July 2004 | **Interval Meter Rollout**

MANDATORY ROLLOUT OF INTERVAL METERS FOR ELECTRICITY CUSTOMERS

Final decision

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ESSENTIAL SERVICES COMMISSION

Preface

Full retail competition now enables all electricity customers to choose their retailer. When retail competition was introduced for the largest electricity customers (industrial customers and larger commercial customers), the installation of interval metering was required for customers who switched electricity retailer.

In its 2001–05 Electricity Distribution Price Determination, the Essential Services Commission indicated that it was prepared to consider requiring interval meters for domestic and small business customers (with costs to be recovered through a regulated charge) if the benefits of interval metering justified the additional cost.

In this final decision on the mandatory rollout of interval meters for electricity customers in Victoria, the Commission has taken account of the stakeholder consultation (including submissions and meetings) and further information gathering and analysis that it conducted following the release of its draft decision paper, *Mandatory Rollout of Interval Meters for Electricity Customers,* in March 2004.

This is the Commission's final decision on this matter. The Commission will now proceed to implement its decision through changes to the appropriate regulatory instruments and the current 2006 Electricity Distribution Price Review.

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Chairperson
Essential Services Commission

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This final decision paper sets out the Essential Services Commission's decision to mandate a targeted rollout of interval meters. The Commission has concluded that a rollout of interval meters would improve the competitiveness and efficiency of the electricity market in Victoria and thereby contribute future net economic benefits to electricity customers and to the economy generally.

The Commission considers that price signals that reflect the costs of consumers' electricity use patterns are a prerequisite for consumers and the economy as a whole to realise fully the potential benefits of the structural and policy reforms that have occurred in the electricity industry. In this report, the Commission concludes that a rollout of interval meters is required to achieve both cost-reflective pricing and the technological platform needed to deliver the potential economic and social benefits. These benefits can be delivered by promoting:

- effective electricity competition
- improved energy efficiency and conservation
- market efficiency through more demand management
- technological innovation and advancement in the energy market
- greater customer empowerment and self-reliance
- the improved security of supply associated with smoothing the load profile.

Interval meters enable retailers and customers to measure real time electricity consumption and to send and respond to the cost-related price signals that are essential for the market responses needed to underpin more sustainable and efficient energy supply and consumption practices and patterns. The responses of electricity demand to cost-related prices should contribute to:

- smoothing the peaks in the electricity load profile, thus reducing the volatility of energy prices
- improving the efficiency of the operation of the electricity wholesale market
- improving the balance between supply and demand in the wholesale market
- lowering the cost of energy by delaying investments in new infrastructure to satisfy the future growth of, and peaks in, the demand for electricity.

These potential improvements in wholesale market efficiency are particularly relevant for Australia's 'energy only' wholesale market, which has weather driven needle peaks in demand and relatively low forecast reserve plant margins. These features are especially relevant in the Victorian and South Australian regions of the market.

Standard meters, which have been used for around 100 years, record the accumulated total energy. To obtain the energy use for billing, the previous accumulated reading is subtracted from the current reading. These meters no longer fully support the information requirements of the modern industry. Interval meters, on the other hand, record the consumption of electricity each half-hour, allowing retailers to structure tariffs that more closely reflect the

costs of purchasing power in the wholesale market, in which costs can vary on a half-hourly basis.

The Commission's decision to mandate a rollout of interval meters is predicated on its following assessments:

- Market forces alone would fail to deliver a timely interval meter rollout on a scale sufficient to provide economies in meter manufacture, installation and reading.
- Regulatory intervention would be required to achieve the economic benefits that would result from a more timely and larger scale rollout.
- Based on the Commission's cost–benefit analysis, a net economic benefit would arise from a timely, mandatory rollout of interval meters.
- The current cost increment between accumulation and interval meters is expected to fall over time.

In summary, the Commission's final decision for a rollout of interval meters to Victorian electricity customers is for:

- interval meters to be installed by 2008 for all large customers (those consuming greater than 160 MWh per year), with new and replacement installation commencing in 2006
- interval meters to be installed by 2011 for all small business and large residential customers (those consuming less than 160 MWh per year but more than 20 MWh per year) with offpeak metering or three-phase metering, with new and replacement installation commencing in 2006
- interval meters to be installed by 2013 for all small business and residential customers (those consuming less than 20 MWh per year) with offpeak metering or three-phase metering, with new and replacement installation commencing in 2006
- interval meters to be installed on a new and replacement basis for all small business and residential customers with single-phase, non-offpeak metering, with installation commencing in 2008.

Compared to the draft decision, this final decision allows more time to plan and implement the rollout of interval meters to small customers. It affirms, however, the Commission's view in the draft decision paper, *Mandatory Rollout of Interval Meters for Electricity Customers,* (published in March 2004), that a mandatory rollout of interval meters for Victorian electricity customers is justified on the basis that the benefits to customers would exceed the costs. The Commission has based its decision on a set of rollout costs and benefits (some but not all of which have been estimated directly), as well as wider energy market, economic and social benefits that are likely to result from the availability of interval meters.

In reaching this decision, the Commission has:

- analysed the costs and benefits of interval meters
- considered the role of the Commission in mandating a rollout of interval meters
- considered the relevant regulatory policy issues
- considered stakeholder responses to the draft decision.

This decision means:

- in the seven years from 2006, up to one million large customers and customers with electric water heating will have their accumulation meters upgraded to interval meters
- over an extended period, when a new or replacement meter is required, all remaining meters (around 1.3 million) would be upgraded.

The Commission recognises that there are a number of implementation issues, including managing the impact of interval meters on billing and data management systems and ensuring public confidence in the industry during this period, as well as planning for the rollout itself. The Commission will take a proactive role in working with the electricity industry to facilitate an efficient implementation of the rollout so that the benefits outlined in this paper are realised by customers. In particular, the Commission will seek to ensure that issues are resolved and appropriate systems are planned and developed in a timely manner.

The benefits that have been quantified are based on the demand management efficiency gains that arise from avoided generation, transmission and distribution capacity costs. These estimated efficiency gains have been based on customers responding to interval meter based price signals, primarily during the system peak in summer. These results and the further strategic benefits demonstrate that the benefit of installing interval meters exceeds the small incremental cost of these meters over the cost of standard accumulation meters.

This is the Commission's final decision on this matter. The Commission will now proceed to implement its decision through changes to the appropriate regulatory instruments and the current 2006 Electricity Distribution Price Review.

1 Introduction

The Commission's final decision requires a mandatory rollout of interval meters to Victorian electricity customers to access the benefits for consumers and the economy that the Commission considers would result from such a rollout. In making this decision, the Commission has undertaken a process that commenced with the last distribution price review (by the then Office of the Regulator-General),[1] which found preliminary evidence in support of introducing interval meters and determined that further work was warranted. The Commission subsequently published a position paper[2] and a draft decision paper[3]. The position paper and draft decision paper assessed the costs and benefits of interval meters, sought views from stakeholders on that assessment, and outlined the Commission's position on installing interval meters. The Commission has prepared this final decision paper after conducting stakeholder consultation (including submissions and meetings), further information gathering and a revised cost–benefit analysis to reflect comments on the draft decision paper released in March 2004.

In summary, the Commission has concluded that its analysis demonstrates (1) that an overall benefit to electricity customers would result from a mandated rollout of interval meters, and (2) that there is case for regulatory intervention to support a more timely and widespread uptake of interval meters in the market than would result if the pace of the rollout were left to commercial decisions and market forces.

1.1 Structure of the final decision

This introductory section provides an overview and some background to the decision, including the role of the Commission and industry structural arrangements. The remainder of the paper is structured as follows:

- Section 2 outlines the benefits and summarises the revised cost–benefit analysis.
- Section 3 provides the justification for the Commission intervening to require interval meters.
- Section 4 sets out the Commission's final decision including the timeline for the interval meter implementation and some subsidiary decisions necessary to implement the decision.

The appendices provide:

- background on the current arrangements for metering in Victoria, including the use of basic meters and interval meters——that is, a summary of the current regulatory arrangements applying to customer metering of electricity supplies in Victoria
- a list of the persons who made submissions on the draft decision paper

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1 Office of the Regulator-General 2000, *Electricity Distribution Price Determination 2001–2005*.

2 Essential Services Commission 2002, *Installing Interval Meters for Electricity Customers— Costs and Benefits*, Position paper, November.

3 Essential Services Commission 2004a, *Mandatory Rollout of Interval Meters for Electricity Customers*, Draft decision, March

- the Commission's consideration of the stakeholders' submissions
- draft changes to the Electricity Customer Metering Code necessary to implement the decision.

1.2 Role of the Commission

The Commission was established under the *Essential Services Commission Act 2001* and commenced operation on 1 January 2002, when it subsumed the role of the Office of the Regulator-General, Victoria. The Commission is Victoria's independent economic regulator of prescribed essential utility services supplied by the electricity, gas, ports, grain handling and rail freight industries.

The role of the Commission in preparing this decision arises from its responsibility for electricity metering and as the Metrology Coordinator for Victoria, and also from undertakings that it made to distribution businesses in the 2001 Electricity Distribution Price Review.[4] The Commission regulates aspects of metering under the jurisdictional Electricity Customer Metering Code and the National Electricity Code. As jurisdictional regulator, the Commission is (1) the appointed Metrology Coordinator for Victoria, which means it is responsible for the design and approval of a Metrology Procedure to apply to certain small customers and (2) responsible for administering relevant regulatory instruments, including the Electricity Customer Metering Code.

In September 2000, the Office of the Regulator-General's price determination for Victoria's five electricity distribution businesses foreshadowed a possible rollout of interval meters during the regulatory period 2001–05. The issue arose as a result of the narrowing gap between the cost of dual-element and three-phase accumulation meters and interval meters. The Office of the Regulator-General noted in the price determination that the efficiency benefits of adopting interval meters would need to justify the additional costs.[5] Given its metering role and the fact that interval meters are already being used in the Victorian electricity market, the Commission has a responsibility to examine the impacts of alternative approaches to introducing interval meters and to establish whether the Commission has a role in facilitating an efficient outcome.

In fulfilling its responsibilities, the Commission is bound by its statutory objectives. It is required to exercise its powers to achieve its objectives under the *Essential Services Commission Act, 2001* and, for the purposes of this decision, the *Electricity Industry Act 2000.* The Essential Services Commission Act objectives, in combination, require the Commission to ensure the benefits of competition and improved efficiency in the electricity industry are passed through to customers in the form of effective competition, efficient prices, appropriate supply and service quality, and service innovation.[6] The Electricity

4 Office of the Regulator-General 2000, op. cit.

5 Ibid., *Volume I— Statement of Purpose and Reasons*, p. 73.

6 Essential Services Commission Act, 2001, s.8; Electricity Industry Act, s.10.

Industry Act provides a further common objective that the Commission should promote full retail competition to the extent that it is efficient and practicable.[7]

1.3 Background on industry reforms

Australian electricity industry reform is part of a broader agenda that the federal, state and territory governments are pursuing to establish interconnected, efficient and competitive national markets for electricity services. A key policy objective has been to develop competitive markets (in which competition is feasible) and to apply incentive based regulation to the monopoly network market sectors (in which competition is not feasible or emerging). The aim of these reforms is to maximise the long-term efficiency and viability of the industry for the benefit of customers, via lower prices, higher standards of reliability and new products and services.

This policy approach has lead to the development of competition in the electricity retail market whereby all customers have the ability to choose their retailer and is a key element in the evolution to a more efficient and competitive national market. However, there is limited linking of the wholesale market—which provides strong price signals relating to the supply–demand balance and thus to the cost of supplying power—and the retail market—which sets prices offered to customers and influences the level and pattern of their energy consumption. For customers and retailers, price signals that relate more directly to the wholesale market situation would contribute to increasing the efficiency and security of the energy market as a whole.

Such price signalling would allow customers to exercise choice about their energy requirements, both for the amount used and the time-of-use. In this way, customers would determine the amount of energy they consume at different times of the day and year, and what they are prepared to pay for it. The absence of a clear link between (1) the price in the wholesale market, (2) the tariff setting arrangements of retailers and (3) the price paid by retail customers limits the ability of individual customers and customers as a whole to achieve the full benefits that are potentially available from energy industry restructuring and competition.

In this context, this final decision paper examines important energy policy questions about the role of metering:

- What meter type best meets the needs of the market?
- Do the current metering arrangements act as a barrier to efficient market outcomes?
- What are the costs and potential benefits of new technology meters?
- What is the Commission's responsibility/role in decisions on the adoption of new meters and their installation and operation?

The Commission considers that interval metering would provide a mechanism for more effectively linking the wholesale and retail markets and thus for providing efficient price signals to customers. Some recent national developments are relevant to the Commission's

[7] Electricity Industry Act, 2000, s.10 (b).

decision on this matter. The Parer Review[8] considered the metering issue and related questions in a high level review of the national electricity market. It concluded that the demand-side currently cannot achieve its full potential in contributing to overall efficiency and that most customers do not face price signals that would facilitate efficient demand responses. The review panel also concluded that the explicit involvement of the demand-side would offer potential advantages worthy of pursuit, including the moderation of price spikes where consumption could be made more responsive to price during peak demand periods. The review panel subsequently recommended (using some of the cost–benefit analysis from the Commission's position paper):

> *... interval meters should be mandated for all consumers with the installation programs to be achieved over the next 5 to 10 years.*[9]

In addition, the Ministerial Council on Energy[10] resolved:

> *To enhance the participation of energy users in the markets, including through demand side management and the further introduction of retail competition, and increase the value of energy services to households and business, the MCE [Ministerial Council of Energy] recommends ... consideration of the costs and benefits of introducing interval metering. Outcomes to be considered in 2004.*[11]

The Commission's analysis, its decision and Victoria's subsequent experience with interval meters will provide further market analysis and evidence for consideration by the Ministerial Council on Energy and the other jurisdictions in relation to interval metering.

1.4 The draft decision paper

In March 2004 the Commission issued its draft decision paper on a mandatory rollout of interval meters to electricity customers in Victoria for further consultation.[12] Previously, in November 2002, the Commission had issued a position paper[13] for consultation.

These two papers evaluated options for a rollout of interval meters to Victorian electricity customers and presented the rationale for regulatory intervention and considered the possible costs and benefits of a rollout of interval meters. Importantly, both papers acknowledged that the costs and benefits presented were reasonable estimates that the Commission was using to undertake the cost–benefit assessment for decision making purposes, and that a separate

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8 Council of Australian Governments (COAG) Energy Market Review 2002, *Towards a Truly National and Efficient Energy Market.*

9 Ibid., p. 183.

10 The Ministerial Council on Energy consists of the state and federal energy ministers, and has responsibility for policy leadership and overseeing the continued development of national energy policy.

11 Ministerial Council on Energy 2003, Communiqué, Sydney, 1 August, p. 3. The council has released a subsequent discussion paper, *Improving User Participation in the Australian Energy Market* (March 2004), which is available from the council's website (www.mce.gov.au).

12 Essential Services Commission 2004a, op. cit.

13 Essential Services Commission 2002, op. cit.

process would be required to finalise the actual costs and customer charges for any eventual rollout.

The draft decision paper set out the Commission's preferred approach to the rollout of interval meters based on an implementation that would depend on customer size and meter type. In summary, in the draft decision paper the Commission proposed the following rollout approach:

- interval meters to be installed within two years for large customers (those consuming greater than 160 MWh per year), with implementation commencing in 2004
- interval meters to be installed within five years for small business and residential customers (those consuming less than 160 MWh per year) with offpeak metering or three-phase metering, with implementation commencing in 2006
- interval meters to be installed on a new and replacement basis for small business and residential customers with single-phase, non-offpeak metering, with implementation commencing in 2006.

Based on the analysis of the costs and benefits of installing interval meters, the Commission concluded there would be a net benefit to the community from mandating the rollout of interval meters.

In response to the draft decision, the Commission received 19 submissions from retailers, distributors, meter manufacturers, and other stakeholders (Appendix B) commenting on the proposals and issues presented. Appendix C summarises the submission comments, together with the Commission's response to the submissions. Additionally, the Commission has held meetings and discussions with a number of parties to discuss issues raised in their submissions.

The principal issues raised by stakeholders included:

- whether there are alternatives to interval meters for achieving the demand management objectives
- whether retailers would offer efficient tariffs and, if so, whether customers would take up these tariffs and whether their consumption would respond as assumed and thus deliver the projected benefits
- the possibility that the analysis underestimated the costs of a rollout (particularly the costs of data management) and did not include some of the retailers' costs
- whether the economic analysis conducted over 15 years correctly dealt with the interval meter life relative to the life of existing meters.

These issues were addressed as far as possible and as appropriate in the revised cost–benefit analysis (described in section 2) on which this final decision is partly based.

2 Costs and benefits of interval metering

The cost–benefit analysis, along with the Commission's assessment that the benefits would exceed the costs, is the principal basis of the overall decision. Section 3 discusses another key consideration: the case for mandating a targeted rollout of interval meters.

This section reviews the benefits that the Commission considers are available from interval meters, and presents the results of the revised cost–benefit analysis. The draft decision paper (see note 3) and the position paper (see note 2) describe the basis of the cost–benefit analysis in more detail.

2.1 Key benefits

A number of strategic benefits are associated with interval metering. Many have been included in the economic evaluation of interval metering as outlined below, but not all have been quantified. Although many of the other benefits would be difficult to quantify, they are nevertheless significant and warrant consideration as part of the decision and overall public policy response. Such consideration (see below) is important in seeking to obtain maximum benefits from the energy policy reforms in terms of the growth and development of the economy and the welfare of the community.

In the restructuring of the electricity supply industry, much has been made of the 'peakiness' of customer demand. The largest gains from the reforms are perceived to be the economic benefits of the restructured electricity supply industry's better use of assets. However, the increasing summer peakiness—a result of significant growth in energy demand—has led to less than optimal use of electricity infrastructure. The increasing peak demand is placing strain on many parts of the system and driving significant requirements for capital expenditure for low use plant. Demand at peak times continues to grow, partly because retail prices do not reflect the costs imposed by high summer demand on the system. All customers are generally paying for the energy costs generated by high summer demands, whether or not they contribute to the peak.

The large scale rollout of interval meters would improve the availability of information about energy use and costs that energy suppliers and customers consider when making power supply, purchase and usage decisions. These market participants could include generators and transmission businesses, as well as distributors, retailers and customers. A range of positive impacts from improved information is identified below, although further benefits are also likely to accompany more informed choices.

The technology platform facilitated by the widespread availability of interval or smart meters is fundamental to the development of two-way communications and remote reading. This technology will ultimately facilitate a new generation of efficiencies, such as combined utility meter reading and more sophisticated metering in the gas and water sectors, including use of control features. The introduction of gas, electricity and water smart meters operating in a common mode will accompany further economically and environmentally sustainable progress in these sectors.

Digital technology has already led to developments that were not commercially viable propositions only five years ago. It will continue to develop and enable devices to assist customers to manage their loads, reduce energy consumption and waste, and reduce greenhouse gas emissions. Without a substantial installed base of smart meters, however, there will be a reduced capacity and incentive for such developments. Modern interval meters are the building blocks that will facilitate developments in a wide range of complementary products and services. Although not fully used at this point, these meters incorporate the flexibility to provide the load signals that are required as the basis for these future initiatives and innovations. Basic electromechanical meters, on the other hand, provide little opportunity to innovate in these ways.

Few currently affordable devices provide for the automated use of electricity on the basis of variations to its price. 'Smart accessories' would assist consumers to manage their electricity bills by 'shutting off' when prices are high or moving discretionary loads automatically to lower price times. The introduction of interval meters would also support commercial decisions by manufacturers to allocate resources to the development and production of smart accessories. This incentive does not exist, however, without a significant volume of smart meters in the marketplace and thus a potential market for further innovations.

Interval meters have strong potential to improve the efficiency of the electricity market. These benefits arise from avoided generation, transmission and distribution capacity costs (demand management) and the further market efficiency gains outlined below. Only the demand management benefits have been quantified in this study, these are based on customers responding to interval meter based price signals, primarily during the system peak in summer. In summary, the demand management benefits are likely to have the following outcomes:

- *Provide the capacity and incentive for customers to manage their electricity consumption more efficiently*. The efficiency of the electricity markets increases when customers respond to high price signals by reducing their demand for electricity or shifting their use to lower priced times. In this way, the market would benefit from the reduced need for capacity to meet otherwise higher peak demands.

  If customers are made aware of different pricing of electricity at different times, and of the impact of those price differentials on their electricity bills, they could make informed choices about when they use electricity. Interval metering would provide a means of recording the different times at which customers consume electricity, which could help customers make small changes in behaviour that would bring about reductions in their annual bills. Some customers already have two-rate or multi-rate meters that separately record their use of electricity at different times of day. Half-hourly interval metering is an extension of this existing technology, recording use in 48 discrete time periods every day, rather than in two or three time bands over an extended period (often one month or three months).
- *Increase retail price efficiency.* Interval meters provide retailers with the capability and incentive to introduce more efficient pricing to customers. Traditional single-rate accumulation metering does not record the time-of-use of electricity, and so cannot support efficient pricing structures that reflect the costs incurred by retailers in the wholesale market. With interval meters, retailers would have the flexibility to match their

price offers to customers (or groups of customers) to the prices at which they purchase electricity.

- *Provide distributors with the capability and incentive to introduce more efficient pricing to retailers.* Interval meters allow price structures that more accurately reflect the underlying costs of operating a distribution network, applied through network use-of-system charges. With interval meters, distributors would have the flexibility to match their prices to the costs associated with narrowing gaps between capacity and peak demand in networks.

In addition to the demand management benefits, interval meters have strong potential to result in the following outcomes:

- *Increase the efficiency of the combined wholesale and retail electricity markets*. An effective demand response would also ensure greater security of supply by allowing more efficient rationing when capacity is short. That is, when customers respond to high prices by reducing their demand in peak use periods, they would help to smooth the load curve, which could lead to reductions in the volatility and level of wholesale prices. All customers would receive the benefits of lower wholesale prices. Further, where capital costs are avoided, the operating costs associated with that plant would also be avoided.
- *Provide distributors with the capability and incentive to manage power quality.* The digital platform will provide more information to distributors and their customers to assist them to improve power quality. Electronic interval meters have the capability to accurately measure apparent power (in kVA), even in the presence of harmonic loads. This capacity would enable customer prices to be structured in a manner that properly reflects a customer's power factor, which would more accurately reflect the customer's contribution to system losses, network use and demand for generation.
- *Lead to improvements in operational network management*. Interval meters could also increase the availability to the network businesses of more data for network planning purposes and eliminate the manual meter reading costs in certain circumstances, such as high-rise apartments. They would do so via their deployment in conjunction with remote meter reading capability.
- *Increase the accuracy of settlement and ensure equity among customers.* The accuracy of wholesale market settlement between generators and retailers would be increased if data from interval metering (rather than from profiling) were available and used in settlement. In addition, interval meters have the potential to remove cross-subsidies between customers where simple averaged prices are applied to all customers.
- *Provide a digital platform for the innovation of customer services.* Interval meters could provide greater customer choice and product/service innovation, because retailers could better respond to customer requirements, given improvements in the information available to retailers and, under certain deployment strategies, improvements in customer communication.
- *Reduce disputes associated with, and the need for, estimated data.* The interval data provided by the interval meter could reduce disputes associated with estimated bills. The data could show, for example, how much power each party has consumed when customers move in to and out of premises.

- *Improve customer transfer efficiency*. The interval data could be used to increase the flexibility of customer transfers between retailers, because a manual meter reading would not be needed at the transfer to determine the energy to be ascribed to each retailer.

2.2 Summary of the cost–benefit analysis

The position paper and the draft decision paper detail the methodology and assumptions of the cost-benefit analysis. The quantified benefits are not all the benefits outlined in section 2.1. They are confined to the demand management efficiency gains that arise from avoided generation, transmission and distribution capacity costs. These estimated efficiency gains have been based on customers responding to interval meter based price signals, primarily during the system peak in summer.

This final decision paper outlines the results of the analysis taking into account the comments from the submissions to the draft decision paper. The Commission has varied the economic model to account for concern that the modelling did not deal with the costs of replacing an interval meter at the end of its assumed 15-year life.

In the draft decision paper the Commission determined the costs and benefits of interval meters over a period of 15 years, which was the assumed life of an interval meter installed in the first year. The Commission's approach to the economic analysis was to take a relatively conservative position, so where the benefits exceeded the costs, there would be confidence that decision making could rely on the results of the analysis (accounting for a range of uncertainties).

The Commission accepts, however, that the 15-year analysis neglected to include some further costs for meter replacement at the end of the 15-year period, and that this may have a material impact in some cases considered in the analysis. The Commission has undertaken further analysis to determine the present value of costs over 40 years for the new and replacement scenario for single-phase, non-offpeak meters. The benefits have also been evaluated over a 40-year period based on the annualised benefits from the 15-year analysis, assuming the benefits accrue evenly over time. Section C.2.1 has further explanation of these changes to the economic model.

The Commission's revised analysis for single-phase, non-offpeak meters indicates that the present value of the costs are about the same as that of the benefits when adopting the costs from Appendix D of the draft decision paper and making further reasonable assumptions about the development and cost of metering technology over a 40-year period.

Table 1 shows the revised costs and the corresponding partial benefits that have been assessed. Other than the adjustment to the length of the modelling period for new and replacement meters described above and in section C.2.1, the remaining assumptions and analysis adopted for the cost-benefit analysis have not been varied from those presented in the draft decision paper. As noted above, the benefits that have been quantified in the cost-benefit analysis are limited to the avoided capital expenditure required to meet peak electricity demands a result of the assumed shift in demand away from peak periods due to the influence of interval meters and time-of-use pricing. As outlined in section 2.1, however,

the Commission has identified other material potential benefits from the wide-spread availability of interval meters that have not been quantified in the analysis. When these further benefits are taken into account, the Commission considers there is clear support for its conclusion that positive net benefits can be obtained from a rollout of interval meters for all customers.

Table 1: Incremental costs and partial benefits of an interval meter rollout (in present value terms)

Scenario				Draft decision		Final decision	
Implementation Period	**Meter type**	**Consumption (MWh/year)**	**Present value period**	**Cost ($ million)**	**Partial benefit ($ million)**	**Cost ($ million)**	**Partial benefits ($ million)**
Two years	**Three phase, CT connected**	**>160**	**15 years**	**1**	**64**	**1**	**64**
Two years	**Three phase, direct connected**	**>160**	**15 years**	**1**	**64**	**1**	**64**
Five years	**Three phase, CT connected**	**<160**	**15 years**	**5**	**33**	**5**	**33**
Five years	**Three phase, direct connected**	**<160**	**15 years**	**145**	**252**	**145**	**252**
Five years	**Single phase, offpeak**	**All**	**15 years**	**115**	**129**	**115**	**129**
New and replacement	**Single phase, non offpeak**	**All**	**15 years**	**89**	**102**	**Not applicable**	**Not applicable**
			40 years	**Not applicable**	**Not applicable**	**160**	**158**

Note: 1. The benefits quantified in this table are a limited set of the direct benefits of interval meters and do not include the further substantial benefits outlined in section 2.1.

2. Relative to the draft decision paper's analysis, the analysis for single-phase, non-offpeak meters has been extended to 40 years. The 40-year benefits have been calculated on the basis of extending the annualised benefits. The present value cost is based on assumptions for the long term relating to the development of metering technology as follows:

- average interval meter life of 20 years for meters installed after 2008
- for the new and replacement program, meter provision and installation cost reduces by 1 per cent per annum for 20 years and is then constant
- incremental meter data services cost is $5 per year after 15 years

3 The justification for regulatory intervention

In its draft decision the Commission sought comment on whether the Commission should play any role in fostering or mandating a rollout of interval meters. This question is important because the market does not necessarily deliver improved economic, social or environmental outcomes in all situations.

Section 2.1 outlined the basis for the Commission's consideration that the introduction of interval meters could improve the efficiency of electricity supply and demand, with net benefits overall being generated for the community from an interval meter rollout. Given (1) the Commission's responsibilities for metering, (2) the Commission's objectives to protect the long term interests of customers and to facilitate effective competition and (3) the results of the revised cost–benefit analysis, the question of whether regulatory intervention in interval metering is justified is pivotal to the Commission's decision on whether to intervene.

The Commission's analysis indicates, overall, that net benefits would be associated with the proposed rollout of interval meters, relative to no take-up of interval meters by customers. While these benefits would be a necessary condition for regulatory intervention, it is also necessary to be satisfied that these benefits would not be realised by leaving the decision to adopt interval meters to individual market participants. This section explains why the Commission considers that the market will not deliver efficient outcomes in the current circumstance and therefore why intervention is justified.[14]

Market based decision-making produces optimal outcomes when the decision maker 'internalises' all the costs and benefits (including social costs and benefits) associated with a particular decision. That is, the decision maker must incur all the costs and receive all the benefits of the relevant decision. It is also necessary that the decision maker is well informed about these costs and benefits. In the current context, the Commission considers that (1) the rollout of interval meters would have significant benefits that no individual decision maker would capture, and (2) prohibitive informational and transaction costs exist that could be expected to prevent the market from delivering efficient outcomes.

3.1 Shared benefits of interval meters

The benefits of introducing interval meters would, in the first instance, be shared or dispersed among a number of entities. In particular, the introduction of interval metering would increase

[14] Fri discussed the role of public policy intervention in energy markets concluding that intervention is not warranted unless there are public benefits, and that if this precondition exists, 'if [specific] obstacles are also impeding the development of technology that provides a public good, then an intervention to remove the obstacles makes sense', Fri, RW 2003, 'The role of knowledge: technological innovation in the energy system', *The Energy Journal*, vol. 24, no. 4, p. 67.

Further, The International Energy Agency (IEA), commented that, 'the relatively low levels of demand side participation in evidence…suggests that disconnected markets, where the demand side fails to respond to tight supply side conditions and high price episodes, have already developed and that business models have not emerged to provide a natural market remedy. Thus it may be an early signal that remedial policy intervention is in fact required', *The Power to Choose - Demand Response in Liberalised Electricity Markets*, IEA (Paris), 2003, p. 40.

the scope for cost-reflective pricing that could be expected to provide benefits to customers, retailers, distributors and transmission businesses. However, if the interval metering decisions are left to the market participants it is not clear that any one of these entities could capture all the associated benefits and therefore would have an appropriate incentive to install interval meters. The reasons for this assessment are examined below.

Interval metering would provide benefits to the extent that:

- customers would be charged prices that better reflect the cost of consuming electricity in different periods
- customers would respond by changing their behaviour.

The benefits of such changed behaviour would accrue in a number of different ways, including:

- the avoided cost of any future capital expenditure on generation assets
- the avoided cost of any future operating and capital expenditure on transmission assets
- the avoided cost of any future operating and capital expenditure on distribution assets
- the fuel cost savings associated with reduced generation (including reduced losses)
- any other avoided costs associated with a reduction in electricity consumption (such as avoided environmental costs related to additional greenhouse gases).

In the first instance, these benefits would accrue to a number of different entities. Without regulatory intervention, these entities would need to coordinate to ensure all net benefits accrue to the entity that decides whether to install an interval meter. To examine how this might work in practice, three scenarios are considered, in which the decision maker is respectively (1) the retailer, (2) the distributor and (3) the customer. The Commission concludes that coordination would be unlikely to result in any single decision maker being able to capture the full benefits of installing interval meters.[15]

3.1.1 Retailer as decision maker

If the retailer is responsible for the decision to install an interval meter, then the retailer could capture all the benefits from any efficiencies accruing through more efficient consumption of wholesale energy. This would happen if the retailer offered time-of-use tariffs that leave customers no worse off than if they did not face time-of-use tariffs but that reduce the generation costs of serving those customers.

However, the retailer would not automatically receive any benefits accruing to distribution and transmission network businesses. Network savings could be expected to accrue to the extent that peak network use, which drives network expenditure, was correlated with periods of high-energy consumption and high wholesale energy prices. In this case, the introduction of retail time-of-use tariffs, aimed at reducing consumption when wholesale prices are high, would also reduce peak network use.

[15] The International Energy Agency reached a similar conclusion, 'This dispersal of value, and hence of market incentives, for demand response represents a clear market failure in liberalised electricity markets, and a source of economic inefficiency', International Energy Agency, 2003, op. cit., p. 40.

For a retailer to be able to capture the benefit accruing to network businesses, it would have to be able to negotiate with the network businesses (including transmission businesses) to subsidise the installation of interval meters. If a retailer could not successfully negotiate this matter, then it would have a suboptimal incentive to install interval meters. It is not clear that distribution and transmission businesses would have an incentive to provide such subsidies to retailers instead of attempting to 'free ride' on any benefits from retailers' introduction of interval meters.

Moreover, the network businesses would be unlikely to be able to capture all the benefits of improved network use, because incentive regulation means lower network costs would be eventually passed through to final customers in the form of lower network charges. While this would benefit all customers, the retailers that paid for the interval meters would not capture these benefits and, consequently, would have a suboptimal incentive to install interval meters. The risk, therefore, is that the interval meters are never installed and the associated network cost reductions are never realised.

A further obstacle to retailers capturing the full benefit of expenditure on interval metering is the risk of losing a customer to a competitor. In this circumstance, the retailer would effectively lose any unrecovered costs from installing the interval meter. The retailer's concern about recovering these costs could be resolved by requiring the customer to make an upfront payment equal to the value of any sunk installation (and removal) costs, or by setting contractual terms that require the customer to make such a payment if ceasing to use the retailer's interval meter. However, the former option effectively means the customer would be purchasing some portion of the meter. (The scenario below discusses the customer as the decision maker on whether to install interval meters.) This would create additional transaction costs in the competitive process of customer churn.

For these reasons, the Commission has concluded that retailers would have a suboptimal incentive to promote the installation of interval meters.

3.1.2 Distributor as decision maker

If the distributor were responsible for the decision to install an interval meter, then the same issues would exist. The distributor could not expect to capture all the benefits of improved network use because those benefits, under incentive regulation and outside the regulatory period in which they arise, would end up being shared with customers. That is, the distributor would have less than the full incentive to install interval meters.

Changes in transmission charges are currently directly passed through to customers under the regulatory price control formula for distribution businesses. To capture the benefits of lower transmission costs associated with interval metering, the distributor would need to be able to negotiate with the transmission service provider to make payments equal to any such benefits. This would have to occur through the transmission service provider providing a subsidy per interval meter installed.

In terms of capturing the benefits of lower costs in the wholesale energy market, similar problems would exist. If the distribution business's time-of-use tariff tended to result in a reduction in the wholesale energy costs of supplying that customer, then the distribution business would not automatically capture such benefits. To have the appropriate incentives, it

would need to negotiate in advance with retailers to subsidise the installation of such meters. Similarly, once installed, the interval meter would also allow the retailer to offer a range of additional price signals aimed at reducing peak energy consumption (rather than network use). To the extent that this arrangement would provide greater benefits to the retailer, the distribution business would have to negotiate for the retailer to pass back those benefits to it.

Given the above analysis, it appears unlikely that distributors would be able to capture all the benefits from the installation of interval meters.

3.1.3 Customer as decision maker

A somewhat more attractive proposition would be for the final customer to be responsible for paying for interval meters at their premises. Under this scenario, there may be no need for retailers and distributors to negotiate to pay the other party for any benefits from installing the interval meter. Competition could force retailers to offer customers time-of-use tariffs that reflect the benefits to retailers of lower peak energy consumption.

However, the problems identified earlier would also exist in relation to the individual customer being able to capture all the benefits of network efficiencies created in both distribution and transmission networks. Moreover, customer driven take-up of interval meters would be problematic for additional reasons. Many of these problems are related to distortions in individual decision making that are created by the 'profiling' method used for settling the wholesale energy market.

3.2 Profiling impacts

Any market mechanism for driving the take-up of interval meters would have to take place in the context of the current profiling method used for settling the wholesale energy market. This profiling method would distort the market incentives to install interval meters.

Individual customers only have an efficient incentive to install interval metering only if every customer is already paying the true cost of their energy purchase. A simple example can illustrate this point. Currently, retailers of second tier customers are billed in the wholesale market for a customer's energy use based on that customer's aggregate consumption and the defined 'profile'. The profile assigned to a customer is essentially the average profile of all like customers in that particular distribution business area. The real profile of some customers is less expensive to serve than the average (for example, largely offpeak consumption) and the real profile of other customers is more expensive than the average (for example, heavy use in peak periods). Within the assigned customer profile, therefore, some customers are cross-subsidising other customers in relation to the energy component of their electricity bills. To the extent that a rollout would accelerate the take-up of time-of-use tariffs, it would also speed up the unravelling of cross-subsidies inherent in the profiling method. Customers would be more likely to pay the true cost of their energy consumption. Arguably, this is desirable in terms of equity as well as efficiency.

In addition to this equity argument for the regulatory rollout of interval meters, there is a clear efficiency argument. By installing an interval meter, a customer that has a low cost profile could 'opt out' of the average profile and instead be billed for their actual profile. Initially, the

customers that would have an incentive to install interval meters would be those that already have low cost profiles (that is, those who already have relatively low peak period energy use). Customers that have cost profiles above the average would have a disincentive to install interval meters because such metering would increase their total wholesale energy costs, in general.

By contrast, efficiency requires that the customers that have the highest capacity to reduce peak consumption of energy should install interval meters. To the extent that these customers would be those who already have relatively high peak energy consumption (that is, those with high cost profiles), the market mechanism alone would be unlikely to result in interval meters being installed in the most efficient pattern (that is, being installed for customers that have the greatest capacity to reduce peak energy consumption).

In the long run, the market mechanism could provide an incentive for high cost profile customers to install interval meters, even in the presence of profiling. If customers with low cost profiles install interval meters and thereby were removed from the calculation of the average profile, then the cost of the average profile would increase. Some customers that initially had above average cost profiles would end up having below average cost profiles and, consequently, an increased incentive to install interval meters and opt for time-of-use tariffs. The average profile cost would thus increase for customers still remaining without interval meters, and the whole process would repeat itself until, potentially, no customers were deterred from installing interval meters simply because they have higher than average cost profiles. However, relying on this process—one driven by the distortions associated with profiling—would lead to inefficient and slower take-up of interval meters, for a number of reasons.

The first problem is that this market mechanism, even if it did lead to the same outcome as that of the regulatory intervention proposed by the Commission (that is, all customers progressively installing interval meters), would take much longer to achieve. Moreover, most of the benefits of installing interval meters could tend to occur at the end of that timeframe (when high peak use customers would have an incentive to install interval meters), yet the installation costs would be spread relatively evenly over that period. The net present value of the benefits from interval meters would thus tend to be lower relative to that of a scenario in which interval meters are installed at all customers' premises over a shorter period.

The second problem with relying on the market mechanism is that realising the efficiency benefits associated with one set of customers installing interval meters would depend on a different set of customers installing interval meters. That is, high cost profile customers would install interval meters only if low cost profile customers installed interval meters first (and thereby made the profile high cost customers face costs more representative of their actual profile). If low cost profile customers did not install interval meters in sufficient numbers, then this scenario would not happen and the efficiency benefits would be lost. Low cost profile customers may fail to install interval meters for a number of reasons: they may be unable to capture all the benefits that accrue as a result of their actions (as discussed above); they may be unaware of the potential benefits to them; or they may be unable to finance an efficient investment in an interval meter. Whatever the reason, in this case, the market mechanism under profiling would not provide high cost profile customers with the appropriate incentive to install interval meters. By contrast, regulatory intervention could ensure a quicker take-up of interval meters by all customer classes, including customers that have the greatest capacity to reduce peak demand for energy.

3.3 Profiling and economies of scale in metering installation and purchase

The use of profiling also creates a barrier to the market mechanism delivering the significant economies of scale that would result from the installation of interval metering. The larger the number of meters being installed over any given time, the lower is the average cost of purchase and installation of these meters. Importantly, this economy of scale is not exhausted over the relevant size of the market for interval meters in Victoria. As described above, the existence of profiling means high cost profile customers do not have an incentive to install interval meters, even if it would be efficient for them to do so. This automatically reduces the potential scale of the rollout of interval meters when decision-making is left to individual market participants. As a result, customers (or retailers on customers' behalf) would be unable to capture the full economies of scale in any given period because a significant proportion of the potential customer base has an artificially reduced incentive to install interval meters. Accordingly, economies of scale probably would not be fully realised and an inefficient outcome would result. Requiring all customers, irrespective of profile, to have interval meters installed at their premises over a specified time period would ensure the capture of economies of scale.

3.4 Further benefits of demand-side responsiveness in wholesale market

An important benefit of time-of-use tariffs is that they facilitate greater demand-side responsiveness in the wholesale energy market. Increased demand-side responsiveness results in at least two benefits to the market that individual could not capture when installing an interval meter.

3.4.1 Reduced market power in generation

Demand responsiveness in the wholesale energy market could significantly reduce generators' capacity to exercise market power (that is, to withdraw capacity to obtain prices above marginal cost). Market power is most effectively exercised when the demand-side (customers) cannot respond to the prices charged. This currently occurs in the electricity market when customers face prices that do not reflect the wholesale market price's change in response to changing supply and demand conditions.

Interval meter based tariffs could make the market demand for electricity more price elastic and thus reduce the potential of generators to benefit from the exercise market power. However, individual customers could not capture this benefit because it would flow to the entire market through its effect on the market price. Accordingly, individual customers have lower than optimal incentives to install interval meters.

3.4.2 Reliability of supply

Electricity cannot be stored, so an increase in demand must be met from:

- increased generation capacity, increasing the reserve margin, or
- voluntary reductions in demand flowing from price increases (that is, demand-side responsiveness).

Having a high reserve margin to ensure the reliability of the electricity system is costly. While likely to avoid blackouts, this approach is inefficient because it involves significant investments in generation and network infrastructure that may have little use. If there were an increase in demand-side responsiveness, this could reduce the costs of maintaining the security and reliability of energy supply through underused investments in reserve capacity. In this situation, customers would decide whether to reduce consumption in particular periods when the price of energy was high. They would be rewarded for this behaviour with lower energy bills and the market would benefit from lower energy supply costs by reducing the need for large capacity margins aimed at ensuring blackouts do not occur.

For this reason, to the extent that installing interval meters would provide such benefits, either immediately or in the future, the benefits would be provided to the market as a whole rather than to the individual installing an interval meter. That is, individuals could not capture these benefits and, therefore, would not incorporate these benefits in their personal decision-making.

3.5 Increased market information

The efficient operation of markets depends on the existence of sufficient information for customers to make informed decisions. A potential barrier to the efficient marketing of time-of-use tariffs is uncertainty about the impact that any given time-of-use tariff would have on a customer's final bill. However, uncertainty of this kind could be eliminated only if information were available on each customer's energy consumption profile—that is, if interval meters were already installed.

A regulated rollout of interval meters would enable such information to be provided earlier and could be expected to accelerate the adoption of time-of-use tariffs. In this way, it could be expected to accelerate the present value benefits associated with those tariffs. Once customers have interval meters installed at their premises, and thus can access information on their consumption profile, they could more effectively assess competing retail offerings of time-of-use tariffs. This may involve them sharing information on their load profile with a range of prospective retailers, which would create incentives for competing retailers to win customers with low cost profiles and would probably encourage incumbent retailers to attempt to keep the customers. As a result, competition would be likely to increase in the retail market, and the take-up of time-of-use tariffs would accelerate. In contrast, without interval metering, customers must guess their load profile when deciding whether to shift to time-of-use tariffs.

3.6 Regulatory intervention is warranted

Comments from the submissions to the draft decision on the matter of whether intervention is warranted are outlined in Appendix C.3. The Commission considers that the submissions presented insufficient evidence to vary its conclusion that regulatory intervention is warranted. For the reasons provided in this section, therefore, the Commission has concluded that the net benefits available from the widespread installation of interval meters are unlikely to be achieved if the installation of interval meters is left to the market place.

The analysis presented indicates that the electricity retail market, without appropriate regulatory intervention is likely to continue to fail in relation to the timely installation of interval meters. This situation arises primarily for two reasons:

- Individual market participants could not capture the full benefits that would accrue to the market from their decisions to install interval meters
- The current profiling system, for the settlement of the wholesale electricity market, distorts the energy consumer's decisions on time-of-use metering and pricing.

As a result, there is likely to be continuing under provision of interval meters and a resulting loss of the potential efficiency benefits. The Commission has therefore concluded that regulatory action is warranted to overcome these market impediments and to realise the potential benefits available from a mandated rollout of interval meters.

4 Final decision and implementation

This section presents the Commission's decision and implementation proposals for the rollout of interval meters. Section 4.1 sets out the Commission's final decision on installing interval meters for electricity customers based on a targeted rollout across meter types, and the implementation timetable and related subsidiary decisions. Section 4.2 outlines the Commission's approach to recovering the costs associated with the meters and their rollout. Section 4.3 considers when interval data should be collected relative to when an interval meter is installed. Section 4.4 sets out some necessary changes to regulatory instruments to mandate the rollout. Finally, section 4.5 sets out the Commission's approach to implementation matters that will need to be addressed to ensure an effective rollout for all customers.

4.1 Final decision and implementation timetable

The Commission's final decision is to mandate a rollout of interval meters to all Victorian electricity customers, in accordance with the details contained in Table 2. This final decision accounts for stakeholder comments in response to the draft decision, and for further analysis and research (as outlined in the previous sections of this paper).

This decision varies from that presented in the draft decision paper, primarily in relation to the commencement of the rollout of interval meters for (1) customers with consumption greater than 160 MWh per year, (2) for customers with consumption less than 20 MWh per year and (3) for customers with single-phase, single-register (non-offpeak) meters. The purpose of this adjustment is to ensure the rollout is effective for the businesses and customers. The Commission is concerned to give sufficient time, following this decision, to planning and development of (1) industry systems and data exchange protocols and (2) techniques for managing increased quantities of interval data arising from the meters.

Planning for the overall rollout will commence from the release of this final decision, having regard to the need for the businesses to develop relevant plans and price-service proposals for the 2006 Electricity Distribution Price Review for submission by 21 October 2004.

In the draft decision paper, the Commission proposed implementation of the new and replacement policy for large customers (those with consumption over 160 MWh per year) to commence from November 2004. The Commission has considered this matter further, based on the submissions, further discussions with the businesses and the application of the Tariff Order.[16] The Commission's final decision is require all large customers to have interval meters by 2008 and to mandate new and replacement interval meters from 2006.

The Commission's final decision has also been varied to specify when the meter changeover program should be completed, rather than when it should commence and for how long the rollout should take to complete. This approach will add flexibility to the implementation options available to the distributors in the current price control period to 2006, and from 2006 when specific cost recovery will be available for the rollout.

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[16] The Victorian Electricity Supply Industry Tariff Order, under s.158A of the *Electricity Industry Act 1993*, defines excluded services.

Noting the need for a period of planning for the rollout and for the development of industry systems and protocols, the implementation timetable has also been adjusted, relative to the draft decision, for the small customer segment of the market. For business and residential customers with consumption less than 20 MWh per year and with offpeak, time-of-use and three phase meters, the rollout is to be completed by 2013. In this case, a distributor may commence a 7-year rollout in 2006 or a 5-year rollout in 2008. The Commission's expectation is, however, that relatively few meters will be changed over for these customers in the period before 2008. New and replacement interval meters will be required for these customers from 2006, the same commencement date as the draft decision.

For all customers with single-phase, non-offpeak meters the new and replacement program will similarly commence from 2008 rather than 2006.

The Commission has also varied the draft decision in respect of the communication capability of the interval meters. All meters are to be communication enabled (utilising 'open systems architecture') to ensure that the meter can facilitate remote reading without the need for a further meter changeover.

Table 2: Commission's final decision on a mandatory interval meter rollout

Consumption band	Metering installation	Typical customer	Interval meter rollout decision		Interval meter cost recovery approach
			Meter changeover	New and replacement	
Business greater than 160 MWh/year (first tier customers only)	All meters (three phase, CT connect; three-phase, direct connected)	Large office, large restaurant or industrial plant	To be completed by 2008	Mandated from 2006	Regulated excluded service
Business and residential Less than 160 MWh/year and greater than 20 MWh/year	Three phase, CT connected; three phase, direct connect; two phase	Medium office, café or large residential customer	To be completed by 2011	Mandated from 2006	Regulated prescribed service (separate metering charge)
	Single phase, offpeak; time of use	Residential, shop or small office, usually with electric hot water	To be completed by 2011	Mandated from 2006	Regulated prescribed service (separate metering charge)
Business and residential Less than 20 MWh/year	Three phase, CT connected; three phase, direct connect; two phase	Small office or café or large residential customer	To be completed by 2013	Mandated from 2006	Regulated prescribed service (separate metering charge)
	Single phase, offpeak; time of use	Residential, shop or small office, usually with electric hot water	To be completed by 2013	Mandated from 2006	Regulated prescribed service (separate metering charge)
Business and residential—all consumption	Single phase, non offpeak	Residential, shop or small office without electric hot water	Meter changeover not required	Mandated from 2008	Regulated prescribed service (separate metering charge)

Notes:

1. The National Electricity Code and/or the Electricity Customer Metering Code defines interval meter standards
2. Subject to the National Electricity Code requirements, automatic or remote reading is not mandated, however, all interval meters must be communications enabled.
3. The decision applies to all customer meters covered by the relevant Victorian metering codes.
4. The decision applies to both import and export meters.
5. Interval meter cost recovery approach based on distributor's standard interval meter.

4.2 Pricing and cost recovery of interval meter rollout

This section sets out the Commission's decision on the recovery of costs associated with an interval meter rollout. Table 2 summarised the intended approach to cost recovery. The Commission confirms its approach proposed in the draft decision paper that small customers will share the charges for interval meters, by meter type, and that large customers will pay an excluded service charge relating to the cost of the meter.

Basic meter costs are currently collected through a combination of the network tariff and the connection charge, and customers generally are not subject to a specific metering charge for a standard meter. The incremental costs for interval meters (as outlined in this paper) exclude the existing charge, which will remain a component of the network tariff, at least until the next regulatory price control period commencing in 2006.

The jurisdictional regulators have recommended (Appendix C.4.1) that (1) retailer choice of 'Responsible Person' is appropriate for all 'large' first tier customers and second tier customers with metering installation types 1–4 and (2) metering service charges should be unbundled from the network tariffs. In accepting these recommendations, the Commission must address how to progress them for the 2006 regulatory period and how to determine the impact on the cost recovery associated with rolling out interval meters.

The Commission has published two papers[17] to progress these recommendations and will finalise this matter in the context of the 2006 Electricity Distribution Price Review. The proposed approach is outlined below.

4.2.1 Large customers

The Commission proposes that metering services for large first tier customers be provided on a competitive basis from 1 January 2006 (the commencement of the next regulatory price control period). In addition, the Commission must determine whether the metering service charges will be regulated or whether they will continue to be subject to some form of regulation (similarly to large second tier customers).

The charges for metering services for second tier customers with a metering installations type 1, 2, 3 or 4 are not part of the network tariffs, nor does the Commission regulate these charges.[18] While the Commission is not mandating in this decision metering installation types 1– 4, a large first tier customer may install a meter that has this capability. In this case, the metering services are provided on a similar basis to those provided to large second tier customers where there are many metering providers. Accordingly, the Commission does not propose to regulate charges for metering services provided to first tier customers with a meter that has the capability to meet the requirements of a metering installation type 1– 4.

Alternatively, a large first tier customer may have an interval meter that is read manually consistent with the decision to mandate manually read interval meters. The potential for

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17 Essential Services Commission, *Metering Services - Metering Services Issues for Consultation and for Clarification for the 2006 Electricity Distribution Price Review,* June 2004b, and Essential Services Commission, *Final framework and Approach, Volume 1 Guidance Paper,* June 2004.

18 See the National Electricity Code for definitions of meter installation types

competition in the metering services provided to these customers exists, but the timeframe within which effective competition may arise is uncertain. The Commission proposes, therefore, that the provision of standard interval meters to large first tier customers be regulated as an excluded service.

4.2.2 Small customers

Interval meter provision and metering data services for small customers are both currently treated as an excluded service. The charges have been structured in this way on the basis of longer term potential for competition in metering services for small customers.

However, the jurisdictional regulators' provided a draft recommendation that basic metering services for small customers should not be competitive.[19] Assuming that, an extension to the derogation is authorised in the short term[20] and that the National Electricity Code is amended in the longer term, as recommended by the jurisdictional regulators, then the provision of basic metering services for all small customers[21] will be the exclusive responsibility of the distributor. That is, competition in metering services for small customers is not expected in the 2006 regulatory period.

In the absence of competition, the Commission intends to classify distributors' standard metering services for small customers as prescribed services and to continue to classify the provision of non-standard metering as an excluded service. A separate charge to the network tariff will be determined, however, for the distributor's standard metering services.

From the commencement of interval meter provision under this decision, services associated with a distributor's standard interval meter would be regarded as that distributor's standard metering service. Accordingly, the metering services associated with the interval meter rollout for small customers would be prescribed services from the commencement of the rollout.

The key advantage of classifying standard metering services for small customers as prescribed services is the additional certainty for distributors about the recovery of costs. However, this classification means there is not potential, or effective competition for these 'basic' metering services.

Additionally, the Commission proposes that metering services for small customers, where these services are not the distributor's standard metering services, continue to be classified as excluded services. Before interval meters are provided for a customer segment under this decision, a standard meter may continue to be an accumulation meter, at the choice of the distributor; after mandation commences a standard meter will be an interval meter.

Table 3 summaries the Commission's proposed approach to recovering the cost of metering services for all customers.

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19 Essential Services Commission, Essential Services Commission of South Australia, Independent Competition and Regulatory Commission (ACT), Independent Pricing and Regulatory Tribunal of NSW (IPART), Office of the Tasmanian Energy Regulator and Queensland Competition Authority 2003, *Joint Jurisdictional Review of Metrology Procedures—Draft Report*, December. p. 12.

20 Interim authorisation was granted by the ACCC to extend the derogation on 16 June 2004.

21 'Small customers' being those that consume less than 160 MWh per annum and that do not have a meter that has the capability to meet the requirements of a type 1, 2, 3 or 4 metering installation.

Table 3: Summary of cost recovery approach for interval meters

Meter type	Customer segment	Prior to 2006 (current price control period)	From 2006
Interval meter (type 5)	**Greater than 160 MWh per year (first tier only)**	**Regulated excluded service for distributor's standard type 5 meter**	**Regulated excluded service for distributor's standard type 5 meter**
	Less than 160 MWh per year	**Regulated excluded service for distributor's standard type 5 meter**	**Regulated prescribed service for distributor's standard type 5 meter**
Non- standard meter	**All consumption segments**	**Non-standard type 5 or 6 — excluded service based on cost**	**Non-standard type 5 (see note 3) — excluded service based on cost**

Notes:

1. In some circumstances in which the retailer (on behalf of the customer) requests an interval meter, an installation fee may be charged.
2. For the period after 2006, whether the provision charge includes the specific interval meter rollout cost will be subject to when the distributors' rollout program commences.
3. From the relevant new and replacement date after which an interval meter must be installed and once such a meter has been installed, an interval meter cannot be replaced by an accumulation meter.
4. The Commission does not regulate the charges for meter types 1 – 4.

4.3 Collection of interval meter data

The Commission has further considered the question of when interval data should be collected from an interval meter. This question applies, in particular, to interval meters installed before the rollout commences, but also to meters installed under the decision. The Commission emphasises, however, that the collection and use of interval data are ultimately essential to achieve the benefits of interval meters.

Following the installation of an interval meter, the question of when to commence using the interval data for settlement must account for the ability of the distributors and other industry participants — including NEMMCO[22] — to manage the quantity of interval data. For retailers, a change in the settlement approach for some of their customers will occur. The collection of interval data thus may have an impact on the customers' retail tariff based on their contract in this situation.

For this reason, the Commission needs to clarify the requirement to collect interval data from interval meters in the intervening period before the mandatory rollout.

The jurisdictional regulators recommended in their draft report:

[22] National Electricity Market Management Company (NEMMCO), the operator of the wholesale electricity market

> *Once installed, interval meters should not be replaced with accumulation meters unless specific jurisdictional exceptions are provided for;*
>
> *Above a threshold established by the jurisdiction, an interval meter must be read as an interval meter;*
>
> *Below the threshold established by the jurisdiction, an interval meter may be read as an accumulation meter; and*
>
> *Each jurisdiction establishes the threshold referred to above, and review it from time to time based on the development of the market in that jurisdiction*[23].

Industry also expressed concern in submissions about the ability to manage interval data before systems are developed to meet the primary dates for the mass-market commencement of the interval meter rollout.

The Commission indicated in the draft decision paper that it would consider reviewing the Metrology Procedure and Electricity Customer Metering Code requirement that interval data be collected from an interval meter for customers with consumption less than 160 MWh per year before a defined date.[24] The Commission expects that distributors will install interval meters in some circumstances before the mandatory rollout and it seeks to ensure efficient decisions by the distributors are not unduly influenced by a need to collect data before appropriate systems can be implemented.

The Commission's decision to adjust the date of the rollout for customers with consumption less than 20 MWh per year relative to the date proposed in the draft decision means the number of interval meters will increase more gradually and provides more time to prepare for managing larger quantities of interval data. This approach provides time for the planning and development of systems for interval data collection and managing the volume of interval data. It also allows sufficient time for second tier retailers, in particular, to address any customer contract issues with market settlement changing from being profile based to being based on interval data.

The Commission's decision on this matter is that interval data are to be collected when an interval meter is installed and commissioned (accounting for the decision's flexibility for the distributors to commence the program), from the dates in Table 4. The Commission proposes to vary the Metrology Procedure and the Electricity Customer Metering Code to provide for the collection of interval data consistent with the decision on the rollout and these dates for data collection. The Commission will retain the ongoing requirement to collect interval data from interval meters installed before the changes to the relevant metering codes. This decision does not prevent the collection of interval data from an earlier date where, for example, interval data is requested.

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23 Essential Services Commission, Essential Services Commission of South Australia, Independent Competition and Regulatory Commission (ACT), Independent Pricing and Regulatory Tribunal of NSW (IPART), Office of the Tasmanian Energy Regulator and Queensland Competition Authority 2003, *Joint Jurisdictional Review of Metrology Procedures—Draft Report*, December. p. 15.

24 Essential Services Commission 2004a, op. cit., p. 30.

The Commission also proposes to retain the existing policy that an interval meter, once installed, should not be replaced with an accumulation meter.

Table 4: Decision on timing of the collection of interval data

Meter type and customer consumption	Dates from when interval data must be collected	
	Prior to mandation date of interval meter or date of changeover of meter under distributor's changeover program	After mandation date of interval meter or date of changeover of meter under distributor's changeover program
Greater than 160 MWh per year	On installation of interval meter	On installation of the interval meter
Less than 160 MWh per year and greater than 20 MWh per year Other than single phase single rate meters	No requirement to collect interval data before 2006	From 2006, on installation of the interval meter
Less than 20 MWh per year other than single phase, single rate meters, and All single phase single rate meters	No requirement to collect interval data before 2008	From 2008, on installation of the interval meter

4.4 Changes to regulatory instruments

Regulatory instruments would need to be changed to mandate the decision to rollout interval meters. Some complexity arises in mandating the decision, given the need to ensure during the relatively long transitional period that the meter types involved, based on changing circumstances, continue to meet the metering requirements.

What constitutes a compliant metering installation for a supply point will differ, depending on whether it is a new supply point or one for which the meter needed replacement (in which case, former 'basic' meters are noncompliant) or otherwise (in which case, existing meters are compliant, unless the customer elects to require a new interval meter).

Changes (including transitional or phase-in requirements) in the Electricity Customer Metering Code—which sets out the meter installation requirements for first and second tier customers—will mandate the substantive policy.

Where the rollout requires a meter changeover, the Commission will allow considerable discretion to the distribution businesses, by adopting a light handed regulatory approach. In this way, the regulatory instruments will specify the end date after which all customers in the segment and with each meter type will be required to have an interval meter. For the new and replacement policy, the metering code will set out the date after which all new and

replacement meters need to be interval meters. Minor consequential amendments to other instruments (including the distribution licence) may also be required.

Draft variations to the Electricity Customer Metering Code to mandate the decision to provide interval meters based on the dates in Table 2, relating to customer size and meter type, are set out in Appendices D.1 and D.2. Draft changes to the Electricity Customer Metering Code (similar changes will also be made to the Metrology Procedure) to require interval data to be collected from the dates specified in Table 4 are set out in Appendix D.3.

The Electricity Customer Metering Code, Metrology Procedure and other instruments will now be varied consistent with the Commission's final decision. Separate specific consultation will be take place on the proposed variations to the instruments in the context of the final decision. As indicated in Table 5, the varied instruments will be issued in August for consultation and it is expected that the changes will be completed by October 2004.

4.5 Implementation issues

In its draft decision, the Commission sought comment on all aspects of the proposed approach to planning and implementing the interval meter rollout program, particularly on:

- the arrangements proposed for the strategic oversight, co-ordination and monitoring of the planning and implementation processes and for addressing some of the more technical and operational issues through working groups with appropriate representation, resourcing and terms of reference
- the implementation issues identified and whether any other implementation issues need to be considered before the final decision
- any other issues with commencing a new and replacement policy for large customers in 2004—particularly issues regarding the proposed charging mechanism and the customers to whom the policy should apply
- any other issues if varying the requirement that interval data be collected from small customers with interval meters.

Stakeholders generally supported the arrangements proposed for the strategic oversight, co-ordination and monitoring of the planning and implementation processes and for addressing some of the more technical and operational issues, where necessary, through working groups. There was some concern, however, that these groups could be too heavy handed and might become too involved with the day-to-day management of the rollout.

The Commission considers that a light handed approach to regulating the implementation of the interval meter procurement and installation program is justified and that the distributors are best placed to plan and execute an efficient rollout of interval meters. However, the Commission will take a proactive facilitation role to ensure that the implementation issues are resolved and that the current industry and NEMMCO processes will deliver industry wide systems to enable the necessary data flows arising from the rollout of interval meters.

Additional implementation issues identified by stakeholders are outlined and discussed in Appendix C.5.

The Commission's final decision has provided more time to resolve many of these implementation issues and this final decision outlines an approach for addressing many of these issues. Under this decision, the Commission will not mandate interval meters for any customer before 2006. Relative to the draft decision, this adjustment to the commencement of the new and replacement rollout for small customers, and when data should be collected from customers, delays the commencement of the collection of large volumes of interval data.

The Commission considers there is a need for a high level steering group to act as a clearing-house for issues that are likely to affect all the regulated businesses as the implementation proceeds. The Commission would sponsor and participate in such a group. To provide clarity for the 2006 Electricity Distribution Price Review, the Commission proposes to convene the initial meeting shortly after the release of this paper. The objective of the meeting will be to:

1. identify any additional implementation issues
2. prioritise the implementation issues – those that need to be resolved before submissions to the 2006 Electricity Distribution Price Review are required, before 2006 and before the rollout of larger volumes of interval meters
3. identify which party, or parties, will be responsible for resolving each of these implementation issues
4. develop an overall project plan for the resolution of these issues.

The Commission will also conduct a communication campaign with customers to ensure customers know the rollout is taking place and understand that the Commission requires it. The communication would also cover some operational issues and indicate to customers the broad reasons for interval meters being installed.

Two communication campaigns may be required, depending on when the installation programs commence for small customers: one campaign for 2006 and a second for 2008. The Commission would expect such campaigns to operate in consultation with the distributors, retailers, and other stakeholders.

The Commission will directly consult with its Customer Consultative Committee on the form and content of the proposed communication. In addition, the industry steering group would provide a direct point of contact with industry on communication matters. The Commission will start developing the initial communication campaign during 2005.

As part of the 2006 Electricity Distribution Price Review, the distributors are required to submit price-service proposals for the 2006 regulatory period to the Commission in October 2004. In providing guidance to the distributors, the Final Framework papers[25] indicate that they are to include an explanation of the proposed costs associated with their metering responsibilities and the charges proposed for the recovery of those costs in their price-service proposals, based on this final decision. This will include forecasts of the number of interval meters to be rolled out in each year between 2006 and 2012, and their unit costs. Any benefits that the distributors gain from the rollout of interval meters, in terms of reductions in expenditure, should also be reflected in their price-service proposals.

[25] Essential Services Commission 2004, *Final Framework and Approach: Volume 1, Guidance Paper* and *Final Framework and Approach: Volume 2, Information Requirements and Templates*.

The price-service proposals should also outline and address any implementation issues and, in reviewing these proposals, the Commission will consider any outcomes from the steering committee. In its assessment of the price-service proposals the Commission will also have regard to the cost analysis underpinning this decision for the mandatory rollout of interval meters.

4.6 Next steps

In summary, the activities to be undertaken to implement the Commission's decision with respect to a rollout of interval meters are summarised in the following table.

Table 5: Next steps for implementing this decision

Activity	Date
Release of Final Decision on the rollout of interval meters	**9 July 2004**
Workshop on implementation issues	**30 July 2004**
Amend regulatory instruments: • **Release for consultation** • **Publish amended instruments**	 • **August 2004** • **October 2004**
2006 Electricity Distribution Price Review[26] – distributors' price-service proposals	**21 October 2004**
Communication campaign: • **2006 communication (planning and implementation)** • **2008 communication (planning and implementation)**	 • **January – December 2005** • **January – December 2007**

[26] Essential Services Commission 2004, *Electricity Distribution Price Review 2006 – Final framework and Approach: Volume 1, Guidance Paper,* has a complete timetable for the 2006 Electricity Distribution Price Review.

A Appendix—the role of metering

Electricity meters are required to determine how much electricity customers use, and they have primarily enabled electricity retailers to bill customers for electricity consumed, according to agreed contract pricing or regulated tariffs. In the restructured electricity market, metering now also enables;

- distribution and/or transmission networks owners to charge retailers for distribution and transmission use-of-system services
- retailers to settle on electricity purchased in the national electricity market, in accordance with the National Electricity Code.

Distribution businesses generally own and are responsible for installing electricity meters for small customers. For customers, meters measure and record the electricity used and paid for. Most small business and domestic customers in Victoria have a basic accumulation meter that records aggregate energy use over either one month or one quarter; some Victorian customers have interval meters that can measure and record the energy consumed in each half-hourly period.

Each sector of the electricity industry thus relies on metering information, which is vital to the efficient functioning of the market. Various types of meter are available, and the National Electricity Code, the Metrology Procedure and the Electricity Customer Metering Code set out minimum metering requirements depending on customer characteristics. An individual interval meter can be installed by the distribution business or at the request of the retailer or the customer. While the costs of interval meters have been falling, they are generally higher than those of a basic meter.

A.1 Interval metering

The introduction of the national electricity market, which prices energy each half-hour, has led to changes to metering, including the introduction of interval metering capable of time-of-use readings. In the national electricity market, retailers purchase wholesale energy to supply their customers on a half-hour basis. Traditional electromechanical single-rate metering (accumulation metering) does not record the time-of-use of electricity, so cannot support efficient pricing structures that reflect the costs incurred by retailers in the wholesale market.

An interval meter enables customers to face prices that more closely reflect the cost to the retailer of purchasing electricity when it is used. The customer may thus pay a higher price for using electricity in peak (high cost) times, but a lower price for using electricity in the cheaper offpeak times. In contrast, charges to customers with an accumulation meter are based on an average profile of half-hour electricity use. For these customers, there is no direct link between the retailer's cost of providing electricity to each customer, when the electricity is actually used and the price paid for it.

Some tens of thousands of interval meters are in use in Victoria, making up a small but growing proportion of the total number of electricity meters. In limited circumstances, interval meters are installed instead of basic meters. Large customers (those consuming greater than 160 MWh per year), for example, must install interval meters when they choose a retailer that is not their local retailer.

A.2 Current regulatory arrangements

The metering of electricity supply in Victoria is already subject to regulatory requirements aimed at supporting the efficient operation of the market and the development of competition. These regulatory arrangements include technical requirements for meters, set roles and responsibilities for meter installation and administration, the use of the load profile to settle the market and non-reversions to basic meter requirements. Regulatory requirements also apply to the type of metering installation and the responsibility for metering provision. In relation to second tier customers, the National Electricity Code provides that a customer's retailer should be responsible for the metering installation (that is, both meter provision and data management). The purpose of this requirement is to allow competitive metering and data services, and thus retailer choice of metering providers, and to provide for innovation driven by retailers.

The Victorian Government has derogated from this provision for small customers. For second tier customers using a manually read interval meter or a basic accumulation meter, the derogation means the distributor (not the retailer) is responsible for meter provision and metering data services. As previously noted, the Australian Competition and Consumer Commission granted interim authorisation for the extension of the metering derogation on 16 June 2004.

The question of a further extension of competition in metering provision has important implications for an interval meter rollout. The Commission's position is that distributors should continue to own and be responsible for meters for small customers. The jurisdictional regulators' have also recommended in their draft report that basic metering services for small customers should not be competitive (see note 19). The costs of the rollout discussed in this final decision assume a continuation of the current approach. The costs of a rollout would be likely to be higher if distributors were no longer responsible for metering.

The introduction of the load profile is also a form of market intervention designed to help realise the productive efficiencies of the competitive market. 'Profiling' means a retailer is charged against the profile (defined in the Metrology Procedure) that accounts for the customer's total use, but not for the specific customer's pattern of use. The profiling arrangements enable retailers to settle on a half-hourly basis by applying a profile where second tier customers' consumption is not metered each half-hour.

Further current regulatory obligations exist to ensure (1) an interval meter, once installed, cannot be replaced by a basic meter and (2) interval data are collected from each interval meter.

B Appendix—list of submissions

The Commission received submissions from the following stakeholders to the draft decision:

Submission no.	Name / organisation	Reference in paper	Stakeholder group
1	AGL	AGL	Retailer
2	AGL, Origin Energy & TXU	Host retailers	Retailer
3	Australian Retirement Communities	ARC	Consumer
4	Bob Smith Associates	BSA	Meters
5	Centurion Metering Technologies	Centurion	Meters
6	CitiPower Pty and Powercor Australia Ltd	CitiPower and Powercor	Distribution
7a	Headberry Partners	Headberry	Consumer
7b	Consumer Utility Advocacy Centre / Headberry Partners	Headberry (CUAC)	Consumer
8	Energy and Water Ombudsman (Victoria)	EWOV	Consumer
9	Energy Retailers Association of Australia	ERAA	Retailer
10	Ergon Energy Retail	Ergon Retail	Retailer
11	Kari Jortikka	Jortikka	Consumer
12	Landis + Gyr	L+G	Meters
13	National Electricity Management Company	NEMMCO	National Electricity Market (NEM)
14	Origin Energy Retail Ltd	Origin Energy	Retailer
15	Polymeters Response International	PRI	Meters
16	TXU Networks	TXU Networks	Distribution
17	TXU Retail	TXU Retail	Retailer
18	United Energy	United Energy	Distribution
19	Village Glen, The	Village Glen	Consumer

C Appendix—consideration of stakeholders' responses to the draft decision

This appendix details comments from the submissions on the draft decision and the Commission's consideration of these matters. It outlines and discusses the comments made under the following broad headings:

- general comments on the proposed interval meter rollout are discussed in Appendix C.1
- cost-benefit analysis—Appendix C.2
- justification for regulatory intervention—Appendix C.3
- draft decision and implementation framework—Appendix C.4
- implementation issues to be addressed—Appendix 0
- interval meter cost model assumptions—Appendix 0.

C.1 General comments on the proposed interval meter rollout

The submissions included:

- differing views on overall support for the draft decision
- concerns about jurisdictional inconsistency
- suggestions that other options for demand management and price signalling should be further examined.

General comments on the proposed interval meter rollout

Ergon Energy Retail, Bob Smith Associates (BSA) and Polymeters Response International (PRI) were supportive of the Commission's recommendations. Centurion Metering Technologies (Centurion), TXU Networks and United Energy also provided in principle support, but had concerns about the cost-benefit analysis and/or implementation model. Similarly, AGL was not opposed to an interval meter rollout *per se*, but it had a number of concerns about the proposed rollout to all customers.

However, Origin Energy suggested:

> *... the magnitude of the cost revisions required between the position paper and the discussion paper, together with the universal concerns expressed by industry participants, provides no confidence in the Commission's findings.*[27]

Landis+Gyr (L+G) had a similar concern and considered the Commission's draft decision is:

> *... nothing more than a highly speculative technical and social experiment.*[28]

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27 Origin Energy response to the draft decision, p.1

28 Landis+Gyr response to the draft decision, p.5

Jurisdictional inconsistency

AGL, the Host retailers[29], the Energy Retailers Association of Australia (ERAA) and Origin Energy expressed concern that the Commission's proposal was inconsistent with positions on interval meter rollouts in other jurisdictions, as summarised in the Ministerial Council of Energy's March 2004 discussion paper *Improving User Participation in the Australian Energy Market.*

The Host retailers considered that the proposed interval meter rollout means:

> *... Victoria is therefore heading down a path of further entrenching regulatory fragmentation within Australia, at a time when there is a major and significant effort to achieve national harmonisation. Such a push will increase again the costs of doing business in energy in Australia, consequently increasing the costs to consumers.*[30]

TXU Retail also expressed a similar concern, while Origin Energy was concerned that the Commission's proposal was inconsistent with the move to a single national regulator.

Consideration of all options

AGL, the ERAA, Headberry Partners (Headberry), L+G and Origin Energy suggested the Commission should analyse other or all options for reducing peak demand and providing price signals to consumers, such as lower cost alternatives, time-of -use meters and two-way communications.

AGL suggested that low costs alternatives include summer and inverse block tariffs, rebalanced distribution charges and improved profiles through hot water peel off. Origin Energy considered two-way communications technology should be assessed as it:

> *... would have the potential to provide an integrated metering solution encompassing other utility services, and also addresses energy industry issues not considered, such as billing, customer transfers, and meter reading services.*[31]

C.1.1 General comments on the proposed interval meter rollout – the Commission's consideration

General comments on the proposed interval meter rollout and a consideration of all options

The Commission's draft decision was criticised, based on the results of the revised cost-benefit analysis set out in the Commission's draft decision paper.[32] One concern expressed was that the benefits in the case of small customers do not sufficiently exceed the costs for interval meters to be confidently introduced for these customers.

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29 'Host retailers' refers to the joint response to the draft decision by AGL, Origin Energy and TXU Retail.

30 Host retailers response to the draft decision, p.2

31 Origin Energy response to the draft decision, p.2

32 Essential Services Commission 2004a, Table 4, p. 80

The purpose of performing the analysis discussed in the draft decision paper was to determine whether there is an economic case for introducing interval meters, based on the quantified costs and quantified partial benefits. If there is a reasonable case based on this analysis, then no further quantification of benefits is required, because this would only improve the case. The economic analysis is thus limited in scope and designed to test the hypothesis that there is an economic case for introducing interval meters.

Further, the Commission does not agree that the introduction of interval meters for all customers is speculative. The market is predicated on interval data and the use of a profile for small customers in its current form is transitionary. Interval meters are already being installed and interval data are replacing accumulation data in the market. Based on technological developments, electronic meters that are interval capable will soon predominate in the meter supply market.

For offpeak customers, as the Commission has previously noted, many of these metering installations are likely to be replaced with a single-element rather than a dual-element meter as has been assumed in the costs; again, this would have the effect of increasing the benefit-to-cost ratio. Further, offpeak customers will gain benefits through increased competition, because the profile that is currently applied means the competitive retailers often cannot make offers that properly compete with those of the local retailer. This important competition benefit has not been quantified.

The Commission has revised the cost-benefit analysis for customers with single-register, single-phase meters and the results of this analysis are presented in Table 1 and discussed in section 2.2. The revised present value of costs is about the same as that of the benefits when adopting the costs from Appendix D of the draft decision paper and making further reasonable assumptions about the development and cost of metering technology over a 40-year period. The revised analysis has reduced the estimated net benefit (present value benefit less present value cost) for the small customer meter categories (single-phase without electric hot water). While these costs reflect some conservative assumptions and reasonable industry estimates, the estimates of benefits are limited to the avoided capital expenditure required to meet peak demand; they exclude the quantification of other benefits outlined in section 2.1 and thus represent only part of the overall benefits of interval meters.

The Commission has not considered all the options by which demand reductions may occur and it expects that retailers and distributors are best placed to consider innovative market developments. In the case of demand management, interval meters will facilitate these innovations. A key purpose of interval meters is to ensure customers have price signals that relate to their load. Price signals will enable customers to choose how and when they use appliances that consume power, which has the effect of stimulating demand response and helps increase market efficiency. Low cost approaches may be available for remotely controlling certain loads or indicating to customers that demand should be reduced, for example. The Commission's considers that all these approaches will benefit from interval meters, which will (1) provide an appropriate incentive for a demand management response and (2) maximise such benefits by sharpening the price signals. That is, the interval meter does not replace these technologies, but it enables them to provide price signals to retailers and also to customers. The price signals facilitate better information for customers, thus enabling customers to exercise greater discretion in the use of load and to benefit from that control.

The Commission's position paper and draft decision paper noted that two-way communication is likely to provide further benefits where installed. Worldwide, there are many cases of the implementation of automatic meter reading (AMR) being implemented and one key case where two-way communication and load control are being implemented for all customers: the Italian utility, ENEL, is installing two-way communication and load control for all its 30 million customers and around 15 million meters have now been installed.[33] ENEL lists demand-side management among the benefits of this system, which also includes many other utility benefits. AMR is significant in North America with around 61 million units having been installed by 2004 for electricity, water and gas meters.[34] In this case, the Commission understands the benefits of AMR derive mostly from the utility avoiding the cost of the monthly manual reading of meters.

Meter communication can provide a number of benefits, which include meter reading (including avoiding the extra costs of reading hard-to-reach meters), load control, outage detection and notification and power quality monitoring. It can also provide other benefits in the market, such as, the capability to read the meter for transfers and 'move-ins'; and even to allow remote connection and disconnection.

While the Commission has previously noted that the further benefits of meter communication are uncertain and that the systems may not be fully commercialised, the above evidence suggests these systems are now likely to be fully commercial. The Commission does not propose at this time, however, to mandate meter communications for the following reasons;

- The regulatory uncertainty associated with responsibility for such systems will be resolved following the completion of the Joint Jurisdictional Review of Metrology Procedures (see note 23)
- The benefits of meter communications accrue largely to the distributor, or can be valued by a retailer if a distributor offers the service
- Market failure that warrants regulatory intervention has not been demonstrated.

Jurisdictional inconsistency

The Commission does not accept the proposition that mandating interval meters is materially inconsistent with national direction. Under the National Electricity Code, interval meters are required for large customers who shift retailer in all jurisdictions and may be installed at the request of smaller customers. NEMMCO has reported that there are 134,000 active interval meters in the National Electricity Market as at March 2004.[35] Many distributors are installing interval meters where they represent the most cost-effective meter for the customer's circumstances. Energy Australia has decided to install interval meters for all customers with consumption above 15 MWh per year; this means they will install a few hundred thousand

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33 *ENEL Telegestore Project is on Track*, Metering International, Issue 1, 2004 p. 15

34 *Worldwide AMR Deployments,* Scott, H. A., Presentation at Metering Australia & New Zealand 2004, April, 2004

35 *Metering and Retail Market Development 2004 Annual Report,* National Electricity Market Management Company (NEMMCO), June 2004, p 34.

meters over the next five years.[36] Interval meters are, therefore, a natural feature of the market and not a feature confined to a single jurisdiction.

While the Ministerial Council on Energy's approach to user participation has not been finalised it is likely to allow for such a decision to be made for each jurisdiction. A single national decision is unlikely, given that key characteristics differ by the region in the National Electricity Market (such as the incidence of summer needle peaks that follow jurisdictional boundaries). Further, the Joint Jurisdictional Review of Metrology Procedures (see footnote 23) also recommended that each jurisdiction consider interval meters and account for specific jurisdictional issues (section 8.5 of the draft report, page 69).

C.2 Costs and benefits

The submissions provided extensive comments — they are summarised below according to the potential key benefits in the draft decision paper.

General comments on the cost-benefit analysis

BSA considered that the rollout would provide significant financial and environmental benefits, and would provide meter manufacturers with the confidence to invest and innovate.

PRI considered the rollout would provide real equity from generators to consumers. Headberry, however, suggested generators have an asymmetry of power that cannot be offset by demand management because the generators:

> *... have the ability to offload and reload very large bites of power much faster than any group of consumers can hope to emulate.*[37]

The Host retailers suggested that if the unquantified benefits were significant or reliable, then the Commission would have quantified them. However, BSA argued that these benefits while not quantified, are real and should be noted when the benefits of the rollout are discussed.

AGL suggested the majority of customers would be likely to pay more for energy under the proposal due to the high costs involved.

Increased efficiency of the combined wholesale and retail electricity markets

While BSA, Ergon Energy Retail and Jortikka agreed that increased market efficiency would be a key benefit of the proposed interval meter rollout, AGL, Headberry, TXU Networks and TXU Retail were not convinced. AGL noted:

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[36] See Energy Australia's submission to the joint jurisdictional review issues paper, on the Essential Services Commission website (www.esc.vic.gov.au/apps/page/user/pdf/MetrologyReviewSubmission_EnergyAust.pdf)

[37] Headberry Partners, *Interval Metering of Electricity Supplies to Domestic Customers*, February 2004, p.6

> *While some customer may be in a position to shift some of their demand to off-peak periods, AGL does not believe that this will necessarily lead to a significant alteration to the shape of the load.*
>
> *Victoria is a summer peaking market with peaks driven by airconditioning use at times of high temperatures. When temperatures are extremely high it is unlikely that current airconditioning users will turn their airconditioners off.*[38]

Headberry surveyed of a sample of 180 domestic customers and found a high resistance to customers changing their electricity consumption patterns, particularly the elements related to personal comfort. TXU Networks also suggested high inertia would act against customers shifting their loads.

United Energy noted that there will be no price signals to encourage a demand response (unless there is some requirement to move to a more cost reflective tariff), so the benefits would not be recognised.

Provision of capacity and incentive for customers to manage their electricity consumption more efficiently

Ergon Energy Retail noted that a key benefits would be customers' ability to manage more efficiently their electricity consumption. Jortikka agreed that interval meters would provide the tools for managing electricity consumption, but noted that that the challenge would be in providing the incentive to customers to do so.

Headberry suggested consumers do not have the ability to manage their demand response to the wholesale market or to obtain information fast enough to respond:

> *The information provision to most domestic consumers is delayed, and requires continuous attention. Domestic consumers advise that at the times when load shifting is needed (mid afternoon in summer and early evening in winter) up to 60% of households do not have an adult present to carryout such a function. To enable such a response will require the householder to invest significant capital to hard wire remote switching all major appliances and to install computer programs to continuously download data from the NEMMCO website and action the switching dependent on pricing which will posted after the pricing event has occurred.*[39]

The ERAA agreed, in principle, that the adoption of interval meters for all customers is one means of encouraging sharper demand-side price signals, but not clearly more effective than other options for reducing the demand of small customers.

TXU Retail was concerned about the assumed magnitude of consumers' response to price signals (demand elasticity) and would like to see several key questions answered:

- How do consumers respond to the *ex post* price signal that monthly billing arrangements provide?

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38 AGL response to the draft decision, p.4

39 Headberry Partners, op cit., p.6.

- How large does the price signal need to be to induce the assumed response?
- Is additional equipment installed in consumer premises assumed to be available to facilitate/enable this response?
- Has the cost of any such consumer equipment been factored into the cost-benefit analysis?

TXU Networks suggested the evidence presented by the Commission does not assist in determining whether the required behavioural changes will occur.

Increased efficiency and product innovation

BSA agreed that the interval meter rollout would provide incentives for tariff innovation. However, AGL and Headberry noted that developing complex tariffs would incur costs and argued that experience with customers already on interval meters indicates customers want relatively simple tariff structures.

AGL suggested there are far more cost-effective ways of sending price signals to customers, such as the introduction of seasonal and inverse block tariff structures.

Several stakeholders commented on regulatory restrictions on retailers that limit the extent to which innovative tariffs might be implemented. Appendix C.5.1 considers these comments in the context of customer issues.

Provide distributors with the capability and incentive to introduce more efficient pricing

TXU Networks agreed that the potential for distributors to introduce more efficient tariffs is a potential benefit, but noted that the retail tariff would need to reflect the price signals:

> *... for distribution pricing to be effective in improving the use of the network, a level of coincidence between network price signals and those received by the end-customer through retail prices is required. Given a retail requirement to offer pricing across a number of distribution networks, it is unlikely that this coincidence will occur to the degree necessary to encourage changes in customer behaviour that alleviate network constraints.*[40]

Headberry argued that distributors already have the capability to provide incentives to minimise peak demand on the network, and it used United Energy's 'summer peak energy charge' as an example of such a practice.

Again, several stakeholders commented on the regulatory restrictions on distributors limiting the extent to which innovative tariffs might be implemented.

[40] TXU Networks response to the draft decision, p.5

Improvements in operational network management

TXU Networks agreed that improvements in operational network management are possible, but noted that the advantages of remote meter reading for small customers are unlikely to exceed the costs of deploying this technology.

Headberry noted that there are already ways of remotely reading interval meters and suggested that interval metering is not required for network management, because distributors already know the demand on their networks and, if they require more information, there are cheaper alternatives than installing interval meters at every house.

Increased accuracy of settlement and equity among customers

Headberry agreed that potential benefits are more accurate settlement and equity among customers, but questioned whether current settlement inaccuracies are sufficiently great to necessitate an interval meter rollout.

TXU Networks highlighted that unwinding cross-subsidies between customers resulting from average pricing is perceived as a benefit, while the cross-subsidy between rural and urban customers is generally not addressed.

Reduced disputes associated with, and need for, estimated data

TXU Networks agreed that some forms of dispute may be reduced, but considered it likely that other forms of dispute would increase. TXU Networks provided the following example:

> *... where it is not possible to obtain access to a customer's meter, or data needs to be substituted, half-hourly estimates may not reconcile back to the accumulation amount, leading to permanent inaccuracies in customer bills.*[41]

Revised cost-benefit analysis

CitiPower and Powercor noted that the case for an interval meter rollout to all three-phase metering installation appears to be compelling, but not so for single-phase, single-register metering given the small margin between assessed benefits and costs. AGL, the Host retailers, Origin Energy and TXU Retail were also concerned about the small net benefit for small customers and in particular the low margin for error. The Host retailers argued that:

> *In proceeding with a mandated rollout of meters for [small customers] based on high level order of magnitude quantification, the Commission risks making a decision that is not economically efficient.*[42]

AGL suggested:

> *Given the uncertainty of a number of significant inputs to the modelling, including customer responsiveness, distributors' and retailers' ability to charge cost reflective*

41 TXU Networks response to the draft decision, p.5

42 Host retailers submission to the draft decision, p.1

> *prices and the assumption on the ability to avoid investment, these results do not allow much margin for error in either of the analyses.*[43]

The ERAA notes that some members have undertaken cost-benefit analyses that deliver results that conflict with those found by the Commission.

Sensitivity analysis

AGL, L+G and TXU Networks suggested a need for sensitivity analysis of the proposed interval meter rollout. L+G suggested this analysis was crucial given the large uncertainties inherent in the cost and benefit assumptions.

Interval meter trial

AGL, the Host retailers, CitiPower/Powercor, Headberry, Origin Energy, L+G, TXU Networks TXU Retail and United Energy considered the Commission should undertake an interval meter trial for small customers, primarily to prove the benefits in the Victorian context. The Host retailers argued that such a trial:

> *... would enable the benefits outlined in the Commission's paper to be proved, would provide a significant learning opportunity and would provide the public certainty that the significant investment and cost being incurred on their behalf will provide long run benefits.*[44]

The Host retailers considered the benefits might have been overstated because the Commission relied on evidence from programs that are operating in significantly different circumstances. Similarly, L+G argued that the Commission had selectively and erroneously quoted reference sources to support its analysis of benefits, and suggested a trial should be undertaken before drawing conclusions about customer behaviour in Victoria.

Timing of benefits

The Host retailers, United Energy, and CitiPower/Powercor questioned the timing of the benefits, and were concerned with the suggestion that benefits commence on day 1. The Host retailers noted that it was not clear whether the benefits case allows for the inevitable delay in response resulting from relying on market forces to deliver price signals and transitional arrangements for meter data retrieval.

United Energy argued that benefits should not accrue until they are proven.

Timeframe of cost-benefit analysis

The Host retailers, L+G, Origin Energy and TXU Networks questioned the use of a 15-year time frame for the analysis, given that accumulation meters have a life of 30 plus years.

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43 AGL submission to the draft decision, p.2

44 Host retailers submission to the draft decision, p.2

Stakeholders were concerned that the Commission had excluded replacement costs for interval meters.

TXU Networks maintained:

> *... analysis of costs is ultimately flawed because the largest part of the cost, specifically the purchase and installation of meters, is not being compared to the basic meter's natural life of 30 years. The analysis therefore ignores a complete replacement cycle of interval meters compared to the basic meter alternative.*[45]

C.2.1 Costs and benefits – the Commission's consideration

General comments on the cost-benefit analysis

The issues raised in this section relate mostly to achieving the benefits that the Commission set out in its draft decision paper. Stakeholders also raised more detailed issues with respect to the cost-benefit analysis, and the question of an interval meter trial.

The Commission commented on the approach to estimating the partial benefits in section C.1.1: the quantification of all the benefits would be difficult and, while significant and reliable, would not be without some error. It considers that it is not necessary to quantify all the benefits if the benefits that are most easily quantified match or exceed the costs on a conservative assessment.

Responses to the draft decision took different views on whether demand response can be considered equitable with generation, given the asymmetry of power in the market. The benefits forecast in the draft decision would be realised if there were reductions in customer demand that drive efficiencies in the cost of generation. Price outcomes in the wholesale market under demand response would also be favourable if competition in that market were effective. Gaining the benefits of demand response in the wholesale market, however, may result in lower revenue to generators as a whole where the aggregate capacity is lower, not in lower prices in all circumstances.

Realising the benefits

The Commission has extensively commented on the realisation of benefits and whether technology enablers are necessary to realise the benefits outlined in the draft decision paper and the position paper. The issues raised in submissions on the draft decision cover similar ground. The Commission agrees that to achieve all the benefits outlined in section 2.1 of the final decision paper, customers would have to respond to price signals made available by the interval meter. Some of the benefits that also relate to improved market efficiency (allocative efficiency) do not assume a customer response to prices signals.

To assess whether the benefits can be realised it is necessary to review the evidence. The evidence for customer response to price signals was reviewed in the position paper and updated in the draft decision. Despite some submissions expressing concern that the evidence

[45] TXU Networks response to the draft decision, p.6

of customer response has been selective, they presented no significant evidence that counters the Commission's view that customers will respond to price signals.

Relevant evidence of customers responding to price signals continues to be reported from overseas studies. In particular, the initial results from the dynamic pricing pilot being conducted in California, under the auspices of the regulator, have now been published.

The California pilot test began in June 2003. It was designed to monitor customer energy use in response to different types of dynamic pricing (where prices vary by time-of-use and market conditions). A stratified sample of 2500 customers in California were placed on time-of-use prices and received critical peak price signals over 12 to 18 months. Customers were initially chosen based on their location and use characteristics and allowed to opt out of the experiment at any time during the pilot. Residential and small commercial customers had interval meters installed before May 2003. Each customer was randomly placed on two different time varying or dynamic rates: either a time-of-use rate only or a time-of-use rate plus critical peak price signals that let customers know when supply-demand balances are tight and costs are high. Utility dispatchers give customers day-ahead notice that prices for electricity use will be much higher during the critical peak price period for up to 15 days per summer. The pilot is intended to last for a minimum of 12 months, to give customers time to understand and adapt to the new dynamic rates.[46]

The pricing structures for the California pilot were realistic, given that the region is summer peaking, similar to the load profile for Victoria. The tariffs being tested included a traditional time-of-use rate and two types of dynamic pricing rates. The dynamic rates include a critical peak-pricing (CPP) element that involves a substantially higher peak price (about 50–75 cents per kWh, compared to 24 – 26 cents per kWh for the standard peak rate) for 15 days of the year and a standard time-of-use rate on all other days. One type of CPP rate (CPP-F) features a fixed peak period on both critical and non-critical days and day-ahead customer notification. The peak period for residential customers is between 2 pm and 7 pm on weekday afternoons and the peak period for commercial and industrial customers is from noon to 6 pm. The other type of CPP rate (CPP-V) features a variable length peak period on critical days, which may be called on the day of an emergency. All the tariffs are seasonally differentiated, with summer corresponding to the months of May-October (inclusive), for residential customers, and from June to 5 October for commercial and industrial customers. The CPP-V rate group includes customers with enabling technologies that provide automatic demand response.

In addition, the tariffs for the trial were required to satisfy three constraints:

- be cost neutral for the class-average customer
- not change the bill of low and high users by more than 5 per cent in either direction
- provide customers with an opportunity to reduce their bills by 10 per cent if they reduced or shifted peak usage by 30 per cent.

[46] This description for the most part is taken from the California Energy Commission website (www.energy.ca.gov/demandresponse/documents/2003-05-02_PILOT_SUMMARY.PDF)

The California Energy Commission has published the results of this comprehensive pilot study of dynamic pricing and interval meters for the summer of 2003.[47]

To compare the California results with the Commission's cost-benefit study, the relevant results to review are the price elasticities and the peak demand reductions for the tariff types. Table 6 shows the reductions that occurred in demand at the time of coincident system peak demand. These reductions are significant and exceed the estimated reductions (in the position paper) that were necessary to achieve the benefits represented by the value of the avoided demand.[48] Similarly, Table 7 shows the demand elasticities that have been estimated from the California study.

Table 6: California interval meter and dynamic pricing pilot study – impact on coincident peak demand

Tariff type	Coincident peak demand - Percent Reduction
CPP-F tariff on critical peak days	**19.5**
Time-of-use tariff on critical peak days	**23.5**
CPP-V tariff on critical peak days	**49.4**

Table 7: California interval meter and dynamic pricing pilot study – price elasticities of demand

Tariff type	Own price elasticity	Elasticity of substitution
CPP-F tariff (all days)	**–0.14 to –0.34**	**–0.12 to –0.19**
Time-of-use tariff on critical peak days	**0.0 to –0.59**	**0.0 to –0.24**
CPP-V tariff on critical peak days	**–0.39 (CPP days) to –0.66 (non-CPP days)**	**–0.39 (CPP days) to –0.26 (non-CPP days)**

In interpreting these results, the elasticity is a relevant measure of customer response to price and provides a first-order means of translating the analysis to Victoria. The elasticities used by the Commission in its analysis were –0.1 for residential customers and –0.025 for business customers.[49] The Californian estimates of customers' response—under conditions similar to the Commission's expectations of how innovative pricing based on interval meters it likely to apply in Victoria—suggest the Commission's elasticity estimates are conservative.

Overall, the results show that the impacts vary with appliance ownership, being higher for households that own major electric appliances such as, central air conditioners, swimming

47 Charles River and Associates, *Statewide Pricing Pilot Summer 2003 Impact Analysis, Draft Report*, January 2004. Available from the California Energy Commission website (www.energy.ca.gov/demandresponse/documents/spp_reports/SPP_Summer_2003_Impact_Rpt.PDF)

48 Essential Services Commission 2002, op. cit., p. 87. The estimate from the demand elasticity analysis was a reduction of 20%.

49 Essential Services Commission 2002, op. cit., p. 85.

pools and electric cook tops. Energy conservation was also evident and, for customers with no load control ranged from 5.7 per cent to 8.7 per cent reduction in daily use.

In the case of the load controlled tariff (CPP-V) around half of the customer load was reduced. However, it may not be possible to generalise about the results from this specific target population given the significant controlled air conditioning load in southern California.

In addition, while the reduction in demand at peak time is an important measure it is also necessary to consider the price differentials that relates to the changes in demand. The experimental tariff generally has two parts—peak and offpeak—with the CPP prices increasing further on the defined critical peak days. The ratio between the critical peak price and the peak price was between 3.0 and 2.4 for the prices tested, while the ratio between the peak and offpeak rates for the time-of-use tariff was between 2.8 and 1.7 for the experimental tariffs. These ratios are not extreme: the current 'winner' time-of-use tariffs in operation in Victoria have a peak-to-offpeak ratio of between 2.0 and 2.5 across all seasons.

In commenting on the results of the pilot, the Chairman of the California Energy Commission said:

> *The impacts are in line with prior information and put to rest the theory that California customers have already responded to higher prices and cannot respond any more.*
>
> *They also indicate that coincident peak demand responds as much as the energy consumption during the peak period.*
>
> *The experiment has yielded statistically significant estimates of price elasticities of demand that are in line with the empirical literature on time varying rates.*[50]

In a further response to the need for increased efficiency the California Public Utilities Commission now requires the utilities to offer peak critical pricing to large customers (those with demand over 200 kW).[51]

Interval meter trial

A trial of interval meters and innovative tariffs would assist in resolving some operational issues and, if conducted for a long enough period could help demonstrate the likely customer response to price signals.

However, in considering whether a trial is warranted the Commission must consider (1) the expected benefits of a trial accounting for the degree of uncertainty in the costs and benefits in the Commission's draft decision paper, and (2) the risk of proceeding with a rollout

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50 *Advanced Meters and Dynamic Pricing in California: Implementing a Vision for the Future*, presentation by William J. Keese, Chairman, California Energy Commission, March 25, 2004 - Presented at the Metering, Billing, and CRM/CIS Conference San Diego.

51 California Public Utilities Commission, *Interim Opinion in Phase 1 Addressing Demand Response Goals and Adopting Tariffs and Programs for Large Customers,* Decision 0306032, Proceeding: R0206001, June 2003

accounting for the costs of the trial and the delay that a trial would cause to the general rollout of interval meters.

The objectives of a trial would be to:

- estimate energy use, peak demand impacts and price elasticities
- predict customer choice for voluntary programs
- assess the effectiveness of alternative implementation methods
- measure customer satisfaction with alternative tariff structures and implementation features
- establish proof of technology
- resolve operational issues

To be of value, the results of the trial would have to be useful for predicting customer response so a further cost-benefit analysis could unequivocally determine whether the benefits of a general rollout of interval meters would exceed the costs associated with the meters.

A trial would need to be conducted across, perhaps, two summers as a minimum. Given the need to plan the experiment so the results are meaningful, draw a customer sample, install meters and, after the trial's conclusion, assess the results, this process would probably take some years.

A trial may be unable to resolve some questions, such as the long run cost of interval meters or the costs of implementing systems to deal with increased quantities of interval data. Further, there might be ongoing concerns about whether the trial results are applicable to the whole customer base, whether the various statistical estimates are robust and how the prevailing weather during the trial has influenced the results.

On balance the Commission's considers there is insufficient uncertainty in those matters that would resolved by a trial (for example, customer response), accounting for the time and resources that would be involved to warrant conducting a trial.

Revised cost-benefit analysis, Sensitivity analysis, timing of benefits, timeframe of cost-benefit analysis

The Commission performed the cost-benefit analysis using reasonable estimates of costs and customer response. It performed various tests and sensitivities and reported the results in Appendix E of the draft decision paper. In consideration of the model's cost basis, an incremental analysis has been performed and therefore the costs being considered are incremental to the base case costs. The costs used in the analysis were the extra costs of the interval meters (incremental costs) associated with the changeover.

Some submissions argued that the present value should be calculated over a 30 or 40-year period. The Commission accepts that the 15-year analysis has excluded some costs for meter replacement at the end of the 15-year period and this exclusion may have a material impact in some cases considered in the analysis.

The economic model determined the present value of the costs and benefits of an interval meter rollout for a 15-year period for both the changeover program and where the rollout was

new and replacement only. In the first case the analysis implies a meter changeover every 15 years, relative to the base case, given the assumption of a 15-year interval meter life. Hence, for an accelerated rollout the costs and the benefits in each 15-year period will be about the same as those in the first 15-year period, as the costs in the first year included the full cost of the meter and installation. Therefore, if the present value of the costs and benefits are calculated over a 30 or 40-year period rather than a 15-year period for a changeover program, the costs and benefits would have the same relativity and there would be no material change in the net benefit. Hence, allowing for the costs (as outlined in the draft decision paper), the benefits would exceed the incremental costs for each of the customer segments that do not have a single-element, single-phase meter as previously calculated.

In the case of a new and replacement program, however, if the present value were calculated over a 30 or 40-year period, rather than a 15-year period, then there would be additional costs relative to benefits. These costs would arise because the new and replacement scenario assumes in year 1 the incremental costs are only the extra cost of the meter (over the accumulation meter cost), not the full changeover costs which apply in each subsequent 15-year period. Consequently, relative to the base case, the full cost of a meter, its associated installation and reading costs needs to be included in each subsequent 15-year period. Thus in the new and replacement case the costs do not simply repeat in each 15-year period. The revised incremental present value cost per customer for single-phase non off-peak meters on the 40-year analysis is approximately $7 per year.

Given the importance of this matter to the decision the Commission's conclusions on this matter are set out in section 2.2.

There are many difficulties in performing a robust analysis over such a long period and decisions need to be made about what is incremental to a mandated interval meter rollout over such a period. Systems, such as those involved in meter data management, business-to-business (B2B) services and customer servicing will be replaced many times over in the analysis period, with or without a mandated rollout of interval meters. In this way, the base case must also allow for interval data because this is a feature of the market and would be an increasing feature of the base case if interval meters were not mandated. Not all these costs are, therefore, incremental in this analysis. As noted, considerable changes will occur in meter technology and meter reading over such an extended period, meaning that not only will costs fall in real terms, but also that it is difficult to be certain that a base case allowing the current technology for such a term is sensible. Based on the ongoing development of digital technology, new and replacement meters will be electronic digital meters in a shorter time period than 40 or even 15 years.

The Commission has also undertaken analysis to determine the sensitivity of the benefits to changes in the discount rate. Generally, higher discount rates reduce the benefits relative to the costs, because the costs occur early in the analysis period and the benefits are taken to be the same across all years of the analysis. In particular, the Commission applied a conservative 6 per cent discount rate to costs, because that rate results in higher costs, given that incremental costs predominantly occur early. In practice, the benefits may grow over time as customers become familiar with new price structures and as new equipment gradually incorporates demand response enabling technology. Higher discount rates will have a relatively larger impact on the present value of benefits.

There are considerable uncertainties in this analysis. Despite a concentration on cost questions, a more thorough analysis of benefits would need to consider whether, based on the most recent published information, the analysis has been too conservative and underestimated the benefits. Further, while the present value of costs (subject to the various sensitivities being tested) is likely to be similar to that of the quantified partial benefits in the case of single-phase, single-register meters for small customers, significant strategic benefits that have not been quantified.

C.3 Justification for regulatory intervention

General comments on the justification for regulatory intervention

PRI considered the draft decision was comprehensive in addressing the indisputable rationale for mandating an interval meter rollout. Jortikka also considered that the rationale for regulatory intervention was sound.

While Centurion considered it acceptable for the Commission to mandate targets for the implementation of interval meters and to monitor performance, it argued that it should be left to the market to determine how to achieve those targets:

> *The suggested framework attempts to control a process that is best left to market forces and will vastly increase the overall cost of the interval metering rollout.*[52]

Shared benefits

Jortikka agreed that no single business has sufficient vertical integration to capture all of the business benefits that the interval meter rollout would deliver. Further, Jortikka noted that, if the overall load profile were changed marginally, all of the supply side stakeholders would benefit.

AGL disagreed, however, with the Commission's conclusion and suggested corporate it argued that retailers would have sufficient incentives, where there are net benefits involved, to undertake the investment independent of government involvement.

Profiling impacts

TXU Retail agreed with the Commission's analysis that removing a subset of consumers from the profile would force the removal of cross-subsidies across consumer classes. However, it was concerned that the rebalancing constraints on retail pricing would not permit required price rises for peak tariff customers if offpeak tariff customers were removed first from the profile.

Headberry noted:

[52] Centurion response to the draft decision, p.5

Whilst it is accepted that the absence of interval metering requires some approximations (for example by load profiling), when taken into context of all the other approximations applying in the NEM, the lack of a full rollout of interval metering does not add significantly to the other approximation risks that apply in the market.[53]

C.3.1 Justification for regulatory intervention – the Commission's consideration

The Commission notes that stakeholders did not indicate substantial concern about the Commission's view that regulatory intervention to achieve the overall benefits of interval meters is warranted.

AGL, however, argued that the analysis is flawed, noting that corporate decision-making does not require all of the benefits to be internalised and that investments can be made when there are net benefits. The Commission considers that the benefits are sufficiently dispersed, accounting for the current market structure, that a single entity may not accrue enough net benefits to provide for proper decision making. The evidence suggests, based on the activities in the market, that this is the case in Victoria.

The Commission considers that the profile and its impact on retailers and their customers are a significant approximation of the market and arguably an approximation that was not intended in the market design. This is particularly the case in Victoria, which has adopted a simple profile that does not account for specific offpeak loads. The primary impact of the profile is on second tier customers, because a retailer's loads for these customers are directly settled based on the profile. The impact of the gradual removal of the profile on the regulated retail prices is thus likely to be only second order.

The Commission's final decision for a delay in the interval meter rollout for small customers should alleviate concerns about the management of retail price impacts.

C.4 Draft decision and implementation framework

In addition to general comments on these issues, the submissions focused on:

- pricing and cost recovery
- the implementation proposal and timetable
- the collection of metering data

General comments on the draft decision and implementation framework

Ergon Energy Retail supported the Commission's recommendations. Centurion also supported a mandated rollout of interval meters, but was concerned that the implementation framework assumes distributor exclusivity for metering and that distributors control the rollout. For this reason, Centurion called on the Commission to recognise the existence of

[53] Headberry Partners, op cit., p.6

independent metering service providers and to structure the implementation framework to accommodate increasing competition within the 'non-derogated' metering market.

Centurion also suggested a new metering category—type 5 remotely polled—for sites that have low consumption levels and that are not subject to distributor exclusivity.

Pricing and cost recovery – general

The ERAA and the Host retailers were concerned that the Commission has not fully considered cost recovery for retailers. The Host retailers suggested:

> *Whilst price regulation remains, the ability of the [retailers] to recover costs is a political decision which places unreasonable and disproportionate risk upon retailers.*
>
> *If cost-recovery is not provided, the consequent erosion of retail margins will lead to reduced competition for customers as regulated tariffs become comparatively more attractive.*[54]

CitiPower/Powercor, TXU Networks and United Energy claimed that further consideration of pricing and cost recovery is required. United Energy argued that the proposed framework still does not provide cost recovery certainty for distributors, given that the exclusivity of small customer metering has not been determined and is yet to be incorporated in regulatory instruments.

Centurion suggested metering charges should be reviewed bi-annually, because this would allow individual components to be critically assessed and varied or abolished. However, CitiPower/Powercor and TXU Networks generally preferred less frequent price reviews, so as to reflect the steady state cost of interval metering, reduce price shocks, increase certainty for distributors and reduce administrative costs.

Specifically, TXU Networks stated:

> *... [TXU] would prefer that the Commission model costs over 15 years to provide a flat price path, thus preventing price shocks to customer and giving certainty for the purposes of business case preparation. This is in contrast to the current process for amending gas FRC charges, which is administratively complex and time-consuming, as well as causing confusion for retailers and customers.*[55]

Pricing and cost recovery – small customers

Centurion, CitiPower/Powercor, the ERAA and TXU Networks supported the Commission's proposed approach to cost recovery from small customers, but support was qualified in some cases. Centurion, for example, was concerned that the cost recovery mechanism dispersed funds to distributors only and did not recognise potential competition in metering services. CitiPower and Powercor were concerned about cost recovery certainty and protection against stranded assets if competitive metering services were introduced.

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54 Host retailers response to the draft decision, p.2

55 TXU Networks response to the draft decision, p.7

While TXU Networks supported the draft decision to recover costs via a shared charge, it was unsure whether the Commission's proposal to distinguish between existing meter installations is an equitable one given that customers have limited choice in meters. Given that all customers would benefit from the introduction of interval meters, TXU Networks suggested a more equitable and administratively simple process would be to charge all customers the same charge, irrespective of the existing meter type.

United Energy suggested:

> *Given the Joint Regulatory Review is leaning towards distributors being responsible for small customer metering in perpetuity, it appears more efficient to deal with all meter costs within DUOS rather than to create a range of excluded services charges that need to be quoted, billed, and the subsequent management of remittances and disputes.*[56]

Pricing and cost recovery – large customers

The ERAA supported the Commission's cost recovery recommendations for large customers. CitiPower and Powercor were concerned that distributors could be left with a stranded asset if a large first tier customer were to move to a second tier retailer. As a solution, they suggested setting an upfront charge or obliging the retailer instead to provide interval metering.

United Energy argued that the charges for large first tier customers should be recovered through distribution use of system (DUoS) charges, and did not support an excluded service charge for this customer group. The meter standard that United Energy adopted for three-phase CT meters is an interval meter and already included in the distributor's network tariffs.

Implementation proposal and timeframe

BSA, Ergon Energy Retail, Jortikka and PRI supported the Commission's proposed timeframe for the rollout. Ergon Energy Retail suggested, however, that ceasing all accumulation meter installation for small customers earlier could capture further efficiencies. BSA expected that the rollout program would voluntarily accelerate as benefits were realised.

CitiPower and Powercor also supported the timeframe for large customers, provided that cost recovery uncertainties are adequately addressed and the time needed for the information systems augmentation is fully assessed and accommodated. TXU Networks was concerned that the proposed timeframe is insufficient to deal with many of the issues requiring attention. It recommended, therefore, a two-stage approach to determining appropriate charges. Similarly, TXU Retail was concerned that the timeframe is insufficient (given rebalancing constraints) to enable required increases in peak tariffs to be implemented.

PRI suggested the most economical approach to the rollout is a 'contiguous sequential installation program', with geographic areas segmented to target those areas with the highest consumption (to take them out of the profile first) and/or aged meters (to ensure greatest asset recovery from recently installed meters). However, Jortikka suggested the distributors should be responsible for deciding the sequence of locations for the interval meter rollout.

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[56] United Energy response to the draft decision, p.7

Collection of interval meter data

CitiPower/Powercor, L+G and United Energy argued that interval data should be collected from interval meters once installed, because a delay would add costs (given that administrative processes would need to be repeated) and hold back the assumed benefits of the interval meter rollout. United Energy acknowledged that the collection of interval meters might create bottlenecks and test its systems, but that a delay would increase other costs.

Origin Energy and PRI, however, suggested a delay between the installation of an interval meter and the collection of interval data, so as to:

- allow time for the customer's contract to expire
- provide time to adjust pricing terms with the customer
- remove the deterrent to install interval meters before the rollout commences.

TXU Networks acknowledged that a delay would provide a useful contingency to allow data management and the development of B2B systems, but noted that additional administrative costs would be incurred.

C.4.1 Draft decision and implementation framework – the Commission's consideration

General comments on the draft decision and implementation framework

The Commission has proposed that the distributors are responsible for the interval meter rollout and that the distributors have ongoing responsibility for the provision and reading of standard meters, including standard interval meters for customers who use less than 160 MWh per year. It notes Centurion's comments that independent metering service providers should be further recognised. Competition in the provision of metering services can take place in two ways: (1) where the retailer may select from various accredited providers to supply such services and (2) where a distributor responsible for metering selects a service provider to provide such services. In a market structured so distributors have primary responsibility for standard meters, there is a role for competitive providers of metering services, as well as for suppliers of metering equipment.

Innovation in metering services is likely to occur in the collection of, and 'value adding' to, metering data, and likely to incorporate remote meter reading techniques. The Commission considers that there is scope for increased competition in the provision of these types of innovative metering service. As noted, the Commission will consider increased competition for these services for first tier customers (see note 17).

In their draft report, the joint regulators have recommended that NEMMCO be responsible for redeveloping chapter 7 of the National Electricity Code to incorporate the recommendations of the review.[57] The Commission will encourage NEMMCO to consider the potential of new technologies, in conjunction with the 'Responsible Person' role, when conducting this review and considering the definition of the meter installation types.

[57] Ibid., p. 19.

Pricing and cost recovery

In considering this important issue and determining a position, the Commission has considered the submissions on the draft decision, the current arrangements for the payment of metering services (including those under the Tariff Order) and the current review of the Tariff Order. The Commission has also considered how it will address cost recovery when a decision is made to allow retailers to provide meters for certain first tier customers (section C.4.1).

The Joint regulators have recommended:

> *In the longer term and subject to national direction, retailer choice of Responsible Person (retailer or distributor) is considered to be appropriate for all 'large' first tier customers and second tier customers with metering installation types 1 – 4.*[58]

The have also recommended:

> *The jurisdictions should unbundle metering service charges from the Distribution Use of System ('DuoS') charges. Metering service charges that are regulated remain the responsibility of the jurisdiction. Where it has not already done so, the jurisdiction should determine the most practicable timeframe for unbundling the metering charges, consistent with the timing of distribution price reviews.*[59]

The Commission supports these draft recommendations of the jurisdictional regulators. The issues for the Commission are (1) how to progress these recommendations for the 2006 regulatory period for both large customers and for small customers, and (2) what impact this will have on the cost recovery associated with the decision to rollout interval meters. The Commission has published a paper to progress these recommendations, and it will finalise these matters in the context of the 2006 Electricity Distribution Price Review.[60] Given the importance of the cost recovery approach to the decision on the interval meter rollout, the Commission's consideration of this matter and its decision are set out in section 4.2.

Implementation proposal and timeframe

Section 4 sets out the Commission's final decision, which varies from the draft decision in three key areas:

1. The mandated rollout will not commence for any customer before 2006.
2. The mandated accelerated rollout for customers with consumption less than 20 MWh per year is to be completed by 2013, rather than 2011.
3. The new and replacement program for customers with single-phase, non-offpeak meters will not commence until 2008.

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58 Essential Services Commission, Essential Services Commission of South Australia, Independent Competition and Regulatory Commission (ACT), Independent Pricing and Regulatory Tribunal of NSW (IPART), Office of the Tasmanian Energy Regulator and Queensland Competition Authority 2003, *Joint Jurisdictional Review of Metrology Procedures—Draft Report*, December. pp. 11-12.

59 Ibid., p. 13

60 Essential Services Commission 2004b, op. cit.

These changes reflect comments from the submissions on the implementation timeframe. They will allow more time for essential planning before and following the completion of the 2006 Electricity Distribution Price Review. Further, the staged program and a gradual ramp-up in the volume of meter installations will allow the subsequent rollout programs to incorporate relevant experience.

Collection of interval meter data

Following the installation of an interval meter, the question of when to commence using the interval data for settlement must also account for the ability of the distributors and other industry participants—including the National Electricity Management Company (NEMMCO)—to manage the quantity of interval data. For some customers, a change in the settlement approach must be considered because this can have an impact on customer contracts.

The Commission's view is that interval data will be collected when the interval meter is installed and commissioned under the mandated policy for all customers. It notes the following implications for large customers for whom the rollout commences in 2006:

- Settlement is not directly affected because the decision applies to first tier customers only.
- There are benefits to the profile from the immediate use of the interval data.
- Data management is less of a problem because the customer numbers are small in this segment.

For customers with consumption less than 160 MWh per year, the decision to allow a delay in the rollout relative to the dates proposed in the draft decision paper means the number of interval meters will increase more gradually and at a later time. The planning and development of systems for interval data, as well as the issues associated with the volume of interval data, are thus mitigated. The decision also allows sufficient time for second tier retailers, in particular, to address any customer contract issues directly associated with market settlement changing from being profile based to interval data based.

The Commission's decision on this matter is set out in section 4.3.

C.5 Implementation issues to be addressed

General comments on the implementation issues to be addressed

CitiPower/Powercor, the Energy and Water Ombudsman Victoria (EWOV), TXU Networks and United Energy generally supported a high level steering committee and working groups. However, the submissions contained concerns about the extent to which these groups would oversee day-to-day management of the rollout program. Distributors generally considered that they would be best placed to handle the day-to-day management.

Centurion suggested a steering committee is unnecessarily heavy-handed, borders on collusion and promotes the use of market power:

> *We are concerned that it may result in a controlled allocation of contracts at fixed prices, to the exclusion of smaller operators.*
>
> *The only high-level oversight committee required is that to ensure the mechanisms are effectively in place to conduct the bi-annual* Interval Metering Rollout Price Review *[suggested by Centurion] and to account for the collection and dispersal of the* Regulated Cost Recovery Charge *(or charges).*[61]

United Energy suggested the steering committee be charged with undertaking a post implementation review.

EWOV indicated it would be pleased to contribute to the working group responsible for the communication program delivered to customers.

Project management

In response the to project management issues listed in the draft decision paper, TXU Networks:

- argued that competitive metering for large customers should commence sometime after 1 January 2006 to enable appropriate funding of system changes for competition, and that distributors would prefer an upfront charge to remove the asset stranding risk
- suggested retaining consistency with current arrangements for meter responsibility in determining whether the 'Responsible Person' or the distributor should be responsible for metering current transformers for second tier customers
- noted that it does not support external management of the procurement and installation of meters across the industry.

United Energy noted that the final decision should address load control for single-phase (or multi-phase), offpeak customers.

Communication

TXU Networks suggested that leading the communication program should be a multi-functional responsibility, with different parties having responsibility for different aspects of the program; at the same time, it recognised that it is critical that retailers maintain a direct customer interface. TXU Retail argued that retailers should be the main point of contact, because they are responsible for the ongoing relationship with customers.

CitiPower/Powercor and United Energy argued that customers should be responsible for the costs of rectifying any wiring defects relating to their electrical installation, meter accommodation or access problems. However, TXU Networks suggested smearing these costs across all customers, because the customers have not voluntarily elected to change metering installations. The Host retailers suggested such work could cost thousands of dollars and, therefore, that this issue is of greatest urgency in requiring resolution.

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[61] Centurion response to the draft decision, p.5

Provision and installation of meters

In response to the provision and installation issues listed in the draft decision paper, TXU Networks suggested the following:

- Market forces and technological advancement would provide ample opportunity to obtain meters with the required functionality.
- The role of a safety inspector should be agreed on and resolved through a working party.
- Distributors should be responsible for determining the timing of the interval meter installation relative to scheduled meter reads.
- Distributors should be responsible for handling meter replacement appointments.
- Coordinating the testing of meters is not a significant issue.
- Determining the most appropriate standards for interval meters is a significant issue that will require resolution, in consultation with Trade Measurement Victoria, before October 2004.

TXU Networks also suggested that life support customers should not be included in the interval meter rollout program, because these customers are few in number and more likely to be concerned with reliability of supply than with price signals.

CitiPower and Powercor suggested remote meter reading (for a cost premium on the standard metering charge) could address the increasing rate of 'no access' to meters.

United Energy suggested using a single-element interval meter with an integrated time switch as the standard for offpeak customers.

Metering data

CitiPower and Powercor suggested the final decision needs to address the high failure rate for downloads of interval meter data and the diminution of customer access to metering data.

United Energy noted that the assumption of 1.3 data streams per interval meter is incorrect because it does not allow for data storage for forward estimates to be provided, estimates of interval data (due to no access), the replacement of estimates with actual data on the next cycle read, and potentially normal validated/substituted data.

NEMMCO confirmed that it would investigate the efficient provision of infrastructure to manage the volume of metering data that the interval meter rollout would generate. While the design of NEMMCO systems that support MSATS (the Market Settlement and Transfer Solution) would not need to change, additional processing equipment (servers) may be needed as the volume of metering data increases. To confirm the requirements, NEMMCO will need to clarify the end-to-end data management process with the industry.

TXU Networks suggested that identifying how data from interval meters is to be estimated when there is no historical data is a significant issue that requires immediate resolution to prevent disputes and customer confusion.

Business to business (B2B) or service orders

TXU Networks argued that automated B2B services would be critical to the efficient and orderly rollout of interval meters. Further, it noted that they would be critical for ensuring systems were in place for all high volume transactions introduced by the rollout.

Industry testing

TXU Networks noted that metering hardware is fundamental to revenue collection for the whole industry. A fundamental change to this part of the revenue calculation process, therefore, would require thorough industry testing from end to end, including stress and volume testing to ensure the system works effectively.

Consumer issues

TXU Networks expressed concern that allowing customers to request an interval meter earlier than scheduled would reduce the efficiency of a planned rollout. It argued that customers that make such a request should thus be subject to an additional fee, to reflect the cost of a special installation rather than an efficient programmed installation.

Additional implementation issues

The Host retailers indicated they had researched demand management projects globally to understand the factors required for a successful program. They found the critical factors were:

- making all stakeholders of the risks and rewards of the program
- having multiple strategies to encourage consumer participation, to minimise the downside risks of benefits not being realised
- ensuring effective preparation (for all aspects of the implementation)
- setting criteria for measuring success post-implementation.

Ergon Energy Retail also suggested the Commission consider overseas examples (such as Puget Sound) for issues that could result if the rollout were not appropriately implemented:

> *... customers quickly learnt not only how to respond in an interval metering environment, but once they had tired of responding to price signals they also learnt how they could game the market rules to their advantage by opting out. The continued success of the Puget Sound program was only hampered by the lack of appropriate rules and educational programs.*[62]

United Energy suggested issues (in addition to those proposed in the draft decision paper) that need to be resolved, namely:

- timing of the meter replacement to maximise the opportunity for all systems to be synchronised, thus minimising errors

[62] Ergon Energy Retail response to the draft report, p. 2.

- clarification of the responsibility for load control, in addition to the responsibility for transformers
- some site-by-site issues, such as meter replacement where a premise will be abolished, direct connected customers that would loose business if meter replacement were undertaken in work hours, and difficult sites with asbestos and wiring problems
- fundamental costing decisions, such as single-channel, offpeak interval meters.

Origin Energy recommended removing the current prohibition on prepayment metering so the prepayment technology can be implemented at the same time the interval meter is installed:

> *Evidence from Tasmania indicates a greater likelihood of behavioural change in response to price signals if prepayment is included as part of the metering solution. Customers will also minimise installation costs if the prepayment technology and the interval meters are installed concurrently.*[63]

The following are other implementation issues raised in the submissions:

- L+G questioned how the Commission proposes to address niche-metering applications for which interval meters are extremely unlikely to ever be available.
- TXU Retail suggested clear plans are needed to minimise the risk that data collection, billing, wholesale settlement and other critical components of the industry revenue chain would be interrupted.
- CitiPower and Powercor recommended implementing a benchmarking project and ongoing monitoring program.

Implementation issues for distributors

PRI considered that management of the procurement process should be left with the distributors, as should the selection of the product type if it meets the fundamental requirements of the rollout strategy.

TXU Networks also considered that the distributors should be responsible for determining the method and timing for installing interval meters, and proposed output measures for approval by the Commission. It claimed that this approach would enable distributors to effectively manage and prioritise the order of the interval meter rollout.

Implementation issues from a regulatory perspective

AGL, CitiPower/Powercor, the ERAA, Origin Energy, TXU Networks, TXU Retail and United Energy were concerned about the assumption that price signals would find their way through to consumer tariffs, given the regulatory restrictions on network and retail tariffs. Key concerns raised by these stakeholders included:

- the implications of the standing offer price path released by the Victorian Government in December 2003

[63] Origin Energy response to the draft report, p. 2.

- the right to re-assign customers to new retail and network tariffs
- the limitations imposed by the rebalancing restriction on tariffs.

AGL, the ERAA and Origin Energy were also concerned that these restrictions would affect cost recovery for both retailers and distributors.

CitiPower and Powercor argued that tariff reform must be addressed in the final decision, because:

> *... it is a fundamental consideration to ensure that appropriate pricing signals are presented to the electricity market in order to realise the full potential demand management benefits envisaged by the Commission. The interval meter rollout must be combined with reform of network tariffs and logically customers must be re-assigned to an appropriate network tariff when they receive an interval meter.*[64]

Origin Energy also noted that the potential benefits of the proposed interval meter rollout would not be realised without tariff reform.

Embedded networks

Australian Retirement Communities (ARC), TXU Networks and Village Glen suggested excluding embedded networks from the proposed interval meter rollout. ARC and Village Glen noted that the means by which the embedded network (exempt retailer) recovers the cost of the electricity supplied to the parent meter from their first tier customers is a matter for the embedded network. If re-selling electricity to first tier customers does not require the use of interval meters, then those customers should not have to incur the cost of interval meters. Nevertheless, ARC and Village Glen supported the mandatory introduction of interval meters for electricity customers whose use is directly settled in the national electricity market, including second tier customers in embedded networks.

Given the proposal to treat interval metering as an excluded service charge, CitiPower and Powercor noted that if a building were converted to an embedded network after the distributor installed interval metering and the embedded network operator did not require the distributor's interval meters, then a stranded asset issue would arise. CitiPower and Powercor noted that the Commission seems to support such embedded networks, but that the draft decision paper did not explain how the stranding risk associated with prospective embedded networks would be addressed.

C.5.1 Implementation issues to be addressed – the Commission's consideration

General comments on the implementation issues and project management

In its draft decision paper, the Commission sought comment on all aspects of the proposed approach to planning and implementing the interval meter rollout program, particularly on:

[64] CitiPower and Powercor response to the draft decision, p. 5.

- the arrangements proposed for the strategic oversight, coordination and monitoring of the planning and implementation processes, and for addressing some of the more technical and operational issues through working groups with appropriate representation, resourcing and terms of reference
- the implementation issues identified and whether any other implementation issues need to be considered before the final decision
- any other issues with commencing a new and replacement policy for large customers in 2004, particularly issues regarding the proposed charging mechanism and the customers to whom the policy should apply
- any other issues if varying the requirement that interval data be collected from small customers with interval meters.

The Commission's decision on these matters is set out in section 4.5.

Communication

The Commission's approach to communication issues is set out in section 4.5.

Operational issues

Consistent with a light handed regulatory approach, the Commission expects that industry will be equipped, consistent with existing licences, codes, guidelines and service installation rules, to deal with most operational issues. The Commission will not become involved in the purchase of meters or require distributors to adopt any particular approach to procuring meters.

One issue raised in the submissions was that of dealing with problem boards during a meter changeover or replacement. The Commission assumes that industry will develop an approach to problem boards or hard-to-access meters that is consistent with current distribution responsibilities and accounts for appropriate safety requirements. The Commission does not consider that the cost of fixing the problem boards should be smeared in the prescribed charges.

The replacement of direct connect meters will necessitate the disconnection of customers for a short period. This short disconnection may concern some business customers and is likely to require businesses to develop an appointment-type approach to such meter changeovers. The Commission expects distributors have already developed an approach to this matter for meter testing and replacement.

Provision and installation of meters

The submissions presented no consistent position on the extent to which additional standards or clarification of standards is required for interval metering. Currently, standards for all meters are defined in the Electricity Customer Metering Code, which links the standards to those prescribed in the National Electricity Code. Stakeholders will be aware that ongoing processes in connection with metering standards and the *National Measurement Act 1960*

(Cwlth) are likely to lead to the lifting of the exemption under the Act for utility meters.[65] This change is expected to bring meter standards further in line with relevant international standards.

In its draft decision paper, the Commission noted that the costs were based on two register meters but that not all customers need two register meters—that is, many customers would benefit from a general time-of-use tariff rather than their existing two-part tariff. The Commission proposes to leave this matter primarily to retailers and their customers to resolve in each case. The decision on the appropriate interval meter (whether single register or two register) follows a decision on the tariff. The move to single-register meters may suit larger offpeak users in particular. The Commission notes that the tariff must change when a two-register hot water meter is changed to a single-register meter because the new meter will not continue to support a tariff based on two registers. The Commission does not require the energy of switched load or other loads to be separately recorded.

Consumer issues

The Commission's decision has provided for customers who want an interval meter earlier that they would have the meter installed under the rollout or the new and replacement program. Given that the new and replacement program would take many years to complete, it is necessary to provide for such a decision by customers. The Commission's approach to cost recovery means each customer is, in effect, covering the cost of a standard meter (whether an accumulation meter or a interval meter), so the only additional charge required is the charge for a meter installation. Such a charge would be a regulated excluded service charge. Table 3 allows for the provision for an out-of-schedule interval meter.

The Commission expects customers would continue to have access to the data from the meter in a manner similar to their access today. With the range of meters in service today, customers have a number of different approaches to determining their consumption from the meter, including reading traditional dials or digits, or scanning through registers on the newer electronic meters. The Electricity Customer Metering Code provides for customer access to their metering data as follows;

> *A customer is entitled to access data stored in metering equipment used to measure and record the amount of electricity supplied to its electrical installation, either by inspecting the metering equipment or, where available, by electronic access to the metering equipment.*[66]

The Commission does not propose to vary this clause.

Customer pricing issues

The Commission's decision importantly allows additional time to manage customer pricing changes and contracts under interval meters. The Commission understands that the retailers' agreement with the Victorian Government for a four-year price path will have expired by

[65] Regulation 87 of the National Measurement Regulations 1999 exempts utility meters from the operation of part VA of the National Measurement Act.

[66] Essential Services Commission 2004, *Electricity Customer Metering Code*, clause 14.1(a).

2008 when the new and replacement policy commences for the bulk of customers. However, subject to the ongoing legislation, some customers are likely to have interval meters before the expiry of the four-year price path in 2007. In general, the requirement for a price change will be greatest for second tier customers, because settlement will change. The small customers that will be affected by the interval meter policy in the period 2006–08 are customers who will be provided with an interval meter on a new and replacement basis. Given that most of these meters will be for new customers, the pricing and contractual issues will be minimal. In addition, the new and replacement program for the smallest customers will allow sufficient time for contractual terms and conditions to incorporate the interval meter decision.

The Commission's decision on interval meters has been predicated on tariff changes that allow customers to respond to finer price signals. Specific network tariff issues, accounting for the interval meter decision, will be addressed during the 2006 Electricity Distribution Price Review. In this respect, the Commission has indicated to the distribution businesses that it seeks proposals in their submissions to broaden the 're-balancing constraints'.[67]

Should there be any exclusions from the decision to install interval meters?

A number of submissions noted a case for excluding certain customers or situations from the interval meter policy. The suggested exclusions included customers in embedded networks and customers on life support equipment. Some submissions also suggested that any decision by the Commission to allow prepayment meters should be made to allow prepayment to be implemented at the same time the interval meter is installed.[68]

The Commission has developed its policy for interval meters on the basis that all customers benefit from the meters and from the actions of others with the meters. In addition, the Commission's cost recovery approach is for all customers to pay for the interval meter as a standard meter.

Customers in embedded networks already require an interval meter (to provide for settlement accuracy) when supplied by a retailer other than the exempt network owner. If all customers in such networks have interval meters, then they have the additional potential benefit of not needing a new meter to switch retailers. In addition, many customers in embedded networks are large customers, and they would benefit from having interval meters.

Life support customers, like all customers with direct connect meters, would need to be disconnected from supply for a short period to allow a new meter to be installed. The Commission recognises that the disconnection may concern these customers. While these customers may not have supply at times today, increasing the number of such occasions would increase the concern of these customers. For the majority of small customers, without electric hot water, because the installation would be on a new and replacement basis only, there would be no extra interruption to supply.

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67 Essential Services Commission 2004, *Electricity Distribution Price Review 2006 – Final framework and Approach: Volume 1, Guidance Paper*

68 Prepayment meters are not approved for use in Victoria under the retail licence clause 10.

The Commission's metering policy is to adopt a uniform approach across all customers for standard metering. To develop a metering requirement policy for certain customer segments that differs into the long term would create further difficulties for these customer segments. Such difficulties could include a reduction in the availability of competitive retail offers. For life support customers, the Electricity Distribution Code sets out a protocol for distributors when dealing with planned interruptions to the electricity supply, and this protocol would apply in the case of a meter replacement.[69]

On balance, the Commission has determined that the interval meter decision will apply to all customers, including those with life support equipment or in embedded networks where metering is warranted. In addition, if the Commission were to vary (via a separate process) the current retail licence to provide for prepayment meters, then the prepayment meters would need to be interval based.

C.6 Interval meter cost model assumptions

General comments on the interval meter cost model assumptions

AGL argued that unless all the costs to the industry of an interval meter rollout are fully accounted for, it is impossible to conduct a robust cost–benefit assessment. It urged the Commission to reconsider previous submissions on the costs of a rollout and to ensure the cost–benefit analysis considers all costs.

TXU Networks noted that the Commission used the Intelligent Energy Source (IES) report for a number of costs and additional information relating to its draft decision. TXU Networks indicated that it is uncomfortable with this reliance on a report that is five years old and that was written before the realities of full retail contestability were established. It argued that all costs included in the Commission's analysis should be updated to reflect the current realities of the Victorian electricity industry.

Number of meters

PRI was confident that the volume of meters required for the rollout could be easily achieved given PRI's supply capability and that of other manufacturing companies with suitable product.

Basic and interval meter costs

CitiPower and Powercor suggested the Commission might have overestimated economies of scale for the installation costs for single-phase (dual- and single-element) meters, because the economies of scale are limited largely to project management costs and overheads. Similarly, L+G, United Energy and TXU Networks questioned whether the economies of scale in meter purchases could be maintained, given a limited number of suppliers and the low volume of meters. TXU Networks also queried whether a mass purchase (on behalf of all distribution businesses) to achieve economies of scale would have anticompetitive implications.

[69] Essential Services Commission, *Electricity Distribution Code*, clause 5.6.1.

United Energy highlighted the Australian Competition Tribunal decision on the Moomba-to-Sydney gas pipeline, and suggested:

> *This precedent means that the regulator should ensure that where actual costs are unknown they need to ensure that cost estimates are reasonable and that an average is chosen rather than the lowest cost. This is particularly the case where the information on costs comes from a party that would have an incentive to understate the costs to ensure higher returns.*[70]

United Energy suggested there would be a balance between establishing a longer-term contract and the potential for interval meter costs to drop significantly below the contracted price, or the technology may change. BSA claimed the costs would fall once a clear rollout program were in place.

L+G noted that the executive summary in the draft decision paper indicates a $30 cost difference between accumulation and interval meters, while Appendix D2 gives a figure of $50 for the same quantity. L+G suggested the costs for accumulation meters should be updated.

CitiPower and Powercor suggested that a move to single-element meters would effectively cut off the opportunity to charge differently for controlled loads (such as storage water heaters) compared with other loads operating at that time. The ability to differentiate the price for controlled loads would seem to be economically efficient and promote the development of load shifting strategies to manage peak demands.

L+G and TXU Networks were concerned about the underlying assumption that the manually read interval meters being proposed could be easily converted to remote communications and appliance control. Both TXU Networks and United Energy sought clarification on whether the meters assumed would accommodate two-way communications.

Information technology costs

AGL, the Host retailers, Origin Energy and TXU Retail questioned why the Commission has not allowed the full information technology costs incurred by the industry, particularly for retailers. They suggested that the Commission provide its reasons in the final decision. The Host retailers noted:

> *The Commission appears to have adopted the costs outlined in the CGEY report without taking account of the initial caveat that the costs do not include industry infrastructure costs (eg a national B2B and the incremental costs of additional transactions for the rollout) and decommissioning. The report also stated that the costs presented should not be relied upon for decision-making, as there are very few software products capable of supporting the proposed rollout.*[71]

AGL suggested that a negative net benefit would arise if the Commission used the industry's information technology cost estimates in the cost analysis.

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70 United Energy response to the draft decision, p. 10.

71 Host retailers' response to the draft decision, p. 2.

TXU Networks requested confirmation that the Commission is referring to the meter data management activities of the distribution business when it refers to meter data agent costs. The distribution businesses will be undertaking the data management for the rollout.

United Energy noted that the cost analysis has not included data storage costs from day 1 of the interval meter rollout. It argued that this assumption is not valid because current systems have the functionality to roll out only a few more interval meters. Further, United Energy suggested the data storage costs have been underestimated: as interval meter volumes grow, so do the data stored online to meet regulatory requirements—a compounding issue. It considered the costs presented by the Commission to be oversimplified and inconsistent with current code requirements.

Discount rate

The Host retailers, CitiPower/Powercor, Origin Energy, TXU Networks, TXU Retail and United Energy argued that a discount rate of 6 per cent is too low for the risk associated with the interval meter rollout, and that the rate values distant benefits highly. United Energy claimed:

> *Any rate used in this analysis needs to reflect the uncertainty that a project of this magnitude has in relation to the potential for substantial technology improvements and redundancy, high impact of any technology failure and the moving regulatory framework associated with the national reform process over this project life.*[72]

The Host retailers, Origin Energy and TXU Networks suggested the appropriate discount rate is the weighted average cost of capital (WACC) used for the 2001 Electricity Distribution Price Review. The Host retailers and TXU Networks suggested that using the regulatory WACC would result in year 15 benefits being valued 12 per cent less than the current assumption. TXU Networks also noted that federal Treasury guidelines suggest a real discount rate of 8.3 per cent for public interest projects

Additional costs

AGL, the Host retailers and TXU Retail suggested the Commission has not fully accounted for the back office costs, including increased activity for customer contact centres. AGL also noted that the Commission has accounted for only two years of customer education costs despite the rollout occurring over a much longer period.

L+G argued that the Commission has not fully accounted for the inevitable additional costs of technological risk—costs that L+G considered to be particularly relevant given the recent problems with certain meters in New South Wales.

Headberry considered the Commission has not accounted for the costs incurred by the customer, including the costs of:

- securing an appropriate energy management system
- new switching for appliances with associated wiring to the energy management system

[72] United Energy response to the draft decision, p. 4.

- rewiring new meters to specific appliances
- installing computers with a continuous online facility to an electricity price source
- purchasing 'smart appliances'
- the self-education needed to understand how to fully use the new market
- time spend implementing demand management to gain the benefits.

TXU Retail also questioned whether the Commission's analysis accounts for consumer costs. TXU Networks disagreed with the Commission's decision to exclude further costs for enabling technologies, because these technologies would be fundamental to realising the potential benefits of interval metering.

C.6.1 Interval meter cost model assumptions – the Commission's consideration

General comments on the interval meter cost model assumptions

Section 2.2 of the final decision, which discusses the cost–benefit analysis, also discusses the cost inputs used in the modelling. The Commission has conducted an incremental cost–benefit analysis involving interval meters. As indicated, interval meters are already a feature of the market and, to a large extent, not all development costs relating to interval data are fully incremental to this study. Further, efficiencies are likely in the management of data during the period of the analysis.

Notwithstanding the importance of the final decision, the Commission considers that the costs applied in the draft decision paper are reasonable for the purpose of this analysis.

The Commission accepts that the cost differential of $30 between accumulation meters and interval meter as stated in the executive summary of the draft decision paper relates to the supply of meters in significant quantities, and that this qualification should have been made.[73]

The cost differential for a single-rate, single-phase meter, based on the costs published in the draft decision paper, varies between $50 and $30, depending on the assumed quantity of meters supplied.[74] The Commission considers that these meter costs are reasonable and that there are indications that the costs of meters may have already fallen relative to the cost assumptions used in the modelling and set out in the draft decision paper.[75]

Information technology costs

As noted, there are some uncertainties about information technology costs. These costs were estimated on the basis of the costs submitted by Cap Gemini Ernst and Young (CGEY) and

[73] Essential Services Commission 2004a, op. cit., p. 3.

[74] Ibid., p. 71.

[75] An article in the industry publication, Australasian Power Transmission and Distribution (June/July 2004, page 24) suggests that the price of a basic single-phase interval meter is now about $70, having fallen from $160 in 1988.

NEMMCO, and in other submissions. The Commission also had regard to the costs of information technology systems generally and the costs previously submitted by the businesses. NEMMCO has considered costs in some detail, and its costs are substantially lower than those submitted by any other party. As noted, the Commission considers there are alternative ways of dealing with the data (ways that the industry has not fully explored), and not all information technology costs are fully incremental to the interval meter rollout.

Further, not all information technology costs will necessarily repeat at the same magnitude. Once the necessary functionality and how to deal with increasing volume requirements have been determined, then only incremental changes to information technology are expected to be required.

Cost of enabling technology

As noted in the draft decision, the modelling has not included costs for enabling technology, except the costs of education (for which $1 million has been allocated in the model). While the Commission has not proposed to mandate such enabling technology, the businesses may choose to propose such additional technology in connection with the meters.

Given the range of possible enabling technologies and the fact that the corresponding costs may be nonmaterial when such technologies are designed into control systems, wiring or appliances, the Commission has not included further costs for enabling technologies. A further reason for this exclusion is that the minimum technology that the Commission would be seeking to mandate would not include such enabling technology.

D Appendix—draft changes to the Electricity Customer Metering Code

The Commission has considered whether the requirement to install interval meters needs to be incorporated in the Metrology Procedure as well as the Electricity Customer Metering Code. The Metrology Procedure sets out the characteristics of type 5, 6 and 7 metering, including the maximum allowable energy flow through type 5 and 6 meters (by defining x and y in the Schedules). The maximum allowable energy flow through both type 5 and 6 meters, under the Metrology Procedure is 160 MWh per annum.

While the Metrology Procedure prevails to the extent of the inconsistency with the Electricity Customer Metering Code, the Metrology Procedure does not state when a type 5 or 6 meter should be installed. Clauses 6, 7 and 12 of the Electricity Customer Metering Code set out the obligations on distributors to install meters for first and second tier customers respectively. Hence, these clauses will be varied to provide for: (1) the changeover of meters to interval meters and (2) the commencement of the installation of interval meters on a new and replacement basis. Some consequential changes will be necessary to other clauses and, to a limited extent, other instruments.

D.1 Draft variations to the metering code setting out the requirement to roll out interval meters

Add a clause 6A as follows:

6A INTERVAL METER ROLL-OUT

6A.1 Subject to clause 6A.2, the ***distributor*** must ensure that by:

(a) 1 January 2008 all ***meters*** for ***electrical installations*** with consumption of greater than 160 MWh per annum in the ***distribution area*** are ***interval meters***; and

(b) 1 January 2011 all ***meters***, other than single-phase, single-register ***meters***, for ***electrical installations*** with consumption of less than 160 MWh per annum and greater than 20 MWh per annum in the ***distribution*** area are ***interval meters***.

(c) 1 January 2013 all ***meters***, other than single-phase, single-register ***meters***, for ***electrical installations*** with consumption of less than 20 MWh per annum in the ***distribution area*** are ***interval meters***.

6A.2 The ***distributor*** is not required to install an ***interval meter*** where:

(d) it would be unsafe to do so; or

(e) the distributor is unable to do so,

because of something outside the ***distributor's*** responsibility or control.

6A.2 The ***distributor*** must report to the ***Commission*** at least annually on their progress towards meeting the requirements of clause 6A.1.

D.2 Draft variations to the metering code setting out the requirement to install new and replacement interval meters

Clauses 7 and 12 would be varied for first and second tier customers respectively. As these variations would be largely the same, only the variations for clause 7 are shown. Clauses 7.1(a), (f) and (i) to (k) would be replaced with:

(a) Subject to clauses 7.1(d), 7.1(f) and 7.1(g), if a ***first tier customer***, or a ***retailer*** on behalf of a ***first tier customer***, requests a ***supply*** of electricity to the ***electrical installation*** of the ***first tier customer*** from a ***distributor***, the ***distributor*** must provide, install, commission, test and maintain ***metering* equipment** to measure and record the amounts of electricity supplied to the ***first tier customer's electrical installation***.

(f) Where a ***distributor*** installs ***metering equipment*** for a ***first tier customer*** for a new ***point of supply*** or new ***metering equipment*** because existing ***metering equipment*** requires replacement, the ***distributor*** must:

(1) if the installation occurs after 1 January 2006 and the ***metering equipment*** is not to be a single-phase, single-register ***meter***, install an ***interval meter***;

(2) if the installation occurs after 1 January 2008 and the ***metering equipment*** is to be a single-phase, single-register ***meter***, install an ***interval meter***; or

(3) if requested by the ***first tier customer***, or by a ***retailer*** on behalf of a ***first tier customer***, different ***metering equipment*** to the type the distributor would otherwise install.

(i) Where a ***first tier customer*** or a ***retailer*** on behalf of a ***first tier customer*** requests a ***distributor*** to install different ***metering equipment*** in accordance with clause 7.1(f)(3), the ***distributor*** must use its reasonable endeavours to install that type of ***metering installation*** within 20 ***business days*** of receiving a written request to do so from the ***first tier customer*** or the ***retailer*** on behalf of the ***first tier customer***.

(j) Where a ***first tier customer*** who has requested a ***distributor*** to install different ***metering equipment*** in accordance with clause 7.1(f)(3) ceases to take ***supply*** from the ***distributor*** at the premises where the ***metering installation*** is installed, the residual costs incurred are payable by the ***first tier customer***.

(k) If a ***first tier customer*** or a ***retailer*** on behalf of a ***first tier customer*** requests a non-market generator to be connected to the distribution system, ***interval metering equipment*** must be installed in accordance with clause 8.4(c).

D.3 Draft variations to instruments prescribing when interval data must be collected

Clause 15.1A of the Electricity Customer Metering Code currently imposes an obligation to collect interval metering data once interval meters are installed, there is a similar obligation in the Metrology Procedure. While changes would be made to both instruments, the substantive changes to Clause 15.1A of the Electricity Customer Metering Code would be as follows:

15.1A COLLECTION OF INTERVAL METER DATA

(a) A distributor must ensure that where ***interval metering equipment*** is installed before [date of application of revised code], interval ***metering data*** is collected from the ***metering equipment***.

(b) A distributor must ensure that where ***interval metering equipment*** is installed on or after [date of application of revised code]:

(1) for ***electrical installations*** with consumption greater than 160 MWh per annum, interval ***metering data*** is collected from the ***metering equipment***;

(2) for ***electrical installations*** with consumption less than 160 MWh per annum and greater than 20 MWh per annum other than single-phase, single-register ***meters***, interval ***metering data*** is collected from the ***metering equipment*** from 1 January 2006; and

(3) for ***electrical installations*** with consumption less than 20 MWh per annum and for single-phase, single-register ***meters***, interval ***metering data*** is collected from the ***metering equipment*** from 1 January 2008.