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26 August 2011

Dr John Pierce
Chairman
Australian Energy Market Commission
PO Box A2449
SYDNEY SOUTH NSW 1235

By email: submissions@aemc.gov.au

Dear John

Ref: EPR0022 – DSR 3 Issues Paper

Thank you for the opportunity to comment on the Issues Paper dated 15 July 2011 published by the AEMC and entitled "*Power of choice - giving consumers options in the way they use electricity*". Please find attached a brief submission in response to the specific questions raised in the Paper.

The stated aim of this review is *"to identify opportunities for consumers to make informed choices about the way they use electricity, and provide incentives for network operators, retailers and other parties to invest efficiently so that there is increased confidence that demand and supply side options are given equal weight in satisfying the community's demand for energy services*."[1]

The starting point for this Review therefore should be for the AEMC to learn about what drives consumer behaviours with respect to their electricity consumption and how this might be influenced by policy and/or regulatory decisions. Any such assessment is particularly difficult because it requires an in-depth understanding of "consumer utility" as this applies to electricity usage behaviours, and how this is impacted by any particular DSP option for each individual consumer. The consumer utility impacts of any potential DSP option are both highly variable and extremely dynamic. One particular aspect of this has being explored already in some depth in the context of the NEM; i.e. the Value of Lost Load. These VOLL studies[2] have shown that, even within homogeneous groups of consumers, VOLL can vary

1 AEMC Issues Paper – p i

2 One example of these studies is as follows:- *"Assessment of the Value of Customer Reliability"*, prepared by CRA for VENCorp, December 2002

considerably from one consumer to another, from one electricity application to another, and from one time period to another. It is reasonable to assume that the same variability applies to any broader measure of "consumer utility" across the full spectrum of electricity usage behaviours and how they may be impacted by any particular DSP option. The Issues Paper appears to have largely ignored this question and its relevance to the Review.

Probably the most critical issue for the future of DSP in the NEM relates to the pricing of all of the various unbundled services associated with the NEM including those that are priced via competitive markets and those that are subject to price regulation as monopoly services. In the competitive markets, the lack of any effective short-term forward market with efficient price discovery hampers the development of DSP, and the pricing approximations and price dampening in the real time market mechanisms in effect undervalue DSP in those markets. For the regulated monopoly services, revenue recovery is generally biased in the direction of energy related charges which tend to overvalue energy efficiency and fuel substitution while undervaluing DSP options which reduce peak demand. This Review should be addressing how different price structures for these regulated monopoly services can impact on consumer behaviours and consider what would be the most appropriate governance arrangements for determining what pricing structures to apply in the future.

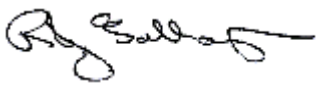
Almost of equal importance to the pricing issue for the future success of DSP in the NEM is the question of commercial separability of DSP from energy purchasing in the retail sector. There are essentially 3 different ways this can occur:

- the consumer bypasses the retail sector by purchasing directly in the wholesale market;
- separate metering of embedded generation and/or controllable loads in a consumer's installation (only partially effective); and
- more complex retail contracts that provide for considerably more sophistication in the allocation of price and volume risk under different market conditions.

There is some albeit quite limited evidence of each of these approaches having been applied in the NEM to date. The Review should consider what barriers persist that are discouraging broader application of each of these options, and what regulatory interventions, if any, may be necessary to remove them.

I would be pleased to discuss any of the matters raised in this submission with you or your staff if you wish.

Kind regards



Director
Att.

Attachment 1

Response to the Questions in the AEMC Issues Paper

	Question	Response
Methodology & assessment		
1	Chapter 3 outlines our approach to identifying "market and regulatory arrangements that enable the participation of both supply and demand side options in achieving an economically efficient demand/supply balance in the electricity market." Do you agree with our approach?	The Net Societal Benefit of any particular DSP action is equal to the net Industry Cost Savings plus any Savings in Externalities less Consumer DSP Costs (i.e. Loss of consumer utility plus DSP investment costs plus DSP transaction costs). As there are wide variations in the consumer costs and, in particular, the loss of consumer utility of any particular DSP action, there is a hard limit to the amount of any particular DSP action which is economically efficient, and this changes quite significantly over time because the loss of consumer utility is dynamic. The extent of the theoretical maximum amount of economically efficient DSP that can be captured will depend on the market conditions and regulatory arrangements established to govern the commercial inter-relationships within the industry, and between the industry and consumers. And it would be unrealistic to assume that there is an idealised set of market conditions and regulatory arrangements that would enable 100% capture. The assessment process proposed in the Discussion Paper places undue emphasis on the costs associated with establishing the right market conditions and regulatory arrangements. If indeed this is such a material cost that it warrants the amount of attention given to it, then arguably, the net benefits of DSP are so small that they are insignificant in an overall assessment of an economically efficient supply/demand balance, in which case we should abandon any further consideration of them. I however do not believe this to be the case. Also, I believe the process places undue reliance on past studies and surveys to develop estimates of likely consumer response to specific market conditions or regulatory arrangements. Generally speaking, the responses to such studies and surveys are heavily influenced by the cumulative history of electricity industry service levels and prices experienced by the target consumer group as well as the detailed design of the experimental study and so on. Rarely are the results readily transferable from one market to another or from one consumer group to another. In any event, this is at odds with the statement that "*the key assumption behind this review is that consumers will always make the best decision from their viewpoint, based on the prices they face, the technology and equipment they have access to, the information they have and their individual transaction costs.*"[3] It is also worth noting that this assumption ignores what is arguably the single biggest consumer cost associated with many DSP options; i.e. the loss of consumer utility.
2	How should the benefits of DSP be measured? Can they be accurately quantified?	
3	What are appropriate discount rates to apply to DSP investments for the various parties across the supply chain?	
4	Are there other issues which we should consider in our assessment process and criteria?	
Consumer participation and DSP opportunities		
5	What are considered the drivers behind why consumers may choose to change their electricity consumption patterns? Please provide examples or evidence where appropriate.	Consumer drivers are primarily economic or social – e.g. "*save money*" or "*save the planet*". In any event, if the consumer driver is social, this manifests itself in the consumer's approach to valuing the energy service and the externalities associated with it, and comparing them to the alternative involving some form of DSP action. In other words, the social driver is in effect translated into an economic driver from the consumer's perspective. Other potential consumer drivers such as risk mitigation, health and safety issues, and the like are usually second order issues or quite separate matters that have only a marginal impact if any on any particular DSP decision.
6	Chapter 4 lists some plausible DSP options that are currently used or could be used by consumers. Are there any other plausible DSP options currently used by consumers that have not been identified? Please	Two variants on the plausible DSP options listed in the Issues Paper are: 1. *Aggregation of Demand across multiple consumers* – this changes the risks and rewards that a consumer will face when contemplating a specific DSP action; 3 particular forms of aggregation are (i) consolidation of related energy supplies across multiple sites for energy purchasing, (ii) inset networks in conjunction with

3 AEMC Issues Paper – page 16

	Question	Response
	provide description of measures and examples, where available.	consolidated energy purchasing, and (iii) aggregation of DSP across unrelated sites by a third party aggregator. 2. *Increase consumer demand whenever spot prices are negative* – really only assessable by wholesale market participants such as pumped storage plant and other large scale pumping installations. Another potential option is temporary voltage reduction within the distribution network; however, the supply quality implications of this type of DS action would need careful consideration, and stringent limits imposed on its potential application.
7	Are there any DSP options that are currently available to consumers, but are not commonly used? If so, what are they, and why are they not commonly used (i.e. what are the barriers to their uptake)? Please provide examples and evidence if available.	From a technical perspective, all potential forms of DSP involving some form of demand control at the consumer's installation are already available to consumers. The principal barriers to its take-up are: • lack of effective price signals through the supply chain to consumers; and • perceived lack of separability of DSP from retailing. If these deficiencies were addressed, there would be sufficient incentive for innovators to seek solutions to the other barriers such as financing of DSP measures, educating consumers, installing the necessary control systems and communications infrastructure and so on. With the advent of smart meters, in-house displays, electronic based home automation systems and the NBN, there is probably no need for any further facilitation of infrastructure provision to support DSP options even for small consumers.
8	Are there other DSP options that are not currently available to consumers, but could be available if currently available technologies, processes or information were employed (or employed more effectively) in the electricity (or a related) market?	
Market conditions required for efficient DSP outcomes		
9	What are considered the relevant market conditions to facilitate and promote consumer take up of cost effective DSP?	*Effective Price Signals* The 3 key concerns with the current price signals in the market are: – the 5/30 minute pricing issue in the spot market; – the excessive reliance on energy related charges for network revenue recovery by NSPs; and – the very simplistic tariff structures employed by retailers for the provision of bundled services to consumers. *Separability of DSP from Retailing* Separability is important because it will foster competition and innovation amongst energy services advisors, DS aggregators, appliance and equipment manufacturers and even retailers to exploit the true DSP potential in the market. The current regulatory arrangements do not prevent commercial separability of DSP from a minimalist package of retail services, but some regulatory intervention is probably needed to prevent retailers from actively discouraging it. Some separability is occurring already for example where in-house gensets are being sub-metered and treated separately in wholesale market settlements. This practice could also be extended to controllable loads. However, the real breakthrough would occur with the widespread introduction of standardised retail contracts where the volume risk transfers from the retailer to the consumer when the spot price exceeds a contractually defined threshold level. Such contracts have benefits for both the retailer and the consumer. The retailer no longer carries volume risk under extreme market price conditions and the consumer retains ownership of his DSP potential in the market to exploit it in any way he wishes.
10	Are there any specific market conditions which may need to be in place to enable third parties to facilitate consumer decision making and capture the value of flexible demand? Please provide examples and evidence as appropriate.	
11	What market conditions (technologies, processes, tariff structures, information etc.) are needed, that are not currently employed in the electricity market, to make other DSP options available to consumers?	
Pricing		
12	Do you consider retail tariffs currently reflect the costs to a retailer of supplying consumers with electricity?	Looking at each of the 3 pricing related concerns listed above: *The 5/30 minute pricing issue* Given the relatively low cost of FCAS services in the NEM now compared with the overall value
13	Are any changes needed to retail	

	Question	Response
	price regulation to facilitate and promote take up of DSP?	of energy traded, this issue should be readily resolvable, not just for providers of real time DS services but also for low duty generators, both scheduled and unscheduled.
14	Do the charges to retailers for use of transmission networks reflect the value of that use?	*Energy related charges of NSPs* The issue of network tariff structures is a complex one with many different facets of it being directly relevant to the subject matter of this review. In fact, it probably warrants a separate review by the AEMC after this Review establishes some principles and guidelines for the DSP related aspects of the issue. Some discussion of the issue is provided separately in the form of a paper[4] I prepared some years ago, most of which is still considered relevant today.
15	Do the charges to retailers for use of distribution networks reflect the value of that use?	*Network charges in retail price offerings* Until the network charges themselves are reformed to fit the needs of a marketplace which encourages proactive DSP, the history of retail price offerings is unimportant. The focus for regulatory attention involving retailers from a DSP perspective should be on (i) facilitating separability of DSP and (ii) maximising competition in the retail sector.
16	Do all consumer groups, including vulnerable consumers benefit from having cost reflective prices in place? If not, are any special provisions required to protect certain classes of consumers?	So called "cost reflective prices" can vary over a very broad range and still be considered economically efficient, particularly where there is a wide margin between SRMC and LRMC, and where there are a significant amount of shared costs involved. In any event, as a matter of principle, social welfare, to the extent that it is desirable, should be highly targetted and provided separately, and not be used as an excuse to constrain prudent economic tariff design.
Information		
17	To what extent do consumers understand how they can reduce their electricity bill? What information do consumers need in order to increase their understanding of how they can reduce and manage their electricity consumption and hence bills?	There are 4 types of customer information that are relevant here: *General information on DSP* – there are decades of experience with this, particularly in the areas of energy efficiency and energy conservation, which should provide useful insights into how, and to what extent, this should be expanded into other areas of DSP. *Specific information on the consumer's installation and each available DSP opportunity* – provided the market conditions are right, this is essentially the role of sellers of equipment and energy services as well as buyers of DSP services. It is not an issue for regulatory intervention other than possibly the accreditation of those dealing with consumers, and protecting consumers from the provision of false and misleading information, the latter already dealt with under general competition law. *Provision of useful real time and near to real time market data* – Provided the market conditions are right, one would expect that, over the long haul, there will be a proliferation in the number and level of computer-based DSP decision systems which rely in part on a regular feed of real-time or near to real-time market information. This may be as simple as time synchronisation or it could include quite comprehensive data for various DSP triggers such as market prices, ambient temperatures, system frequency, system emergency or lack of reserve condition, network voltages, and so on. There would be some merit in developing standards for the way in which such information is communicated to those parties which control the various DSP decision systems (i.e. consumers, aggregators, retailers and possibly network operators). This should be considered within the broader context of how smart network technologies are to be integrated into and operate within the NEM. *Provision of useful short to medium term market information* – Existing centralised processes for the provision of forecast information to the market are essentially supply-side oriented. It would be useful if each of these were reviewed to see if there would be benefit from expanding them to include specific information aimed at potential DSP providers.
18	What issues are associated with provision of existing information in the market? Are there arrangements that could improve delivery of such information? If so, how and by whom?	
19	Could better information be provided to consumers regarding the actual consumption of individual appliances and pieces of equipment? If so, what information could be provided and in what form?	
Pricing options, products and consumer incentives		
20	Are retailer and distributor business models supportive of DSP?	Separation of distribution and retailing is not in itself an impediment to DSP. See previous comments under the heading of *Pricing* on the DNSP business model and network pricing.

4 *Network Pricing Options from the Network Business's Perspective*, presented at the CUAC Expert Forum on Electricity Pricing, 16 August 2007

	Question	Response
21	What incentives are likely to encourage research and development of other parties to promote efficient DSP?	No comment
22	Are there any regulatory, cultural or organisational barriers that affect take up of DSP opportunities?	See previous comments on network charging.
23	What form of commercial contracts/clauses are required for facilitating and promoting efficient DSP?	Previous comments on the separability of DSP from retailing are relevant to this question.
Incentives to invest and access to capital		
24	Are there specific issues associated with investment in infrastructure needed for consumers to take up DSP opportunities?	There are 2 different split incentives issues for DSP: 1. *Owner versus renter:*- this is the classic split incentives issue that has frustrated energy efficiency and energy conservation programs for decades, and it also applies to varying degrees to other DSP opportunities. 2. *Multiple applications for a DSP opportunity:*- Where the same DSP opportunity has multiple applications (e.g. Demand reduction in the energy market, network support and FCAS), any one of which would not justify the DSP investment on its own. Consumers, energy service providers, specialist consumer agents and DS aggregators all provide a partial solution, and can better capture the full value of such DSP opportunities than electricity industry participants. The regulatory arrangements and market processes should be designed to encourage these players to enter the market. In some cases, regulatory intervention may be required to break down existing barriers (e.g. retailer resistance to separability of DSP, fees structures and prudential requirements for direct customer participation in the wholesale market, retailer ownership of meters, timely access to meter data etc.).
25	Do you consider that the issue of split or misaligned incentives has prevented efficient investment in DSP from taking place?	
26	What are potential measures for addressing any issues associated with split or misaligned incentives?	
27	Are there specific issues concerning ease of access to capital for consumers and other parties?	No comment
Technology and system capability		
28	What are the significant energy market challenges in optimising the value of technology and system capability to facilitate an efficient level of DSP?	DSP will emerge if the price signals throughout the supply chain are right, risk allocations associated with supply reliability are allocated efficiently, there is strong competition in the retail sector, the cost of entry of DSP specialists into the marketplace is low, and regulatory arrangements provide some transitional support for DSP until it is properly established and broadly accepted as a key contributor to efficient market outcomes. The NEM is currently lacking to varying degrees in all of these areas.
29	Do current technology, metering and control devices support DSP? If not, why not, and what are considered some of the issues?	With modern communications and control technologies, centralised provision of DSP infrastructure is no longer necessary. However, uniform standards and protocols for information access and communications and interfacing would greatly assist technology substitutability and compatibility and thus facilitate greater competition amongst DSP related suppliers and service providers. It would also facilitate information flows for real time system control at both the main system and local network levels.
30	How can issues relating to weak and/or split incentives be addressed to ensure that the benefits of smart grid technologies are aligned and felt across the electricity supply chain, including by consumers?	The twin topics of network pricing structures and the proper integration of smart grid technologies into a modern, competitive and somewhat fragmented electric industry and marketplace such as the NEM are both much broader topics and involve many more complex legal, technical and social issues than merely their potential impact on DSP. The questions being posed here by the AEMC need to be addressed within the framework of a much broader assessment of both of these topics.
31	How can pricing signals/tariff	

	Question	Response
	arrangements be made complementary with smart grid technologies to facilitate efficient DSP in the NEM?	
32	In maximising the value of technologies, such as smart grids for DSP, what are the issues relating to consumer protection and privacy?	No comment
Market and regulatory arrangements		
33	To what extent do parties have appropriate incentives to put in place the systems, technologies, information flows etc. that facilitate efficient DSP?	DSP is viewed by all sectors of the industry as being less controllable and less reliable and involves many more unknowns than traditional industry infrastructure from both an investment and an operational perspective. The regulated service providers (AEMO and NSPs) are only incentivised by the regulatory requirements which govern their operations – there are no other commercial drivers, and the NEL unduly protects all industry participants from unreliable service to the consumer. Retailers do have some commercial incentive, but consumer churn discourages investment in DSP in favour of more conventional supply side business solutions to their needs.
34	Are there aspects of the NEL or the Rules which prevent parties taking actions that would otherwise allow for more efficient levels of DSP?	Without a detailed review of NEL or the Rules, generally speaking, it is more likely that aspects of the legal and regulatory arrangements for the NEM discourage DSP or make it unnecessary for parties to take action rather than preventing it outright. However, supply quality standards may prevent temporary voltage reduction being employed as a DSP action at the grid level, but it could still be used voluntarily by medium and large users with their own voltage transformation on site.
35	Are there market failures which mean regulation is needed in some areas to ensure appropriate market conditions are in place?	No comment
Energy efficiency measures and policies		
36	What energy efficiency policies and schemes should be considered as part of this Review, i.e. as impacting on, or seeking to integrate with the NEM?	No comment
37	To what extent can energy efficiency policies and schemes be adopted as options for enhancing the efficiency of DSP in the NEM? What are the strengths and limitations of energy efficiency policies as a DSP option compared to other options?	No comment
38	To what extent do existing retailer obligation schemes facilitate efficient choices by consumers in their electricity use? Are there aspects of those schemes that facilitate efficient consumption choices more than others? If so, please explain.	No comment

Network Pricing Options from the Network Business's Perspective

Jim Gallaugher, Director & Principal Consultant

Gallaugher & Associates Pty Ltd

1. Introduction

In the brave new world of competitive energy markets, the roles of energy retailer and distribution network service provider have moved apart, and each now has its own separate business agenda.

On the one hand, retailers operate in a competitive market environment, and, if customer churn rates are a useful guide to the level of competition in the market, the Australian energy markets are arguably the most competitive in the world. On the other hand, the mainstream services of distributors are not exposed to competition other than 'at the margin', and hence they are subject to quite extensive regulatory supervision. Even where at the outset of the electricity industry reforms, distribution and retailing functions remained together as was the case in Victoria, these have since been separated to maximise the value of each in the eyes of the investment community.

As a result, the relationship between the consumer and the distributor is now somewhat more tenuous than it used to be. For small consumers in particular, the consumer's retailer is now the primary point of contact with the industry. Network charges that apply to each electricity supply point are charged by the distributor to the responsible retailer, and it is up to the retailer to decide how those network costs are to be recouped via its competitive retail offerings.

This paper examines the issue of distribution network pricing and its role from the distributor's perspective. It is not a highly detailed analysis of how a distributor should structure its network charges to optimise their contribution to the achievement of the distributor's business objectives. Rather, it is a much more strategic discussion of the factors that impact on a distributor's decision concerning its overall pricing philosophy and detailed tariff strategy, and how this might be affected by the upcoming interval meter rollout.

Throughout the paper, the focus has been on the Victorian distribution industry and, in particular, CitiPower's current Tariff Schedule and Tariff Strategy have been referred to more so than the others in discussing current practices and future options. CitiPower has been used because its supply area and customer mix are very different to any of the other distributors and they have had more opportunity and arguably more incentive to introduce network price innovation involving interval metering quantities than the other distributors to date.

2. Key characteristics of a distribution network business

Like all businesses, distribution network businesses have a number of key characteristics that both define them and set them apart from other industries. These characteristics have a significant impact on strategic decision-making of the business including the development of its pricing strategy. The more important of these characteristics include:

Capital Intensity

As is the case for all sectors of the power industry, distribution network businesses are highly capital intensive. The combined Regulated Asset Base of Australia's 15 major distribution businesses exceeds $30 billion, and they continue to invest in new and replacement network infrastructure at the rate of $3.5 billion per annum. In extreme cases, return on capital and capital recovery combined can account for up to 70% of a distributor's regulated revenue allowance.

If distribution businesses are to continue to make marked improvements in their overall business efficiency, they must strive for further dynamic efficiency gains in their use of capital. When two thirds or more of the cost base of the business is capital related, merely achieving operating efficiency gains is not going to be enough to meet or exceed the efficiency targets being set by regulators. In addition to looking for more cost efficient network designs, DNSPs are also pursuing other less conventional measures including various forms of active and passive demand response.

High Gearing

In addition, regulated network businesses are generally viewed in the capital markets as low risk, low return businesses. As such they tend to be highly geared, which is quite satisfactory provided that the amount of revenue at risk is perceived to be relatively small. This is a very important consideration in developing business strategy and, in particular, in designing the detailed tariff structure of the business.

Regulatory Oversight

As monopoly service providers, the distribution businesses are subject to regulatory supervision of both the pricing and performance of their monopoly network services. The existing State-based regulators are to be replaced by a single national regulatory regime to be administered by the Australian Energy Regulator (AER). As there have been some profound differences in the form and style of regulatory supervision across the States, there will inevitably be some changes as we transition towards a uniform national regulatory approach.

The implications of this for each distribution business are still unclear at this stage, and it probably won't have any real impact until the next regulatory reset. However, all of the

current regulatory arrangements for the monopoly network businesses are characterised by regulatory measures designed to incentivise the regulated entity to both continue to improve its overall economic efficiency while at the same time increasing the quality of service it provides to network users. The transfer of regulatory oversight responsibilities to the AER will not result in any fundamental change in this approach.

The form and style of the regulatory oversight of the business can and does play an important role in the formulation of the distributor's business strategy including its detailed pricing arrangements for the provision of distribution services.

Essential service provider: - For the vast majority of consumers, access to the local distributor's electricity network is not an option – it is unavoidable. This lack of choice for the network user in securing what is an essential service to him/her often has a significant influence on the relationship between the distributor and the consumer, and it creates additional challenges for the distributor to achieve customer satisfaction. With the advent of computers and the plethora of other digital devices in the home, consumers' expectations concerning the quality and reliability of supply have risen. Similarly business consumers are also much less tolerant of voltage fluctuations and supply interruptions.

Consumer reaction to price movements is therefore an important issue for the distributor to take into account when making its pricing decisions for all of its prescribed services including its network tariffs.

3. Key business strategies for regulated distributors

While there are other important factors that characterise a distribution network business such as a breadth of technical competencies, innovation, the increasing importance of IT systems and applications in the running of the business etc., the four listed above are the key drivers of business strategy for the regulated network services and the impact of that strategy on the individual consumer.

These key strategies revolve around:

'Managing' the regulatory process for the benefit of the business: - Information asymmetry between the regulated businesses and the regulator, if appropriately managed and exploited, provides a significant strategic advantage to the business. Regulators worldwide have been continually frustrated by this problem and have expended a lot of effort trying to overcome it. In these circumstances, it is quite understandable, distributors focus on managing the interfacing of their business with the regulator with the dual aims of satisfying its regulatory obligations while at the same time maintaining its strategic advantage.

Maintaining a high degree of revenue certainty: - Maximising the gearing of the business enables equity investors to gain access to higher returns, provided that the business is able to maintain a good investment grade credit rating. This is only achievable with such a high gearing if the business is able to demonstrate a very high degree of revenue certainty in the medium term. Traditionally, distributors have been keen to structure their DUoS charges using parameters that the business can forecast with a high level of accuracy, and to then ensure the charges remain stable. Introducing new and innovative pricing structures brings with it risks and uncertainties re:

- *The potential for adverse consumer reaction to the changes* – substantial changes in pricing structures create winners and losers amongst network users depending upon how those changes are reflected in retailers' tariff offerings to consumers; and
- *Revenue uncertainty:* - pricing innovation is generally targeted at evoking a consumer response (load shifting, peak demand reduction, energy conservation etc.), but the rate at which consumers will transfer over to the new pricing structure and the impact it will have on their energy usage can be difficult to predict with any degree of accuracy.

Continuous Improvement: - Incentive regulation forces distributors to strive for continuous improvement in the efficiency and performance of all facets of their operations. The rewards for achieving this are maximised if and when the distributor is able to outdo the regulator's benchmarks established at the beginning of each regulatory period. Even though we have a building block approach to economic regulation of our distributors, as part of the regulatory process, the costs and performance of the distribution businesses are compared and this does impact on the regulator's pricing decision. With the move to a national regulatory regime, this form of 'benchmark competition' between distributors is likely to take on increased significance over time. Therefore, distributors must be cognisant of how their business is performing relative to others and continually strive to improve its relative position.

Maintaining business values more or less in line with community values and expectations: - In broad terms, regulated utilities adopt corporate values that reflect general community social values and aspirations. They tend to be relatively conservative in nature and not predisposed to taking a leadership role where they would actively work to change community values and behaviours over time. Nevertheless, they generally pride themselves on being good corporate citizens and often use their resources to support local community programs and support systems.

Leveraging off the regulated business to pursue unregulated business opportunities: - Wherever possible, electricity distributors and other regulated network businesses are seeking out business opportunities where they can leverage off the resources and

infrastructure of the regulated business to provide unregulated services, particularly in cases where they have a clear competitive advantage. With the separation of the distribution and retail functions, the opportunities for the stand-alone distribution businesses are reduced. Nevertheless, there are areas such as for example metering services, meter data management, specialist consulting services, and telecommunications services that have been exploited to varying degrees by distributors across the NEM.

Regulated network businesses by their very nature are intended to be relatively low risk, low return ventures for which there is very little upside benefit if they perform extremely well, while at the same time they can expect to be punished mercilessly by governments, the regulator, and the community they serve if they perform badly.

While as businesses, they are continually striving for, and in most cases achieving, incremental improvements throughout all of their business functions, they are quite risk averse. In these circumstances, it is fair to say that distributors are generally uncomfortable with the proposed rollout of interval meters and rather sceptical about the perceived benefits it is expected to deliver. From a technical perspective, they will undoubtedly embrace the program and implement it extremely well and at a pace commensurate with the funding the regulator has provided to cover its costs of implementation. On the other hand however, I expect they will be much more cautious about implementing far-reaching distribution pricing programs or related demand management support infrastructure that arguably will be fundamental to maximising the net benefits of the rollout in the longer term.

4. Network pricing theory

In addition to taking a lead role in the implementation of the interval meter rollout for small consumers, distributors are also expected to introduce new and innovative Distribution Use of System (DUoS) charges that will play a role in inducing consumers to change their behaviour. Retailers are also expected to factor these new rates into the design of their competitive retail tariff offerings so that consumers are exposed to more complex time-of-use rates that better reflect the combined costs of generation, transmission and distribution services associated with their electricity supply. For the purposes of this paper, I will focus solely on the pricing of distribution network services and ignore the issue of how retailers might choose to pass these on to consumers.

Economic theory suggests that the uses of community resources are optimised (i.e. economic efficiency is maximised) when the price of a good or service reflects its true marginal cost. While this is a relatively simple concept in theory, it is extremely difficult if not impossible to apply in practice because:

- Marginal costs should include the costs of all externalities that are often very difficult to value and in any case are usually excluded;

- The marginal cost can vary quite markedly depending upon the timeframe being considered;
- Common costs are not readily divisible ; and
- in any event, the theory only holds true if all other goods and services are similarly priced on this basis.

Another serious concern with its practical application is that, where marginal costs are lower than average costs, marginal cost pricing would be unprofitable and unsustainable. In spite of these limitations, marginal cost pricing still plays a role in developing the detailed pricing strategy of unregulated competitive goods and services as well as regulated monopoly services. The pricing principles included in the Victorian Essential Services Commission's final decision on the Electricity Distribution Price review 2006 – 2010 are as follows:

- *Tariffs for each customer should generate revenue in excess of the avoidable cost to service the customer;*
- *Tariffs for each customer should generate revenue less than the cost of providing the service on a stand-alone basis to the customer; and*
- *Each distribution tariff should signal the impact of additional usage on future investment costs.*

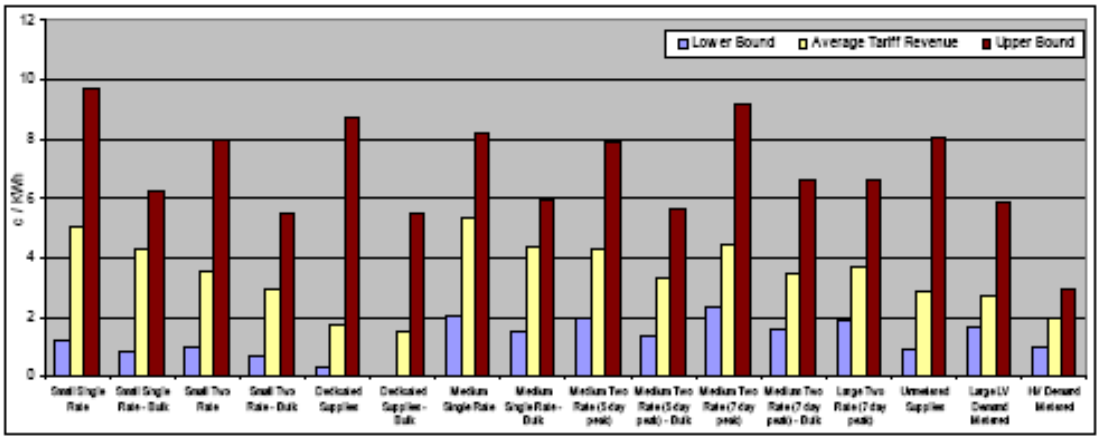


Figure 1: CitiPower Tariff Levels related to Efficient Bounds[1]

The first two of these principles in essence are a practical application of marginal pricing theory being used to set the upper and lower bounds on the allowable prices that the distributor can apply to an individual consumer. The third principle also requires the distributor to consider longer term marginal costs in the detailed design of its tariff structures.

[1] Source: "Citipower Tariff Strategy Report – 2006 to 2010", initially published in November 2005 and subsequently updated in December 2006.

The problem with these principles however is that they are open to a considerable degree of interpretation and there is an extremely large range between the upper and lower bounds in which the distributors are free to operate.

As an example, CitiPower engaged an independent consultant to determine the upper and lower bounds for its range of tariffs, and the results of this study are shown in Figure 1 above. Whereas the lower bound is generally between 0 and 2 c/kWh, the upper bound is less than 5c/kWh in only one case and can be almost as high as 10c/kWh. Not surprisingly, the average cost of supply in each case lies between the upper and lower bounds.

Accepting these results at face value, this confirms there is an extremely wide range of prices that a distributor could apply to each class or category of consumers and they would still comply with the efficiency requirements specified in the ESC's pricing principles. Similar studies by the other 4 Victorian distributors produced broadly similar results.

In essence therefore, the Victorian distributors have wide discretionary powers in setting their distribution price levels and structures for individual categories of consumers, and the principles of economic efficient pricing established by the regulator provide very little in the way of guidance as to how those prices should be structured.

5. Distributor pricing strategies

From the distributor's perspective therefore, economic efficiency principles alone provide insufficient direction for developing a detailed tariff strategy, and the economic regulator, the ESC, has chosen not to impose any other pricing principles or guidelines that would narrow down the distributor's options in this respect. He has however imposed some stringent rebalancing constraints that in effect all but guarantee a high degree of tariff inertia.

Distributors need to develop supplementary principles and objectives on which to base their broad pricing strategies and detailed tariff designs. In the case of Victoria, these are spelt out in the Tariff Strategy Reports which the distributors are each required to prepare and submit to the ESC.

As one might expect, there is a lot of similarity between the Victorian distributors concerning the tariff principles or objectives they have chosen on which to base their tariff structures, and they flow from the key characteristics that drive the distribution businesses as discussed earlier in this paper.

They include the following:

> *Revenue certainty:* - distributors need to be able to determine with a high degree of accuracy the revenue they will earn in any period from a particular set of tariff structures and rates. In addition to the demands of its lenders for revenue certainty, distributors are required to maintain their regulated revenues at the aggregated level within quite strict limits set by the regulator.

Economic signals: - the third principle set by the regulator requires that "each distribution tariff should signal the impact of additional usage on future investment costs". This suggests tariff design should focus more on long run marginal costs of supply averaged across consumer categories, at least for marginal consumption.

Stability: - Distribution prices should remain quite stable over time and rate shock should be avoided. This objective reflects and reinforces the rebalancing constraints imposed by the regulator. However, the rebalancing constraints do not necessarily apply in cases where new tariffs are introduced and consumers are transferred over to them. In these situations however, the distributor's own tariff objectives would appear to severely constrain the allowable price movements that could occur in such cases.

Perceived equity: - The concept of fairness and equity in the relative prices payable by different categories of consumers plays a significant role in determining the detailed tariff structures and price levels to be applied by a distributor. The most striking example of the application of this principle or objective is the uniform or "postage stamp" pricing of distributors across their entire franchise area for any given category of consumers. In some Australian States, this is actually a Government pricing policy imposed on the electricity industry; however, this not currently the case in Victoria.

Regulatory Compliance: - As a catch-all requirement, all distributors have an objective to comply with all of their regulatory obligations including all of the detailed elements of the regulator's pricing decision which constrain their own internal pricing decisions.

Perceived pricing equity, revenue certainty and tariff stability are all most readily achieved by retention of exactly the same set of tariff structures from year to year and implementing "across-the-board" price movements so as to achieve the target revenue for the business.

Experience suggests that even from a consumer's perspective, when prices change, the focus of attention is usually on the apparent equity of the relative price movements for one category of consumer versus another and not on the absolute relative price levels of each category.

In these circumstances, it is easy to understand why there is, and has long been, a very high degree of inertia in electricity tariff structures and relative price levels. The existing DUoS structures and levels, particularly for small consumers, were principally derived by unbundling energy and retail costs from the pre-existing uniform retail tariffs which applied throughout Victoria prior to the industry restructuring and market reforms in the mid 90s.

There is no doubt that the advent of interval metering for large numbers of small consumers will bring with it a major shift in distribution pricing strategy. However, at this stage, just what form this will take is very unclear. The Tariff Strategy reports of the distributors each adopt a very cautious approach to this issue. Each of them is suggesting more or less the following sequence of events:

- Install some interval meters.

- Trial some pricing options in cooperation with retailers.
- Assess both consumer behaviours in response to alternative price signals and their associated cost and revenue effects on the distribution business.
- Develop more sophisticated distribution tariff strategies that will better assist in the realisation of the nets benefits expected from the interval meter rollout.

This is a very logical and pragmatic approach and is precisely what I would expect the distributors to do. However, it provides very little guidance for retailers and consumers in the short term about how distribution tariffs are likely to change in the future, and we are unlikely to know much more in this respect until the next regulatory period beginning in 2011, by which time the AER will be the relevant economic regulator.

While the provision of distribution services by the electricity distributors is generally viewed as a monopoly, there are some aspects of the service that are exposed to competition. This can be in any one of the following forms:

- On-site generation, which reduces the energy flow through the distribution network;
- Fuel substitution for what would otherwise be electricity applications having a similar effect of reducing energy flow through the network;
- Inset networks displacing some of the services traditionally provided by the distributor; and/or
- Network by-pass, where a large consumer may arrange his own connection through to the transmission network, or alternatively arrange for connection to the network of an adjacent distribution network service provider.

Over time, it is likely that these forms of competition, particularly in the areas of on-site generation and inset networks, will escalate to place increasing pressures on the distributors to remove some of the price averaging inherent in the current distribution tariff designs.

In March 2007, the ESC published a review[2] of the Tariff Strategy reports submitted by the 5 Victorian distributors. The ESC was generally quite critical of the distributors for the paucity of useful information provided. The ESC had expected each of the distributors to explain in detail how implementation of the ESC's Pricing Decision for the 2006 to 2010 Regulatory Period would impact on each of the distributor's network tariffs year by year, explain the rationale for the various price movements, and demonstrate that the prices and price movements being planned complied with all of the various elements of the Pricing Decision. All of the distributors' reports fell well short of this ideal.

[2] "Comparative Report of the Distributors' Tariff Strategy Reports – 2006 to 2010", March 2007, published by the ESC on its website together with the 5 Tariff Strategy Reports of the distributors.

The expectations of the ESC imply underlying assumptions that the distributors have a highly sophisticated approach to the development and implementation of network pricing, and that price innovation should be playing a leading role in improving the overall economic efficiency of the distributors' operations. Historically however, neither of these assumptions can be justified. On the contrary, the whole history of electricity tariff setting in Victoria has actively discouraged the industry from pursuing innovation in price setting. To the extent that there has been any innovation at all, it has been introduced very gradually, it has been quite narrowly targeted, and it has been implemented in a way that avoids having to compel existing consumers to transfer over to more expensive tariff options.

To date, Victorian distributors have focused on managing their costs as the primary means of improving the efficiency of their operations, and this has been very successful. Not only have the costs of service provision gone down but also the overall quality of network services to users has improved. In the future however, it is inevitable that enhanced consumer segmentation and pricing innovation designed to modify consumer behaviour and/or respond to competitive behaviour 'at the margin' will have to play an increasing role. Within the current regulatory framework, this will only occur very gradually.

6. Existing DUoS tariff structures

Electricity tariff structures generally have two or more of the following basic components:

A fixed charge: - different fixed charges can be applied according to the type or category of consumer, the number and type of meters installed, the billing frequency, the supply voltage and the number of phases connected to the installation, the number of supply points, the geographic location of the consumer etc.

A demand charge: - these are generally applied to the maximum demand of the consumer for a given time period or a contractually fixed level of demand; however, with the advent of interval metering there are many more options available such as averaging the billing demand over a number of high demand intervals or excluding demands that are not coincident with overall high demand on the power system at either the local distribution network level or beyond.

Block energy charges: - these may include increasing or decreasing block rates (i.e. the price per unit increases or decreases with increasing consumption), and different block rates may apply according to time-of-day, day-of-week or season. In its absolute simplest form, the energy block rate would be a single rate applying to all energy consumption within the billing period

Reactive energy charges: - these are in effect pricing penalties for the consumer failing to maintain an adequate power factor at his/her electrical installation. It requires some form of

power factor measurement to be installed and only applies to commercial and industrial installations even though it can be an issue with residential loads as well.

DUoS Tariff	Code	Standing charges $/cust/pa	Demand charges $/kW/pa	Minimum Demand kW	Peak charges (c/kWh)		Off peak charges c/kWh
					First 340 kWh/month	Balance	
Residential Single Rate	C1R	16.399			4.177	5.481	
Residential Single Rate - Bulk	C1RB	14.142			3.376	4.289	
Residential Two Rate 5d	C2R	36.615			6.496	6.496	0.712
Residential Two Rate 5d - Bulk	C2RB	36.096			5.113	5.113	0.610
Residential Interval	C3R	36.615			6.496	6.496	0.712
Residential Interval - Bulk	C3RB	36.096			5.113	5.113	0.610
Dedicated Curcuit	CDS						0.852
Dedicated Circuit - Bulk	CDSB						0.748
Non-Residential Single Rate	C1G	36.939			5.068	5.068	
Non-Residential Single Rate - Bulk	C1GB	31.506			4.047	4.047	
Non-Residential Two Rate 5d	C2G5	87.727			6.059	6.059	1.356
Non-Residential Two Rate 5d - Bulk	C2G5B	81.789			4.586	4.586	1.011
Non-Residential Interval	C3G	87.727			6.059	6.059	1.356
Non-Residential Interval - Bulk	C3GB	81.789			4.586	4.586	1.011
Non-Residential Two Rate 7d	C2G7	79.675			5.048	5.048	1.352
Non-Residential Two Rate 7d - Bulk	C2G7B	73.283			3.920	3.920	1.031
Unmetered Supplies	C2U				5.928	5.928	1.421
Large Two Rate 7d	C2L7	76.757			4.314	4.314	1.256
Large Low Voltage Demand	C2DL		61.113	120	1.062	1.062	1.064
Large Low Voltage Demand - Bulk	C2DLB		55.911	120	0.615	0.615	0.976
Large Low Voltage Demand R	C2DLER		62.402	120	1.081	1.081	1.106
Large Low Voltage Demand G	C2DLEG		62.402	120	1.081	1.081	1.106
Large Low Voltage Demand - Bulk R	C2DLBER		57.089	120	0.626	0.626	1.014
Large Low Voltage Demand - Bulk G	C2DLBEG		57.089	120	0.626	0.626	1.014
High Voltage Demand	C2DH		39.713	1,000	0.299	0.299	0.439
High Voltage Demand D1	C2DHD1		24.936	40,000	0.074	0.074	0.068
High Voltage Demand R	C2DHER		40.551	1,000	0.307	0.307	0.460
High Voltage Demand G	C2DHEG		40.551	1,000	0.307	0.307	0.460
Subtransmission Demand	C2DT		9.180	10,000	0.093	0.093	0.138

Figure 2: CitiPower Distribution Tariff Schedule 2007

The advent of interval metering enables retailers and distributors to both develop much more sophisticated block energy rates and to replace existing demand charges with more targeted demand charges, possibly in the form of peak energy rates at specified times.

Figure 2 above shows CitiPower's published Tariff Schedule for 2007. It is characterised by the use of:

- Fixed charges for small to medium consumers and demand charges for all large consumers. Some medium size consumers have access to tariff options that in effect give them a choice.
- Relatively low fixed charges in conjunction with relatively high energy charges, and the use of relatively high demand charges in conjunction with quite low energy rates where demand tariffs apply.
- Single block energy rates for all consumers other than:
    - Residential consumers on single-rate tariffs, where an increasing block structure applies; and
    - All consumers supplied on time-of-use rates, where a relatively higher peak energy rate and a relatively lower off-peak energy rate apply.

There are a number of features of CitiPower's current range of network tariffs that I believe warrant discussion. For the purposes of applying DUoS rates, consumers are still categorised essentially according to the type of retail tariff structure used by their retailer for providing the bundled service to the consumer. This is a carryover from the initial unbundling of DUoS charges and is quite understandable, particularly where there continues to be a regulated retail price cap in place. Retailers must expect to wear the risk of market exposure associated with the energy cost component of the regulated price cap, but clearly distributors should set their distribution charges consistent with the basis on which the price cap has been determined. The simplest approach for all concerned has been to maintain the retail price structures of the past and DUoS charges that are completely compatible with those structures.

This argument however does not apply for the medium to large consumers where retail competition has been in place the longest and there is a very high penetration of interval metering already installed. In these cases, it would appear that given the dual objectives of maintaining revenue certainty and pricing stability, and the fact that not all of these consumers yet have interval metering installed has been sufficient reason to put off any substantive tariff reform. In any event, arguably demand tariffs are more 'cost reflective' and more in line with the regulator's pricing principles than the tariffs applying to small consumers and therefore are less in need of reform.

It could also be interpreted however as a sign that CitiPower believes that non-residential consumer energy usage is essentially price inelastic in the absence of an extremely blunt signal like a demand charge that applies to the maximum recorded demand in each billing period (i.e. each month). When the price signal goes beyond a threshold trigger point that motivates the consumer to install automated demand monitoring systems and progressive internal load shedding protocols, further sophistication of the price signal has no material merit.

More sophisticated pricing signals would require consumers to develop more sophisticated demand management strategies and install more intelligent systems to implement them. The preparedness of consumers to do this and the incremental benefits that could be derived from it form the distributor's business perspective both remain unproven at this point, and, at least to date, the distributors have had little if any commercial incentive to pursue the issue.

This all suggests that CitiPower has been reasonably happy with the tariff structures it has had in place now for more than 10 years, and is satisfied that they not only comply with CitiPower's regulatory obligations and but they are also compatible with CitiPower's stated tariff objectives.

The primary purpose of course of the distribution tariffs is to provide the distributor with the means by which it can recover it allowable regulated revenue. Although there is insufficient information available in the public domain to ascertain precisely how these tariffs will provide CitiPower with its required revenue, there is sufficient information available to provide a reasonably good indication of how each tariff, each tariff component, and each customer class will be required to contribute. Some of this information is summarised briefly below.

Contribution of different types of charge:

Fixed charges	3%
Demand charges	22%
Off-peak energy charges	8%
Remaining energy charges	67%

This suggests that much of CitiPower's demand driven costs are being recovered via energy charges. This is to be expected for small consumers in particular because current metering precludes the application of demand charges for these consumers. Where demand tariffs are applied, the breakdown in revenue recovery is as follows:

Demand charges	71%
Peak energy rates	14%
Off-peak energy rates	15%

It is interesting to note that revenue from off-peak energy charges exceeds that derived from peak energy charges, and for a number of the demand tariffs, off-peak rates actually exceed the peak rate in the same tariff.

In terms of residential supplies, residential consumers contribute the following:

Forecast metered energy consumption	20.5%
Forecast revenue contribution	28.5%

Finally, the average cost per unit of energy payable by each consumer group is as follows:

Residential	4.7c/kWh (28.5%)
Small general purpose	4.1c/kWh (40.0%)
Large low voltage	2.6c/kWh (25.5%)
High Voltage	1.5c/kWh (5%)
Sub-transmission	0.7c/kWh (0.5%)

The relativity between residential and small general purpose consumers is somewhat puzzling, but can probably be traced back to the inverted tariff structure for residential consumers and the greater access to time-of-use rates for general purpose consumers.

CitiPower's cost structures are heavily influenced by the unique design requirements of the central business district where the distribution network is entirely undergrounded and the required reliability of supply is considerably higher than applies elsewhere. In spite of this, on average, the price per unit paid by residential consumers for distribution network services is still considerably higher than any other consumer group in CitiPower's territory.

7. Key Issues in tariff formulation

7.1. Uniform or 'Postage Stamp" pricing

Electric utilities in Victoria, and indeed in each of the other Australian States and Territories, have over many years now, complied with a bi-partisan Government uniform tariff policy throughout the State or Territory. In simple terms, the policy has called for identical tariffs to apply to similar consumers connected to a utility's network regardless of their location. Where multiple utilities operated within the one State or Territory, the outworkings of the policy have usually included equalisation payments between utilities such that very similar or even identical tariffs could apply between different utilities.

Since the introduction of full retail contestability, the application of the policy has become less stringent simply because the advent of competition doesn't allow it. Victoria however has gone further than any other State or Territory in its policy relaxation. When the SECV was split up and privatised in the mid 90s, as part of the industry reforms, certain measures were taken to ensure that, even though the uniform tariff policy would no longer apply, its removal would not cause any major price movements and price separation between urban and rural areas would occur very gradually. The principal measures aimed at securing this outcome included:

- Rebalancing of the initial Regulated Asset Bases of each of the distributors which had the effect of valuing the urban based distributors for price setting purposes at a level in excess of what would be justified by the underlying replacement cost of their physical network infrastructure. Similarly the distributors with a significant rural and regional customer base were correspondingly undervalued.
- Transmission Use of System and Connection charges were established on a reasonably cost effective basis, and this had the effect of imposing higher per unit transmission prices on rural and regional consumers compared with their urban counterparts. To offset this, a series of inter-utility equalisation payments were introduced as part of the regulatory arrangements. The payments in effect transfer some of the transmission cost burden for rural and regional supplies onto urban consumers.

The impacts of both of these measures will eventually phase out over time. First, the transmission related equalisation payments have been reduced progressively over time and are due to be phased out completely before the end of the current regulatory period. Secondly, as the physical assets that were in place at the time of the industry reforms are progressively replaced over time at the end of their useful life, the Regulated Asset Bases of the distributors will gradually self-correct so that ultimately they will fully reflect their true underlying asset values and all of the artificially induced cost transfer will have been removed.

On this basis, one would expect that this will result in a gradual rise in Powercor and SP Ausnet distribution charges relative to those of the principally urban based distributors. Initially, this will no

doubt raise price equity issues along the borders of the distribution service territories particularly in the outer regions of the Melbourne metropolitan area. There have already been some instances of this in respect of commercial and industrial supplies, but eventually it will become quite widespread affecting small residential and non-residential consumers as well. I would expect that in these circumstances, it will become increasingly difficult for Powercor and SP Ausnet to maintain uniform tariffs across their territories and, in the absence of Government or regulatory intervention, uniform pricing will gradually break down and disappear altogether.

No doubt, this issue will attract increasing attention over time particularly from consumer groups (and probably politicians or their parties) representing rural and regional consumers. When people are making up their mind about this issue, they should bear in mind the following:

- The uniform tariff policy of the past has not delivered equal access to electricity supply to all 'like' consumers on levels terms. In reality, there has been a huge disparity between consumers in the costs to them personally for the initial connection to the grid. Some consumers have paid 10's of thousands of dollars for the initial connection on a non-refundable basis whereas others have paid little or nothing. Secondly, for consumers who are too remote from the grid to be able to afford the cost of connection, they have traditionally received very little support for installing high cost stand-alone on-site power generation and storage facilities. In more recent times, some level of Government support for renewable technologies has been offered, but it is in no way tied to the level of financial assistance afforded to grid connected rural consumers provided via the uniform tariff policy.
- 'Equal access' to most people would normal imply both a similar cost of service and an equivalent level of service. In reality, this is not the case. The both the quality and reliability of supply for consumers supplied on rural distribution feeders is generally considerably lower than is normally the case for their urban counterparts.
- Whereas in the past electricity usage in the home was generally associated with basic needs such as lighting, refrigeration, cooking and heating, an increasing proportion is now being consumed for what are generally viewed as more discretionary uses such as air conditioning, computers, other digital entertainment systems, swimming pool pumps etc.
- On average, distribution network charges account for approximately 40% of the household electricity bill. Postage stamp pricing in respect of distribution network charges will still result in at least some separation of prices due to the treatment of network energy losses and the differences in the competitive tariff offerings of retailers for the bundled supply.

In summary, in the absence of policy intervention, uniform or 'postage stamp' pricing is not a long-term sustainable pricing strategy option for distributors in Victoria. It is interesting to note that in its Tariff Strategy Report, SP Ausnet made the following comment:

"It could be viewed that the status quo of urban customers paying too much and rural customers paying too little is unfair and that a step towards ending or reducing this cross-subsidy would be a step toward a more equitable outcome. However it appears the concept of postage stamp pricing retains support from many stakeholders. The State Government through the transmission equalisation payment, network tariff rebate and funding for rural gas reticulation actively supports the cross subsidisation from metropolitan to rural customers."

The Victorian distributors inherited a uniform pricing structure when they were first established and, thus far, they have all retained it. Justifying this position on the basis of the above argument however is rather tenuous as best. First, the transmission equalisation payments in their current form are scheduled to be phased out within the current regulatory period. Secondly, it should not be the role or responsibility of distributors to impute Government policy, and thirdly, cost allocation which is in essence a zero sum game should not be determined on the basis of a popularity contest. To date, retention of uniform pricing has been the most expedient approach to tariff setting; in the future however, this probably will not be the case.

7.2. Distribution infrastructure cost drivers

There are essentially four primary drivers of a distributor's network costs:

- The extent of the geographic area the network must cover;
- The number of consumers of various sizes connected to the network;
- The aggregate demand of consumers; and
- The quality and reliability of supply which the distributor aims to provide.

The costs incurred by the distributors in the provision of distribution services are broadly those associated with:

- Planning, designing, building, operating and maintaining the distribution network;
- Connecting consumers to the distribution network, and connecting the distribution network to the transmission system; and
- Metering and billing.

Not all of these costs are recovered via DUoS charges. Connection fees and regulatory approved fees for prescribed excluded services make a relatively small but important contribution to the distributor's cost recovery.

Looking at each of the distribution cost drivers in turn:

Geographic area: - Clearly, the larger the geographic area of a distributors supply territory, then its costs are likely to rise even if it is only supplying the same level of aggregate

demand. However, other factors such as the type of terrain, access to line easements, environmental factors, the variability in load density across the territory etc. all have an impact. Generally, all of these factors are outside the control of the distributor; however, the distributor's costs can be influenced by how well the distributor is able to plan and design its network to cope with those factors.

Consumer numbers and sizes: - For the same aggregate demand, a distributor's costs are impacted by the number of consumers connected to the network and the incremental cost associated with each consumer is size dependent. In this regard, the costs are not a function of whether it is a residential or non-residential consumer, but the connection voltage and the number of phases connected. The use of customer type (residential versus non-residential) in defining tariff categories is merely a surrogate for consumer size and demand contribution. It assumes a level of consumer homogeneity that is simply not there, and therefore tariffs developed on this basis involve a very high degree of cost averaging. Historically, there may not have been any other practical alternatives. However, with the advent of interval metering, eventually this should no longer be necessary.

The aggregate demand of consumers: - In this context, the aggregate demand of consumers refers to the combined maximum loading on each item of plant and equipment in the distribution network. These do not occur all at the same time. Consumers have widely varying load profiles, and as the number of electricity applications continue to rise, so the variations in load profiles increase accordingly. The consumer behaviours that give rise to his/her load profile can also be modified by demand charges, differential time-of-use pricing and/or through other services such as those involving remote switching of loads. Even if these price elasticity effects were fully understood and could be modelled precisely, it would still make detailed tariff design a very complex issue. However, in reality, they are extremely difficult to measure, are highly uncertain, and vary widely from one consumer to another.

Quality and Reliability of Supply: - The main elements of electricity supply which impact on its quality and reliability include:

- Power system frequency
- Voltage level
- Voltage fluctuations
- Continuity of supply

Power system frequency is managed by the power system operator and is essentially outside of the control of the distributor. Generally, supply voltage needs to be maintained within + or – 6% or so of the nominated level for the supply to remain in a satisfactory

state. Excessive voltage levels may occur for example due to a power surges caused by lightning or high voltage injection into the low voltage network. Also voltage levels can sag below the minimum level if there is insufficient design capacity in the network. Supply voltage is largely under the control of the local distributor and this aspect of his performance is monitored by the regulator. Voltage fluctuations can be caused by faulty equipment on the network or they can be generated by consumers themselves, and they then can adversely impact on all consumers located near the source. The distributors implement preventative maintenance programs for the network, and take action to locate errant consumers when voltage fluctuations occur.

Continuity of supply is the primary focus of the regulated performance incentive mechanism for distributors. Number of supply interruptions, aggregate time off supply, and the duration of supply interruptions are all taken into account. In addition to the incentive mechanism which concentrates on aggregate performance of the distributor, the distributor is also required to compensate consumers directly in the event of minimum threshold service performance levels not being maintained.

In broad terms, not all aspects of supply quality and reliability can be controlled by the distributor, but for key aspects for which it does have a degree of control through investment decisions and operations and asset management practices, the distributor is incentivised to perform to levels defined by the regulator. Arguably however, the incentives are not set in such a way that distributors will necessarily target an economic optimum level of performance; they are driven essentially by the decisions of the regulator.

It's worth noting that distributors are not responsible or indeed held accountable for a very significant distribution network-related cost – i.e. the cost of distribution network losses. This cost is directly allocated to retailers in the wholesale market energy reconciliation process, and the distributor has no real involvement other than to advise the regulator on the most appropriate basis for allocating the losses between consumers.

The significance of the losses can be seen by comparing their cost with the cost recovery through DUoS charges. The ESC's 2005 Pricing Decision approved an approximate aggregate $1.25 billion of cost recovery via DUoS charges for 2006 across the 5 Victorian distributors. For the same period, the cost of distribution losses in Victoria was probably of the order of $100-150 million. Arguably, it would be more efficient to allocate these costs directly to the distributors to manage as they are the only ones in any position to manage them.

7.3. Regulatory constraints

A key component of the regulatory price determination for each 5-year regulatory period is the series of regulatory constraints imposed by the Regulator on the distributor in terms of the detailed design of their distribution tariff structures. These essentially fall into 3 categories:

- Pricing principles, which have already been discussed earlier in this paper;
- Transparency requirements, by imposing an obligation on the distributors to publish a Tariff Strategy Report that is intended to inform retailers and consumers about the likely future direction of tariff changes and the rationale for them; and
- Rebalancing Constraints, which in effect limit a price increase within each tariff to not more than 2% per annum relative to the average price movement for all tariffs.

In my view, there is considerable room for improvement in respect of each of these areas of regulatory oversight of the distributors' detailed tariff structures and prices.

Pricing principles: - The principles are intended to impose constraints on the detailed pricing arrangements which ensure that they are economically efficient. However, in reality they provide very little useful guidance to the distributors because the upper and lower bounds are so far apart, and the third principle which requires distribution tariffs "to signal the impact of additional usage on future investment costs" is rather ambiguous and open to a wide range of interpretations.

Historically, the pricing strategies of Government owned monopoly electric utilities in Australia have reflected the political and social policy agendas and economic priorities of those in power at the time. Even in the US where the monopoly utilities have been privately owned, regulators have imposed similar requirements on their pricing structures.

The pricing principles as currently defined are entirely consistent with a light-handed regulatory framework; however, they leave a significant amount of pricing discretion in the hands of the distributors for the way in which they choose to allocate the burden of revenue recovery across the consumers connected to their networks.

Transparency: - As it is the responsibility of the distributors to develop their own detailed tariff structures, it is right and fitting as part of a light-handed regulatory approach to require the distributors to open and transparent about their pricing arrangements including the rationale behind them and how they are likely to move in the future. All of the Tariff Strategy reports published by the 5 Victorian distributors in 2006 however fall well short of this ideal. This is not merely my view; it is also the stated view of the Regulator[3].

The reality is that, at least to date, the distributors have had little reason to modify their distribution tariffs other than at the margin. Pricing innovation has not been a high priority. Full revenue recovery, revenue certainty and pricing stability have been and still remain the principal drivers of the distributors' tariff strategies.

[3] "Comparative Report on the Distributors' Tariff Strategy Reports 2006 – 2010", March 2007, published by the Victorian Essential Services Commission

As a result, at this stage, even though Governments and regulators have considerable faith in the benefits that interval meters will bring, distributors are much more sceptical and at this stage they haven't done the detailed research to gain an understanding of how distribution pricing innovation in association with the introduction of interval meters for small consumers will be reflected by retailers in their competitive retail price offerings, and then how those price offerings are likely to influence consumer behaviour. In the absence of any of this information, the distributors have little choice at this stage to be other than quite vague about how their network prices may change in the future.

Rebalancing constraints: - The current rebalancing constraint in my view is anachronistic and counter-productive, and sends an extremely strong signal to distributors that pricing stability is more important than other pricing objectives. At the same time, it would appear that, if a distributor was determined to circumvent the constraint, it could do so by disestablishing the existing distribution tariff and create a new one in its place, and no such constraint would then apply.

On the one hand, policy initiatives such as the introduction of competition in electricity and gas, and the anticipated move into the area of emissions trading have the effect of making energy prices more fluid and more reflective of their true market value. Yet, on the other hand, for a cost component that only represents some 40% of the delivered cost of electricity, a very stringent constraint is imposed on relative price change.

At a policy level, I believe there is a need for a major rethink about the policy guidelines that should apply for the development and implementation of network pricing arrangements that have much more meaning and rationale than simply being a continuation of past practice. I also see little merit in leaving these decisions largely in the hands of the distributors. Distributors' business objectives alone should not be the principal determinants of how distribution costs should be allocated between network users, and if external factors are to play a significant role, arguably distributors are not necessarily well qualified to make those decisions.

From a distributor's perspective, I suspect most of them would be quite happy to focus their attention on their internal cost structures and processes for service delivery and to make these as efficient as possible for the provision of any given level of service. Under the current regulatory regime however, it could be argued their responsibility extends to include designing better tariffs that will induce economically and socially desirable changes in consumer energy consumption behaviour and that, if they are unsuccessful, they could be penalised accordingly. It could also be argued however that the current regulated rate of return doesn't allow for such a risk being assumed by the distributor.

7.4. Practical limitations in tariff application

Even if a distributor had very clear tariff objectives, a perfect understanding of the price elasticity effects of different tariff designs and price levels, and very accurate information about current and future retail price offerings of retailers to consumers, there would still be quite serious practical limitations that would prevent the distributor from maximising the achievement of those tariff objectives.

These practical limitations include:

- The distribution network component of the "cost of supply" for any individual consumer involves a large proportion of common costs due to simultaneous usage of the shared network by large numbers of users.
- Most distribution network investments associated with "additional usage" are very lumpy in nature, and this increases as one moves further upstream in the network.
- Consumer aspirations and expectations and the technologies of energy delivery and usage are continually changing whereas distribution investments are assumed to have an economic life of 30 years or so.
- Even though it may be theoretically desirable to design and implement many different tariff designs and apply them according to a whole range a criteria which would also take account of an individual consumer's likely behavioural responses, this is clearly out of the question. The distributors don't have access to such consumer data nor do they control the competitive tariff offerings of retailers.

As a result, even though distributors and regulators may be reluctant to admit it, there is a very high degree of price averaging and arbitrariness in tariff design, and political perceptions have long played a significant role in such pricing decisions.

8. Implications of the interval metering rollout for distributors

In broad terms, the interval meter rollout will place the regulatory spotlight more intensely on detailed tariff design and to a much greater extent than has been the case over the past 10 years or so since the initial unbundling of rates in the mid 90s.

The regulatory heat associated with this will be exacerbated even further by the transfer of the distribution regulation role from the State-based regulators to the AER. Distributors will be keen to gain some early insights into how this transfer is likely to impact on their businesses and, in particular, what changes in emphasis in the regulatory oversight arrangements are likely to occur.

From an internal business perspective, the interval meter rollout will bring with it, its own unique set of challenges and uncertainties. The installation rates for new meters will increase by an order of magnitude and it will involve considerable cost and revenue risk and uncertainty. Meter data

handling will also increase by orders of magnitude, and the systems and procedures for processing and storing this data will need to be improved significantly compared with current practices. This is also little doubt that the rollout will evoke negative reactions from many consumers for a host of different reasons, some of which will be legitimate while others are not.

The delays in the start of the rollout compared with what the Regulator had initially intended would have been welcomed by the distributors because it will enable them to plan the rollout more thoroughly and reduce some of the risks and uncertainties surrounding its implementation.

There is also an air of inevitability that, once the rollout commences, there will be a paradigm shift in electric metering activity that will become the new norm for the long run. That is, as soon as the initial high priority consumer groups have been transferred over to interval metering, policymakers and regulators will then turn their attention to all of the remaining consumers who still have accumulation meters installed, and eventually these will all be changed out and replaced with interval meters as well.

The focus of attention for distributors in the short term is on detailed planning of the rollout and managing the costs of it within the allowances provided for it in the recent Pricing Determination. However, over time, the distributors will need to turn their attention increasingly towards the longer term implications of the rollout for their businesses. While ideally, one might like to see this occur quite quickly, in reality, in the absence of external pressures to do otherwise, it is likely to take a number of years.

Considerable consumer research is required along with unambiguous pricing principles and objectives that provide a very clear basis on which costs will be shared on average, and consumers will be incentivised to shift and/or curtail demand (via distribution tariffs). In the absence of external pressures to do otherwise, distributors can and should take their time to do the necessary preparatory work properly. However, I subscribe to the view that "learning by doing" is a more pragmatic and ultimately a more effective approach provided that one is able to learn from mistakes and take corrective action relatively quickly. For this approach to be adopted by distributors however, it would probably require both some facilitation by the Regulator, and a good deal of understanding from consumers. In these circumstances, I expect distributors will continue to opt for the much more cautious approach.

In particular, distributors will not rely on consumer response to time-of-use rates to deliver reduced peak demands quickly thus negating the need for further network investment in the short term. First, it will take a considerable time before there is a high enough penetration of interval meters for any consumer response to be significant; and secondly, the distributors will need to be convinced that any demonstrated demand reductions achieved will be sustained over time.

It is also worth noting that even with time-differentiated distribution tariffs, the network price signals are likely to be much less significant than those caused by short term price movements in the wholesale energy market. In these circumstances, the incremental effect of the distribution price

signal on consumer behaviour may be quite small and in fact the distributor would be relying more on the energy price signal to effect consumer demand reductions. This adds even greater uncertainty for the distributor as the volatility of wholesale prices can vary considerably from year to year.

The current pricing principles of the regulator and the distributors provide very little useful information about what approach distributors would adopt in restructuring their distribution tariffs. I suspect the distributors are likely to be somewhat minimalist in their approach and opt for changes that still retain the current relative cost contributions of the major consumer categories but redistribute it via a three-tier energy rate structure – peak, shoulder and off-peak – but with a range of prices that is still less than ideal. SP Ausnet provides some insight into this in its Tariff Strategy Report.[4] A three-tier structure for fixed time sectors is quite understandable. There is too much variation in demand from day to day to justify any additional time sectors or more fine tuning of energy prices across the day. However, given the impact of weather-sensitive loads on peak demands, more seasonal or temperature dependent rate structures could better target the consumer demand that is driving network investment.

At this stage it is impossible to predict who will be the winners and losers of future tariff changes, and this will not become clear until we know considerably more about how the distributors intend modifying their tariffs. Clearly however, those whose load is biased into peak periods are likely to be losers. In the residential sector, it is likely to be those who are normally at home during the day on weekdays and those with major appliances that are run during the day even if the occupants are not home (i.e. air conditioners and swimming pool pumps). Introducing very high seasonal or even temperature dependent rates at Summer peak times may be more effective and meet less consumer resistance than having quite high peak rates throughout the whole year. More acute price signals appropriately targeted at the right times are likely to have a significantly greater impact in terms of demand response than a simple three-tiered price structure operating across the whole year with preset time periods for each tier.

[4] "SP Ausnet Distribution Tariff Strategy Report 2006 – 2010" re-issued 1 November 2006 and published on the Victorian ESC website