mostafa & Herriges, Joseph A, & Sweeney, Thomas J.: “Residential Response to Voluntary Time-of-Use Electricity Rates”, Resource and Energy Economics, Volume 20, Issue 3, September 1998
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3. Goldman, Charles: “Price Responsive Load (PRL) Program – Framing Paper #1”, prepared for The New England Demand Response Initiative (NEDRI), March 2002, http:/www.eetd.lbl.gov/EA/EMP/
4. Daniel Violette & Frank Stern, “Cost Effective Estimation of Load Impacts from Mass-Market Projects: Providing Value in Restructured Markets”, Proceedings of the 2001 International Energy program Evaluation Conference, Salt lake City Utah, August 21-24, 2002, World Wide Web
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8. Hirst, E.: “Barriers to Price-Responsive Demand in Wholesale Electricity Markets”, prepared for the Edison Electric Institute, June 2002, http:/www.ehirst.com
9. Lafferty R., Hunger D., Ballard J., Mahrenholz G., Mead D., Bandera D., “Demand Responsiveness in Electricity Markets”, Office of Markets, Tariffs and Rates circa 2002, World Wide Web
10. Peak Load Management Alliance: “Demand Response: Design Principles for Creating Customer and Market Value”, November 2002, http:/www.peaklma.com
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12. R.02-06-001: “Report of Working Group 2 on Dynamic Tariff and Program Proposals”, California Public Utilities Commission Order Instituting Rulemaking on Policies and Practices for Advanced Metering, Demand Response and Dynamic Pricing, November 15, 2002
13. Siddiqui, Afzal: LBNL-51533 “Price Elastic Demand in Deregulated Electricity Markets”, Ernest Orlando Lawrence Berkeley National Laboratory, May 2003, http:/eetd.lbl.gov/EA/EMP/
14. Violette, Daniel M.: “Regulatory Activity on Time-Differentiated Electric Pricing Programs”, presented at the 14th National Energy Services Conference, New Orleans, December 9 2003, http:/www.summitblue.com

APPENDIX II
Specific Responses to Section 5 Issues for Consultation

5.1 DSR market Mechanisms

5.1.1 The discussion outlined a number issues facing the CoAG Review 'pay-as-bid' proposal. What solutions might overcome these design and implementation problems?

EA Network supports the analysis in the discussion paper and does not believe the "Pay-as-bid" proposal is a workable solution.

5.1.2 Is there scope t consider improvements to existing mechanisms for physical market participation by end users (i.e. as scheduled or market loads)?

Potential may exist, however, to the extent that this has not already been captured in bi-lateral contracts the major barrier is the low value which end users place on participation as much as the lack of ability to capture this value.

5.1.3 Do stakeholders regard the aggregation facility as a viable mechanism to stimulate dispatch of otherwise untapped demand side response?

Any mechanism that stimulates end user demand side response is to be encourages. However, the viability of such an aggregation faculty mechanism is not yet proven. Whilst the EUAA paper trial provide some useful lessons it was not structured so as to accurately predict the commercial viability of an operational aggregation facility. Any aggregation facility would need to prove itself as cost effective in a commercial operating environment.

5.1.4 Is the suggested scope of government involvement with the aggregation facility sufficient to define an appropriate role for government? If not, what other issues warrant consideration?

Some government support and encouragement in the initial evaluation and establishment of an aggregation faculty may be warranted. However, any proposal should ultimately be commercially viable on a stand-alone basis. Overall, purely commercial structures and operation is to be preferred if possible. The extended and complex issues relating to establishment of inter-jurisdictional standards for B2B transactions to support FRC provide evidence of the difficulty in imposing regulatory approaches on participation.

5.1.5 Are there any overseas demand side bidding models that can be usefully applied to the National Electricity Market?

US programs established in New England, New York and Georgia are worth studying.

5.1.6 What are the most appropriate mechanisms for developing and implementing an end-user education campaign to facilitate demand side commercial skills?

EA Network supports end user education that will increase demand side participation in retail, network or environmentally driven demand management. Any education should encompass all types of demand management activities and to specifically address the opportunities and values available to end-users. Appropriate end user education should therefore be developed in conjunction with the preferred options for participation and integrated into the implementation of options. Education which proceeds or anticipates solutions is liable to be less effective and possibly counter productive.

5.1.7 What solutions (regulatory and other) might address the market impediments to enhance user participation? Specifically options addressing the property rights, market based price signals, customer awareness, and technology.

No further comment.

5.2 Interval Meters

5.2.1 Do stakeholders support a review of the effectiveness of interval metering for large end users? What are the assessment factors and criteria that should underpin this review?

EA Network supports such a review, which should be undertaken with an eye toward identifying impediments that may be reducing Australian results relative to international best practice.

5.2.2 What customer classes/market segments could benefit from the rollout of interval metering technology? Please state the basis of your evaluation. What lower cost metering solutions (if any) should be financially viable to achieve user participation benefits for this customer class?

EA Network is currently rolling out interval meters to customers consuming between 40-160MWh per annum. This segment was initailly targeted due to their high level of consumption. This segment is also likely to be more price responsive (i.e. elastic) than smaller, domestic consumers. Comparative price elasticities and pilot project results were the basis for the business case.

5.2.3 Do stakeholders support a remote load control program specifically targeting household air-conditioning use, and other technologies that could assist consumers to voluntarily manage their domestic energy use? What cost-effective technologies could facilitate an effective program?

One option under consideration for development by EA Network is a trial of air conditioning cycling, similar to those in operation in the USA (e.g. Long Island Power Authority LIPA Edge Program), which could potentially remotely operate air conditioning compressors and shut them down for short periods during demand peaks.

5.2.4 Have stakeholders experienced a trend towards increased use of interval meters and development of cost-reflective tariffs in the retail electricity market? Are there any policy or market impediments that may prevent this trend from continuing?

Initiatives in Italy and California combine with recent movements in Australia to indicate the beginning of an international trend toward rolling out interval meters to smaller and smaller customers. Within Australia, the recent draft determination in Victoria mandating the rollout of interval meters to all consumers provided a recent boost to the number of Australian consumers expected to receive interval meters over the next decade.

EA Network cautions the Working Group and other policy-making bodies against complacency in regard to interval metering. There are a host of operational, technical, regulatory and institutional obstacles to the successful adoption of interval metering for the mass market. It is worth mentioning the Puget Sound pullback in Washington state, USA, where inappropriately crafted prices led to a consumer backlash and the premature ending of what was the largest scale rollout out of interval meters at the time.

5.2.5 Do stakeholders support the retention of load profiling subject to further assessment of the development of cost reflective tariffs?

EA Network's original support for load profiling at the introduction of FRC was based on the assumption that load profiling was an intermediate step and the preferred long term goal was full interval metering when technology and economics made this cost effective.

5.3 Retail Prices

No specific comments.