Cost Benefit Analysis of Smart Metering and Direct Load Control

Workstream 3: Retailer Impacts - Phase 1 Report

Ministerial Council on Energy

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Contents

1 Executive summary

In April 2007, the Council of Australian Governments (COAG) endorsed a staged approach for a national mandated roll-out of electricity smart meters to areas where the benefits for consumers outweigh the costs. In July 2007, the Ministerial Council on Energy (MCE) project managed by the Department of Industry, Tourism and Resources (DITR) engaged a consortium of consultants to undertake a cost benefit analysis. It involves assessing the cost and benefits of a smart meter roll-out assuming different smart meter functionalities and a number of scenarios.

Phase 1 examines the incremental costs and benefits of the additional functionalities, over a roll-out of basic smart meters.

KPMG has been engaged to undertake the "Retailer Impacts" part of the cost benefit analysis. In particular, to provide an assessment of:

- The products (eg. more cost reflective tariffs) retailers may offer and to whom; and
- The potential impacts on the retailers' recurrent costs, although we also discuss a number of the broader implications of smart meters for retailers.

The purpose of the report is to provide a basis for a public consultation process on the issues.

Retail product offers

In terms of retail products as they relate to demand side response, the evidence suggests that if smart meters themselves encourage a significant amount of activity in relation to demand side response, then a number of the additional functionalities are likely to provide incremental benefits. Section 7 identifies those functionalities, which includes 9, 15, 16 and 17.

These benefits are most likely to be function of:

- The improved market penetration of more cost reflective tariffs (including 'interruptible' offers for firm demand side response); and/or
- A higher customer response to those on cost reflective tariffs.

If there is to be a mandated roll-out of smart meters (and this decision is justified) there would appear to be a strong case (at least in terms of the benefits) to ensure those meters have the capacity to communicate as effectively and simply as possible with customers. This is a common view amongst retailers, and given our understanding of the constraints the market is likely to impose, this view appears to be well founded.

The key reason is that, if a roll-out of smart meters is to be beneficial, then the focus should on enabling retailers to offer the simplest (but more cost reflective) retail products possible. Absent this, retailers are likely to be much less inclined to develop and actively promote such tariffs. This is likely to impact on the take-up of those tariffs.

A number of the functionalities are likely to provide material benefits to retailers and/or customers in terms of the retailers' ability to develop products that differentiate themselves (and perhaps encourage retention) and for customers in terms of the level of service they receive. Whilst these benefits may be significant in some cases, the value of improved service levels is inherently difficult to quantify.

Retailers' recurrent costs

On the basis of the available evidence, we have no reason to dispute the retailers' generic view that the recurrent operating costs of retailing using advanced smart meters would not be materially different to the costs they currently incur. We think on the basis on the available evidence this is a reasonable and conservative assumption, although it is possible that their recurrent costs may be somewhat but not materially lower.

In terms of retailers' recurrent operating costs, there are likely to be some reductions in:

- Call centre and related customer management costs; and
- The costs associated with bad debts and managing bad debts.

There will, however, be somewhat higher IT operational costs associated with the new capital investment to enable some of the functionalities.

There are, however, also likely to be some significant implications for some of the retailers' other costs. For example, it seems likely that retailers could benefit from reductions in:

- Working capital costs; and
- Hedging costs.

The latter are likely to be highly material, if the level of demand side response some parties suggest is possible eventuates.

Section 7 highlights the functionalities that they are likely to provide these cost impacts, which includes 9, 15, 16 and 17.

Qualifications

There are several important qualifications that readers should consider in relation to these key findings. These include the:

- Uncertainties about what might be the benefits of basic smart meters, let alone those of the higher functionalities;
- Difficulties of undertaking the incremental analysis, particularly given the limited hard evidence on the benefits of particular functionalities; and

- The policy and regulatory constraints under which retailers operate (eg. price regulation).

2 Introduction

In April 2007, the Council of Australian Governments (COAG) endorsed a staged approach for a national mandated roll-out of electricity smart meters to areas where the benefits for consumers outweigh the costs. In July 2007, the Ministerial Council on Energy (MCE) project managed by the Department of Industry, Tourism and Resources (DITR) engaged a consortium of consultants to undertake a cost benefit analysis. It involves assessing the cost and benefits of a smart meter roll-out assuming different smart meter functionalities and a number of scenarios.

The alternative functionalities are in essence:

- A "basic" smart meter – a smart meter with core functionalities (as defined by the consultant team with the client). In short, an interval meter that can be remotely read; and
- An "advanced" smart meter – which provides a number of additional functionalities such as remote disconnect/reconnect and the capacity to communicate with other devices.

The scenarios for the roll-out are:

- Distributor led;
- Retailer led;
- Direct load control; and
- Central communications.

The overview report describes these functionalities and scenarios in more detail.

On the client's instructions there are two phases to the analysis:

- Phase 1 examines the incremental costs and benefits of the additional functionalities, over a roll-out of basic smart meters; and
- Phase 2 involves a full cost benefit analysis (over existing metering technology) and will examine various jurisdictional and regional impacts.

This report addresses Phase 1 work only, but contains commentary which provides context for the findings, and is relevant to both phases of work.

KPMG has been engaged to undertake the "Retailer Impacts" part of the cost benefit analysis.[1] In particular, to provide an assessment of:

- The products retailers (eg. more cost reflective tariffs) may offer and to whom; and

[1] On the client's instructions and in line with COAG's Regulatory Impact Statement Requirements the project is assessing costs and benefit on a stakeholder specific basis.

- The potential impacts on the retailers' recurrent costs, although we also discuss a number of the broader implications of smart meters for retailers. The transitional costs to retailers are dealt with in a separate workstream which is why we focus on recurrent costs, but we use the term loosely to cover more than just retailers' recurrent operating costs.

The purpose of the report is to provide a basis for a public consultation process on the key issues.

2.1 Approach

To assess the incremental impacts on retailers of a roll-out[2] of advanced smart meters, we have:

- Held discussions with retailers on the relevant issues;
- Identified and reviewed market evidence about the impact the additional functionalities might have on the:
  - Retailers' development of retail products (ie. the develop of more cost reflective tariffs);
  - Retailers' recurrent costs; and
- Drawn conclusions about the impact of advanced smart meters on retail products and retailers' recurrent costs.

Qualifications

As a practical matter, for Phase 1 we have found it necessary to approach the task:

- First, by assessing at a conceptual level what a roll-out of basic smart meters might deliver relative to the status quo (although we have not finalised our views in this regard); and
- Second, by assessing the *incremental* costs and benefits that a roll-out of advanced smart meters might provide, relative to basic smart meters.

We have found this approach necessary for the following reasons.

A national roll-out of smart meters to all small customers is an undertaking that few countries have tried, particularly in the context of contestable retail electricity markets. Given this, there is a degree of uncertainty about the impacts it might have.

Attempting to estimate the *incremental* impacts of advanced smart meters exacerbates these uncertainties, by asking questions that arguably go beyond the capacity of the available evidence to answer. For example:

[2] For this report a 'roll-out' means introducing smart meters other than by the voluntary actions of the market.

- Retailers hold divergent views about whether they would offer different retail products, what these might be and the customers they might offer these products to if there were a roll-out of basic smart meters. Retailers could therefore only speculate as to what might be the incremental impact of the higher functionality, typically identifying the directional impacts of particular functionalities only; and

- Retailers were unable or unwilling in the time available to provide estimates of the impact on their recurrent costs of the introduction of basic smart meters, let alone the incremental impacts of higher functionalities. Where we provide estimates of the incremental impact on retailers' recurrent costs of a roll-out of meters of improved functionality, they are therefore indicative only.

  One retailer provided some written feedback and stated the problem as follows:

  It is not possible to quantify any costs and benefits at this time, given the ambiguity and high-level perspective of the functions, the lack of knowledge regarding jurisdictional anomalies, lack of knowledge regarding proposed communications and software solutions that would be required to support the infrastructure, and the short time frame to digest and assess the impact of the information.

This has significantly complicated the Phase 1 analysis of Retailer Impacts. In many cases, we have only been able to provide a qualitative assessment of the incremental impacts, or costs and benefits for retailers.[3]

This report also identifies a number of constraints that are likely to limit the extent to which retailers respond to a roll-out of any smart meters by offering more cost reflective tariffs. Our assessment of the benefit assumes the removal (by technology development or government intervention) of these constraints.

The conclusions in this report *do not* address whether a roll-out of any smart meters would deliver benefits that exceed the costs. Phase 2 of the project will address this issue.

2.2 Outline of report

This report provides the output of our analysis. In particular:

- Section 3 outlines the nature of retail energy markets;

- Section 4 summarises the retailers' views on smart meters and advanced smart meters;

- Section 5 examines the evidence on the potential impact of smart meters on retail products;

- Section 6 examines the evidence on the potential impact of smart meters on retailers' recurrent costs; and

[3] Unless otherwise indicated, a reference to "costs" and "benefits" in this report refers only to those relevant to retailers, or the retail products they might offer and which may provide benefits to third parties.

- Section 7 draws conclusions on the implications of advanced smart meters by additional functionality;
  - For retail products; and
  - Retailers' recurrent costs.

2.3 Disclaimer

Inherent Limitations

This report has been prepared as outlined above. The procedures carried out in preparation of this report constitute neither an audit nor a comprehensive review of operations.

No warranty of completeness, accuracy or reliability is given in relation to the statements and representations made by, and the information and documentation provided by the officers of the Department of Industry, Tourism and Resources ("DITR"), who were consulted as part of the process.

KPMG has indicated within this report the sources of the information provided. We have not sought to independently verify those sources unless otherwise noted within the report.

KPMG is under no obligation in any circumstance to update this report, in either oral or written form, for events occurring after the report has been issued in final form.

The findings in this report have been formed on the above basis.

Third Party Reliance

This report is solely for the purpose set out above and for DITR. This report is not to be used for any other purpose without KPMG's prior written consent.

This report has been prepared at the request of the DITR in accordance with the terms of KPMG's contract dated 13 July 2006, KPMG's proposal dated 20 June 2007 and the Form of Order dated 19 July 2007. Other than our responsibility to DITR, neither KPMG nor any member or employee of KPMG undertakes responsibility arising in any way from reliance placed by a third party on this report. Any reliance placed is that party's sole responsibility.

3 Retail electricity markets

The section provides some context for identifying the potential impacts on retailers of a national roll-out of smart meters, and applies to any smart meters. In particular, it outlines:

- The nature of electricity retailing at present; and
- Provides a brief overview of the current state of the Australian retail electricity market.

3.1 The nature of electricity retailing

We summarise the nature of electricity retailing by briefly examining it from the customer's and the retailer's perspective, focussing on the mass (primarily domestic) market.

In the Loy Yang case the Federal Court accepted that there are separate retail markets for the supply of electricity to:

- Residential and small business customers; and
- Industrial and commercial customers.[4]

In practice, it may also be more accurate to describe the small user market as an energy rather than an electricity market (eg. as dual fuel capability is one of the key features sought by consumers). The ACCC has considered this issue in a number of recent merger reviews, but has not been required to form a firm view on how best to define the market.

For the purpose of this report we focussed on the retail electricity market only.

3.1.1 The customer's perspective

From the customer's perspective the electricity retail purchase decision (ie. who to buy from and on what terms) involves a transaction which is:

- Of relatively low transaction value;
- Of relatively low emotional value; and
- Difficult for the typical consumer to understand.

They do, however, typically attach considerable value to the underlying product, particularly if deprived of it (ie. its reliability). But this is not an outcome a retailer controls.

These transaction features have important implications for the nature of the market.

[4] Australian Gas Light Company (ACN 052 167 405) v Australian Competition and Consumer Commission (No 3) [2003] FCA 1525, paragraphs 280 and 595.

Transaction value

Table 1 outlines the average domestic and business users' annual electricity consumption, and the cost of that consumption in 2002-03.[5]

Table 1: Electricity sale and costs in 2002-03

Energy and customer type	*Use (GWh pa)*	*Use per customer (kWh pa)*	*Average price (c/kWh)*	*Average cost ($/pa)*
Electricity – residential	52,902	6,595	13.17	869
Electricity – business	128,471	119,912	9.77	11,720
Source: ESAA, Electricity Australia 2004. This is the last year for which price data was reported by the ESAA				

The average domestic customer spent approximately $869 per annum on electricity in 2002-03 (roughly $960 in today's dollars, although this may slightly overstate the increase – see below).[6]

This average, however, disguises at least two 'types' of electricity user: those who use gas for most of their space and water heating needs and those that do not. Those using gas for these end users will typically have electricity bills considerably below the average for their level of energy use, and vice versa. For example, the Australian Bureau of Statistics' Household Expenditure Survey 2003-04 suggests that the average household spent $1,227 per annum on domestic fuel and power in 2003-4 or $23.59 per week.[7]

Comparing household expenditure on energy relative to other goods and services provides an indication of the relative financial importance of the energy purchase decision.

Table 2 illustrates average weekly household expenditure on goods and services. It shows that for the average household, energy accounts for 2.7% of expenditure and that energy is one of the smallest categories identified. The average household spends similar amounts on alcoholic beverages or gambling, although behavioural economics suggests that consumers do not always assess the same level of expenditure on different goods in the same way. [8]

Table 2: Average weekly household expenditure on goods and services 2003-04

Good or Service	*Average Weekly Expenditure ($)*	*Contribution to Weekly Household Expenditure (%)*
Current housing costs	135.02	15.3
Domestic fuel and power	**23.59**	**2.7**
Food and non-alcoholic beverages	152.87	17.3
Alcoholic beverages	23.32	2.6
Tobacco products	11.55	1.3
Clothing and footwear	35.26	4.0
Household furnishings and equipment	52.00	5.9
Household services and operation	56.14	6.4
Medical care and health expenses	45.78	5.2
Transport	139.25	15.8
Recreation	112.78	12.8
Personal care	17.20	2.0
Miscellaneous goods and services	78.69	8.9
Total goods and services expenditure	*883.45*	*100.0*

[5] Business includes all non-domestic customers.
[6] To compare these dollar amounts we have assumed an inflation rate of 2.5% per annum.
[7] Australian Bureau of Statistics, Australian Household Expenditure Survey: 6530, 2003-04.
[8] Australian Gaming Council, Factsheet: Gambling expenditure, June 2007.

In recent times the amount of expenditure might have increased somewhat with the higher penetration of air conditioning and rising electricity prices in some jurisdictions, but the overall change in electricity expenditure as a proportion of total weekly expenditure is likely to have been modest.

Figure 1: Retail electricity price index (Australia)[9]

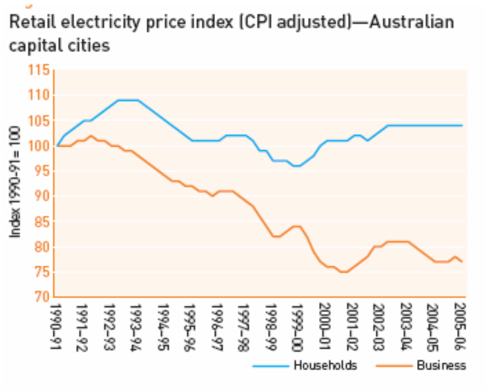

Figure 2: Retail electricity price movements (capital cities)[10]

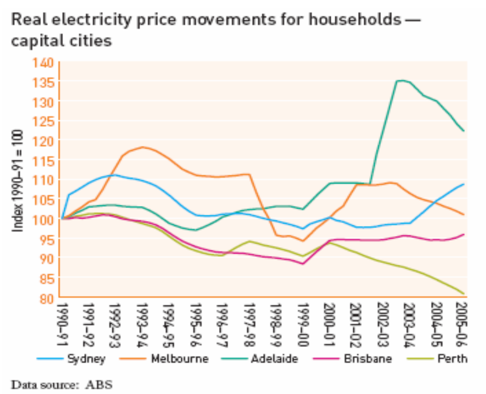

Figure 1 which highlights the change in real electricity prices since 1990-91, supports this assumption. In particular residential prices since 2003 have remained relatively stable. Figure 2 identifies the differences in household electricity price movements across the different capital cities, the differences are due to a number of factors, including competition, load profiles and network charge differences.

In addition, in 1998-99 the ABS estimated that domestic fuel and power accounted for 2.6% of household expenditure.

[9] Australian Energy Regulator, State of the Energy Market 2007, July 2007
[10] Ibid

Implications

The data in Table 2 implies that if the average customer were in a position to achieve a 10% reduction in their energy bills by switching retailer, this would reduce their household expenditure by 0.25%. Similar metrics apply to decisions on whether to accept different supply terms, such as a more cost reflective tariff.

It should not be surprising therefore to find that consumers devote comparatively little attention to the electricity purchase decision (ie. who to buy from and on what terms).

The attention customers currently give to making a related decision - deciding how much electricity to consume - highlights the relatively low importance consumers attach to the electricity purchase decision. Households make these decisions when they use energy and when they acquire durable goods that consume electricity and gas (eg. houses, appliances).

Policy makers have known for many years that energy (running) costs have traditionally had a low priority in these decisions. For example, in 1991 the International Energy Agency stated *"most historical records of individual decisions on energy efficiency point to high implied discount rates – at least 35% - and, in some cases, as much as 200%."*[11]

Some policy makers conclude that these discount rates are disproportionately high. For example, in 1993 the UK Department of Environment concluded: *"Consumers appear to require very much higher rates of return from capital investment in energy efficiency than from investment in energy supply or in other goods and services."*[12]

Policy makers typically cite a variety of market "barriers" or "failures" to explain such observations (eg. a lack of information, split incentives).[13] The typical consumer affords energy costs so little importance in making these decisions that many governments have introduced various forms of regulatory intervention in these markets to increase the degree to which consumers take energy costs into account.

Government interventions include thermal building standards, minimum energy standards and voluntary energy labelling for appliances. Government interest has increased in more recent times with the growing recognition of the external costs of energy consumption that are not factored into the price (eg. climate change), although there would appear to be a more direct policy response to this market failure (ie. to increase energy prices).

The importance placed by consumers on how much electricity to use may increase with the introduction of a price signal in respect of greenhouse gas emissions. There is now broad based and bipartisan support for introducing a carbon trading system which all parties acknowledge will increases electricity prices. The price signal would, however, have to be substantial to change significantly the amount of money the typical household spends on electricity. For example, tripling the wholesale price of electricity would increase final electricity prices by

[11] International Energy Agency, 'Energy and Environment Series: Energy Efficiency and Environment', OECD, Paris, 1991, page 83.

[12] Evidence submitted by the UK Department of Environment to the House of Commons Environment Committee, 'Energy Efficiency in Buildings', Fourth Report, Session 1992/03, Volume II, HMSO, London, Nov. 1993, page 3.

[13] Productivity Commission, The Private Cost Effectiveness of Improving Energy Efficiency, Inquiry Report No. 36, 31 August 2005.

about 80%, and increase average household expenditure on energy from 2.7% to up to 4.8% of total expenditure.[14]

Emotional value

Customers also typically attach low emotional value to the electricity purchase decision. It is what marketing professionals often describe as a "low involvement" product.[15] These are typically low cost frequently purchased items. The decision on how much energy to use is a frequent decision, whereas the decision on which retailer to buy from and on what terms is less frequently made. The retailers we spoke to were strongly of this view in relation to the electricity purchase decision.

The customer's demand for electricity derives from the services it enables (eg. as a reliable source of heat, light, refrigeration etc.). Electricity has few other intrinsic attributes of value to consumers; indeed, it has few other attributes tangible to consumers at all (eg. it is colourless, odourless, largely noiseless). Similar issues are relevant to the decision on who to buy from.

As retailers have indicated to us as part of this project, the vast majority of customers simply *"do not care"* about the product or who serves them.[16] Because it is such a low involvement product customers tend to be reactive rather than proactive in deciding who serves them and on what terms (eg. the type of prices they pay).

A report by the UK Department of Trade and Industry (DTI) presented market research on switching suppliers, for a number of products with similarities to energy.[17] It researched the following markets: car and home insurance, fixed line and mobile telephones, current account and mortgage banking services, and energy. It stated in relation to energy that:

> *"Consumer interest in these markets is low, and switching has been primarily triggered by proactive sales visits/approaches from energy companies and by the familiarity of some suppliers…"*[18]

It also expressed some surprise regarding the levels of switching in energy, given the limited economic benefits. It stated:

> *"Despite the relatively high levels of switching in-home energy, only nominal savings are expected as a result of switching in these markets."*[19]

A minority (about 7% currently) of Australian customers do, however, consciously buy 'green' electricity even though it is more expensive than the best available offer.[20] This implies that some are attaching some environmental values to their electricity purchase decision.

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[14] Assuming an energy costs of about 40% of the final cost of electricity (or $400 dollars on a typical bill of $1,000). Increasing the energy cost to $1,200 would increase the final cost of electricity to $1,800.
[15] Kotler, P., Adam, S., Brown, L., and Armstrong, G., 'Principles of Marketing', Prentice Hall, 2001, page 128.
[16] Many of retailers we spoke to expressed views of this nature, particularly non-incumbents who have to persuade customers to move away from their incumbent supplier.
[17] The Department of Trade and Industry, 'Switching Supplies', a research study commissioned by the Consumer Affairs Directorate, United Kingdom, November 2000.
[18] Ibid., page 17.
[19] Ibid., page 11.

Complex purchase decision

The electricity purchase decision is also a relatively complex one. The relative infrequency with which consumers are required to make the decision on who serves them and on what terms (eg. every 2-3 years), and the newness of the decision, exacerbates this complexity.

The aforementioned UK study found customers (for energy and mobile phones in particular), had difficulty comparing offers and interpreting information provided to them. For example, only 9% of energy consumers (the lowest of the products in the survey) said that finding the best package for them was "very easy" and the qualitative research indicated that these findings were probably overstated. In the qualitative research *"people struggled to interpret information on mobile phones as well as energy in a way that was personally relevant to them."*[21]

These conclusions appear to be consistent with those drawn from behavioural economics, which demonstrates that consumers often rely on *"intuition and rules of thumb to make decisions, often without perfect knowledge."*[22]

3.1.2 The retailer's perspective

Electricity retailing to the mass market is a low margin business due to the nature of the service and the limited value customers place on it. This section focuses on the mass market from the perspective of a retailer that is attempting to be major player in this market.

The service

Electricity retailers provide consumers with ways to buy electricity to satisfy some of their stationary energy needs. The offer has three key components:

- A price structure charged for access to energy and for the amount of energy consumed;
- A method by which customers pay; and
- Associated terms (eg. the length of the contract).

Electricity retailing involves the following key functions to deliver these key components:

- Sales and marketing (eg. to generate revenues by retaining and winning new customers);
- Billing and revenue collection (eg. to generate cash inflow);[23]

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[20] ERAA, Research shows NSW consumers reacting to Climate Change at the ballot box and in the home, 2 April 2007. Approximately, 7% of domestic customers in NSW have green tariffs. Of those who have not switched to a green tariff 33% said the reason was cost, 21% said the reason was time; and 19% said they did not know about; 15% said they do not like switching.
[21] Ibid., page 9.
[22] The Economist, 'All too human', 12 October 2003, page 76.
[23] Sometimes the metering and or meter reading function are also included.

- Customer service (eg. to manage customer communication at reasonable cost); and
- Risk management (eg. minimise energy costs by managing input cost risk).

The first function is a profit centre, while the last three functions are largely cost centres.[24]

There are two key drivers of the economics of electricity retailing:

- Retail margins; and
- The nature of retail costs.

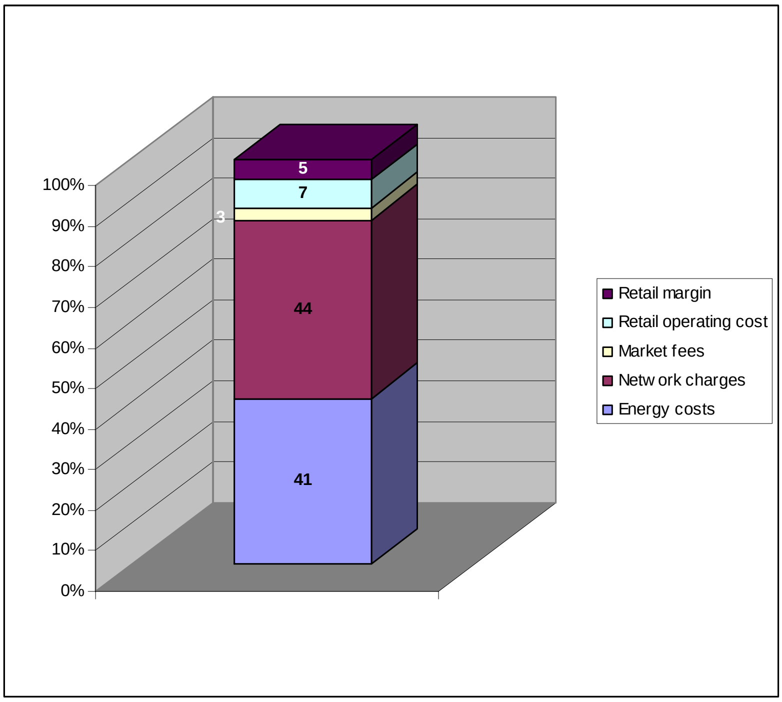
Retail margins

Figure 3 shows the proportion of the final price of electricity for a typical Victorian domestic customer broken down by supply function.[25] While the relative contributions of networks and energy may vary by jurisdiction (eg. with higher energy costs), we would expect the retail costs and margin to be relatively consistent.

It shows retail operating costs (including margin) account for about 12% of the final price of electricity. The retailers' costs are a modest proportion of customers' bills.

[24] Energy trading can also be a profit centre, but that is a function that can and usually is undertaken separately to energy retailing (ie. it is similar to the distinction between stock broking and proprietary trading).
[25] Charles River Associates, 'Electricity and Gas Standing Offers and Deemed Contracts (2003)', December 2002. These proportions are for an average residential consumer's bill in Victoria.

Figure 3: Composition of typical final domestic electricity prices in percent



Section 7 provides an indicative break-down of a retailer's operating costs, and identifies the costs that smart meters might influence (eg. call centre costs, bad debts). The margin typically incorporates other costs that smart meters might impact on (eg. working capital). Energy costs typically incorporate the cost of hedging, which is another cost that smart meters might influence. Customer acquisition (investment) costs typically are either included in the margin. Section 7 also describes these two costs in further detail.

In terms of retail margins, most regulators (when given the chance to set retail margins) typically allow retailers to earn a regulated margin of up to about 5% (usually expressed as an EBIT margin on revenue) on small customers that do not choose an alternative supplier.[26] Although there is some evidence that the market might require somewhat higher margins than this.[27]

If we assume that the typical domestic electricity bill is about $1,000 per annum, the retailer makes about $50 per customer – before interest and tax. This leaves around $70 per customer for a retailer's operating costs on the above example.

The available margin per customer is therefore modest in relation to the overall bill, and small variations around the mean can change that profitability considerably. For example, one retailer

[26] KPMG, Benchmarking retail operating costs and margins, September 2006. The most recent decision by IPART allows a 5% EBITDA margin, which apparently reconciles to an EBIT margin of about 4%. It, however, provides a separate allowance for customer acquisition costs. IPART, Final Report and Determination – Promoting retail competition and investment in the NSW electricity industry – Regulated electricity retail tariffs and charges for small customers 2007-2010, June 2007.
[27] KPMG, Benchmarking retail operating costs and margins, September 2006.

we spoke to stated that *"if a customer calls you more than a couple of times a year, you have probably just lost your margin on that customer"*. Another retailer explained that for this reason *"retailers really do not want their customers to care"* about the product. It can also mean that small reductions in costs can improve margins considerably.

The margins retailers operate on tend to constrain the degree to which they are in a position to offer differentiated tariffs. Energy retailing is therefore a service which, for the mass market, involves a low degree of customisation and customer contact. Retailers tend to operate mass marketing campaigns and make their competitive offers very similar to existing offers to overcome customer inertia (eg. similar tariffs, but with a discount). Australian retailers typically sell electricity door-to-door or over the phone by specialist contractors and so offers must be saleable in these environments.

Where retailers have similar input costs it is also difficult for them to offer price reductions that are likely to be attractive enough for significant numbers of customers to switch. Their costs are simply too small to make a major difference to the types of discounts they can offer. This also has significant implications for how they compete (eg. vertical integration to get input cost advantages and non-price efforts at acquiring and retaining customers, such as building brand loyalty).

Given the way the market currently works, the 'ideal' domestic customer typically is one that:

- Pays on time, ideally by direct debit;
- Does not communicate frequently with the retailer;
- Is disinclined to switch; and
- Is a relatively large user, for electricity and gas. Large users are generally more attractive because retailers typically recover the margin mostly in the unit price, which also explains why dual fuel customers are more attractive, and has potential implications for the unwinding of the load cross subsidy (see Section 5.2.1). Customer acquisition costs are however largely independent of volume.

With a roll-out of smart meters, the *load profile* of the customer may get added to this list. This, however, will depend on the extent to which retailers are able to introduce more cost reflective tariffs and target customers with a lower cost profile. In principle, there is no reason why customers with different load profiles should be more or less profitable *per se*, but in practice this is often not the case.

The key constraints on retailers introducing any new tariffs are likely to include:

- The cost of introducing and marketing new products and the minimum numbers of potential customers required to make new products commercially feasible;
- The minimum savings or other perceived benefits required to make it saleable to consumers; and

- The ability to identify, target and market to the relevant customers cost effectively.

A roll-out of smart meters will enable retailers to introduce more cost reflective tariffs, but they will have to find ways to address these constraints. As one retailer summarised: "*the key question a retailer will ask itself is: are more cost reflective tariffs going to increase the $50 margin I can make on the typical customer?*"

The nature of retail costs

The retailers' costs are primarily either fixed or customer-related. These are respectively a function of the:

- Information technology systems (and to some extent the capital) required; and

- Processing each customer (i.e. information available to bill the customer, sending bills etc).

In broad terms, the fixed costs are probably a somewhat larger proportion of the total. For example, slightly less than half the operating costs of retailer are probably largely fixed.[28]

Recent market developments reflect the importance of the fixed costs. In particular, the major retailers have focussed on getting larger by acquisition, sometimes appearing to pay a significant premium. In other words, electricity retailing would appear to involve significant economies of scale. The alternative explanations are that they may hope to gain some exploitable market power, or that they do not expect these customers to shift as much as those they acquire in the market.

Two recent acquisitions highlight this:

- In 2007 AGL Energy issued a prospectus to part fund its acquisition of Powerdirect.[29] The acquisition added 470,000 customers to its business (an increase of 17%). AGL Energy expects that it will reduce its cost to serve by 4%.[30] In other words, a 17% increase in customer numbers, on a large base, should reduce the cost to serve by 4%; and

- In 2006 Origin Energy acquired Sun Retail.[31] This acquisition added 833,000 primarily electricity only customers. Origin now has about 1,800,000 electricity and 880,000 gas customers (of which most are dual fuel). It stated that the scale benefit due to the acquisition would be around $10 per customer, on an existing cost to serve of $118 per customer. This implies that an increase in customer numbers of 31% should reduce the cost to serve by 8-9%.

It is also worth noting that some retailers are much larger than this, where they are in a position to be (eg. British Gas in the UK has about 13 million gas customers and 6 million electricity customers).

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28 KPMG, Benchmarking retail operating costs and margins, September 2006.
29 AGL Energy, Prospectus: Institutional Placement of 56,550,000 new shares at $16.50 per share, February 2007.
30 This is after the reduction expected by Project Phoenix (see below).
31 Origin Energy, Acquisition of Sun Retail, 27 November 2006.

The response of incumbent retailers to the threat of losing customers perhaps highlights the importance of customer related costs. Faced with this threat, retailers have two basic options:

- To lower prices across the board and retain volumes (ie. customers), or
- To retain prices and be prepared to lose customers.

The market evidence suggests that incumbent retailers are generally reluctant to reduce prices across the board to maintain market share (see Section 5.3). In other words, they have often been prepared to lose a material proportion of their customers (they do, however, subsequently try to win these customers back on market contracts). Instead, they seek to retain customers in part by relying on their inertia, rather than matching the best available prices.

Losing customers would appear to allow for some reductions in costs (and some margin retention), whereas reducing prices to all customers implies no reduction in costs (and significant margin erosion).

Inevitably there is some tension between the desire for scale and the desire to retain margins their customer base to the greatest extent possible.

The way the capital market values retail energy businesses also provides an indication of how it sees the nature of the business. In the capital markets, one of the most commonly used metrics of the relative cost of acquiring a retail business is the cost per customer.[32]

This valuation metric implies that a retailer's portfolio of customers is in effect its primary asset (eg. like the loan book of a bank). Moreover, there is an expectation that it will keep this asset largely intact. The prices recently paid by AGL Energy and Origin Energy for the Queensland retail businesses may support the perception they are to some extent buying a 'franchise' at least in respect of a large proportion of the customer base. For example, paying around $1,000 per customer implies in simple terms that it will take about 20 years to get this investment back, if each customer provides an EBIT of $50 per annum. The alternative explanation is that they expect on average to earn significantly higher margins than the regulators allow, and certainly the acquirers claim they have paid lower multiples than suggested above. There is, however, some other evidence to support this 'franchise' view (see Section 5.3).

Key implications

The key implications of the above are that the key drivers of a retailer's competitiveness are:

- Volume – to generate the necessary scale economies;
- Low cost to serve – to maintain competitiveness; (eg. both AGL and Origin have major cost reductions initiatives in place at the moment, as does TRUenergy);[33]

[32] Australian Financial Review, 'Australian Energy poised', 6 August 2003, page 27. See also Australian Financial Review, 'AGL needs up to $500m equity for Pulse', 1 July 2002, page 16. See also the Allen Consulting Group, Review of the Gas Code: Commentary on Economic Issues, Report to BHP Billiton, August 2003.

- Low customer acquisition (and retention) costs; and
- Risk management – to control input costs.

3.2 The Australian retail electricity market

Table 3 outlines the market share of retailers in the electricity market for 2006.[34]

Table 3: Electricity customers by retailer - 2006[35]

Retailer	No. (M)	%
Origin Energy	2.09	22%
AGL	1.93	20%
Energy Australia	1.25	13%
Synergy	0.83	9%
Integral Energy	0.82	9%
Country Energy	0.78	8%
TRUenergy	0.65	7%
International Power	0.35	4%
Aurora	0.26	3%
Ergon Energy	0.17	2%
ActewAGL	0.15	2%
PAWA	0.07	1%
Red Energy	0.07	1%
Victoria Electricity	0.07	1%
Jack Green	0.03	0%
Total	*9.52*	*100%*

* Percentages do not equal 100 due to rounding.

There are two major private electricity retailers in Australia - AGL Energy and Origin Energy and a couple of mid-size private sector players - TRUenergy and International Power. There are also a number of smaller private sector players.

Some of data in Table 3 is, however, somewhat misleading because:

- The two major private sector players (and TRUenergy) all have significant shares of the retail gas market, whereas this is not the case for most of the publicly owned retailers. They are therefore more dominant in the retail *energy* market than this data suggests; and

[33] Via Project Phoenix AGL is aiming to reduce its cost to serve per customer from $91 to $68 (prior to the acquisition of Powerdirect). It involves cost reductions of $60M from the retail business, and investing $80-100 in IT to save $30-40M in operating costs. AGL, A new AGL scheme booklet release (revised), 29 August 2006, page 26. Origin Energy is also proposing to reduce its cost to serve down to $70 per customer in a few years once it has a single billing system. TRUenergy also has an agreement with IBM to implement new retail systems that will provide greater efficiencies and enable it to compete in the national market. The new retail platform is to be implemented in late 2008. See Power Industry News, 'TRUenergy lifts performance', Edition 555, 20 August 2007.

[34] UBS Australia, Australian Utilities Structure 2006.

[35] We have updated this data for recent transactions (ie. AGL acquiring Powerdirect, Origin acquiring Sun Retail and International Power buying EnergyAustralia out of their joint venture) with the best available information. We have not changed the total number of customers, or the market share of the smaller players (even where we know they have changed) where we do not know from who they have won these customers.

- A number of the smaller players have grown significantly in recent times (eg. we understand that Victoria Electricity has a couple hundred thousand customers) and there have been a number of other new entrants (eg. Australian Power and Gas).

It is evident that a variety of policy and regulatory issues are currently having a significant impact on the Australian retail electricity market and its structure. The key factors include:

- Government ownership in several jurisdictions;
- The absence of full retail contestability, or its recent introduction; and
- Regulation of the retail electricity market, including price regulation (which is a key factor influencing the level of switching observed in some jurisdictions); and
- The complications brought about by state based regulation.

Where relevant, this report discusses these issues in further detail (eg. Section 5.7 discusses the constraints price regulation can impose).

First Data Utilities' World Retail Energy Market Rankings have judged the Victorian and South Australian markets amongst the three most competitive markets in the world.[36] The other markets deemed to be the most competitive are in the United Kingdom, Texas, Norway and New Zealand. Section 5.2 summarises the key features of these markets relevant to this study.

It would seem reasonable to assume that with further privatisation in Australia there would be a reduction in the number of retailers to perhaps three or four major (probably vertically integrated) retailers. This would be consistent with developments in the most competitive and least regulated electricity markets in other countries.

3.3 Conclusion

The nature of electricity retailing and the development of Australia's market may have an impact on the extent to which a roll-out of smart meters or advanced smart meters results in retailers offering more cost reflective tariffs. Section 5 discusses the key issues in further detail.

[36] First Data Utilities, World Energy Retail Market Rankings: Utility Customer Switching Research Report, Third Edition, June 2007. Its assessment or rating appears to relate only to the level of switching.

4 Overview of retailers' views on smart meters

The section outlines the retailers' views on a mandatory roll-out of smart meters. We have drawn these views from our discussions with following parties:

- Aurora Energy;
- AGL Energy;
- Australian Power and Gas;
- Energy Australia;
- Ergon Energy;
- Jack Green;
- Origin Energy;
- Red Energy;
- Synergy;
- TRUenergy;
- Victoria Electricity; and
- The Energy Retailers Association of Australia.

In Phase 2 we will ensure all jurisdictions are covered in further detail.

We conducted these discussions under the Chatham House rule, and thus do not attribute any views. The primary purpose of these discussions was to get the retailers' views on:

- Whether the features of smart meters might encourage retailers to introduce new retail products;
- Whether the incremental features advanced smart meters might encourage retailers to introduce new retail products;
- The likely impacts of smart meters on the retailers' recurrent costs; and
- The incremental impact of advanced smart meters on the retailers' recurrent costs.

Although, in principle, Phase 1 of this project is only about the incremental benefits and costs of advanced smart meters, it was necessary to adopt this approach to engage in meaningful dialogue with the retailers and to focus on the practical implications smart meters and advanced smart meters might have.

The summary provided is our perception of the retailers' views on the key issues as a whole.

We have also participated in a number of workshops where retailers have presented material from various smart meter trials and other related views.

4.1 Interpreting the retailers' views

The retailers' views differed widely on several key issues, including what the benefits of smart meters might be in terms of retail products.

In assessing the retailers' views it may be necessary to try to separate their views on what might be good public policy from what might provide them with commercial advantages. This does not necessarily mean that their views on the former are invalid; just that they are potentially driven by imperatives which are not relevant to whether the benefits of a national roll-out will exceed the costs. For example:

- Many retailers would appear to have 'moved on' from the debate about whether a roll-out of smart meters is good public policy or not, because of the decision in Victoria. Rather than trying to influence this decision, they are now focussing on ensuring that the roll-out is in, or at least not contrary to their interests, to the greatest extent possible. For example, retailers are now not questioning the merits of the policy as much as it would reasonable to expect, given their apparent views (see Section 4.2).

- Retailers currently operate under particular 'rules' which influence the nature of the competition between them (eg. the use of accumulation meters). Their focus is on how best to make money given these 'rules'. Any change in the rules creates uncertainty and possibly the need for significant changes to their business model, for uncertain benefits. This may make them reluctant to embrace change, and the implications (eg. for retail products).

- Australia's retail electricity market is still at a comparatively early stage of development. The introduction of full retail competition is yet to occur in some jurisdictions and is in its infancy in others. The major retailers are undertaking major business reengineering projects to establish systems capable of operating on a national basis (eg. AGL Energy, Origin Energy and TRUenergy). Smaller retailers are unlikely to devote significant time and resources until a roll-out is about to have a major impact on the market and their operations within it.

Retailers consequently appear to see the introduction of smart meters as an inconvenience more than threat, but not generally as an opportunity. Section 4.2 discusses the more specific views of retailers in this regard.

4.2 Mandatory roll-out

There is wide opposition amongst energy retailers to a *mandatory* roll-out of smart meters. Many retailers commented that their views on this issue were, however, now irrelevant as it appeared inevitable that a roll-out would occur.

The key reason for the opposition is a view that a mandatory roll-out of smart meters will not generate significant benefits in terms of demand side response (although some retailers saw that they might provide other benefits for customers). Retailers generally do not believe that customers will value or demand (in material numbers) the more cost reflective tariffs that smart meters allow. They also believe the associated demand reductions will be modest.

Given that the vast majority of customers are reactive this is likely to mean that retailers will not be inclined to introduce more cost reflective tariffs across their customer base. Retailers therefore believe that it is likely to be an expensive way of targeting customers who might respond to more cost reflective tariffs.

The typical view is that it is likely to be very difficult to sell retail products by focussing on tariffs as the customer does not understand them and is not interested in investing the time necessary to understand them. This is simply because their bills are not significant enough for them to care. One retailer stated our salespeople *"never talk about tariffs when trying to win a customer"* – all they do is offer the same basic offer, but with some alternative benefit. The retailer also stated that if you talk about tariffs *"you are dead"* in terms of making sales.

A key theme of the retailers' response was that, if the objective is to change consumer behaviour, then merely rolling out smart meters is unlikely to be sufficient, even if retailers do offer more cost reflective tariffs. They believe there would be a major need to educate consumers about the issues.

Retailers are particularly surprised that governments would seek to mandate a roll-out of smart meters, while at the same time continuing to regulate retail prices. Retailers believe it is unlikely that smart meters will make a significant difference to the products retailers offer whilst prices remain regulated.

They also believe that governments do not appear to appreciate the fundamental nature of the contradiction in their policies. In other words, to the extent a smart meter roll-out is successful in encouraging the introduction of more cost reflective tariffs, it is likely to lead to price shocks for some customers, including some 'vulnerable' customers. Avoiding price shocks is, however, presumably why policy makers regulate prices.

Section 5.7 discusses these issues in further detail.

Other views

One retailer is opposed to a mandatory roll-out because they believe it is an unnecessary intrusion into the market and because they believe it will '*stifle innovation*'. It was particularly concerned about a mandated roll-out led by distributors, and would much prefer a competitive market model. The same retailer argued that the take-up of smart meters would be *"zero"* if the customer has to pay for the meter, although they saw this potentially changing if prices have to increase substantially to meet environmental constraints over time. It was, however, the most optimistic in regard to what would happen to retail products with a mandatory roll-out. We understand that it believes that this would create the critical mass in the market that would enable the cost effective introduction of mass consumer products. It suggested that:

- Up to 50-66% of customers on accumulation meters would end up on some form of Time of Use pricing; and

- A small proportion of these (probably less than 10%) would end up on some form of Critical Peak Pricing. This may include some form of interruptible (either voluntary or mandatory) tariff, which maintains a simple structure, but offers some form of discount. In other words, it would be similar to how retailers currently compete, but with a different driver for the discount. It would rely on some form of direct load control via the smart meter and associated communication infrastructure.

This retailer indicated that they would be likely to lead the process of introducing more innovative tariffs and believed that customers would over the longer term respond, particularly as pressure grows to address the environmental implications of energy use. In other words, regulation might play a role in shifting customer behaviour as their understanding of the issues improves.

This will be an issue we investigate in further detail in Phase 2 where the data allows.

At the other end of the spectrum most other retailers suggested that the proportion of customers that would end up on more cost reflective prices would be significantly less than this. Some suggested that it may be a niche market, perhaps around 10% of customers, similar to the number of customers who are currently on green tariffs. We would note, however, that the market penetration of green tariffs has increased over the last few years from about 2%.

Others suggested that there might be a somewhat larger segment (but minority) of the market that may find the savings that they could achieve on more cost reflective tariffs attractive, and equally that they would re-price their offers to customers that become very expensive to serve (as these customers are unlikely to shift anyway).

It was apparent from the discussions that the basis for the views of many of the retailers on benefits is intuition rather than substantive analysis. A number indicated that it was too early to tell and that much would depend on how the deployment occurred.

Only two retailers endorsed a mandatory roll-out.

- One retailer was in favour of a mandatory roll-out, but not because it foresees much product innovation in regard to cost reflective tariffs, but because of the other benefits it might provide to customers (improved services). It stated that it cannot find a business case for introducing more cost reflective tariffs that derive significant benefits for it (but is in the process of commencing a trial to assess various aspects of the benefits smart meters with in-home displays might provide as a marketing tool to customers); and

- One retailer stated that they were keen to see smart meters penetrate the market and believe that they would influence its development, but were more ambivalent about whether it needed to be mandatory. This retailer indicated that it could see both sides of the argument, but that it might be more cost effective to undertake a widespread roll-out. It saw the market responding with product innovation, but did not see itself as leading that process.

Only one retailer indicated that it was likely to be proactive in using the new technology to introduce new tariffs.

All others suggested that they would follow the market. This may be important given that, at the margin, most of the competition emanates from smaller retailers, as they are typically offering the best deals. This end of the market tends to focus on matching what the larger players do, but doing it better (ie. by having relatively lower cost operating models and by being quicker to respond). Their focus is on building scale by growing volume rapidly; in the first instance to reach profitability. They are unlikely to initiate the introduction of more cost-reflective tariffs, implying that this will only happen if the larger players start the process and it becomes so widespread that the smaller players are forced to respond.

4.3 Recurrent cost implications

Section 6.1 outlines the views we received from retailers during our consultations with them on the recurrent cost implications of smart meters. In short, those views were that the retailers' recurrent costs would be:

- About the same or somewhat lower with smart meters; and
- About the same or somewhat lower (again) with advanced smart meters.

4.4 Functionality

It was a common ground amongst retailers that, if a mandatory roll-out of smart meters were to occur, a higher functionality would generally be preferable. Even those who were most negative towards the benefits of smart meters held this view. Their reasoning is as follows:

- If smart meters are going to have any impact on customer behaviour they need to be able to provide very simple signals and ways for customers to respond;
- Some of the additional functionality of advanced meters should assist in this process; and
- Therefore, where the additional costs of improved functionality are modest, it would seem reasonable to opt for the higher functionality.

In other words, this might increase the market penetration of any more cost reflective retail offers and/or make customers more responsive to them. Retailers thought the additional functionalities are likely to provide other benefits to distributors (in the first instance) or customers (in terms of the quality of service).

4.5 Scenarios

Retailers expressed differing views about whether the different approaches to delivering smart meters or advanced smart meters would alter the benefits and costs.

The key views expressed were as follows:

- At least two retailers believe that ensuring that the obligation does not lie with the distributors is crucial. In their view a distributor led approach would lead to a lowest common denominator approach that would stifle innovation and risk stranding investment. They also believe that the apparent economies of scale in a distributor led roll-out might not be as large as thought (because retailers believe that there would need to be several waves of effort to cover any particular region), and because some retailers have larger scale than many distributors. For example, both AGL Energy and Origin Energy are larger than a number of distributors, albeit across the broader market.

- Some retailers believe the key is to ensure that as many aspects of the process as possible are open to competition (such as competitive tender processes, even if distributors ultimately take the lead role). They also saw that there needs to be one set of national rules, with contestability around all aspects of delivering to those rules using an open approach to communications.

- Other retailers are happy for distributors to lead the roll-out, *provided* that the key decisions on functionality are made by the retailers, who are the party that will ultimately have to sell the benefits to customers.

- Some retailers believe that placing the obligation with them might act as a barrier to entry, particularly for small new entrants. It may in effect require them to become asset managers and place further constraints on new entry, by requiring additional capital that is scarce and expensive for businesses at that stage of their development (eg. new billing systems). Some also saw it increasing the cost of small retailers relative to large retailers.

Overall, there does not appear to be a consensus view amongst retailers, but some retailers have strong views on these issues. Phase 2 will investigate these issues in more detail.

5 Evidence relating to retail products

A roll-out of smart meters would in the first instance reveal the "cross subsidy" that currently exists between small customers on the basis of their load profiles.

For the purposes of this report, we define "cross subsidies" as prices or tariffs that the market may not bear because they are not completely cost reflective. This definition of cross subsidy is similar to the economic definition. It covers prices that may be unsustainable in a competitive environment from a retailer's perspective, given the way in which it incurs its costs. In other words, prices that are either below the marginal costs incurred for a particular customer (and therefore must be subsidised by another customer), or are above the level at which another retailer is prepared to provide the service (and therefore exposes the retailer to the risk of "by-pass"). In practice, where the market is prepared to bear the cross subsidy, it is probably more accurately described as price discrimination, which is typically considered to be efficiency enhancing.

It would mean that the profitably of these customers would vary with their load profiles. In principle, this creates both:

- An opportunity to introduce retail products for customers with flatter load profiles which would lower their electricity bills, particularly for non-incumbent retailers; and

- A threat to incumbent retailers that they would lose their (newly) more profitable flatter load profile customers and reduce profit margins if they do not respond by:

  - Offering these customers more cost reflective prices; and

  - Increasing prices to customers subsidised now (ie. those with the peakiest load profiles), despite the difficulty of doing so.

  In principle, this threat might be sufficient for incumbent retailers to undertake this rebalancing process across their customer profile (ie. introduce more cost reflective tariffs for everybody).

Below we identify and examine the evidence which may inform the extent to which this might occur. In particular, we examine:

- The key drivers of the potential changes in retail tariffs;

- Efforts to remove other cross subsidies in retail electricity tariffs;

- The relevant international evidence;

- The use of more cost reflective tariffs amongst larger users;

- The use of more cost reflective tariffs amongst smaller users;

- Evidence from the various trials currently underway; and

- The constraints imposed by other government policies and regulations, and other issues.

5.1 Drivers of potential changes in retail products

In principle, smart meters should lead to significant changes in retail products because freely functioning markets tend to unwind cross subsidies. In practice, however, this process is typically subject to certain variables and constraints.

The key variables are likely to include the:

- Impact on bills; and
- Number of customers affected.

The key constraints are likely to include the:

- Costs to the customer of bearing more cost reflective prices. The customers' 'costs' might include transaction costs (eg. the time to find and understand the more cost reflective prices and being prepared to accept any risks they impose). A significant proportion of customers will in the first instance pay more under cost reflective tariffs, which is unlikely to encourage customers to take them up; and
- Costs to the retailer of charging more cost reflective prices. The retailer faces costs in developing and marketing more cost reflective prices, which it is likely to compare against the other ways of attracting customers (eg. by offering dual fuel capability).

The overall competitiveness of the market may also play an important role. For example, less competitive markets would typically be less effective at unwinding any particular cross subsidy.

So while markets tend to unwind cross subsidies (because the customers who are currently bearing the costs will not tolerate it), a particular market may tolerate or not fully unwind what in theory appears to be material cross subsidy.

The pressure provided by functioning markets thus provides the only real test of whether a particular "cross subsidy" is unsustainable.

There is therefore some uncertainty about the extent to which the retail electricity market might unwind the load profile cross subsidy, and/or the timeframe over which this might occur. The best available guidance about the extent to which the market will unwind the load profile cross subsidy probably comes from the evidence on:

- The size and nature of this particular cross subsidy; and
- How this market and similar markets function.

5.1.1 Size and shape of the load profile cross subsidy

There is evidence to suggest that the load profile cross subsidy is material.

Certain parts of Australia have some of the world's peakiest electricity load shapes and thus relatively low asset utilisation. For example, in Victoria and South Australia the last 10% of maximum demand occurs for less than 20 hours per year and yet requires up to 10% of invested capital.[37] This implies that those creating the peak are imposing significant costs on those with flatter load profiles. For example, the Victorian Essential Services Commission has estimated that the cross subsidies between those domestic customers that do not have air conditioning and those that do, could be as much as $200 per customer per annum.[38]

This does not necessarily mean that this situation is economically inefficient.

The Trowbridge Study

In September 2003 Trowbridge Deloitte undertook a study for the Essential Services Commission in Victoria.[39] The study attempted to estimate the *energy* cost cross subsidies in the Victorian electricity market amongst small customers. In particular, they sought to identify differences between the estimated actual cost of energy for specific customer classes and the cost of energy currently implicit within the incumbent retailers' standing offers for these customer classes.

It evaluated the level of cross subsidies by comparing the incremental energy costs associated in moving from the current Net System Load Profiling methodology to a customer group's 'true' consumption pattern. It also considered the energy costs associated with the current standing offer tariffs and the potential price change if a full roll-out of smart meters was to occur. It noted that energy costs were typically 35-45% of the typical customers' bill.

The study concluded that for those residential customers on a general purpose tariff that the range of outcomes would be from -5% to 15% for the years 2000-02. A positive outcome indicates that a customer group's energy cost is likely to be lower under the current profiling arrangements than it would be if based on the customer group's "true" cost of energy (receive a cross subsidy). A negative outcome indicates the customer group's is likely to be higher under the current profiling system than if based on the customer group's "true" cost of energy (pay a cross subsidy).[40]

In other words, this customer group would have paid up to 15% too little or 5% too much compared to what it would have paid in the absence of profiling.[41] In total, therefore these

[37] Energy Response, IEA Demand Side Response Workshop, 11 November 2005.
[38] Victorian Essential Services Commission, Installing Interval Meters for Electricity Customers, November 2002.
[39] Trowbridge Deloitte, Customer Energy Cross Subsidies in the Victorian Electricity Market, September 2003.
[40] Ibid., page 4.
[41] Based on using simulated pool outcomes for the years 2000-02. Trowbridge simulated potential pool price outcomes by combining forecast demand allowing for different weather scenarios with price/demand relationships associated with more recent market outcomes. The weather scenarios include more extreme weather than that experienced during either of 2001 and 2002 (both of which we unusual years but for different reasons – 2001 had high summer prices and 2002 had high winter prices). It notes that is approach produces a more robust analysis than

customers might have (based on a hypothetical typical domestic customer with a bill of $1,000, of which 40% is energy costs), paid either $60 too little or $20 too much per customer in any particular year.

In aggregate the cross subsidy paid by this customer group could be very substantial in any particular year based on this analysis.[42]

It also noted that the range of cross subsidies can be large *within* customer groups, so the transfers between a flat and peaky load general domestic customer could be considerably beyond the ranges indicated above.

It also seems possible that the inter-customer group cross subsidy has reduced over the last few years as more larger users have moved onto smart meters, but the cross subsidy between the remaining customer groups and within these groups has increased.

Shape

The shape of the cross subsidy (eg. the number of customers paying – or receiving - the cross subsidy and the amount they are paying) may also be of importance in how retailers deal with it.

If, for example, there are a relatively large number of customers currently paying a relatively small amount of money to a few large winners, then it might take longer for the cross subsidy to be unwound or it might only be unwound for a relatively small group of customers. This is because non-incumbent retailers may be less able to offer significant enough savings to these newly profitable customers, for it to place significant pressure on the incumbent retailer to rebalances its tariffs. The incumbent is likely to re-price the customers who are the major beneficiaries of the subsidy, but other retailers are unlikely to compete for these customers in the shorter term because their prices will have to increase first.

If, however, there are a small number of customers paying a relatively large amount of money to a relatively large group of small winners, then there is likely to be greater pressure for the cross subsidy to be unwound. This is because the non-incumbent retailer is more able to offer significant enough savings to these newly profitable customers to get them to switch, and thus place more pressure on the incumbent to respond accordingly. In the first instance, removing the cross subsidy will lead to lower bills for these customers which may influence their incentive to respond to the price signals, but only in the short term.

Given that air conditioning is the end use that 'drives' most of the peakiness in domestic load and its high market penetration in some jurisdictions, it seems likely that the threshold point for

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its other approaches to estimation. The range for customers on general purpose tariffs was the largest for any customer group.

[42] It also noted that the study focuses cross subsidies associated with wholesale pool price outcomes, and that if it had estimated cross subsidies on the basis of hedge contract prices, the range of cross subsidies would decrease. For example, if it were assumed that a retailer would attempt to set prices on their average expectations across these years as Trowbridge simulates, then the average of these simulated pool outcomes produces an average range of -3% to 7%) or bills that were $28 too low or $12 too high compared to what they would pay absent profiling. In aggregate these still represent significant transfers between customers.

the typical domestic customer (ie. whether they would be winners or losers under more cost reflective tariffs) may be a 'peaky' as opposed to a 'relatively flat' air conditioning user.

In our view, it is likely that there is a relatively large group of flatter users who are each paying modest amounts to a relatively small group of peakier users. There is also likely to be smaller group of even flatter users (eg. those without air conditioners) who are paying relatively large amounts to peakier users, and a group of particularly peaky large users who are benefiting significantly under the present arrangements.

Overall, this may make it more somewhat more difficult to unwind the load cross subsidy, except for those customers near to the two extremes of the profile. In Phase 2 we will investigate whether we can generate additional information on these issues.

5.2 General evidence on the treatment of cross subsidies

The best way to highlight the costs of removing the load profile cross subsidy is reviewing the available evidence from similar markets.

At a general level, there is evidence of consumers demanding and responding to differential pricing. For example:

- Variable usage charges are not uncommon for other services and products (eg. mobile phones). The development of more competition in Australian domestic banking appears to have led to a major change in how banks charge customers (eg. lower interest rate margins and higher transaction charges). Whether these services are sufficiently similar to electricity to provide a reliable indication of what might happen is less clear;

- The introduction of retail competition itself reveals a form of cross subsidy based on a customer's propensity to shift. The evidence suggests that the market now prices this propensity or, more accurately, the indifference to switching (see Section 5.2).

- The benefits of providing dual fuel offers in the retail energy sector (and sharing the associated cost savings) has been exploited by the market; indeed, in the UK, 80% of switches occur for this reason;

- The retail electricity market is unwinding, at least to some degree, some of the other cross subsidies in retail tariffs, albeit in ways that do not necessarily involve more cost reflective tariffs (see Section 5.2.1);

- Certain customer groups in the electricity sector appear to respond to the incentives created by pre-payment meters. In Tasmania, they have a market share of about 20%;

- In Norway about 16% of households are on electricity contracts tied directly to spot prices; and[43]

[43] S., Littlechild, 'Competition and contracts in the Nordic residential electricity markets', 23 July 2005, pre published paper later published in Utilities Policy.

- There is evidence of customers responding in certain trials to cost reflective prices (see Section 5.6).

There is also evidence to suggest that the market might be willing to bear the load profile cross subsidy to a greater extent than theory might predict.

At a general level, the evidence is that:

- There are numerous examples of "cross subsidies" that may appear to be unsustainable persisting in markets (ie. price discrimination is common). For example, non-motorists would appear increasingly to be subsidising motorists' fuel costs when they shop at Coles or Woolworths, due to the discounted fuel vouchers these supermarkets provide.[44] Non-motorists shopping at these supermarkets would appear to be paying each average motorist shopping at these supermarkets and using these fuel vouchers about $73 a year.[45]

  This also shows, however, that certain customers are responsive to petrol prices. In this case, the level of expenditure is higher and it may be easier to switch supplier and modify behaviour (ie. consumers may believe petrol consumption is more discretionary and there are more substitutes).

- If the cross subsidies identified by the ESC are correct then there would appear to be a strong incentive for customers and or retailers to offer smart meters to customers who could receive the benefit (ie. up to $200 per year). This would appear to imply a quick pay back period, one that may even be attractive to domestic consumers.

  While there would appear to be some other barriers to accessing these benefits (see Section 5.7), none would appear to be insurmountable. Retailers did not appear to be agitating excessively to get some of these constraints removed prior to discussion about a smart meter roll-out commencing, so that they could install smart meters for more customers. Moreover, there have been no major moves by the market to smart meters, where some of the key constraints have been removed (eg. price regulation in the UK and NZ). Nor was competition in NZ active prior to the introduction of profiling, partly because it required the use of a smart meter.

- A report by Energetics for ESCOSA apparently found there was *"no evidence that small customers would accept more complicated structures with the introduction of smart metering"*[46] They have also found low take-up rates in certain jurisdictions where smart meters are voluntary.

- Unwinding the load profile cross subsidy has significant implications that would appear to be at odds with the conventional retail business model and customer preferences (ie. simple retail product offers). This would appear to be in contrast to some of the other cross subsidies the market has addressed, as discussed above. The changes brought about by the

[44] Gans, J., King., S., Supermarkets and Shopper Dockets: The Australian Experience, Melbourne Business School, University of Melbourne, 16 July 2004.
[45] Assuming the average motorists uses 35 litres of petrol a week and gets a discount of 4 cents per litre. ANZ trends in household expenditure, December 2005 www.anz.com.co.economics.
[46] Energetics, Electricity Pricing Structures for Customers with Interval Meters, Public Report for the Essential Services Commission of South Australia, March 2003

roll-out of smart meters would therefore need to create sufficient incentives for customers to demand that retailers modify this business model.

- Other cross subsidies exist in retail tariffs (eg. by volume and by creditworthiness). The market is unwinding these cross subsidies to a degree, but generally not by sending more cost reflective price signals (as Section 5.2.1 illustrates), at least in the way that would be necessary to address the load profile cross subsidy.

- The load profile cross subsidy may also be more difficult to remove than the volume and creditworthiness cross subsidy, as it imposes complexity and risks on consumers they may not be willing to bear (a requirement to monitor and change their behaviour).

- Unwinding the load profile cross subsidy creates losers who are likely to be resistant to moving to Time of Use tariffs, which might slow the process or that they end up on a more punitive flat price. The only advantage the incumbent retailer has in this case is that the customer is only likely to be attractive to other retailers in the event that they accept either undesirable outcome.

5.2.1 The volume cross subsidy

Retailers are typically attracted to larger than average customers in the mass market. This is because the unit price typically incorporates their margin, which means that larger than average customers are more profitable than smaller than average customers. For example, AGL recently released its 2007 Full Year Results, which included reporting lower gross margins. The Sydney Morning Herald noted that: *"The company had also made up for the losses by signing up new customers in NSW. However, NSW customers were spending less than their Victorian counterparts, so gross margins for the year in the retail business were down by 5.5 per cent."*[47]

Retailers could, however, provide offers that have a higher fixed charge to reflect the margin and a correspondingly lower per unit charge. On this basis, they would be able to offer larger users lower bills. If reflected across the customer base, all customers would be equally profitable, and the retailers would not bear volume risk.[48]

This would also appear to have the advantage of making mass marketing campaigns easier to manage and would be simple to achieve from a retailer's perspective, at least operationally.

For the largest (and smallest) users the volume cross subsidy is likely to be material. For example, if the average user has a bill of $1,000 a variable charge of $900 and an average unit of price of 15c/kWh, they would be using 6,000 kWh per year.[49] The $50 per customer EBIT margin identified in Section 3.1.2 would therefore account for 0.83c/kWh of the unit price.

This means that the user that is:

[47] Sydney Morning Herald, AGL aims high for earnings, customers, 23 August 2007, page 33.
[48] This can be more difficult for incumbents because it implies that prices for smaller users have to increase to maintain profitability and price regulation make not allow for this, particularly if it imposes side constraints on the rebalancing of tariffs.
[49] These figures are for illustrative purposes only, but are close enough for the purposes of this example.

- Fifty per cent greater than the average user is paying a margin of $75 per annum (ie. or 50% more than they 'should'); and

- One hundred per cent greater than the average user is paying a margin of $100 per annum (ie. double what they 'should').

Conversely, small than average users are typically paying too little.

Retailers are not typically unwinding this cross subsidy across the board by rebalancing fixed and variable charges. This may be because:

- Most customers dislike high fixed charges, even though they may be better off under them;

- It is difficult to successfully sell particular "tariffs" to customers; and

- The benefits for many customers around the average consumption level would be small, and many would be worse off, albeit only modestly.

Instead, retailers typically target customers with some other form of discount and focus more on these users. This removes the cross subsidy to some degree (ie. to the extent customers are willing to switch), but not necessarily by charging more cost reflective prices.

This would appear to highlight the difficulty retailers perceive in addressing the underlying cause of the cross subsidy where it would results in tariff changes that customers may resist.

It is worth noting, however, that a move to higher fixed charges appeared to occur in NZ for some time, but the Government intervened on social policy and environmental grounds. In 2000 the Government noted that consumers "*have suffered from continuing increases in the fixed charge elements of the power bill. This impacts more severely on smaller consumers, especially low income consumers.*"[50] This resulted in a Low Fixed Charge tariff policy, which encourages electricity companies to offer at least one tariff with a low fixed charge.

We understand that tariff component rebalancing related more to the fixed charges associated with network than the margin *per se,* however, the practical impact is similar. It also shows that more cost reflective prices might result in significantly higher fixed charges in parts of the industry and thus lower incentives to reduce their consumption.

5.3 Competitive retail electricity markets

5.3.1 United Kingdom

The British energy market is the world's largest with a reasonably long history of full retail competition (1999), without price regulation (2002).

In the British market there are now:

[50] Ministry of Economic Development, 'Power to the Consumer', October 2000.

- Six vertically integrated energy companies: Centrica (British Gas), Innogy (controlled by German company RWE); London Energy (controlled by French company EdF); Powergen (controlled by German company E. On); Scottish Power; and Southern and Scottish; and

- No major independent retailers. The combined market share of the other retailers is about 0.5% and a number of these are non-for-profit organisations.[51] There are no niche market retailers offering different types of services on any significant scale.

The experience from the UK suggests that incumbent retailers are generally not reducing prices to match the offers of non-incumbents across the board to maintain market share. In other words, they have often been prepared to lose a significant proportion of their customers but retain margins on the remainder. For example, the incumbent retailers have typically lost about 50% of their market share.

Ofgem reports that customers are typically missing out on savings of up to about £100 per annum generally (and up to £150 per annum) by not switching supplier.[52] This is up to about 10% or more of the average domestic consumers electricity and gas bill.[53] These margins appear to have reduced somewhat in recent times, after significant wholesale price volatility.[54]

Incumbent retailers therefore appear to be prepared to "price" the typical customer's reluctance to switch (ie. customers' transaction costs). In other words, they are prepared to allow their prices to diverge from that of their competitors to a degree. This situation has persisted despite recent wholesale market events that have required incumbents to significantly increase and then decrease their prices.

More generally, competition in the UK market appears to have gone through a number of stages:

- In the first instance the discounts were primarily related to different forms of payment;

- Then retailers began offering dual fuel (and 80% of switching occurs for this purpose); and

- Retailers are now offering a wider range of products and services in an effort to leverage off their relationship with the customer and build brand loyalty. They are also collaborating with the providers of other services (eg. supermarkets).

The most recent developments in the market are as follows:

- Over 9 million gas and electricity customer accounts (about 20% of the market) are on 'innovative' products. This includes 6 million customer accounts on fixed rate products (ie. contracts), and 2.5 million customer accounts are on on-line tariffs;[55]

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[51] Stephen Littlechild, Smaller Suppliers in the UK Domestic Electricity Market: Experience, Concerns and Policy Recommendations, 29 June 2005.
[52] Ofgem, Energy efficiency can help reduce impact of energy price rises, October 2005.
[53] Ofgem, Factsheet 66: Updated household energy bills explained, May 2007.
[54] Ofgem, Domestic Retail market Report, June 2007.
[55] Ofgem, One in Five Households Choose an Innovative Energy Deal, 4 July 2007.

- About 350,000 households have chosen a green tariff (1.3% - a much lower proportion than Australia, but more recently signs have emerged that this is changing[56]);

- There is no evidence that customers are demanding the use of smart meters to allow for the introduction of cost-reflective tariffs that would allow. Ofgem is, however, in the process of undertaking a trial of smart meters and there is a requirement on retailers to provide customers with an in-home display if they request one;[57] and

- In terms of energy services, Ofgem notes that all energy suppliers market some products and services, including free home energy surveys, discounted loft and cavity insulation, energy efficient boilers and numerous energy saving appliances. These would appear to be efforts either to increase marginal revenues per customer and/or assist with customer loyalty and retention.

  Some retailers are starting to offer contracts that reward customers for saving energy (eg. one retailer is launching a program where customers can earn credits by reducing their consumption, or choosing electronic billing). The credits can then be used to buy more energy efficient appliances. Ofgem states:

  We expect suppliers to increasingly develop product offerings in this area in response to government's climate change commitments and as metering technology evolves.[58]

  These developments may well have implications for the sorts of offers retailers might start making in Australia.

In the British market switching rates have declined from their peaks, although wholesale price volatility in the UK recently caused a significant amount of switching.

5.3.2 New Zealand

The New Zealand market has a longer history with allowing competition with price deregulation than the UK. However, it has a number of similar features. These include:

- A concentrated (and vertically integrated) market. The five largest retailers have about 97% of the market;[59]

- Incumbent retailers have a market share of about 67% across all networks;

- A current switching rate of about 8% per annum, after earlier being much higher;[60]

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[56] Essa news, British Gas launches green energy tariffs, 6 August 2007, page 7.
[57] ESAA news, Consultation begins on UK interval meters, 13 August 2007. Ofgem has also removed the 28 day rule that allowed customers to switch supplier only four weeks after signing up with another. It is understood Ofgem expects this to make it easier to offer longer term deals including the installation of energy-saving measures. ESAA news, Ofgem halves the number of energy supply rules, 6 August 2007. Ofgem, First trials for smart energy meters in Britain are to begin, Press Release,12 July 2007.
[58] Ofgem, Domestic Retail market Report, June 2007, page 16.
[59] http://www.electricitycommission.govt.nz
[60] First Data Utilities, World Energy Retail Market Rankings: Utility Customer Switching Research Report, Third Edition, June 2007.

- A discount between the weighted average retail charge of the incumbent retailers and the weighted average retail charge of the cheapest retailer of about 7%.[61] In 1999, the margin was about 9%. We understand that the margin has been as low as 4% in 2002.[62]

Other notable features in respect of the New Zealand market are that:

- There was almost no activity in the small users end of the market, prior to the introduction of profiling as it typically required the installation of a new (smart) meter;
- There are currently three players in the smart meter market which appear to be focussing on business users, and the retailers are out of this market as meter owners (and have almost no involvement with smart meter reading).[63]
- One retailer (the Government owned Meridian Energy) is now embarking on a smart meter roll-out to 100,000 households in Christchurch.

The NZ experience has implications for the roll-out scenarios and will be the subject of further analysis in Phase 2.

The New Zealand Electricity Commission is also in the process of considering issues around smart metering.[64]

5.3.3 Texas

Texas is the US state with the most active retail market, although price regulation exists. It would appear to have:

- Two incumbents with a market share of 66% as at September 2006;
- Forty active retailers in the market, two of which have several hundred thousand customers;
- About 7% of domestic customers signing to non-incumbent retailers each year; and
- Margins between the average and best available competitive offers of a similar magnitude to those in the UK and NZ (between the incumbent's offer and the best available).[65]

It is also rolling out smart meters.

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[61] http://www.electricitycommission.govt.nz
[62] The typical margin appears to be lower than in the UK which suggests that New Zealanders may have a higher propensity to shift for smaller savings. The NZ market is considerably smaller and there are also relatively few customers able to benefit from dual fuel offers (although this is likely to make their electricity bills relatively high).
[63] Stream information, presentation to the Electricity Commission, November 2006. In New Zealand there is competition for metering services.
[64] Electricity Commission, Advanced Metering, June 2007.
[65] Public Utility Commission of Texas, Scope of Competition in Electricity Markets in Texas, January 2007, page 60.

5.3.4 Norway

Norway would appear to have:

- Incumbents with about 77% of the household market; and
- The Norwegian Water Resources and Energy Directorate notes that *"in general incumbent suppliers tend to operate with slightly higher prices than independent suppliers"*. In the second quarter of 2005, the average difference was about 6%.[66]

The Norwegian market is also notable for the large swing in switching rates both seasonally and across years (and the high level of re-switching amongst switchers – around three times). Utilities are able to alter prices as frequently as every two weeks and a significant proportion of users are on spot market contracts (including 16% of domestic customers – the figure in Sweden is 4%, but a much larger proportion of large users).

We understand that there are several reasons for this:

- Retail competition in Norway reportedly started with these floating rate offers;
- More Norwegians dislike paying the risk premium associated with fixed price offers, as we understand is also illustrated in the proportion of consumers who choose fixed interest rate loans;
- More Norwegians are tolerant of electricity price fluctuations, which have a longer history there due to its electricity system's dependence on weather.

5.3.5 South Australia and Victoria

South Australia and Victoria have the most active retail electricity markets in Australia. They have some notable similarities with the above markets.

Some of the key features of the South Australian market are:

- A reasonably concentrated and vertically integrated market;
- A current switching rate of about 15%;
- An incumbent with 64% of the domestic market, a significant minority of which appear to be on market contracts with the incumbent;
- Nine competitors that have captured 36% of the market; and
- All retailers are offering at least one market contract at a discount to the standing contract where the discount ranges from 2-12%. Most retailers also incorporate other price and non-

66 Norwegian Water Resources and Energy Directorate, Supplier switching in the Norwegian end user market – 2nd quarter 2005.

price benefits in their offers. Non-incumbents would appear to offering the larger discounts.[67]

Some of the key features of the Victorian market are:

- A reasonably concentrated and vertically integrated market;
- About 25% of households switched retailer in 2006;
- The incumbents have a market share of about 87%;[68]
- Independent research undertaken by the ESC showed that market contracts are able to provide consumers with lower bills (in the order of 5.5-7.5% over the standing price). In addition, a range of other incentives are on offer.[69]

5.3.6 Conclusion

The experience across these markets varies, but there would appear to be several important similarities that are relevant to whether retailers might introduce more cost reflective tariffs across the board to unwind the load profile cross subsidy:

- First, the most active markets display a high degree of market concentration (and vertical integration). This may say something about the general competitiveness of retail electricity markets.
- Second, it would appear about half the customer base has been willing to switch to non-incumbent retailers for savings of 5-10% of the value of their bill. Conversely, at least at this stage of the markets' development, up to half of the market appears to be unwilling to switch for such savings. In other words, incumbent retailers typically charge prices that permit such a discrepancy, even though these customers can easily exploit it by switching. In effect, they would appear to be pricing these customers' indifference to switching for relatively modest savings.

Given this, it may well be difficult to interest most of these customers (ie. customers who are disinclined to switch) to accept more cost-reflective tariffs that either:

- Would save them a similar amount of money if they are currently flat load customers and stay the way; or
- Might save them similar amounts of money, if they accept such a tariff and change their behaviour.

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[67] NERA, Review of the Effectiveness of Energy Retail Market Competition in South Australia, Phase 2 Report for ESCOSA, June 2007.
[68] UBS, Australian utilities structure 2006.
[69] ESC, Customers seeking competitive deals in retail energy market, 13 December 2006.

Given the added complexity of such an offers it seems reasonable to conclude that the savings would have to be larger than those outlined above to encourage significant take up.

It is possible this might change as these markets mature further, but it seems that this may take some time given the maturity of some of these markets and the higher savings these remaining customers may need to switch.

5.4 Existing more cost reflective tariffs amongst large users

The market evidence shows that amongst larger uses, retailers typically charge more cost reflective prices (including passing through network tariffs). In terms of energy costs, this is typically in the form of:

- A flat price - albeit one that reflects the customer's load profile. The price signal still gets through in these circumstances - albeit in a more diluted way; or

- Some form of Time of Use pricing, particularly for small or medium size enterprises.

There is some evidence of retailers using smart meters amongst small to medium size users as a way of providing more competitive retail offers (eg. Powerdirect).

We are unaware of data on this market, but we understand that the majority of large users are generally not inclined to prefer Time of Use based products. We also understand that there is little involvement even amongst larger and more sophisticated energy users in actively managing their demand (eg. via interruptible tariffs).

Retailers typically do not value this capacity very highly even when it is relatively 'firm' (i.e. they control the decision to shed load). In our experience, retailers share up to 50% of the savings with the customer (but usually less), and value voluntary load reduction much less because typically it does not obviate the need to hedge via more conventional means.

The large user market is a fundamentally different because individual bills (and margins) are large enough for retailers to tailor customer specific tariffs. For example, it seems unlikely that the flat rate (but load profile reflective) form of pricing would be appropriate for the domestic market because it would imply different tariffs for many types of customer and the costs of such an approach are likely to be prohibitive.

What happens in the large user market is likely to be of limited relevance to the mass market. The reluctance of large users to accept price volatility and risk is, however, worth noting because it seems reasonable to assume that less sophisticated energy users would, if anything, be more reluctant.

5.5 Existing more cost reflective tariffs amongst small users

A significant proportion of domestic customers are already on some form of Time of Use tariffs. There are also a number of initiatives under way to increase that proportion.

5.5.1 EnergyAustralia's roll-out of smart meters

EnergyAustralia is in the process of rolling out smart meters to all its customers. At this point we understand that it has installed about 100,000 smart meters into the mass market sector.

This distribution division of EnergyAustralia's business is driving the roll-out, which it has justified in terms of the benefits to the network business in terms of deferred capital expenditure. It seems likely however that any benefits would only accrue to the business for up to 5 years (because regulators reassess its capital expenditure requirements every five years as part of the price review process by the regulator). It would also presumably be losing revenues over the intervening period if customers responded to those price signals. Indeed, the data would appear to suggest that its retailer has lost revenue (see below).

All new installations and existing installations which have a meter upgrade (consuming below 40MWh per annum) must install a smart meter (Type 5 or better) and must be placed on the *LV Energy40 TOU* network price.

To support the roll-out of smart meters, EnergyAustralia has introduced Time of Use network tariffs. The key tariff for smaller users has the following charges (excluding GST):

- A peak price of 12.8c/kWh for 2pm-8pm on working weekdays;
- A shoulder price of 2.4c/kWh for 7am-2pm and 8pm-10pm on working weekdays; and
- An off-peak price of 0.6c/kWh all other times.[70]

The relativities are therefore as follows:

- Peak and off-peak 21 times; and
- Peak and shoulder 5.3 times.

Truly peak responsibility cost reflective pricing might justify even higher peak prices and lower prices at all other times.

The retail business also has a regulated retail PowerSmart Home tariff for customers with smart meters. It has the following charges (excluding GST):

- A peak price of 25.1c/kWh for 2pm-8pm on working weekdays;
- A shoulder price of 8.9c/kWh for 7am-2pm and 8pm-10pm on working weekdays and 7am-10pm on weekends and public holidays; and
- An off-peak price of 5.1 c/kWh all other times.

The relativities are therefore as follows:

[70] Integral Energy has a similar tariff but fewer customers on smart meters.

- Peak and off-peak 4.9 times; and
- Peak and shoulder 2.8 times.

EnergyAustralia makes identical offers to market agreement customers, within its network area who have smart meters.

According to EnergyAustralia.

> *A survey of 3,000 PowerSmart Home customers shows that 94% of customers have found their bills are the same or cheaper than what they would have paid under the traditional flat pricing system, often without changing the way they use electricity. In fact, customers saved an average of 10% compared to what they would have paid under flat pricing, while some customers were able to save more than 30%. Of the small number of customers whose bill was higher, the increase was mostly less than 5%.*[71]

It should be noted that EnergyAustralia (distribution) is targeting the roll-out to customers who are likely to benefit from the installation of smart meters.

It would seem that this approach is costing EnergyAustralia revenue and margin. We understand from another retailer that the network charges are on average 2-3% higher, which suggests the retailers are bearing both higher input costs and potentially lower margins.

Several other retailers (eg. Country Energy) are also installing smart meters on a new and replacement basis.

5.5.2 United Energy's summer network tariffs

In 2001 United Energy introduced some more cost reflective network tariffs in its distribution area. This included introducing for all tariffs a seasonal split for summer (November to March inclusive) and non-summer, with higher energy prices in the former. The loading on the summer tariff was about 20% higher than that applying in the non-summer period.[72]

5.5.3 Changes in off-peak electricity water heating tariffs

In 2003 in Victoria the Government made a decision on regulated retail prices from the 1 January 2004. We understand that this provided the businesses with some flexibility to rebalance tariffs with the context of an overall cap on the average regulated retail price. In particular, it gave the businesses the flexibility to increase the off-peak unit rates associated with certain electricity storage water heating tariffs (Residential GD/GR + Dedicated Y6/YT, J6/JT). We understand it now has a specific Community Service Obligation subsidy on off-peak electricity tariffs.

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[71] EnergyAustralia, Introducing PowerSmart Home.

[72] It also has a Summer Demand Incentive Charge as part of a smart meter tariff. It involved a special charge for demand usage during the period 3-6pm on summer workdays for customers with smart meters.

The government considered this appropriate because many of these tariffs were charging less than the cost of supplying the energy at those times (ie. overnight and in the mid afternoon). Indeed, in some parts of rural Victoria, the peak demand was occurring in 'off-peak' times due to the 'success' of the formerly government owned businesses in selling these tariffs.

Many businesses took the opportunity to rebalance these tariffs, increasing the off-peak rate in the case of one retailer by over 44% and reducing the on-peak rate by less than 4%.

5.5.4 Conclusion

The evidence in Section 5.5 presents a somewhat mixed picture. In relation to the first two examples we understand that typically retailers are either not competing for these customers or, if they are, are not passing through the price signals.

This may be partly because they are not yet in a position to do so cost effectively and that there are not enough customers on these tariffs yet to make it worth their while.

This last example provides an instance of where retailers were willing to change tariffs to make them more cost reflective. In this instance, however, the rebalancing affected a distinct class of customers (ie. those on a separate tariff) and it is unlikely that other retailers were going to compete actively for these customers, while they were loss making. This might have assisted in allowing incumbent retailers to make the necessary changes. In other words, the customer was unlikely to leave because they were unlikely to get a better deal elsewhere.

A number of retailers have indicated that if there were numerous customers on Time of Use tariffs, that they would inevitably develop offers that are broadly consistent with them. This is consistent with how they currently approach the market. In other words, if the incumbent retailer uses smart meters to introduce more cost reflective tariffs across the board, the market is likely to follow (ie. base offers on the incumbent's offer). As Section 4.2 indicates one retailer has indicated that it is likely to be proactive introducing more cost reflective, which may mean that the market has to follow it where it is the incumbent.

A key question may therefore be whether the incumbent retailer responds by introducing more cost reflective tariffs across the customer base. We will investigate this issue further in Phase 2. A key question for policy makers is whether they can facilitate this process, whilst ensuring the offers remain attractive to customers.

5.6 Smart meter trials

There are a number of trials occurring in Australia (and around the world) on the use of smart meters, and more particularly on the:

- Development of more cost reflective tariffs;
- Willingness of customers to accept more cost reflective prices; and
- Willingness of customers to respond to those prices.

The key trials are those being undertaken by:

- Energy Australia[73];
- ETSA Utilities (although this is not a smart meter trial)[74];
- Country Energy[75]; and
- Integral Energy.[76]

A number have produced encouraging levels of customer response, which might encourage retailers to introduce more offers.

It is perhaps worth noting that Government owned and integrated distribution and retail businesses are taking the leading role in undertaking trials. In some cases it would appear that the distribution parts of these businesses is driving the trial (as is the case for EnergyAustralia). The ETSA Utilities trial is focussing on demand reductions for the purpose of deferring network investment.

Two retailer led trials are in preparation or in the early stage of development (Origin Energy as part of a Solar Cities project and we understand another retailer is planning a trial). The latter will, however, we understand not involve any incentive payments and its focus is on how in-home displays might enable service improvements to customers.

All these developments are likely to inform how retailers might respond, in the broader market, with a roll-out of smart meters, and the sorts of tariffs they might offer.

Country Energy describes the key lessons for retailers as follows:

- Customer education is the key;
    - The offer needs to be simple;
    - Most customers on continuous or incline block tariffs have limited understanding of Time of Use structures;
    - Ongoing customer education is likely to be important;
    - Smart metering and innovative pricing will not solve every challenge facing retailers;
    - It can, however, form an integral part of a demand management suite; and

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[73] Alex Miller, Energy Australia, Summer and Winter Results from EnergyAustralia's Strategic Pricing Study, 16 May 2007.
[74] ETSA Utilities, Demand Management Programme, undated presentation. See also ETSA Utilities, Annual Demand Management Compliance Report, August 2007.
[75] Ben Hamilton, General Manager Corporate Strategy, Smart metering and customer trials: A retailer perspective, 30 July 2007.
[76] Integral Energy, trails update, 19 June 2007.

- Retailers should be actively preparing for mandated metering roll-outs (ie. trials and technology testing), or risk being left behind.[77]

5.7 Constraints

There are a number of constraints that are likely to influence the extent to which a smart meter roll-out leads retailers offering more cost reflective tariffs. It may also be important to assess the evidence in terms of current market activity in light of these constraints.

The key constraints include:

- Price regulation;
- The form of price regulation;
- The risk of re-regulation;
- The limited ability of retailers to compete for metering services; and
- Split incentives.

Retailers are particularly concerned about the issues around price regulation.

5.7.1 Price regulation

Most retail electricity markets in Australia and overseas (with certain exceptions including the UK and NZ) retain price regulation. Price regulation is highly likely to distort activity in the market, unless the regulated prices are set at 'true' safety net levels (ie. the levels at which all customers can be charged a cost reflective price). In practice, most regulators are unlikely to set regulated prices at these levels, because it will not achieve their objectives. Absent this, price regulation limits the proportion of customers for whom retailers are likely to want to compete, and thus significantly distorts competition and stifles innovation.

Price regulation does not necessarily stop non-incumbents from trying to win the more profitable customers from incumbents by offering lower prices, but it is likely to constrain the ability of the incumbents to respond because often they cannot recoup the lower profitably by increasing prices to less profitable customers. It therefore encourages incumbents to respond via non-price measures (other ways of making customers less inclined to shift for bill reductions, which are often quite small).

Retailers may still unwind some cross subsidies under price regulation; however, the amount of customers for whom this is feasible is likely to be a smaller subset of the customer base.

[77] Ben Hamilton, General Manager Corporate Strategy, Smart metering and customer trials: A retailer perspective, 30 July 2007.

Price regulation is, however, also likely to introduce a lack of flexibility and risk aversion which imposes its own constraints because of the risk that energy costs might increase beyond those recoverable under the regulated prices. This is likely to distort retailers' behaviour because it is a risk they cannot manage. This is likely to impact on how they approach and compete in that market with price regulation.

It is perhaps worth noting, however, that where governments have removed price regulation, it does not appear to have encouraged retailers to develop particularly more innovative and cost reflective tariffs (or use smart meters more broadly). It would appear therefore that price regulation is of itself not the most important barrier to the introduction of more cost reflective tariffs, with a roll-out of smart meters. It is, however, likely to be another significant barrier.

5.7.2 The form of price regulation

The form of price regulation can exacerbate the constraints price regulation imposes. Simple average price regulation has the undesirable features outlined above. In some jurisdictions, however, regulators also control prices at the tariff or tariff component level, or the speed with which these tariffs can change (via side constraints). This can mean that the cross subsidies cannot be unwound and further undermines a key purpose of having retail competition.

5.7.3 The risk of price re-regulation

Retailers also see constraints emerging even with a smart meter roll-out and price deregulation. In short, their argument is as follows:

- Smart meter enable more cost reflective tariffs;
- But this is unlikely to happen while prices are regulated;
- If prices are deregulated, and the roll-out of smart meters has the desired impact on the market, many customers will see higher bills. This is particularly true if retailers introduce Critical Peak Pricing;
- The politicians are unlikely to find this appealing, as there will be losers - some of whom are vulnerable customers; and
- It would therefore be a 'brave' retailer that embarked upon this approach.

There would appear to be some merit in this argument. Section 5.2.1 provides one example from NZ of where price deregulation led to price re-regulation.

It reveals a seemingly rather fundamental contradiction in government policy. Price regulation to protect customers from price shock and potentially rolling out smart meters which, to the extent it is successful, actively encourages price 'shock'. It is not obvious that governments can expect to achieve these two policy objectives simultaneously, unless they use other mechanisms (ie. the welfare system) to compensate vulnerable customers who receive price shocks.

Some retailers are concerned about price regulation re-emerging even if the roll-out of smart meters does not have the desired impact. In short, their argument is as follows:

- Smart meters enable more cost reflective tariffs;
- The market might not respond as governments hope either because governments do not deregulate prices or because customers are not interested;
- Governments then realise they have created a 'white elephant' and feel compelled to require retailers to offer more cost reflective tariffs to justify the original decision; and
- Governments therefore start requiring retailers to offer particular types of tariffs.

Retailers are of the view that this is likely to produce outcomes that do not achieve the ultimate objective. In other words, regulating tariffs in this way is unlikely to result in simple tariffs that to which consumers are receptive and responsive. Retailers also believe it will compromise the retail market in a variety of other ways, which are unlikely to be in the interests of customers (ie. invite 'gaming' by retailers to maximise their position in re-regulated market such as relying on complex regulated tariffs as a way of discouraging switching).

5.7.4 The scope of retail competition

The space in which retailers can compete is constrained by rules regarding the scope of competition (eg. in metering services).

In principle, this does not preclude retailers from identifying customers who would benefit from smart meters and investing in those smart meters themselves. In practice, it may however reduce their ability to do so by limiting their ability to generate the necessary scale in the market to be competitive.

By way of example, in the Victorian gas sector, the cost of metering services is approximately 5% of final price of gas for the average residential customer, which equates to about $37 per customer.[78] A study by Pricewaterhouse Coopers estimated the likely savings from gas meter contestability at up to 10% of cost of metering services.[79] The ESC considered this to be the upper bound on the basis that there is already considerable competition in the market for gas meter services – such as tendering out and third party service provision. On this basis it decided to retain exclusivity for these services, as it decided for electricity.

Where governments have introduced competition for metering services (eg. NZ and UK), it does not appear to have led to a significant amount of activity by retailers. It would not therefore appear to be the most important barrier to retailers introducing more cost reflective tariffs, with a smart meter roll-out.

The issue of competition in metering services will be investigated further in Phase 2 as it is relevant to the relative benefits of the roll-out scenarios.

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[78] Assuming consumption of 60 GJ.

[79] Essential Services Commission, Review of Gas Meter Service Responsibilities, Final Decision, September 2005.

5.7.5 Split incentives

To some degree retailers and distribution businesses share the benefits that smart meters might provide. Some policy makers identify split incentives as a market "failure" to the uptake of more energy efficient appliances (eg. the landlord – renter problem).[80] In other words, this acts as a constraint on the more widespread use of smart meters.

Split incentives, however, arise in numerous circumstances and, where the benefits are sufficient, the market would normally find a solution to this problem (ie. via contract). In the case of the benefits of more cost reflective retail electricity prices there would also appear to be at least some differences in the nature of the benefits that might flow to retailers and distributors and therefore the requirements of any price signals that produce benefits for the parties.

5.8 Conclusions

The available evidence which may inform the extent to which smart meters might lead to retailers actively marketing more cost reflective tariffs would appear to be somewhat mixed.

It appears to suggest that it might be optimistic to assume that, just because smart meters will enable retailers to introduce more cost reflective tariffs, this will happen broadly across the customer base in the foreseeable future. The technology clearly lowers the barriers to retailers adopting such an approach, but the benefits for many customers might be too small to make it worthwhile for retailers to pursue. They may also meet customer resistance to the necessary tariff changes.

The more likely outcome would appear to be that retailers offer more cost reflective tariffs to a small but significant segment of the market. Retailers might also offer Critical Peak Pricing to a subset of these customers. It also seems likely that the tariffs retailers offer are different to what may be ideal from the perspective of sending the most cost reflective prices signals possible to customers. This would be consistent with the need to produce offers to which customers are receptive.

To the extent that the incumbent retailer introduces more cost reflective tariffs (for a significant proportion of their customer base), however, it seems likely that the market will follow.

It is possible that governments could therefore intervene to regulate the outcomes they want in terms of retail tariffs. In other words, require retailers to offer cost reflective tariffs. Whether this is likely to produce outcomes that are consistent with the ultimate objective (ie. tariffs to which customers are receptive and respond by changing their behaviour) is, however, more open to question.

Realising the potential benefits of smart meters in terms of cost reflective pricing is also likely to require addressing a number of political and regulatory constraints (ie. price regulation and the level of regulated prices, and the risk of price re-regulation).

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[80] Productivity Commission, The Private Cost Effectiveness of Improving Energy Efficiency, Inquiry Report No. 36, 31 August 2005.

6 Evidence on retailers' recurrent costs

To assess the implications of a smart meter roll-out for retailers' recurrent costs we:

- Outline retailers' views from our consultations;
- Outline retailers' views from the work of Frontier Economics;
- Outline the views of the Bayard Group; and
- Outline any information available from the various other trials, roll-outs or other considerations of smart meters, which is in the public domain.

We also discuss a number of the broader implications for retailers from smart meters.

6.1 Retailers' views from our consultations

The typical view of retailers is that the introduction of smart meters and advanced smart meters is unlikely to make a significant difference to their recurrent costs.

The basis for the retailers' views appeared to be largely intuition based rather than substantive analysis, and with this in mind they came with major caveats.

A number of retailers were not prepared to speculate, noting that there are too many variables about how the roll-out would occur and the market would operate. A number indicated that the best available information is part of the report prepared by Frontier Economics, and directed us to it.

The retailers we spoke to who offered a view indicated that they believed their operating costs would either be about the same or somewhat (but not significantly) lower. Some were of the view that there would be significant increases in process costs related to the storage, management, complexity and validation of data. This may also require some additional steps in processes. However, they were also of the view that reductions in other costs (eg. potential benefits in working capital and bad debts), would offset these increases.

Retailers attached two key caveats to these views.

- In the short term, recurrent costs would be higher as the businesses adjusted to the new world (eg. they would expect significantly higher number of calls, particularly if some customers began to see large increases in their bills and sought to understand the new tariffs); and
- While costs might be lower, there was a greater risk that they could be significantly higher rather than lower (ie. in the event that the process was not executed as effectively).

Some retailers also suggested that smart meters would likely involve them taking more risk (eg. market and trading risk) than under the current arrangements, but with greater demand side response there may be benefits from them doing so. They may, however, have some more choice in this regard.

There are some costs in terms of investment in communications (for some functionality) and retail product development that would be optional for the retailer, and which they would only incur presumably if the benefits to them out weighed the costs.

The cost imposed on retailers could also vary depending on the how the roll-out is achieved (eg. where they may be competition in metering). For example, the potential costs on retailers in terms of stranded investment (or on competition in the retail market more generally in terms inhibiting switching.. Phase 2 will address this issue in further detail. The experience of New Zealand (as Section 5.3.2 discusses), is likely to be relevant here.

These views are broadly similar to the views expressed by retailers to Frontier Economics, even though a number of the retailer representatives we spoke to were not particularly familiar with this work or its outcomes.

6.2 Frontier economics

The ERAA recently published work undertaken by Frontier Economics on retail costs associated with a roll-out of smart meters. The work comprised two reports:

- Stage 1: A desktop literature review of existing and planned smart meter trials and mandated roll-outs in Australian and overseas jurisdictions, focussing on any cost benefit analysis undertaken and the extent to which retailers' costs were factored into the analysis;[81] and

- Stage 2: Consultation with ERAA members to gain a deeper understanding of retailer implementation and integration issues and costs of a smart meter roll-out.[82]

The Stage 1 report examines 11 smart meter programs in Australian and overseas jurisdictions. It primary conclusion in relation to the consideration of retail costs is that:

> *"…it is difficult to ascertain whether retailer costs have been taken appropriately into account in these analyses."*[83]

Section 6.4 discusses the available information on retailer costs from these studies.

The Stage 2 report examines the implementation costs of smart meters. Specifically, the work involved understanding the likely costs to retailers of implementing the necessary changes to facilitate a roll-out of smart meters to residential and small business customers.

[81] Frontier Economics, Interval meter implementation costs – Stage 1 Literature Review, A report prepared for the Energy Retailers Association of Australia, July 2007.
[82] Frontier Economics, Interval meter implementation – Stage 2 Retailer cost data, A report prepared for the Energy Retailers Association of Australia, July 2007.
[83] Frontier Economics, Interval meter implementation costs – Stage 1 Literature Review, A report prepared for the Energy Retailers Association of Australia, July 2007, page 56.

To gather this information, Frontier Economics used a survey. The key assumptions were that:

- Both manually read and two-way metering technologies were considered;
- The functionality of retailers' systems was based on measuring unavoidable costs. They were assumed to include:
  - The establishment and maintenance of their own metering data repository;[84]
  - Basic interval-based metering products, but not sophisticated products such as would enable Critical Peak Pricing tariffs;
- The Distributor would be the responsible person under the Rules, with responsibility for meter provision (including installation and maintenance) and metering data services; and
- Discount future nominal expenditures (we understand over 10 years) by 3% per annum to derive a figure in terms in real $2006.

Retailers were asked to submit their estimates on a base case of no roll-out of interval meters. We understand that 7 retailers responded to the data request in respect of a manually read interval meter roll-out and 5 retailers responded to the data request in respect of a remotely read interval meter. However, in some cases the data sets were not complete.

The categories of information requested in relation to operating costs were as follows:

- Meter data management
  - Settlements – increased costs due to the need to manage much greater amounts of data;
  - External aggregation – no longer required as the IT investment allows this to be done in-house;
  - New and replacement meters – costs relating to the updating of databases to reflect new and replacement interval meters; and
  - IT opex – costs related to operation of augmented IT infrastructure.
- Business systems
  - Exceptions management – costs of exceptions numbers and time to resolve them may rise with the implementation of interval meters; and
  - IT opex – higher costs relating to operation of augmented IT infrastructure.

[84] Frontier Economics conclude that this is cost is reasonable based on their unavoidability criteria but do not explain why. If it were removed, capex would likely be replaced with some higher operating costs to reflect the purchase of this service. It also includes the costs of some rudimentary or basic interval meter products, but not dynamic Critical Peak Pricing tariffs on the basis that is the major reason for introducing smart meters. Some of these costs would not be unavoidable, however, if the retailer chose not to respond by introducing more cost reflective tariffs.

- Other
  - Training – costs of staff training to become familiar with each retailer's new responsibilities and capability under the roll-out;
  - Process development – resources may be required to develop new business procedures to support the management and use of interval meter data;
  - Mail advice – the costs of activities aimed at mitigating call centre costs (see below);
  - Call centre – back and front office call numbers and duration may increase (decrease) if customers query interval data (query bills less);
  - Complaints – cost of dealing with complaints may rise (fall) if customers query interval data (query bills less); and
  - Management overheads – management overheads may increase to reflect the greater complexity and investment in retailing activities.

Results

Table 3 reproduces the data in Frontier Economics report.

Table 3: Frontier Economics estimates of retail operating costs under a smart meter roll-out 2006

Retailer operating costs under a smart meter roll-out	Manually read		Remotely read	
	Simple average cost per customer ($)	Average of the retailer cost per customer ($)	Simple average cost per customer ($)	Average of the retailer cost per customer ($)
Settlements	0.15	0.28	0.24	0.47
External aggregation	0.91	1.53	-0.85	-1.42
New and replacement meters	1.44	2.22	1.26	2.22
IT Opex	1.36	1.59	1.93	2.46
Exception management	1.36	1.43	4.45	6.38
IT Opex	1.71	3.27	3.07	5.58
Training	0.16	0.18	0.30	0.41
Process development	0.47	0.88	0.60	1.10
Mail advice	0.38	0.57	0.48	0.72
Call centre	0.70	0.64	0.91	0.88
Compliants	0.73	0.55	0.82	0.64
Managemet overheads	0.24	0.53	0.25	0.60
Totals	*17.4*	*23.72*	*13.46*	*20.04*

* Please note that the breakdown of operating costs is inconsistent with the totals for the manually-read smart meters. We understand that this is because some parties did not provide a total cost breakdown (and presumably have significantly higher costs).

They key results are as follows. For the shift from the status quo to manually-read smart meters:

- A simple average (retail operating) costs per customer increase of $17.40; and
- An average of the retailer cost per customer increase of $23.72.

For the shift from the status quo to remotely-read smart meters:

- A simple average (retail operating) costs per customer increase of $13.45; and
- An average of the retailer cost per customer increase of $20.03.

It is our understanding that these figures are the NPV of the incremental cost per customer over a 10-year period. In other words, they are not necessarily the same as any change in the annual recurrent (ie. sustainable) costs per customer. This is because the data is likely to contain the higher initial ‘recurrent’ costs of operating in the new environment. Most of the costs identified would appear to be largely recurrent. The only possible exceptions to this are new and replacement meters as the cost is described as “costs relating to the updating of databases to reflect new and replacement interval meters” and some aspects of training.

If annualised, the increases would appear to be in the order of $1-2 per customer per annum, including the potentially higher transitional ‘recurrent’ costs.

One retailer indicated that a typical rule of thumb used in the industry is that for any incremental capital expenditure, it is reasonable to assume that this will increase operating costs by about 15% of the amount of capital expenditure. The above costs would appear to be broadly consistent with the assumed level of capital expenditure reported to Frontier Economics (ie. the capital costs per customer for the remotely read smart meters is in the range of $29.49-47.27).

It is important to note that the Frontier Economics work is of limited relevance for Phase 1 of this study, as it does not address all the additional functionalities addressed (ie. it would not allow for Critical Peak Pricing).

6.3 Bayard Group

The Bayard Group has produced analysis that outlines its views on the benefits to retailers of smart meters.[85] The Bayard Group is a global energy measurement business which describes itself as *“the unrivalled market leader in electricity meters”* and as a party which *“has a strong position in the rapidly growing advanced or smart metering systems market.”*[86]

It concludes that the benefits are worth $41 per customer per year, on the basis of the following benefits for:

- Working capital management ($25 per customer per year);
- Revenue assurance ($4 per customer per year); and
- Financial risk management ($12 per customer per year).[87]

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[85] The information presented here is based on a powerpoint presentation by Bayard. As a result, we have been unable to establish in detail the basis for the estimates.
[86] See www.bayard.com.au
[87] It also includes per customer benefits on an NPV basis but we have been unable to reconcile these numbers, with those on a per customer basis. The former may reflect the number of customers affected directly. Using a 10% real pre-tax discount rate, a 15 year asset life, a 15 year discount period and a 3 year roll-out.

Working capital management

It assumes that the basic functionality will provide accurate meter reads and the extended functionality will provide reads for monthly billing, e-billing and payment (via IHD) and remote payment.[88] It believes that the service outcome will be reduced working capital and bad debts.

It concludes that these benefits are worth $25 per customer per year. This appears to be based on a net present value of the reduction in opex of $125M or $90 per customer, which reflects the cash flow benefit of billing monthly. This figure appears to include the benefits of monthly billing, bad debt reduction, prepayment, e-billing, and reductions in re-worked bills and complaints.

Most of these benefits would appear to be associated with advanced functionality.

Revenue Assurance

It assumes that the basic functionality will include real time tamper detection and the extended functionality will include remote turn-off. The service outcomes this would provide is that it would eliminate vacant premise consumption and reduce theft.

It concludes that these benefits are worth $4 per customer per year. This appears to be based on:

- A $50M reduction in capex requirements ($36 per customer) associated with a 15% penetration of prepayment meters;
- A $31M reduction in the NPV of opex ($22 per customer) associated with eliminating/reducing theft and tampering;
- A $41M reduction in the NPV of opex ($29 per customer) associated with reducing the quantum of bad debt; and
- A $10M reduction in the NPV of opex ($7 per customer) associated with identifying closed accounts/premises.

Most of these benefits would appear to be associated with the advanced functionality.

Financial risk management

It assumes that the basic functionality will allow for critical peak energy pricing and the extended functionality will allow for selective curtailment and granular daily load forecasts. The service outcomes that this would provide are reduced exposure to high spot prices and avoidance of catastrophic losses.

It concludes that these benefits are worth $12 per customer per year. This appears to be based on $60M reduction in capital requirements (or $43 per customer).

[88] Remote payment is not part of the advanced functionality assessed in this study for the MCE.

Most of these benefits would appear to be associated with the advanced functionality.

Other quantified benefit categories

It also identifies some other benefit categories including billing operations, load management and customer service, but does not appear to include these numbers in its overall estimate.

It suggests that the benefits of these are as follows:

- Billing operations - $38M in opex (or $28 per customer). This is comprised of the:
  - Benefits of electronic billing of $23M in NPV terms (or $17 per customer); and
  - Benefits of reducing the cost of reworked bills of $15M in NPV terms (or $11 per customer).
- Load management - $67M in opex (or $48 per customer)[89]; and
- Customer service - $9M in opex (or $7 per customer). This is comprised of the benefits of reduced complaints/account queries/estimated reads.

Bayard also identifies costs of $40 per customer per year, but does not break these down by who incurs these costs.

Other benefits

Bayard identifies a number of other benefits to retailers including:

- A streamlined accruals process (based on actual energy flows);
- Customer-selected billing dates;
- Unusual loads (eg. marijuana farms); and
- Supply limiting (kW “cap” for essential services).

6.4 Other considerations of smart meters

As Section 6.2 indicates the available information on retailers’ costs from other smart meter trials is limited. We highlight the key evidence from those investigations that have addressed these issues in detail.

[89] It assumes that a customer incentive payment of $10 per year is made to generate these savings (which has been netted out of the estimates).

6.4.1 Victoria

The ESC's initial cost benefit analysis allowed for $30M for retailers' IT systems. Half of this was assumed to provide for the functionality of smart meters and half was assumed to accommodate the volume of smart meters. It did not appear to specifically account for retailer operating costs.

Department of Infrastructure

The Department of Infrastructure has undertaken work looking at advanced smart meter functionality.[90] The consultants draft report considered the merits of adding communications to smart meters the subject of the ESC's mandatory roll-out decision.

The main benefits of an advanced smart meter roll-out would largely arise from:

- Avoided cost of manual normal cycle meter reads (45%);
- Avoided cost of special meter reads and (manual) de-energisations and re-energisations (35%);
- Additional demand response benefits (7%), due to accelerated roll-out - not the technology used *per se*;
- Avoided cost of battery replacement (6.5%);
- Avoided retailer costs, mainly due to reduced demands on call centres (5% or $12M in net present value terms); and
- Reduced portable data entry costs (2%).

Only one of these costs is strictly relevant to retailers in the first instance (although under different delivery scenarios they might be). The report states as follows:

> *4.5 Avoided Retailer Costs*
>
> *With the implementation of advanced communications enabling remote meter reading there is a range of areas where retail costs will be reduced. The largest of these appears to be call centre costs. Information from retailers would indicate that there are savings in relation to calls regarding, estimated bills, meter reader issues (including access and presence of readers on customers' properties), delayed bills and other categories. In some cases Retailers showed savings as a percentage of calls avoided, in other cases they were just dollar estimates. It is our opinion that in some cases the avoided costs are underestimated.* [91]

[90] CRA International and Impaq Consulting, Advanced Interval Meter Communications Study: Draft Report, 23 December 2005.

[91] CRA International and Impaq Consulting, Advanced Interval Meter Communications Study: Draft Report, 23 December 2005, page 58.

6.4.2 Office of the Tasmanian Energy Regulator

In 2006 the Office of the Tasmanian Energy Regulator undertook a cost benefit analysis of a roll-out of smart meters in Tasmania.[92] It relation to retailer costs it found an increase in operating costs in the following categories for the first four years:

- Customer call centre on the assumption that will contact their retailer more often;
- Billing; and
- IT operating costs with the implementation of a new system. It also assumes that IT operating costs will remain more expensive than under the base case, on the assumption that data handling will be more expensive.

It also notes that Aurora Retail considered a range of other capital and operating costs, and advised that these would net out to zero in incremental terms.

Overall this would appear to imply a marginal increase in retailer's recurrent costs from a smart meter roll-out.

6.4.3 DITR: Ministerial Council on Energy

In 2006 EMC[a] conducted a meta-analysis of the results of trials and cost benefit analyses in relation to electricity smart metering.[93] Its review identified a number of benefits for retailers (or customers) including:

- Improvements to cashflow through billing and collection improvements;
- Reduced theft;
- More practical prepayment options;
- Improved customer service; and
- Trading risk management benefits.

[92] OTTER, Costs and Benefits of the Rollout of Interval Meters in Tasmania, Final Report, October 2006. Its definition of a smart meter was a remotely read interval meter with potential for remote automatic load control at periods of peak use if set up when the meter is installed.
[93] ECM[a], Electricity Smart Metering: Meta-Analysis of Results of Trials and Cost Benefit Analyses: Summary Report, 19 December 2006.

7 Implications of higher functionalities

This section discusses the potential benefits for retailers of various higher functionalities, particularly for:

- Retail products (particularly more cost reflective prices); and
- Retailers' recurrent costs.

It also addresses where the functionalities might enable the retailers to offer products that differentiate their services, which may have benefits for them (in terms of customer loyalty and retention) and/or for customers.

Our conclusions should be read in the context of the qualifications in this report in Section 2.1. In some cases therefore some functionality may have material benefits where we have concluded otherwise, but on the basis of the available information we have been unable to determine whether they are material and/or quantify them.

Appendix A summarises the assumptions we propose in regard to the products retailers might offer in relation to more cost reflective tariffs. Phase 2 will refine these indicative products.

7.1 Retailers' product offers

The basis for our views on retailers' product offer is our conversations with retailers, our review of the available evidence and our market experience. Section 5 discusses these issues in some detail and Section 7.4 discusses them in further detail below.

7.2 Retailers' recurrent costs

The basis for our views in term of retailers' recurrent operating costs is similar, but our approach requires more explanation.

Section 6 provides a reasonably consistent range of views on the potential impacts of a roll-out of smart meters on retailers' recurrent operating costs, with the exception of the Bayard work. This work, however, covers some wider potential benefits as well (eg. for working capital and hedging costs).

In this section we provide an indicative assessment of the likely impact on retailers' recurrent costs of:

- A roll-out of basic smart meters (although this view is still preliminary and to be further developed in Phase 2); and
- A roll-out of advanced smart meters over and above those of smart meters.

To do this we:

- Take an indicative estimate of retailers' efficient recurrent costs;
- Allocate those recurrent costs to key retailer activities; and
- Made an indicative assessment within each of those categories about the likely impact of the advanced smart meter functionalities, where possible.

As Section 2 indicates the retailers we spoke to were unable or unwilling to provide (in the time available) estimates of the impact on their recurrent costs of the introduction of basic smart meters, let alone the incremental impacts of higher functionality.

We have therefore received no data from any retailer on the impact each functionality might have on their recurrent costs. Moreover, the views that have been expressed to us have typically been intuitive and qualitative.

This has significantly complicated the Phase 1 analysis of Retailer Impacts. We are therefore not in a position to form firm quantitative views on these matters.

7.2.1 Retailers' recurrent costs

There is limited information in the public domain about the actual recurrent costs of retailers or what retailers typically refer to as the 'cost to serve'. It is highly likely that those costs vary significantly by retailer, amongst other factors, based on:

- Their size;
- Their efficiency (eg. state of their systems);
- Whether they are incumbent retailers or not; and
- The rules and regulations under which they operate.

This means that depending on these and other variables the costs that a smart meter roll-out imposes on particular retailers:

- Would be extremely difficult to determine; and
- Vary significantly by retailer.

We do not believe it would be possible to assess the cost on a retailer-specific basis, and aggregate that information to a national level, without detailed cost information from retailers. Even then, given the inevitable differences in the way particular retailers may account for certain costs, it is unlikely that this would yield particularly useful information.

Each retailer's position, in terms of the costs a smart roll-out would impose, is undoubtedly highly relevant to it.

From the perspective of an economic cost benefits analysis, however, the more relevant costs are those imposed on an efficient retail business. This is because it is reasonable to assume that an 'inefficient' retailer will bear the other costs in any case, at least at some stage, in moving to best practice.

In addition, this analysis is examining the incremental changes in recurrent costs associated with advanced functionality over an assumed situation that all consumers already have smart meters. Given this:

- By definition, any analysis bases the incremental impacts on a hypothetical counterfactual; and
- The quantum of the assumption on the underlying costs is likely to be of secondary importance.

7.2.2 Assumption about efficient recurrent operating costs

For the purposes of this analysis we assume that the efficient recurrent operating costs of a retail business are in the order of $70 per customer per annum.

The basis for this assumption is that both AGL Energy and Origin Energy have indicated that they are aiming to get their costs to around this level as a result their current business reengineering processes, although that process will take several years and involves substantial investment (see Section 3.1).

It is quite possible that neither business will achieve this level of cost, or achieve it over the time frame they are expecting. We note that in both cases their current cost to serve is significantly higher than this amount. If achieved, however, it is likely to set the competitive benchmark against which all other retailers will have to compete.

We also note that a number of regulators have formed the view that the efficient operating costs of retailers are at least this amount, but typically not substantially in excess of it.[94]

7.2.3 Assumption about efficient recurrent operating costs by activity

We have then used KPMG benchmarks to allocate those costs to particular functions or activities.[95] Table 4 provides the breakdown in costs per customer in dollar and percentage terms, using KPMG's benchmarks and based on the assumption of $70 per customer per annum for total costs.

[94] KPMG, Benchmarking retail operating costs and margins, September 2006. IPART, Promoting retail competition and investment in the NSW electricity industry: regulated electricity retail tariffs and charges for small customers 2007-2010, Electricity – Final Report and Determination, June 2007.
[95] KPMG has undertaken a number of retail operating cost benchmarking studies. The most recent one in the public domain is KPMG, Benchmarking retail operating costs and margins, September 2006.

Table 4: Assumed retail recurrent operating costs by activity

Retail operating cost by key activity	%	$ per customer per annum
1. Billing and customer collection		
Billing	5%	3.4
Data validation	2%	1.1
Customer transfer	4%	2.8
Payments processing	13%	9.3
Bad debt expense	4%	2.7
CIS	20%	14.0
Sub-total		
2. Call centre costs	10%	6.7
3. Overheads		
Office and administrative service costs	18%	12.6
Energy trading costs	3%	1.8
Customer communications	15%	10.3
Pricing and risk management	3%	2.0
Settlements	1%	1.0
Regulatory	3%	2.4
Total	100%	70

* Percentages do not equal 100 due to rounding.

These are, however, not the only categories of a retailer's 'recurrent' costs that smart meters might impact upon; indeed, there are other categories of costs that may well be more affected. These costs are:

- Working capital requirements; and
- Hedging costs (and potentially prudential capital requirements).

We discuss these in further detail below.

The following sections discuss the categories of costs that might change:

- First as a result of a roll-out of basic smart meters (at least indicatively); and
- Second as a result of roll-out of advanced smart meters over and above basic smart meters.

7.3 Basic smart meters

7.3.1 Core functionality

It has been assumed for this project that the core functionality of the basic smart meters is as follows:

- Half hourly consumption measurement and recording; and

- Remote reading (weekly read).

It will also allow for local reading, provide communications and data security, tamper detection, remote time clock synchronisation and load management at meters through dedicated control circuit (via broadcast commands).

7.3.2 Indicative impact of core functionality on retail product offers

We will address this issue in further detail in Phase 2 of the study. The views in this section are therefore indicative.

In principle, at this stage, we do not see (except where indicated below) that the retail product offers under advanced smart meters will be significantly different to those that retailers develop with basic smart meters. The key differences are likely to be either in:

- The market penetration of those products (ie. how may customers choose them); and/or
- The customers' demand responses to those products, for those who have chosen them.

7.3.3 Indicative impact of core functionality on recurrent costs

The views in this section are indicative and we will seek to verify them in Phase 2.

Initial cost impacts

The introduction of basic smart meters is likely to have a number of implications for the retailers' recurrent costs. In the short term, retailers have indicated that might be reasonable to expect increases in the following 'recurrent' costs:

- IT operational;
- Customer communications;
- Call centre; and
- Billing.

These short term recurrent cost increases will be incurred for both a basic smart meter and an advanced smart meter. Therefore, given the assumptions under Phase 1, these increases are not relevant from the perspective of the Phase 1 analysis.

The Frontier report identifies some of these costs.

Under basic smart meters there are, however, a number of other costs including that might change on a sustainable recurrent basis. These include:

- Call centre costs;
- Bad debts;
- Working capital; and
- Hedging costs (and potentially prudential costs).

Call centre costs

The key drivers of call centre costs are:

- The cost of the labour of manning the call centre; and
- The amount of labour required which is function of the number of calls with which they have to deal (and the time taken to deal with them).

The number of calls and the time taken to deal with them is likely to be a function largely of:

- Certain aspects of the retailer's communications (eg. the complexity of tariffs and billing information); and
- Regulatory requirements in relation to those communications.

As indicated above, under the basic smart meter functionality there are plausible reasons for assuming that these cost will increase over the short to medium whilst customer get accustomed to the new tariffs arrangements and their greater complexity. Over the longer term, however, it would seem reasonable to expect these costs to decline again.

By way of example, one basis of the benchmarks in Section 7.1.2 is an assumption that a call centre would on average receive 2 calls per customer per year. If that number increases to 3 (or reduces to 1) it changes the call centre costs by approximately $1 per customer per year. This would alter the cost to serve by 1.4%, and may improve margins by a similar amount.

Bad debts and working capital

One of the product enhancements that basic smart meters would facilitate is monthly billing using accurate consumption data. There are a number of potential benefits. In particular, monthly billing might lead to two beneficial impacts on retailers' recurrent costs:

- Working capital; and
- Bad debts.

<u>Working capital</u>

Retailers require substantial working capital to cover the period for which they are making payments and receiving customer's payments. Monthly billing has the potential to reduce this period considerably. Our benchmarks suggest that monthly billing would effectively reduce the debt days outstanding from 63 days to 29 days, or by 54%.[96]

Monthly billing would therefore effectively reduce the working capital necessary in relation to these customers, which we have estimated otherwise would be $114 per customer in capital requirements or $16 per customer per annum, to $52 per customer in capital requirements or $7.34 per customer per annum. This represents an overall reduction of about $8.50 per customer per annum.

Bad debts

Bad debts are also a significant cost for retailers. Our benchmarks in Section 7.1.2 suggest a bad debt expense of $2.70 per customer per year based on a percentage of bad debts to revenue of 0.33%.

A simple example illustrates the importance to retailers of managing bad debts. If we assume that a "typical" customer does not pay a quarterly bill (of say $250) the retailer loses its margin of $12.50 (assuming a 5% margin). However, it may still incur costs of up to $237.50. This means that one customer who does not pay, can remove the margin on up to 19 other customers.

It is evident that a significant number of consumers have difficulty paying their energy bills. For example, the Victorian Utility Consumption Survey suggests that about 12% of households experienced difficulties in paying their energy bills in 2001 (down from 15% in 1996).[97] On this basis, vulnerable customers are a significant subset of all customers (ie. about 230,000 Victorian households). It also shows that about 15% of those customers who reported having some trouble paying their energy bills in 2001, reported 'always' having trouble paying their energy bills.[98] According to this data, in Victoria there are approximately about 195,000 customers who had temporary payment difficulties in 2001, and 35,000 customers who always had payment difficulties. In other words, about 1.8% of customers indicated permanent difficulties in paying their energy bills.

We understand that actual domestic disconnection rates for non-payment of bills in 2005/06 ranged from 0.2% of customers in Victoria to 0.9% of customers in NSW to 1.1% of customers in South Australia in these jurisdictions.

Monthly billing

Monthly billing might assist customers in paying their bills in a timely manner. This is because the bills will be more regular, of a more consistent amount, and may be of a more manageable amount for customers who are having difficulty paying. With electricity typically paid on a three monthly basis in arrears, customers can face higher bills than they were those expecting

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96 Based on work also undertaken in the context of the NSW retail electricity price review. See KPMG, Addendum to Benchmarking Report on Retailer Operating Costs and Margins, October 2006.
97 Roy Morgan Research, 'Victorian Utility Consumption Survey 2001', June 2002.
98 In 1996 respondents were asked if they "regularly" had trouble paying these bills. For electricity and gas respectively, 34% and 27% indicated that they regularly had problems paying their bills.

which may force them into payment difficulties, particularly if other unforeseen expenses arise. The evidence suggests that consumers who are having difficulty paying their bills attached high priority to their energy bills.[99]

There are, however, costs associated with monthly billing. The two most important are the cost of sending bills and the costs of payment processing and collection. These costs are proportional to the billing frequency, in other words a move from quarterly billing to monthly billing is likely to increase these costs by a factor of up to 300%. Our benchmarks suggest that the costs are likely to be prohibitive (ie. as both billing and payment processing and collection costs increase by this amount), unless electronic payment is part of the monthly billing proposal.

The extent to which these benefits are truly a function of basic smart meters is, however, questionable. This is because retailers could (absent any regulatory constraints) move to monthly billing now. Indeed, in other countries (eg. NZ and the UK) monthly billing is more widespread on the basis of accumulation meters. In Australia, some retailers already offer this facility, for example TRUenergy offers two payments options along these lines (Budget Easyway and Flexi Plan) and Victoria Electricity uses monthly billing for all customers.

The fact that these options are not more widespread suggests that with accumulation meters (and any regulatory requirements) the additional benefits monthly billing provides are not substantially above the costs.

Smart meters might, however, provide additional benefits by making this process easier to manage, and providing customers with more confidence in the process (ie. less need for estimations and reconciliations) thus increasing the take-up of monthly billing.

Hedging costs

Hedging costs typically refer to the premium over wholesale market prices that retailers typically incur to fix the price they pay for the energy provided to customers. A retailer's hedging costs will vary depending on a large number of factors, including:

- The size and profile of its energy demands;
- The extent to which it chooses to manage its exposure to wholesale price volatility and the instruments it uses to do that (eg. financial or physical); and
- The costs of those instruments.

In the absence of smart meters the size and profile of a retailers energy demands are impacted by NEMMCO's settlement methodology which uses a Net System Load Profile (NSLP) to profile all 2nd tier basic meter customers. All 2nd tier basic meter customers (excluding controlled load customers) within the same distribution region are profiled using the same NSLP. The NSLP is therefore an average profile which embeds cross subsidies between 2nd tier

[99] Indeed the evidence from the Victorian Utility Consumption Survey and the anecdotal evidence suggest that after rent/mortgage, energy bills are the next priority for consumers to pay. Other bills such as credit cards, car expenses, council rates, water, phone, and personal loans are typically afforded a lower priority.

customers whose load profile is better than the NSLP and 2nd tier customers whose load profile is worse than the NSLP.

The introduction of smart meters will enable this cross subsidy to be unwound and also enable retailers to more readily identify and win / retain customers with favourable load profiles. The unwinding of this cross subsidy means that retailers will be charged the 'true' wholesale cost of their customers.

As the retail function is typically not about bearing trading risk (to the extent that this is possible), it is reasonable to assume that most retailers would generally seek to manage their exposure to wholesale price risk.

Making an accurate assessment of hedging costs for retailers is a major undertaking because of the degree to which they are specific to the business and they vary over time.

In the recent price review of retail prices in NSW, IPART stated that *"Frontier Economics estimated that the cost of virtually eliminating price volatility from the conservative point on the efficient frontier was around $9/MWh."*[100] This appears to be around 15-20% of the market price allowed by IPART. This is about on average 7% of the final price of electricity.

In the current environment it is quite possible that the cost is somewhat higher than this, perhaps around 25%. This suggests that the cost of achieving this risk averse position could be as high as 10% of the final price of electricity.

For the typical $1,000 per year customer this suggests these costs are in the order of $70-$100 per year.

It seems reasonable to assume that to the extent that customers accept and act upon the more cost reflective tariffs that retailers may offer, then this may impact upon:

- The degree of risk retailers are exposed to, particularly at times of demand peaks;
- The retailers level of prudential requirements (see below);
- The amount or efficiency with which they can hedge;
- Perhaps the cost of acquiring those hedges (ie. the second round impact might involve changes in the market price of hedging); and
- The ability for retailers to obtain incremental revenues through opportunities including selling any controlled load capacity either to NEMMCO's Reserve Trader or to a distribution business to assist in managing their network peaks. These additional revenues would, in part, be in lieu of any reduction of the cost or volume required to be hedged.

[100] IPART, Promoting retail competition and investment in the NSW electricity industry: regulated electricity retail tariffs and charges for small customers 2007-2010, Electricity – Final Report and Determination, June 2007, page 84.

For example, if customer response reduced these hedging costs by 10% this would provide very significant savings to the retailer of $7-10 per customer per year.[101] If the demand response is at the high end of expectations, then it is possible that the reduction in hedging costs might be in excess of 10%.

These are clearly highly significant potential savings for the retailer (ie. much larger than the likely savings in recurrent operating costs) from smart meters, if it results in considerable demand side response.

As indicated above, the benefits to retailers will depend on their position (ie. whether they are long generation or not) and may influence their incentive to utilise more cost reflective prices to minimise their hedging costs, at least in the short term. The benefits may also vary by jurisdiction, which we will investigate further in Phase 2.

Prudential requirements

A retailer of electricity is required to meet NEMMCO's prudential requirements in order to trade in energy in the national electricity market. This ensures that the generation sector is paid for energy delivered to the pool, and that the payment occurs in a timely manner by the retailers who purchase energy in the wholesale market on behalf of their customers.

The prudential capital requirements are broadly a function of:

- Assumed energy purchases;
- Multiplying that annual energy expense by:
  - NEMMCO's required days of cover over the number of days in a year (42/365); and
  - A volatility factor, which varies by region of the NEM.[102]

It is possible that, to the extent that customers accept and act upon the more cost reflective tariffs retailers may offer that this may impact on the volatility factor NEMMCO estimates. There is also likely to be a smaller effect on total energy purchases.

Other

We think it is reasonable to assume that under basic smart meters there might over time be modest reductions in some of other costs (eg. data validation and settlements). In these cases, the amount of data to be processed would increase significantly, but the quality of that data should improve over time (but the latter would continue to occur via NEMMCO). In both cases,

[101] We are of the view that this is not an unreasonable assumption, if it is also assumed there is a strong demand side response. This is broadly consistent with the savings identified under the various functionalities that influence demand response under functionalities (15, 16 and 17). It is also broadly consistent with the findings of Bayard.

[102] Volatility factors will vary between states reflecting the various states load factor and other market conditions. Our research into the NEMMCO web site suggests a volatility factor of 2.4 for NSW. See NEMMCO, Method for Determining Maximum Credit Limit and Prudential Margin, Version N0. 5, 23 may 2007.

they represent modest proportion of retailers' recurrent operating costs (ie. around 1%). In addition, the reductions in these costs are likely to be modest and difficult to quantify.

Conclusions on recurrent costs

It seems evident that smart meters generally (in some cases in combination with other changes) could have some highly material impacts on retailers' recurrent costs. In particular, they could materially influence the recurrent costs associated with:

- Hedging;
- Working capital;
- Bad debts; and
- Call centre.

Phase 2 of the analysis will provide more detail on these points.

It is worth noting however that in the first three cases the immediate benefits to retailers might not translate into economic benefits, at least of the same magnitude. This is because in the first instance at least they appear to be transferring wealth between different groups rather than, leading to the avoidance of incremental costs. For example:

- Much of the reduction in hedging costs is likely to represent a transfer payment between the sellers and buyers of financial products, rather than economic benefits in the first instance. But developments in the physical market (for example because generators will be less profitable which will have implications for their investment etc.) will ultimately reflect a proportion of these wealth transfers.
- Similarly, if retailers are reducing their working capital requirements by bringing forward customer payments, the reduction in working capital costs to the retailer is likely to be matched by the reduction in the interest the customer would otherwise earn on this money; and
- While bad debt expense is an important cost to retailers, it is less obvious that it is an economic cost. From an economic perspective it might represent a transfer payment between, in the first instance, the retailer and the customers, and ultimately between all other customers and bad debt customers.

This does not mean that there will not be economic benefits associated with reducing these costs. For example, there may be 'second round' benefits in the following forms:

- Reductions in the other costs of managing hedging, working capital and bad debts;
- Impacts on prices that have second round effects on consumption; and

- Dynamic impacts on the players active in these markets to further improve their efficiency over time.

These second round impacts are, however, often likely to be an order of magnitude smaller than the benefits identified for retailers and they are also much more difficult to estimate, even though over the long term dynamic efficiency gains are often the most important.

7.4 Advanced smart meters

This section outlines the additional functionalities of advanced smart meters and our view as to their likely impact on the retailers' products and thus potentially demand response, based on our conversations with retailers, our review of the available evidence and our market experience.

For each functionality (and performance level) we discuss the implications for retail products and retailers' recurrent costs (and any other impacts in turn).

The overview report describes the functionalities (and performance levels) in more detail

7.4.1 Energy Measurement

7.4.1.1 Functionality 9: Remote reading

This functionality at the specified performance level would provide the scope for daily reading and next day processing, and for communicating that information back to customer.

Implications for retail products

More frequent remote reading may provide better information that feeds into the process of developing retail products, but the impact on the products themselves that retailers may offer is unlikely to be significant (ie. it just might ensure that those tariffs are somewhat more cost reflective and well targeted over time) and therefore the benefits are likely to be marginal.

It may, however, make customers more responsive to Critical Peak Pricing tariffs, by providing more timely information which can assist them in understanding the implications of their behaviour. For example, there is some evidence of customer taking into account more recent information when communicating with retailers (see below). It is possible that it may have a similar impact for those customers who choose to go on to Critical Peak Pricing tariffs. The Consumer Impacts workstream examines these issues in further detail.

Implications for retailers' recurrent costs

A number of retailers have identified significant benefits from this functionality including benefits for:

- Forecasting accuracy and therefore hedging costs. Daily reads may provide some benefits in terms of the real time monitoring of a retailers' exposure to market risk over weekly reading. This may lead to more certainty in regard to those positions and, as a result, more efficient hedging practices (ie. less hedging, more accurate hedging, lower hedging costs) and wholesale forecasting accuracy.

- Working capital requirements;

- Customer communications both in terms of costs and the provision of more useful and timely information to customers;

- The management of bad debt; and

- Customer responsiveness to price signals.

In particular, the Victorian retailers have indicated savings in the order of between $5m and $15m per annum as at 2007. This includes:

- Improved wholesale forecasting accuracy with a value of $1-10M per annum. One other retailer we have spoken to suggested that some indicative analysis they had undertaken suggested that similar savings might be possible;

- Reduction in working capital costs with a value of $2.860M per annum;

- Alignment of gas and electricity readings for dual fuel billing ($0.29M per annum). As we understand it, this is also primarily a working capital benefit (ie. you can read the electricity meter the same day as you are billing for gas);

- Reduction on cost of high bill enquires ($0.425M per annum); We understand that this is based on some US experience which shows that with more timely information it is significantly easier to address these complaints (ie. because people can more readily see the link between their behaviour and the outcome);

- Reduction in Ombudsman complaints ($0.207M per annum). We understand that this relates to the reduction in high bill enquires; and

- Reduction in process cost of bad debt ($0.225M per annum).[103]

This translates into savings in the order of $2.10-6.20 per customer per year if the same savings are available across the jurisdictions. Those associated with retailers' operating costs (items 3-6 above) are about $0.40 per customer per year.

There may also be some transaction cost savings in relation to the management or working capital and hedging. In the first instance, these savings are likely to be very marginal and we

[103] In the Victorian instance, they appear to have identified bad debt expense as a transfer payment, but the process costs of bad debt as an economic benefit.

are unable to quantify them. In the second instance, these are likely to be up to 2% of the face value of the hedge transaction.

In the Consumer Impacts workstream it has been assumed that demand reductions of between zero to 109MW depending on the region and the take-up rate are possible. For the whole of Australia the demand reduction is potentially in the range of 0MW to 166 MW by 2014/15.

Peak caps ($300/MWh strike for calendar year 2008) are currently selling for about $20-30/MWh across the NEM. The long term price of such caps is, however, likely to be about half of this (ie. around $10-15/MWh).[104] Assuming the demand reductions identified for Australia and retailers being able to avoid purchasing caps for the relevant load in its entirety, then the retailers would be able to reduce their costs by between $0-12M per year, or between $0.00-$1.20 per customer per year.[105] It might also have some implications for prudential capital requirements.

If anything these estimates are likely to overstate the potential benefits because the demand response is likely to be less firm than for some of the other functionalities (see 15-17 below), and therefore may not obviate the need to buy some of the hedging products.

There are also likely to be some modest IT operating cost increases for retailers associated with the additional IT investment required to provide this functionality. Those costs are likely to be in the order of $90,000-$420,000 per annum.[106]

7.4.1.2 Functionality 10: Power factor measurement

The functionality would enable the smart meter to record the power factor of the customer.

Implications for retail products

This functionality would be essential for any retailer who wishes to offer tariff products incorporating reactive power or wishing to offer customers power factor correction services.

Power factor measurement is an important issue for certain larger users and a number of distributors have introduced KVa (KiloVolt Amp) tariffs to provide those users with an incentive to improve their power factor. These tariffs charge the customer according to maximum reactive power demand, which provides a more accurate estimate of the impact a customer has the maximum demand the system must be capable of delivering. In these instances, we understand that retailers typically pass through these tariffs to consumers.

Retailers are, however, unlikely to consider it worthwhile in the foreseeable future to develop retail products around power factor measurement for the mass market because:

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104 Conditions in the market and the drought have significantly increased prices above what we consider to be their long term norm.
105 Assuming 4,800 peak hours per year.
106 All references to higher IT operating costs are based on the assumption that IT operating costs are 15% of IT capital costs, and are based on the IT capital costs identified in the transitional costs workstream.

- The majority of consumers in the mass market do not use many appliances that create material issues in relation to their power factor (eg. variable speed drives although those taking 3 phase supply and using air conditioners have some impact, as do compact fluorescent lights);
- The consumers' ability to influence their power factor directly is therefore low; and
- The consumers' interest in doing so is likely to be a derivative of its interest in managing their overall load. In other words, if the average consumer has difficultly understanding their bill today they are likely to find KVa tariffs more difficult to understand.

Based on the available evidence this functionality is unlikely to have material implications for retailers' products in respect of demand response.

Implications for retailers' recurrent costs

Based on the available evidence this functionality is unlikely to have material implications for retailers' recurrent costs.

7.4.1.3 Functionality 11: Import / export metering

This functionality would enable smart meters to deal with customers who generate their own power.

Implications for retail products

In principle, import/export meeting may allow retailers to change the nature of the tariffs that they offer to these types of customers. These might more appropriately value own generation in some cases. For example, most of it produces power during the day and therefore might benefit from more Time of Use pricing.

Over time, if the economics of own generation improve, this could become an important source of diversified 'demand side' response, which retailers can use to reduce their hedging costs. The economics of this decision to invest in own generation is, however, likely to relate more to the underlying investment (eg. in PV) and its value to the retailer, than it will to this functionality.

We understand that currently the level of own generation is less than 1% of the small customer base. For example, EnergyAustralia reports that it has 925 customers who were paid $62,000 for this excess power last year.[107]

We are aware that some jurisdictions (eg. NSW in the case of EnergyAustralia and SA) are increasing their feed in tariffs to double the retail rate.[108] In practice, these benefits may in some

[107] Power Industry News, Buy back rate risk in metering deal, Edition 555, 20 August 2007.
[108] Power Industry News, Buy back rate risk in metering deal, Edition 555, 20 August 2007 and Power Industry News, SA Solar Feed In, Edition 555, 20 August 2007.

circumstances be well in excess of what the economic benefits (ie. the avoided wholesale costs of energy, any network system investment they might assist in avoiding or deferring).

Given that retailers are already able to offer customers products which capture most of the benefits of own generation, this functionality is unlikely to have material implications for retailers' products and thus potentially demand response. It may, however, supplement other green retail products.

Implications for retailers' recurrent costs

In principle, import/export metering will over the foreseeable future have a similar impact as daily remote reading, albeit for small group of customers. In other words, it will provide better information on which retailers can operate.

Based on current numbers, these customers are probably relatively expensive to serve. If the number of customers with on-site generation increases substantially over time, then it is possible that this could become a valuable source of demand response, a proportion of which retailers can consider to be firm by virtue of its diversity. This may lead to benefits in terms of the costs of hedging.

There will, however, be significant costs for consumers with increasing own generation.

Based on the available evidence this functionality is unlikely to have material implications for retailers' recurrent costs.

7.4.2 Switching and load management

7.4.2.1 Functionality 12: Remote connect/disconnect

This functionality provides for the local and remote control of the meter and the ability to check its status remotely. The cases vary the speed with which this can be done. Under Case A up to 2% of meters can be read in any day, with up to 90 per cent of these within 30 minutes. Under Case B 90 per cent of them can be read in 10 minutes.

Implications for retail products

In terms of retail products offers remote connect/disconnect may improve the attractiveness of certain tariffs (eg. prepayment) by facilitating the disconnection and reconnection process, and minimising the disruption for the customer. For example, if the customer can pay electronically to have the power restored. This is likely to be a customer benefit by making prepayment more attractive.

Other benefits that might arise for customers in terms of quicker connection for customers generally and retailers might be able to offer a supply suspension service to customers that are vacating premises for an extended period of time.

Based on the available evidence this functionality is unlikely to have material implications for retailers' products in respect of demand reduction.

Implications for retailers' recurrent costs

Retailers indicated that the capacity to be able to remotely connect/disconnect customers is likely to have some potentially material impacts their recurrent costs (particularly under Case B). These are likely to relate to the:

- Reduced theft of electricity;
- Ability to more efficiently switch off defaulting customers; and
- Ability to switch on new customers more quickly.

There are likely to be some revenue gains for retailers in certain circumstances. We understand that in certain jurisdictions there are no disconnects in move out situations, and an associated loss of revenue. The cost to the retailer in these circumstances is about $1 per customer per annum in those jurisdictions where there is currently no disconnection on move out.[109]

Cost reductions will be a function of the reduction in number of days to either switch on new customers or to switch off defaulting customers. When estimating cost reductions we are also cognisant of the impact of retailers' regulatory requirements relating to minimum notice periods prior to customer disconnection, these requirements will limit the ability of retailers' to significantly reduce the number of days taken to switch off defaulting customers. This is supported by the fact that on average less than 1% p.a. of all residential customers are disconnected for failure to pay an amount due[110].

Based on the available evidence, any gains are unlikely to be material as the functionality enhances both disconnection and reconnection.

To the extent that it encourages the take-up of prepayment there may also be working capital advantages for retailers.

7.4.2.2 Functionality 13: Supply capacity control

Provides for having two supply capacity limit settings, with similar performance levels to those for functionality 12 for individual meters and broadcast commands respectively.

Implications for retail products

Retailers have identified a number of potential benefits of this functionality, including:

[109] Impaq consulting.
[110] Australian Energy Regulator, State of the Energy Market 2007, July 2007, page 195

- Ability to mitigate and potentially avoid widespread system grid collapses;
- Ability to "share the burden" of supply constraints;
- As an alternative to disconnection for customers in hardship (subject to regulatory constraints); and
- Facilitates demand limit tariff products.

In principle, supply capacity control might offer retailers the option of developing new product features that improve the attractiveness of tariffs. This might involve:

- Offering low supply as an alternative to disconnect (or more likely a way of managing costs to avoid disconnection); and
- Offering a tariff with a demand cap above a customer's current demand level (which could enable network deferral by providing firmer maximum demand levels);
- Offering a tariff with a demand cap below a customer's current demand level, as measure of producing firm demand side response. To the extent it provides firm demand side response it might have hedging benefits for retailers. This could either be used in conjunction with existing flat tariffs or with more cost reflective tariffs.

  For example, some customers may for instance find the option of having their total supply curtailed rather than being required to load shed particular appliances (as might occur under Functionality 14 and 15) more attractive, as it could provide them with more choice. This might improve the take-up of these tariffs.

This functionality may also (subject to regulatory constraints) assist businesses in meeting their regulatory obligations in respect of customer service levels and the costs associated with meeting those customer service level.

One retailer, however, indicated that they had market tested whether supply capacity control and found it to be unattractive to their customers.

There is limited evidence to suggest that in terms of demand side response this option would materially increase demand side response, above the other options available. It seems likely, if anything to be more of a complementary product that customers might get value out of because it provides an alternative way of providing demand side response.

Based on the available evidence this functionality is unlikely to have material implications for retailers' products in respect of demand response.

Implications for retailers' recurrent costs

Supply capacity control might provide some assistance in the debt recovery process, particularly for those customers who are unwilling, as opposed to, unable to pay.[111] This is because it:

- Limits the amount of electricity they can use while payments are outstanding; and
- May encourage customers to pay, without disconnecting them.[112]

Any cost reductions are unlikely to be material.

There are also likely to be some modest IT operating cost increases for retailers associated with the additional IT investment required to provide this functionality. Those costs are likely to be in the order of $142,000-$210,000 per annum.

7.4.2.3 Functionality 14: Load management at meters through a dedicated control circuit

Provides for controlling loads on dedicated control circuits remotely. Under Case B individual turn on and off commands can be sent to 2% of meters in any day (and to 90% of meters within one hour). Case C broadcast turn on and turn off commands can be sent to 99% of meters within 1 minute.

Implications for retail products

This functionality would essentially provide another means of controlling appliances already on dedicated control circuits. In this sense, it is not obvious that this would provide material benefits beyond those already available, unless it increased the degree of control or perhaps gave the controlling party a substantially greater degree of flexibility over this control.

We understand that under Case C it is possible that this may allow for some quicker response and therefore may be of benefit to retailers (perhaps in the order of 20-30 minutes), which could be of value during high price events. We are unable to determine the magnitude of those benefits, on the basis of the available information, but we understand that they are unlikely to be material given the nature of the tariffs offered (as discussed in the Consumer Report.

Implications for retailers' recurrent costs

The capacity already exists and will continue to exist with a roll-out of smart meters to control these dedicated loads. If controlling these loads through the meter provided greater flexibility in its use, the capability might be more value thus translates into lower hedging costs.

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[111] Unfortunately, distinguishing between these two types of late payers is typically quite difficult and views differ markedly about the proportion of customers in each category.

[112] It is possible that if supply capacity control can only be used as an alternative to disconnection that it could impose costs on retailers if the customer does not pay. In this instance, the cost needs to be weighed against the customer benefits.

There are also likely to be some modest IT operating cost increases for retailers associated with the additional IT investment required to provide this functionality. Those costs are likely to be in the order of $157,000-$225,000 per annum.

7.4.2.4 Functionality 15: Interface for other load control devices

Provides for the ability to control other load devices under the same cases as for functionality 14.

Implications for retail products

This functionality effectively provides what may be a cost effective replacement or alternative to the existing ripple control technology in NSW and Qld.

Section 4.4 outlines the retailers' general views on the impact that higher functionality might have on the benefits of smart meters in terms of demand response. These views are highly relevant to this functionality. Retailers were of the view that this functionality is likely to have incremental benefits in terms of retail offers. This does not necessarily mean, however, that they thought that smart meters would provide significant benefits overall.

In practice, the benefits are likely to include or be a function of:

- The potential to cover more devices and energy use on cost reflective tariffs;
- A higher take-up of more cost reflective tariffs. Whether they be flat interruptible tariffs through to Critical Peak Pricing tariffs); and/or
- A higher customer response by those on cost reflective tariffs.

In addition, this functionality enables customers to sign up to products (ie. voluntary or mandatory) which means that the benefits are not dependent on the customer response. In these circumstances, retailers value these demand side reductions as firm (see below).

To the extent that a move to smart meters *per se* results in a significant move to cost reflective tariffs, this functionality is likely to provide material benefits in relation to retail product development and thus potentially demand response.

The Consumer Impacts workstream is addressing the value of these benefits through the assumptions it is making in the take up of more cost reflective tariffs.

Implications for retailers' recurrent costs

This functionality would effectively expand the range of appliances that are capable of being part of some Critical Peak Pricing tariffs or similar products. It might therefore offer some additional benefits in relation to those tariffs and thus in relation to hedging costs. These additional benefits are, however, a derivative of the use of Critical Peak Pricing more generally, the extent of which itself is a considerable uncertainty.

Functionalities 15, 16a and 16b

For the purposes of modelling the potential benefits of this functionality the Consumer Impacts workstream assumes that it would apply to new and replacement air conditioners and that demand reductions of between 0MW and 235MW depending on the region and the take-up rate are possible. For the whole of Australia the demand reduction is between 164MW and 391MW by 2014/15.

Using the same illustration and assumptions as provided under Functionality 9, retailers may be able to reduce their costs by between $7.9 to $28.2M per year, or $0.80-$2.90 per customer per year.

These numbers are indicative but show that the savings for retailers could be significant. It is also likely that such reductions will have implications for the market which would produce ongoing economic benefits.

There are also likely to be some modest IT operating cost increases for retailers associated with the additional IT investment required to provide this functionality. Those costs are likely to be in the order of $157,000-$225,000 per annum.

7.4.3 Facilitation of customer interface

7.4.3.1 Functionality 16: Interface to home area network using open standard

Provides for the ability to communicate with devices connected to a home area network using an open standard. Case B allows for tariff update and freeform messages to be sent to either 2% of total meters or to all meters in broadcast groups and received by 99.5% of meters in 30 minutes (as opposed to between 6 hours and 48 hours depending on the message).

Implications for retail products

Some retailers have identified a number of benefits of this functionality including:

- Essential to support products retailers may wish to offer customers that exploit the 2 way communications interface;
- Enables a customer to purchase (or be given) a universal in-home display and have it “plug and play” connect to any meter;
- Supports remote control of various customer appliances for load management for tariff purposes; and

- Enables a customer to extract data from their meter via any other approved Zigbee controller (eg. a personal computer).

To the extent that a move to smart meters *per se* results in a significant move to cost reflective tariffs, retailers are strongly of the view that this functionality is likely to provide material benefits in relation to retail product development and thus potentially demand response. The reasons are similar to those indicated under functionality 15. In short, retailers believe that this is likely to facilitate the best opportunity to engage with and, ideally, motivate the customer.

The retailers were less specific about how this functionality would improve their ability to communicate with the customer over more conventional means, but many saw the flexibility this may provide as potentially of significant value (see Functionality 17).

Implications for retailers' recurrent costs

The ability to interface with other devices that may provide an easier route to communicating with the customer may well provide the ability to send reminder notices electronically or provide retailers with the potential to cross sell additional products and services. This might assist in:

- Encouraging prompt payment;
- Reduce customer communications costs through utilising a cheaper communications mechanism (subject to regulatory constraints); and
- Reduce billing costs, by sending reminders electronically (subject to regulatory constraints).

It might also strengthen the relationship between the retailer and the customer and therefore reduce the amount of churn.

We have been unable identify any strong evidence, however, that demonstrates that these savings would be material.

<u>Case 16c</u>

For the purposes of modelling the potential benefits of this functionality the Consumer Impacts Workstream assumes that it would apply to retrofitted air conditioners. On this basis, it estimates that demand reductions of between 0MW to 235MW depending on the region and the take-up rate are possible. For the whole of Australia the demand reduction is between 228MW and 395MW by 2014/15.

Using the same illustration and assumptions as provided under Functionality 9, retailers may be able to reduce their costs by between $10.9 to $28.5M per year, or between $1.10-$3.00 per customer per year.

These numbers are indicative but show that the savings for retailers could be significant. It is also likely that such reductions will have implications for the market which would produce ongoing economic benefits.

There are also likely to be some modest IT operating cost increases for retailers associated with the additional IT investment required to provide this functionality. Those costs are likely to be in the order of $217,000-$330,000 per annum.

7.4.3.2 Functionality 17: Provision of an in-home display

Involves providing an in-home display as part of the meter package with the following performance levels:

- Case A: Three lights – such as the California Edison version;
- Case B: Free form messaging; and
- Case C: Capable of providing customer initiated response.

Implications for retail products

In principle, the provision of an in-home display is relevant to the retailers' general views on the impact that higher functionality might have on the benefits of smart meters in terms retail product offers and demand response.

It would facilitate the delivery of the potential benefits provided by functionality 16.

All the potential benefits identified for Functionality 16 are therefore relevant to this functionality as are the retailers' view on providing the capacity to communicate more effectively with the customer (and it is possible the benefits might increase under the various cases identified).

The provision of an in-home display may assist in increasing the 'emotional' value (as Section 3.1.1 discusses) associated with the electricity purchase decision, by providing a more consistent and tangible reminder of the link between energy consumption and greenhouse issues.

This functionality, however, raises a broader issue which is whether the provision of an in-home display ought to be a mandatory part of the advanced meter functionality. The retailers' views reflect these broader issues.

There is common ground amongst the retailers about the need to be able to communicate in an as customer-friendly way as possible, if smart meters are to have their desired demand response impacts. There was no common view, however, about whether there was a need to specify:

- Which device/s the smart meter should be able to communicate with; and

- The nature of that device.

A number of retailers expressed significant concerns about attempting to mandate outcomes in this area. They were of the view that such an approach was likely to lead to less customer-friendly outcomes, which would reduce the demand response associated with any cost reflective tariffs. In short, they believed that policy makers should leave these decisions to the market.

They also noted that there are likely to be other 'private' benefits that the retailers may want to exploit and which a mandatory approach might inhibit. For example, they may want to use the in-home display to market a variety of wider services (eg. sell related energy products or services as some retailers are in the UK, as Section 5.3.1 illustrates).

The key question in relation to in-home display is whether a mandatory roll-out would reduce the benefits that would otherwise be achieved from Functionality 16 and 17 (without prescribing the nature of the device). Retailers would appear to be of the view that potentially it would and may interfere with the other benefits that retailers would seek to derive from the ability to communicate with customers more readily.

Implications for retailers' recurrent costs

The comments in relation to Functionality 16 apply equally here.

For the purposes of modelling the potential incremental benefits of this functionality (over and above 15, 16a and 16b) the Consumer Impacts Workstream assumes demand reductions of between 0MW to 105MW depending on the region and the take-up rate are possible. For the whole of Australia the demand reduction is between 0MW and 442MW by 2014/15.

Using the same illustration and assumptions as provided under Functionality 9, retailers may be able to reduce their costs by between $0.00 to $31.8M per year. This works out to be between $0.00 and $3.30 per customer per year.

In this case, these numbers at the top end of the range are likely to be optimistic because the demand response is likely to less firm than for some of the other functionalities (see above).

There may also be some minor costs for retailers in terms of creating the contents and management the information that is sent to the in-home display. There might also be costs in terms of the competitive activity in the retail market if retailer ownership of the in-home display creates a barrier to switching (as it may in regard to having competition for metering services).

7.4.3.3 Functionality 18: Communications with gas and water meters

Communication interface allowing gas and water meters to send information upstream. Case A allows for three monthly meter readings. Case B allows for hourly interval reading for water.

Implications for retail products

In principle, providing the capacity for the electricity meter to communicate with gas and water meters might have some benefits for retailers. These are likely to be a function of the range of services they may provide and their cost to serve (see below). It is unlikely to impact on any retail products that might assist in electricity demand side response.

It might also enable the cost effective and timely provision of multi-utility consumption data to the home area network and in-home display. This may provide further benefits to customers in terms of managing their bills (and regulation permitting) developments such as electronic billing.

Based on the available evidence this functionality is unlikely to have material implications for retailers' products in respect of demand response.

Implications for retailers' recurrent costs

In principle, providing the capacity for the electricity meter to communicate with gas and water meters might have some benefit for retailers as it could facilitate the expansion of the services each retailer provides. This might manifest itself either in:

- Revenue from providing this service to water and gas retailers; or
- In higher margins via a lower cost to serve per customer (ie. having up to three accounts per customer).

It is evident that expanding the range of services provided is one of the main ways in which electricity retailers have sought to leverage off both their relationship with virtually all households and their systems (and fixed cost base). For example, over 80% of switchers in the UK switch to dual fuel offers.

Clearly there is likely to be some benefits for network businesses in terms of lower meter reading costs. Alternatively, some of this could flow to retailers in terms of higher margins on certain customers, or as revenue for services sold to water and gas businesses.

- The ESC identified[113] that the costs associated with basic meter reading and basic meter data management are approximately 0.5% and 1.5% of an average annual customer bill. Therefore assuming an average annual customer bill of $734.[114] This would imply that approximately $3.70 per customer per annum is the available cost reduction through avoiding the need to manually read a basic gas meter. This however may be offset by increased meter data management costs through the increased frequency with which reads may be taken from the gas meter;
- AGL's special meter reading fees in gas range include $19 charges in South Australia and $35.30 in New South Wales;

[113] Essential Services Commission, Review of Gas Meter Service Responsibilities, September 2005, Table 4.2
[114] For consumption of 60 GJ. See ESC, Customers seeking competitive deals in retail energy market, Press Release No 15/2006, 13 December 2006.

- Sydney Water currently charges $27.60 for a special meter read. We would envisage that the cost of a standard meter reading cost in the water industry would be similar or below those costs for gas, given water meters are typically locate at the edge of a site and therefore more accessible; and
- We are aware of other estimates that put the additional profits that may be available to a distributor at $0.525 per customer for gas and $0.085 per customer for water.[115]

In practice, the incremental benefits associated with the capacity to communicate with gas and water meters are, however, likely to be modest because:

- Retailers already offer dual fuel and dual fuel billing (ie. the lack of communication between meters has not appeared to create a major constraint);
- It seems likely that if governments introduced competition for water retailing that they would seriously consider entering that market. But again, it is not obvious that the lack of communications between the meters would be the major constraint; and
- There is unlikely to be a need for gas and water meters to be smart and thus require the same reading cycle.[116]

On the basis of the available evidence, the implications on retailers' recurrent costs of this functionality are unlikely to be material.

7.4.4 Supply and service monitoring

7.4.4.1 Functionality 19: Quality of supply and other event recording

Provides the smart meter with the capacity to record quality of supply events, which can be remotely retrieved.

Implications for retail products

Retailers have indicated that this functionality might provide:

- Better data to handle customer queries/complaints; and
- May highlight opportunities to offer quality of supply improvement services.

Based on the available evidence this functionality is unlikely to have material implications for retailers' products in respect of demand response.

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[115] Impaq Consulting. We understand that these figures assume that retailers could charge 50% of the avoided cost and earn a 10% margin.

[116] The UK Government is considering requiring the installation of smart gas meters. The UK gas market has peaking issues that are likely to be more akin to those for electricity in Australia. ESAA news, Consultation begins on UK interval meters, 13 August 2007.

Implications for retailers' recurrent costs

Based on the available evidence, this functionality is unlikely to have material implications for retailers' recurrent costs.

7.4.4.2 Functionality 20: Meter loss of supply and outage alarm (regular pinging)

Provides the smart meter with the capacity to detect loss of supply to individual meters with alarms received in one hour for 90% of meters.

Implications for retail products

As per 19.

Based on the available evidence this functionality is unlikely to have material implications for retailers' products in respect of demand response.

Implications for retailers' recurrent costs

As per 19.

This is likely to improve the capacity of retailers to communicate with customers (and improve the level of service, via improved data integrity). This might result in more effective customer communications and therefore less need for additional communications between the parties.

We have no evidence to suggest that the changes in costs will be material.

There are also likely to be some modest IT operating cost increases for retailers associated with the additional IT investment required to provide this functionality. Those costs are likely to be in the order of $187,000-$285,000 per annum.

7.4.4.3 Functionality 21: Customer supply monitoring

Provides the capacity to monitoring customer supply remotely (eg. degradation of earth connection), with messages sent within one day for 90% of meters.

Implications for retail products

As per 19.

Based on the available evidence this functionality is unlikely to have material implications for retailers' products in respect of demand response.

Implications for retailers' recurrent costs

As per 19.

We have no evidence to suggest that any changes in costs will be material.

7.4.4.4 Functionality 22: Real-time service checking

Provides for the remote checking in real time of supply to the meter in 1 minute or less for 90% of meters.

Implications for retail products

As per 19, and may assist in identification of outage source (eg. within the home, or from the network). It might also provide some additional benefits in terms of communications costs with customers.

Implications for retailers' recurrent costs

This is likely to improve the capacity of retailers to communicate with customers further (and improve the level of service). This might result more effective customer communications and therefore less reduced need for communications between the parties.

It is likely that this will lead to a marginal reduction in call centre costs, however, how the benefits are likely to be too difficult to quantify, especially given that some of these benefits are likely to be achieved by remote reading.

If the number of 'standard' calls reduces by 10% (either via lower frequency or duration), this would reduce call centre costs by approximately $0.40 per customer per year. This would alter the cost to serve by 0.6%. Over the longer term the savings would likely be higher.

It also seems likely that there may be additional call centre cost reductions from a number of the other functionalities, which in aggregate may be more material, but are difficult to assign to any particular functionality.

There are also likely to be some modest IT operating cost increases for retailers associated with the additional IT investment required to provide this functionality. Those costs are likely to be in the order of $67,000-$105,000 per annum.

7.4.5 Standards and interoperability

7.4.5.1 Functionality 23: Interoperability for meters/devices at application layer

Provides for interoperability of communications at the application layer, rather than the underlying hardware and network layers of the system. This would provide a standard interface through which third parties could send messages.

Implications for retail products

Section 4.5 discusses the broad issue of who should lead a roll-out and their views on the importance of ensuring that the scope for competition is in the provision of all the relevant hardware and software is maximised.

A number of retailers have strong views that interoperability will promote competition in the design and provision of meters and related devices.

The question of whether this functionality would significantly alter the types of products retailers offer, particularly in relation to demand side response, is more a question about whether the lack of interoperability will inhibit innovation and flexibility rather than fundamentally altering the nature of the offers retailers might make.

It might, however, also influence the scope of services retailers seek to provide, which might have benefits for customers and retailers.

In our view it is not obvious that this functionality would significantly alter the types of products retailers offer in respect of demand side response.

Implications for retailers' recurrent costs

Similar to the above, the question of whether this functionality provides scope for significant reductions in retailers' costs is a function of a broader question. The broader question relates to the likely competitiveness of the underlying markets and the degree to which it will result in lower prices than might be the case where the functionalities limit the scope for competition. Another broader question is the extent to which the relevant costs are retailers' costs.

To the extent that the underlying markets are competitive or potentially competitive, then it seems reasonable to assume that this functionality will lower costs, regardless of who bears them.

There is also a risk that this might lead to stranded investment issues in relation to meters that inhibit competition in the retail market.

Estimating those cost reductions is a broader question than those pertaining to retailers costs *per se*.

7.4.5.2 Functionality 24: Hardware component interoperability

Ensures different manufacturers hardware components (eg. communication modules and meters) and can operate with each other.

Implications for retail products

As per 23.

Implications for retailers' recurrent costs

As per 23.

7.4.6 Upgradeability and configurability

7.4.6.1 Functionality 25: Remote configuration

Allows for the remote setting of the meter (eg. times for load control switching).

Implications for retail products

This would enable settings to be adjusted for changes in customer circumstances and assist in harnessing the benefits under a number of functionalities (eg. when they may want to alter the time periods underpinning Critical Peak Pricing). From a retail perspective, this is likely to lead to some minor improvements in customer service and marginal increases in demand side response.

Implications for retailers' recurrent costs

Remote configuration might provide the capacity to reduce further certain costs of dealing with the customer but any impacts are unlikely to be material.

7.4.6.2 Functionality 26: Remote software upgrade

Provides for the responsible person to upgrade the software in the meter remotely.

Implications for retail products

Some retailers suggest that this would provide an element of 'future proofing' and facilitate the adoption of more powerful software, with the potential to improve all the above benefits.

Implications for retailers' recurrent costs

Remote configuration might provide the capacity to reduce further certain costs of dealing with the customer but any impacts are unlikely to be material.

7.4.6.3 Functionality 27: Separate standard baseplate

Provides a baseplate into which the meter (and possibly the communications unit separately) can be plugged.

Implications for retail products

This may reduce customer outage time with flow on benefits to customers and additional energy sales to retailers.

Implications for retailers' recurrent costs

Any impacts on retailers' recurrent costs are unlikely to be material.

7.4.6.4 Functionality 28: Non meter board installation

Provides for the meter to be installed somewhere other than the wall.

Implications for retail products

This may assist in wireless communication between meters and in-home display or home area network.

Implications for retailers' recurrent costs

Any impacts on retailers' recurrent costs are unlikely to be material.

7.4.6.5 Functionality 29: Plug and play device commissioning

Provides for interoperability in device commissioning.

Implications for retail products

This may reduce customer outage time with flow on benefits to customers and additional energy sales to retailers.

Implications for retailers' recurrent costs

Any impacts on retailers' recurrent costs are unlikely to be material.

7.4.7 DLC Functionality

7.4.7.1 Functionality 30: Signal receiver and switch located on appliance

7.4.7.2 Functionality 31: Uniquely addressable signal receiver

7.4.7.3 Functionality 32: Load/Supply capacity control

We will assess the DLC related functionalities in Phase 2 of this study.

7.5 Impact of the scenarios

Section 4.4 outlines the retailers' broad views on the impact the various delivery scenarios might have. In terms of retailers' products and thus potentially demand response, retailers did not generally believe that these scenarios would have a material impact on the outcomes, *provided* the retailers were at least making the key decisions on functionality.

As indicated in Section 4.4, some retailers were of the view that the necessary level of control was much less likely to occur with a distributor led roll-out and therefore the retailers should lead the process. They also indicated that this would lead to greater innovation, by providing retailers with greater flexibility. This might impact on the range of services provided and the cost of providing those services; however, it is not obvious that it would have a major impact on the nature of the offers made, at least in regard to demand side response.

There are risks, however, that a retailer led roll-out could lead to asset stranding, which in turn inhibits competition in the retail market.

Phase 2 will examine these issues in further detail.

7.6 Conclusions

The key conclusions from the above are as follows.

Retail product offers

In terms of retail products as they relate to demand side response, the evidence suggests that if smart meters themselves encourage a significant amount of activity in relation to demand side response, then a number of the additional functionalities are likely to provide incremental benefits, as this section illustrates.

These benefits are most likely to be function of:

- The improved market penetration of more cost reflective tariffs (including 'interruptible' offers for firm demand side response); and/or

- A higher customer response to those on cost reflective tariffs.

If there is to be a mandated roll-out of smart meters (and this decision is justified) there would appear to be a strong case (at least in terms of the benefits) to ensure those meters have the capacity to communicate as effectively and simply as possible with customers. This is a common view amongst retailers, and given our understanding of the constraints the market is likely to impose, this view appears to be well founded.

The key reason is that, if a roll-out of smart meters is to be beneficial, then the focus should on enabling retailers to offer the simplest (but more cost reflective) retail products possible. Absent this, retailers are likely to be much less inclined to develop and actively promote such tariffs. This is likely to impact on the take-up of those tariffs.

A number of the functionalities are likely to provide material benefits to retailers and/or customers in terms of the retailers' ability to develop products that differentiate themselves (and perhaps encourage retention) and for customers in terms of the level of service they receive. Whilst these benefits may be significant in some cases, the value of improved service levels is inherently difficult to quantify.

Retailers' recurrent costs

On the basis of the available evidence, we have no reason to dispute the retailers' generic view that the recurrent operating costs of retailing using advanced smart meters would not be materially different to the costs they currently incur. We think on the basis on the available evidence this is a reasonable and conservative assumption, although it is possible that their recurrent costs may be somewhat but not materially lower.

In terms of retailers' recurrent operating costs, there are likely to be some reductions in:

- Call centre and related customer management costs; and
- The costs associated with bad debts and managing bad debts.

There will, however, be somewhat higher IT operational costs associated with the new capital investment to enable some of the functionalities.

There are, however, also likely to be some significant implications for some of the retailers' other costs. For example, it seems likely that retailers could benefit from reductions in:

- Working capital costs; and
- Hedging costs.

The latter are likely to be highly material, if the level of demand side response some parties suggest is possible eventuates.

This section highlights were those cost impacts (both positive and negative) are likely to arise.

A Assumed retail tariffs with smart meters

This appendix summarises the assumptions we propose in regard to the retail products retailers might offer residential customers in relation to more cost reflective tariffs and our approach used in determining these products. Phase 2 will refine these indicative products.

For the purposes of Phase 1 we made the following simplifications:

- We propose one set of tariffs per state; and
- We have not developed a specific set of tariffs for small business customers

We will re-visit these simplifications in Phase 2, and if required provide for varying tariffs by customer category and region within state.

A.1 Approach

In determining the products we utilised the following approach:

- A Time of Use product was developed to differentiate between peak, off-peak and (if required) shoulder periods;
- A Critical Peak Price product was also developed to allow for such pricing;
- The definitions of peak, off-peak and shoulder periods were based on those currently used by the major incumbent retailer within each state;
- The definition of the critical peak price parameters were based on discussions with retailers relating to similar products currently being trialled;
- The Time of Use rates were determined on the basis of using actual rates to the maximum extent possible. The steps we followed in this regard are as follows:
    - Where the incumbent retailer offered a Time of Use product we used the actual rates within those products;
    - Where no Time of Use product was offered, we developed the rates on the following basis:
        - The off-peak rate was set to equal the current off-peak price within other residential retail products; and
        - The peak rate was then calculated to maintain a similar relativity between peak and off peak prices as observed in other products.

The following sections detail our proposed Time of Use and critical peak price products.

A.2 Potential Time of Use products

The following table (Table A.1) summarises the rates we propose retailers may offer in developing a Time of Use product, for comparison purposes the table also contains a flat (non Time of Use) rate based on those currently offered by retailers.

Table A.1

Indicative time of use tariffs					
	ToU - rates (c/KWh GST exclusive)				Flat comparison rate (c/KWh GST exclusive)
State	Peak	Off Peak	Shoulder 1	Shoulder 2	Flat
WA	20.22	6.56	13.12	9.84	13.94
NSW / ACT	25.1	5.1	8.9	N/A	11.7[1]
QLD	19	7.11			14
Vic	19.2	7			13.46
SA	20	10			17
TAS	17	6.55			14
NT	15.01	12.58			15.01

Note: (11 First 1,750 KWh per quarter
(2) Balance

Synergy is introducing different SmartPower prices from 1 October 2007. The corresponding prices to the above are 25.28, 7.22, 15.42 and 11.32 c/kWh.

The following table (Table A.2) summarises the definitions of the time periods associated with the Time of Use products.

Table A.2

ToU - time period definitions				
State	**Peak**	**Off Peak**	**Shoulder 1**	**Shoulder 2**
WA*	M-F 12pm-6pm	All days 10pm-8am	M-F 8am - 12pm M-F 6pm - 10pm	Weekends 8am - 12pm
NSW / ACT	M-F 2pm - 8pm	All days 10pm - 7am	All other times	
QLD	M-F 7am - 9pm	All other times		
Vic	M-F 7am-7pm	All other times		
SA	M-F 7am-9pm	All other times		
TAS	M-F 7am- 8pm	All other times		
NT	All days 6am - 8pm	All other times		

* Synergy (WA) is also introducing different time periods. The peaks are now Summer (11am-5pm) and Winter 7-11am and 5-9pm). The weekday shoulder period is Summer (7-11am) and 5-9pm and Winter (11am-5pm). The weekend Shoulder period is 7am-9pm, and the Off-peak period for all days is 9pm-7am.

As previously discussed the products detailed in Tables A.1 and A.2 were developed using actual product information to the maximum extent possible, the details of which are as follows:

- West Australia – the rates and time definitions were based on the Synergy SmartPower Tariff;

- New South Wales (and ACT) – the rates and time definitions were based on the Energy Australia PowerSmart Home Tariff;
- Queensland – the rates and time definitions were based on the Origin Energy (QLD) Farm Tariffs;
- Victoria – the rates and time definitions were based on the AGL South Winner Tariff with some minor adjustments using the approach previously described;
- South Australia – the rates and time definitions were based on the AGL SA Tariff 128 M with some minor adjustments using the approach previously described;
- Tasmania – the rates and time definitions were based on a combination of the Aurora Tariff 31 and Tariff 62 with some minor adjustments using the approach previously described; and
- Northern Territory – the rates and time definitions were based on the Power and Water Corporation domestic Time of Use tariff.

A.3 Potential Critical Peak Price products

The following table (Table A.3) summarises the rates we propose retailers may offer in developing a critical price product.

Table A.3

Indicative Critical Peak Price product					
	Rates (c/KWh GST exclusive)				
State	Peak	Off Peak	Shoulder 1	Shoulder 2	Critical Peak Price
WA	20.2	6.2	12.5	9.3	101.1
NSW / ACT	25.1	4.8	8.5	N/A	125.5
QLD	18.1	6.8			95.0
Vic	19.2	6.7			96.0
SA	20.0	9.5			100.0
TAS	16.2	6.2			85.0
NT	14.3	12.0			75.1

We developed the critical peak price product rates based on discussions with retailers and the feedback from their current product trials. Our approach can be summarised as follows:

- The Time of Use rates (peak, shoulder and off peak) were developed by applying a 5% discount to the rates from Table A.1, except to the peak price. The discount incorporated reflects the need to provide customers with an incentive to utilise this product in preference to the standard Time of Use product; and
- The Critical Peak Price (CPP) rate was set as five (5) times the peak period rate. This is based on retailers' experience from their current trials that have observed diminishing

returns (in relation to demand response) for CPP's in excess of 5 times the peak rate. We would expect any load control tariffs to provide similar price variations, although the way those benefits are shared with customers might differ as Section 4.2 discusses (eg. they might get an up-front discount reflecting the value of firm demand side response).

The parameters assumed in relation to the nomination of CPP periods were determined based on retailers current product offering and can be summarised as follows:

- Retailers or distributors can nominate up to 12 CPP days in any one year.
- The CPP period would be for a duration of 4 - 5 hrs during the peak time of day (approx 12 - 4 or 5pm); and
- Retailers must provide customers 2 – 24 hours notification prior to any CPP period.