



Final report
**Retail prices for
franchise electricity
customers 2012–14**

**Report 4 of 2012
June 2012**

The Independent Competition and Regulatory Commission (the Commission) was established by the *Independent Competition and Regulatory Commission Act 1997* (ICRC Act) to determine prices for regulated industries, advise government about industry matters, advise on access to infrastructure, and determine access disputes. The Commission also has responsibilities under the ICRC Act for determining competitive neutrality complaints and providing advice about other government-regulated activities. Under the *Utilities Act 2000*, the Commission has responsibility for licensing utility services and ensuring compliance with licence conditions.

Correspondence or other inquiries may be directed to the Commission at the following addresses:

Independent Competition and Regulatory Commission
PO Box 161
CIVIC SQUARE ACT 2608

Level 8
221 London Circuit
CANBERRA CITY ACT 2601

The secretariat may be contacted at the above addresses, by telephone on (02) 6205 0799 or by fax on (02) 6207 5887. The Commission's website is at www.icrc.act.gov.au and its email address is icrc@act.gov.au.

Foreword

When the Commission released its draft decision on the 2012-13 retail electricity prices for franchise customers on 5 April 2012 we noted the importance the Commission placed on being confident that the data and methods it uses provides a reliable assessment of the cost of electricity.

For the final report the Commission undertook further analysis of the impact of the introduction of the price on carbon and this has resulted in a change to the method the Commission used to calculate a prudent retailer's wholesale electricity costs in the final decision. The Commission is satisfied that the revised methodology is appropriate for determining the energy purchase cost in the period 2012-13. The methodology may need to be reviewed in the future to account for market developments and any other changes in the way retailers and generators are contracting with one another.

The Commission recognises that a 17.74% increase in retail electricity prices is substantially greater than retail electricity price increases approved by the Commission in previous years. The reason for this, as explained in the draft decision, is largely attributable to the introduction of the price on carbon. The price on carbon accounts for 14.2 percentage points of the approved price increase.

In making this determination the Commission also considered the likely impact of the increase in retail electricity prices on ACT households and small businesses. This analysis notes that the impact of the cost increase is proportional to a households' or businesses' energy usage. The analysis highlights that actions to improve energy efficiency can assist households and businesses to offset the impact of the price on carbon. The Commission also observes that both the ACT and the Australian governments have instituted compensation measures to assist households to deal with electricity price increases.

Mike Buckley
Senior Commissioner
8 June 2012

Contents

Foreword	iii
1 Introduction	1
1.1 Background to the review	1
1.2 Scope of the terms of reference	1
1.3 Review timeline	2
1.4 Structure of the final report	2
2 Consideration of submissions	4
2.1 The retail allowance	4
2.2 Impact of the price on carbon on energy purchase costs	6
2.3 Incorporation of costs associated with achieving environmental objectives	12
2.4 Other issues raised in submissions	16
3 Setting the regulated electricity price for 2012-13	17
3.1 High-level methodology	17
3.2 Retail electricity cost components	19
3.3 Final decision on cost elements	30
4 Setting the regulated electricity price for 2013-14	31
5 Pass-through arrangements	34
6 Impact on customers	38
6.1 Impacts on customers	38
6.2 Summary of submissions on draft report	39
6.3 The Commission's consideration	40
6.4 The Commission's conclusion	42
Appendix 1 Terms of reference	43
Appendix 2 Final price direction	44
A2.1 Period of the direction	44
A2.2 Price control	44
A2.3 The value of X' in 2013-14	44
A2.4 Calculation of energy purchase costs in 2013-14	45
A2.5 Pass-throughs	46
A2.6 Price reset for 2013-14	49
Appendix 3 Energy purchase cost technical refinement	50

Appendix 4	Energy purchase cost model	51
A4.1	Overview of the Commission’s model	52
A4.2	Introduction of a price on carbon	54
A4.3	The base case	55
A4.4	Extending the base case	57
A4.5	Forward to spot price case	58
A4.6	Time-weighted to load-weighted case	59
A4.7	The full model	60
A4.8	The ex ante versus ex post cost of carbon	61
A4.9	Relationship between time-weighted and load-weighted spot prices	61
A4.10	Final consideration	63
Appendix 5	Energy purchase cost final data inputs	64
Appendix 6	LGC and STC prices	66
Appendix 7	Extracts from the ICRC Act	67
	Abbreviations and acronyms	69
	References	71

1 Introduction

1.1 Background to the review

Retail competition for small electricity customers (small businesses and households) in the ACT was introduced on 1 July 2003. This followed the opening of the market for customers consuming more than 160 megawatt hours (MWh) per year (predominantly large businesses) in 1998 and for those consuming more than 100 MWh per year (mainly medium-sized businesses) in 2001.

When the ACT Government decided to allow all customers to be contestable, it also required that ActewAGL Retail offer customers consuming less than 100 MWh per year a non-negotiated standard customer contract incorporating a tariff approved by the Independent Competition and Regulatory Commission (the Commission). Customers who remain on non-negotiated contracts are known as franchise customers and are subject to a suite of regulated tariffs. Customers who choose to enter into alternative contract arrangements with ActewAGL Retail or other electricity retailers are known as non-franchise customers.

At the time retail competition was introduced for small customers, the ACT Government issued the Commission with terms of reference to provide a price direction for the period 1 July 2003 to 30 June 2006.¹ Towards the end of the price direction, the ACT Government sought the Commission's views on the need for continued price regulation. In April 2006, based on the prospects for market development, the Commission recommended that the price-setting arrangements be discontinued and a monitoring arrangement be put in place. The Commission suggested that the existing tariffs be extended for 12 months to allow for necessary legislative changes to be implemented.²

The Commission's recommendation to adopt a price monitoring approach was not accepted and the ACT Government has issued further terms of reference to the Commission to undertake price directions since 2006.³

On 21 September 2011, the ACT Government issued the Commission with terms of reference seeking a price direction to determine the electricity tariffs for franchise customers for the period 1 July 2012 to 30 June 2014.⁴

1.2 Scope of the terms of reference

The Commission has been tasked by the ACT Government to provide 'a price direction for the supply of electricity to franchise customers for the period 1 July 2012 to 30 June 2014 with provision where appropriate for a review by 30 June 2013'.

There are approximately 130,000 franchise customers in the ACT to whom ActewAGL Retail supplies electricity in accordance with the terms of its standard customer contract. These customers consume approximately 1,234 gigawatt hours per year, which is approximately 43% of total ACT electricity consumption.

¹ ICRC 2003.

² ICRC 2006.

³ ICRC 2007; 2008; 2009a; 2010b.

⁴ Independent Competition and Regulatory Commission (Price Direction for the Supply of Electricity to Franchise Customers) Terms of Reference Determination 2011 (Disallowable instrument DI2011-261). The terms of reference can be found in Appendix 1.

Specifically, the terms of reference require the Commission to consider the following matters in its investigation:

- a. The impact on direct electricity costs of changes in government policies and pass-through of those costs to regulated prices including, but not restricted to:
 - i. the Commonwealth Government Carbon Tax
 - ii. Commonwealth or ACT retailer obligation energy efficiency schemes
 - iii. the Commonwealth Government’s Large and Small Renewable Energy Targets
 - iv. the ACT Feed-in Tariff
 - v. any other schemes implemented to address climate change.
- b. The efficient and prudent cost of managing risk in the cost of purchasing electricity.
- c. The requirements of s. 20 of the ICRC Act.
- d. Any other matters the Commission considers relevant.

Under the terms of reference the Commission must report in sufficient time to allow ActewAGL Retail to make any necessary changes to its billing system and to provide information on the new tariffs to customers before the new tariffs commence on 1 July 2012.

A copy of the terms of reference is in appendix 1.

1.3 Review timeline

The Commission has adopted the following timeline for the review.

Activities	Dates
Release of issues paper	23 December 2011
Closing of submissions on issues paper	3 February 2012
Release of the draft report	5 April 2012
Closing of submissions on draft report	8 May 2012
Public hearing ^a	11 May 2012
Final report and price direction	8 June 2012
ActewAGL Retail implementation of tariff changes	From 1 July 2012

a. Stakeholders did not seek a public hearing

The release of the final report by 8 June 2012 will allow ActewAGL Retail sufficient time to make necessary changes to its billing system and provide information to customers prior to the changes to prices from 1 July 2012.

1.4 Structure of the final report

The remainder of this final report is structured as follows:

- Chapter 2 discusses the three major issues addressed in the review relating to the retail allowance, the impact of a price on carbon on energy purchase costs and the incorporation of costs associated with achieving environmental objectives.
- Chapter 3 provides a detailed explanation of setting the regulated retail electricity price for 2012-13 and the calculation of the constituent cost elements.

- Chapter 4 describes the procedure for setting the regulated retail electricity price in 2013–14.
- Chapter 5 discusses pass-through arrangements.
- Chapter 6 analyses the impact on customers.
- Appendix 1 reproduces the terms of reference.
- Appendix 2 contains the final price direction.
- Appendix 3 sets out a technical refinement to the energy purchase cost calculation.
- Appendix 4 shows the derivation of the energy hedging cost component.
- Appendix 5 contains the energy purchase cost final data inputs.
- Appendix 6 sets out prices for large-scale generation and small-scale technology certificates.
- Appendix 7 reproduces articles 15, 16 and 20 from the ICRC Act.

2 Consideration of submissions

The Commission received five submissions in response to its draft report released on 5 April 2012. This chapter addresses three principal issues raised in those submissions: the determination of an appropriate retail allowance, the impact of the price on carbon on energy purchase costs and the incorporation of costs associated with achieving environmental objectives.

This chapter deals with these three issues. The balance of the cost elements and mechanics associated with the build-up of the cost index and its application over the life of the regulatory period are addressed in chapters 3, 4 and 5. In addition to the technical matters, submissions raised matters related to the impact of price rises on customers. These matters are the subject of chapter 6.

2.1 The retail allowance

The Commission considered the appropriate allowance for retail costs in detail in previous inquiries. In the draft report, as in previous inquiries, the Commission concluded that the appropriate regulatory benchmark upon which to base efficient costs was that of an incumbent electricity retailer. The Commission also considered the level of the retail margin and maintained it at 5.4% of total costs as was applied in the most recent price direction.

Submissions on draft report

The ACT Civil and Administrative Tribunal (ACAT) supported using the incumbent retailer as the regulatory benchmark and proposed a reduction in the retail margin from 5.4% to 5.0%.⁵

ActewAGL Retail argued for inclusion of customer acquisition and retention costs (CARC) in the retail allowance. It argued that irrespective of the Commission's position on whether an incumbent or new entrant was the appropriate regulatory benchmark, there was a need to include CARC:

Even if the Commission continues to set the regulatory benchmark on the basis of an incumbent retailer providing retail services to customers on a regulated tariff, ActewAGL believes that it is important to recognise the requirement for CARC in the efficient cost build. The major issue for ActewAGL and efficient commercially focussed retailers is that it incurs CARC in the current market.⁶

To support this position, ActewAGL Retail provided a report from the Allen Consulting Group (ACG) arguing that the retail cost allowance (retail operating costs (ROC) plus CARC) in the ACT is lower than other jurisdictions.

ACG determined an appropriate range for the value of CARC to apply in the ACT of between \$27.23 to \$43.98 per customer with a median estimate of \$37.70 per customer.⁷

To support the case for the inclusion of CARC, ACG identified a range of benefits which it argued would accrue from increased competition.

In addition, ActewAGL Retail argued that the outcome of not including CARC would be to lower the overall retail margin obtained by the business.

⁵ ACAT 2012, p. 1.

⁶ ActewAGL Retail 2012, p. 19.

⁷ Ibid., p. 20.

By not allowing CARC, the Commission's allowed margin is, in fact, below 5.4 per cent since expenditure on customer acquisition and retention activities must be funded from what would otherwise be its profit. Assuming that a retailer incurs \$37.70/customer in CARC, the attached report by ACG shows that the effective margin allowed in the ACT is 2.97 per cent. A TFT [the regulated retail tariff] determined without CARC is not commensurate with a commercially based tariff and therefore does not provide an appropriate rate of return consistent with the requirements of the *Independent Competition and Regulatory Commission Act*.⁸

ActewAGL Retail also argued for an increase in the retail margin to 6.0%.

The Commission's consideration

ActewAGL Retail argued for the inclusion of CARC and an increase in the retail margin to 6.0%. The Commission considers these two matters jointly as they both relate to the overall retail allowance granted to the business.

In the draft report the Commission noted that its 2003 approach to calculating ROC (which is the starting point for the current cost build-up) included an allowance for sales and marketing. ACG argues that in 2011-12 the total retail costs (ROC plus CARC) for the ACT as compared to other jurisdictions is too low. The ACG submission derives total retail costs for the ACT of \$107.89, for New South Wales of \$111.70, for South Australia of \$115.00 and for Queensland of \$131.90.⁹

With respect to this analysis, the Commission notes that the regulatory approach varies across jurisdictions. For example, other jurisdictions have adopted an approach based on the efficient costs of a new entrant (rather than an incumbent as is the benchmark in the ACT). New South Wales and Queensland explicitly include CARC while South Australia has implicitly included CARC in ROC since 2008.

The Commission accepts that the total retail costs per customer shows that the ACT allowance is below that of the comparator jurisdictions. However, consistent with an incumbent retailer benchmark the ACT allowance exceeds the ROC per customer allowance for New South Wales and Queensland and is marginally below the South Australian allowance, noting that this allowance implicitly includes an allowance for CARC.

ACG also undertook an adjustment for economies of scale. This was done on the basis that it is more expensive on a per customer basis to service smaller markets due to a higher proportion of fixed costs. ACG made an adjustment for economies of scale using assumptions developed by ActewAGL Retail as part of the previous price inquiry process.

The Commission notes that while other regulators have suggested the existence of economies of scale in regulated retail activities, there is little empirical evidence to demonstrate the extent of such economies. In view of the lack of tested empirical evidence surrounding economies of scale, the Commission gives little relevance to the economies of scale analysis.

With regard to the appropriate retail margin, ActewAGL Retail argued that the margin should be increased from 5.4% to 6.0%. ActewAGL Retail argued for the increase on the basis of the exclusion of CARC. As noted above, the Commission does not consider the inclusion of CARC to be relevant in the context of determining costs for an incumbent firm.

⁸ ActewAGL Retail 2012, p. 21.

⁹ ACG 2012, p. 11– table 3.2.

In addition, it was argued that the retail margin was low with respect to that granted in New South Wales. The Commission restates the point made in the draft report that it does not consider the difference in the energy purchase cost methodology to be relevant to the calculation of the retail margin. Therefore the Commission does not accept the argument that a higher retail margin than that of NSW is appropriate in the ACT due to the Commission's approach to determining energy purchase costs.

In addition to the analysis regarding ROC, CARC and retail margins, the ACG submission identified a range of benefits in support of its position on the longer term benefits that can result from increased competition. However, many of the benefits outlined in the report are already present in the ACT. Time-of-use contracts are available if a time-of-use meter is present; alternatively, a customer may request an installation. ACT retailers also already offer both direct debit discounts and email bills, while pay-on-time discounts could easily be adopted. Moreover, the Commission disputes the characterisation of the remaining benefits such as store credits for retail outlets as benefits – since benefits are traditionally associated with improvements in productivity or efficiency gains. The Commission also notes that the ACT is well placed to benefit from innovation in other jurisdictions, which then 'migrate' to the ACT.

The Commission's conclusion

The Commission does not consider that the submission from ActewAGL Retail provides justification to move away from the position reached in the draft report. That is, the Commission will continue to exclude CARC and will retain a retail margin of 5.4%. The Commission maintains the position that it is yet to be demonstrated that the longer-term benefits from the ACT community' perspective from an increase in the retail allowance are likely to outweigh the near-term costs.

In reaching this conclusion, the Commission notes that it does not consider there to be an inconsistency between this position and its previous comments regarding the overall benefits of the removal of a regulated tariff. The Commission maintains its position that there are likely to be long-term benefits from the removal of the regulated tariff and the establishment of a fully competitive market. However, the Commission is not convinced that the inclusion of an allowance for CARC and/or a marginally higher retail margin in the cost build-up will on their own move the ACT retail electricity market from being contestable market to one that is competitive and brings benefits to the ACT community.

It is also important to note that the Commission's remit is the preparation of a price direction for the next two years and that this is a fundamentally different task to the establishment of a competitive market. The decision to remove the regulated tariff is a decision that rests with the ACT Government. The Commission considers it appropriate under the current legislative framework to continue to base the efficient costs on those that would be incurred by an incumbent retailer receiving a reasonable retail margin.

2.2 Impact of the price on carbon on energy purchase costs

The introduction of a price on carbon, and its incorporation into the energy purchase cost, represents the major challenge faced by the Commission as part of this review.

In the draft report, the Commission identified that it had reservations about using the Sydney Futures Exchange (SFE) data in current circumstances.¹⁰ The issues identified were the reduction in the period of the data to about six and a half months, and the persistence of political risk related to the future existence of and the level of a price on carbon.

Based on the analysis undertaken for the draft report, the Commission identified two options for estimating energy purchase costs for this regulatory period. The first was to retain the existing data source based on exchange traded Australian Securities Exchange (ASX) data and alter the period over which data was collated in an attempt to capture prices generated when the market was operating with sufficient liquidity.

The second option was to alter the data source to reflect the forward contracts entered into by electricity retailers. These contracts are known as over-the-counter (OTC) contracts. The Commission understands that electricity retailers enter into OTC contracts but has in previous price determinations adopted ASX data given its exchange-traded nature and that arbitrage between the two markets will ensure that the price of the two contracts are closely aligned.¹¹

A reason identified by the Commission for adopting OTC contract prices for 2012-13 rather than ASX prices was that the ASX prices may no longer be an accurate representation of OTC contracts. The Commission identified this as a possibility given the different ways in which the two contracts price the cost of carbon. The cost of carbon is implicitly included in the ASX contract price while the OTC market has developed what is known as the AFMA Carbon Benchmark addendum which explicitly addresses the manner in which costs associated with the Australian Government's carbon pricing mechanism are passed-through. These are referred to as carbon exclusive contracts.

The Commission however was not able to complete prior to release of the draft report the analysis required to determine whether the equivalence between the two contracts remained. Hence it was unable to settle on the most appropriate option. The discussion in the draft report concluded that:

The draft determination in this draft report is, therefore, based on a contract price determined from the SFE futures data relating to trades made after the passage of the carbon price legislation.¹²

Submissions on draft report

Three submissions addressed the issue of the use of ASX or OTC contracts as the appropriate data source for determining the energy purchase cost component. In its submission, ACAT noted:

that the Commission is still reviewing the possible use of Over-The-Counter data in place of SFE futures data. We suggest that OTC data be used for the 2012-13 TFT [the regulated retail tariff] period only if it results in a reduction of the Energy Purchase Cost from the currently proposed 70.91 \$/MWh. The use of the SFE data appears to have resulted in a reasonable reflection of the initial carbon price of \$23 per tonne of CO₂-e.¹³

ActewAGL Retail stated that it:

¹⁰ Although the draft report refers to SFE data, electricity futures are traded through the Australian Securities Exchange (ASX).

¹¹ The Commission calculates energy purchases costs using a model populated with futures price information. A futures contract commits the seller to provide and the buyer to purchase a commodity at the agreed price at a designated time in the future. The contract itself is a standardised contract in which all terms have been defined and agreed to, leaving price as the only remaining point of negotiation.

¹² ICRC 2012, p. 10.

¹³ ACAT 2012, p. 2.

cautiously notes the Commission's approach to determining the carbon price in the EPC [energy purchase cost], since the time shortened purchasing portfolio period is not consistent with the established portfolio purchasing model or wholesale energy purchasing behaviour of a prudent retailer. The Commission has nevertheless noted that it expects that the derived EPC allowance would not be substantially different should it move to the ICAP data source given that it has shortened the averaging period to remove the effect of political risk in the implicit price of carbon.

ActewAGL recognises that the Commission's method is a one-off, pragmatic response to achieving the outcome of full pass through of the cost of carbon. However, ActewAGL points to the potential for political risk to distort the carbon price implicit in the d-cypha carboninclusive trades.

The Commission stated in its draft decision that:

on the basis of its preliminary examination of the ICAP OTC data, the Commission does not believe that the use of the data in place of the SFE futures data will lead to radical changes in the cost index and therefore to the determination of regulated retail electricity prices for 2012–13.

While this may be the case for 2012–13, the re-emergence of uncertainty around a carbon price would cause political risk to distort the carbon price implicit in the d-cypha carboninclusive trades and impact the evaluation of FP [forward price] in future price directions.

ActewAGL firmly believes that the most effective way to isolate political risk associated with carbon policy is for the Commission's EPC model to reference carbon-exclusive trade data with a separate allowance for carbon based on the industry-standard Australian Financial Markets Association (AFMA) Australian Carbon Benchmark addendum.

ActewAGL therefore maintains its recommendation that the Commission make use of a carbon-exclusive curve (ICAP) to derive the EPC in conjunction with a separate allowance for carbon, as this remains the best way to avoid the issue with d-cypha data.¹⁴

AGL stated:

Regarding the ICRC's updated EPC methodology, AGL considers that it is not appropriate to use a truncated sample of SFE contracts in an attempt to ameliorate the legislative uncertainty related to the introduction of the carbon price. While using this approach might better reflect the impact of the carbon price on the wholesale electricity price, it does not accord with the strategies used by retailers to manage their hedging requirements i.e. purchase contracts to hedge price risk over 2 – 3 years.

As noted in our previous submission, AGL is of the view that it is difficult to accurately isolate the impact of one particular policy or event in the market on futures prices. Therefore, using 'carbon inclusive' futures price data from this period would result in an under estimation of retailers costs associated with the carbon pricing mechanism.¹⁵

The Commission's consideration

The Commission identified two possible methodologies for determining the energy purchase cost component. In previous price directions the Commission has adopted the use of ASX data while acknowledging that electricity retailers in fact enter into OTC contracts. As discussed above, the Commission has assumed that arbitrage between the ASX futures market and OTC markets will ensure that the ASX futures prices are reflective of OTC contract prices.

Based on this assumption, it has been the Commission's preference to use the exchange traded ASX data instead of OTC contract information due to the lack of transparency inherent in the OTC contract market. However, as noted in the previous discussion, the uncertainty in recent years regarding the introduction of the price on carbon has fundamentally changed the nature of the

¹⁴ ActewAGL Retail 2012b, p. 8.

¹⁵ AGL 2012, p. 2.

electricity contracting market. Therefore, the Commission must reconsideration its underlying assumption.

The assumption adopted in previous price directions that the ASX futures prices are reflective of OTC contract prices is based on the premise that the two contracts can be compared on a like-with-like basis. A comparison of the ASX futures prices and OTC contract prices (as provided by the trading broker ICAP Energy Australia (ICAP)) for 2011-12 supports this conclusion.

Figure 2.1 Difference between ICAP and ASX for 2011-12 futures prices

Figure 2.1 shows the difference in \$/MWh between the ICAP and ASX data for 2011-12 contract prices. The figure shows that the difference is generally less than \$0.20 on an average contract price of approximately \$40/MWh. In comparing the contracts it is important to note that both types of contract for settlement during 2011-12 were carbon-exclusive. Hence the ASX and OTC contracts are able to be considered on like-with-like terms prior to the introduction of the carbon-exclusive contracts for 2012-13 settlement and beyond.

Two conclusions can be drawn from the analysis of ASX and ICAP data for 2011-12 contract settlement. First, the data supports the Commission's assumption regarding equivalence between the two markets and therefore validates the use in previous years of ASX data as a reliable estimate for OTC trades.

The second conclusion is that the demonstrated equivalence between the two data sources provides confidence that the ICAP data could be relied upon as a means of estimating energy purchase costs if it better represents the price of electricity, notwithstanding the Commission's preference to use exchange-traded data.

While there is demonstrated equivalence between the ASX and ICAP data for 2011-12 contract prices, the introduction of carbon-exclusive contracts for settlement post 1 July 2012 represents a

significant change in the energy contracting market. The settlement price of electricity purchased through carbon-exclusive contracts depends on the existence and price of carbon. These carbon-exclusive contracts have different characteristics to the ASX contracts.

The differences relate to the treatment of risk. In its draft decision the Commission identified three major risks to which electricity futures traders are exposed:

- spot market risk – related to uncertainty about the balance between the demand for and supply of power that may exist in the market at any particular point in the future
- political risk – surrounding whether a price on carbon will exist at settlement and uncertainty as to its level
- impact risk – related to uncertainty about the impact the introduction of a price on carbon may have on prices in the spot market (i.e., the amount of the carbon price passed-through by generators reflected in the final wholesale price).

Table 2.1 summaries these risks and how they are dealt with in an ASX contract and an OTC contract with the AFMA Carbon Benchmark addendum.

Table 2.1 Comparison of contract specifications

Risk	ASX contract	OTC contract with AFMA Carbon Benchmark Addendum
Spot market risk – Risk associated with the actual price of electricity on the spot market	Exposed to spot market risk	Exposed to spot market risk
Political risk – Uncertainty surrounding existence and level of carbon price	Implicit – An ASX contract includes the market's expectations about the likelihood and level of the carbon price coming into effect	Explicit – The AFMA Carbon Benchmark addendum explicitly includes 'with carbon' and 'without carbon' scenarios. The final contract price depends on whether a carbon price exists
Impact risk – Impact of carbon price on final wholesale price of electricity	Implicit – An ASX contract includes the market's expectations about the final impact of the carbon price on wholesale electricity prices	Implicit – While the AFMA Carbon Benchmark addendum specifies the carbon pass-through as the carbon reference price (\$23/tonne in 2012/13) multiplied by the average carbon intensity of the NEM, once OTC contracts are settled, a retailer is exposed to the actual impact of the price on carbon on wholesale prices

NEM = National Electricity Market

As can be seen in table 2.1, the manner in which the OTC contract with the AFMA Carbon Benchmark addendum deals with the political risk differs from the ASX contract. An OTC contract with the AFMA Carbon Benchmark addendum explicitly includes with carbon and without carbon scenarios.

Figure 2.2 shows the 2012-13 prices of an ASX contract and an OTC contract with the AFMA Carbon Benchmark addendum (assuming a carbon price of \$23/tonne and a carbon intensity factor for the National Electricity Market (NEM) of 0.92 tonnes per MWh).

Figure 2.2 ICAP (with carbon price included) and ASX futures prices for 2012-13

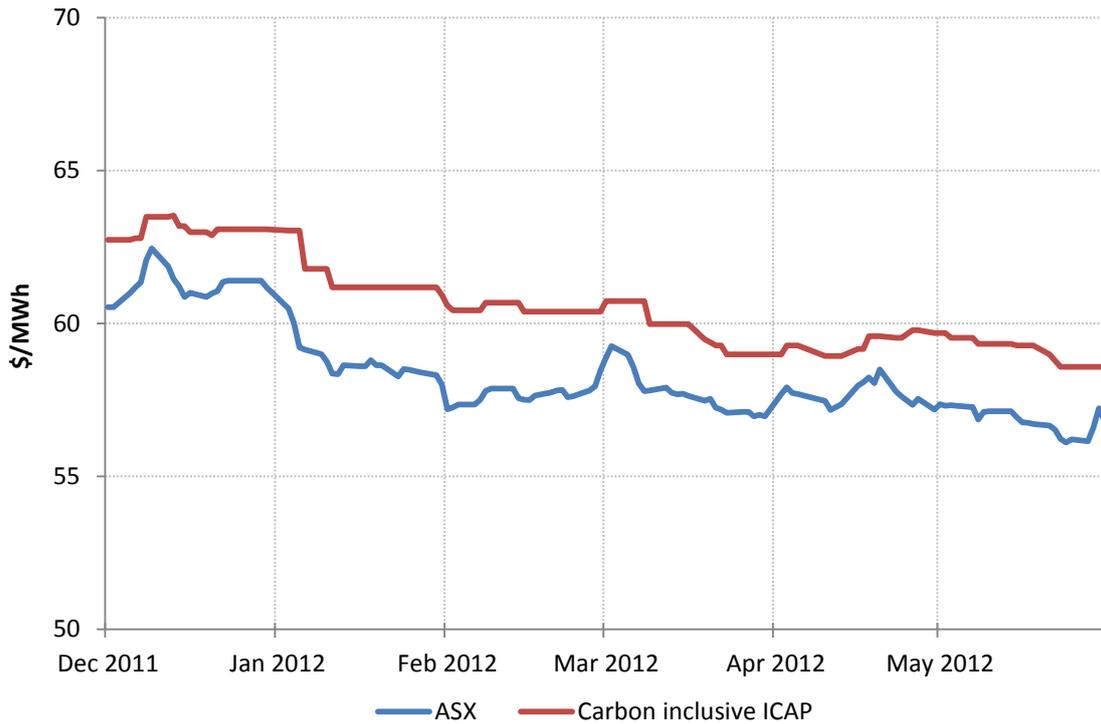


Figure 2.2 shows that the ICAP data for OTC trades adjusted for the carbon inclusive price is above the ASX price with the difference between the two forms of contract reasonably consistent at approximately \$2.50/MWh throughout the period (1 December 2011 through 31 May 2012). This difference is driven by the differing characteristics of the two contracts and indicates that the equivalence between the ASX and ICAP data which existed for settlements prior to the introduction of a price on carbon no longer exists. The difference between the two contracts means that if the Commission were to adopt the ASX contract prices the granted allowance would likely underestimate the energy purchase cost to an electricity retailer.

The Commission’s Conclusion

The analysis undertaken shows that the use of ASX data would likely underestimate the energy purchase costs of a retailer. Therefore, to estimate costs for 2012-13 the Commission will adopt the OTC carbon-exclusive data as provided by ICAP with an adjustment for the price of carbon based on the AFMA Carbon Benchmark addendum. The Commission believes this approach is consistent with its preference to adopt a conservative and precautionary approach in estimating efficient costs.

In reaching this conclusion, the Commission is satisfied that the ICAP OTC data provides a reasonable estimation of the underlying contract prices incurred by electricity retailers. This is based on the analysis of ICAP and ASX data during 2010-11 which demonstrated equivalence between the contracts, thus supporting the view that ICAP data has been a reasonable estimation of underlying contract prices as faced by retailers.

While the Commission is comfortable with the use of the ICAP data for 2012-13, it retains its preference to use exchange-traded data where possible. The Commission will monitor the ASX

and ICAP futures prices and will consider returning to the use of exchange-traded data in the future.

2.3 Incorporation of costs associated with achieving environmental objectives

There are a range of costs incurred in meeting environmental obligations imposed by the Australian Government and the ACT Government. These costs are sometime referred to as 'green costs'. The relevant costs for this price direction are the Australian Government's enhanced Renewable Energy Target (RET), which now consists of a Large-scale Renewable Energy Target (LRET) and a Small-scale Renewable Energy Scheme (SRES), and the ACT Government's energy efficiency scheme.

Costs arising from the commencement of the Australian Government's carbon pricing mechanism on 1 July 2012 are not included under the green cost component for the cost build-up. The impact of the carbon price on the wholesale electricity cost is included in the energy purchase cost component. Costs incurred by electricity retailers from the ACT Government's feed-in tariff scheme are included in network costs. In previous directions, the ACT Government's Greenhouse Gas Abatement Scheme has been included. However, this scheme will cease operation when the Australian Government's carbon pricing mechanism commences on 1 July 2012 and accordingly it is no longer included in the cost build-up.

Submissions on draft report

ACAT submitted that it supported the proposed methodology for calculating green costs based on cost recovery with additions for risk.¹⁶

Submissions from ActewAGL Retail and AGL proposed alternative methodologies to those proposed in the draft report for calculation of LRET and SRES costs. ActewAGL Retail also proposed an alternative approach to recovering costs from the ACT Government's energy efficiency scheme.

Detail on ActewAGL Retail's responses to each of the cost components follows. In large part the submission from AGL reflected that provided by ActewAGL Retail. The comments from AGL are therefore not reproduced below.

Large-scale Renewable Energy Target

An electricity retailer is subject to an LRET obligation each calendar year for which the cost of complying is calculated as follows:

$$LRET \text{ obligation} = LGC \times RPP$$

where LGC is the price of a large-scale generation certificate (\$/MWh) and RPP is the renewable power percentage. The RPP represents the proportion of a retailer's total MWh of electricity purchased for which it is required to surrender LGCs.

In the draft report the Commission proposed to move away from its existing approach to estimating LGC prices. It proposed to adopt the average LGC spot price over the last five days of May preceding commencement of the financial year rather than the spot market price on a single

¹⁶ ACAT 2012, p. 2.

day. Inherent in the Commission's approach was an assumption that the average price provided an estimate of the price at which an electricity retailer would be able to purchase the required number of certificates to service the regulated ACT load.

In response, ActewAGL Retail stated that it:

has serious concerns with the Commission's proposal to use a model that samples LGC spot prices over just one week from a single broker. Although highly transparent, this simplistic approach does not reflect risk typical management behaviour adopted by prudent retailers.¹⁷

ActewAGL Retail argued for an approach based on Long Run Marginal Cost but acknowledged there was insufficient time to undertake the required analysis for incorporation into the final report. Instead, ActewAGL Retail stated that an approach similar to that used to calculate the energy purchase cost component should be adopted whereby it is assumed that a retailer progressively purchases certificates over time to cover future obligations.¹⁸

Small-scale Renewable Energy Scheme

An electricity retailer is subject to a SRES obligation over each calendar year for which the cost of complying is calculated as follows:

$$SRES\ obligation = STC \times STP$$

where STC is the price of a small-scale technology certificate (\$/MWh) and STP is the small-scale technology percentage. The STP represents the proportion of a retailer's total MWh of electricity purchased for which it is required to surrender STCs.

In its 2011-12 price direction, the Commission based the price of an STC on that offered by the CER Clearing House. The CER Clearing House offered a price of \$40 per certificate.

In the draft report, the Commission proposed a shift away from the clearing house price to a market-based approach. The Commission developed this approach based on its preference to where possible rely on market-data and to ensure consistency with the approach applied to the calculation of LGC prices.

In response to the draft report, ActewAGL Retail submitted that:

It is ActewAGL's view that SRES cost recovery should continue to be calculated on the basis of the CER's clearing house price of \$40 per STC and CER's binding and non-binding STPs because:

- the current market price reflects a short term over-supply of STCs. Over the longer term it is anticipated that the market price will be restored to levels consistent with the CER's fixed clearing house price; and
- published spot prices are not supported with traded volumes. Spot prices should not be used in isolation, to properly evaluate efficient market costs for purchasing STCs outside the house it is essential for any model to consider concurrently, the volume of certificates (liquidity) available for sale at a given price.¹⁹

In addition, ActewAGL Retail noted decisions by other regulators that adopted the \$40 clearing house price.

¹⁷ ActewAGL Retail 2012, p. 10.

¹⁸ Ibid., pp. 12-13.

¹⁹ ActewAGL Retail 2012, p. 14.

ACT Government energy efficiency scheme

The draft report proposed that costs associated with the ACT Government's energy efficiency scheme be excluded from 2012-13 prices and that a suitable catch-up mechanism be applied to 2013-14 prices. This approach was suggested due to the lack of information available at that time. However, subsequent to the release of the draft report the legislation on the energy efficiency scheme has been enacted and additional information on its cost has become available.

The ACT Legislative Assembly passed the Energy Efficiency (Cost of Living) Improvement Bill 2012 on 3 May 2012. The scheme will commence operation from 1 January 2013. ActewAGL Retail has proposed that an estimate of the costs it will incur from 1 January 2013 to 30 June 2013 be included in 2012-13 prices.²⁰ The proposal also argues for the inclusion of an adjustment mechanism to allow for discrepancies between the forecast and actual costs to be accounted for in the following year.

The Commission's consideration

This section outlines the Commission's considerations on incorporating LRET, SRES and the ACT Government's energy efficiency scheme into the cost build-up.

Large-scale Renewable Energy Target

The submission from ActewAGL Retail argued for the development of a purchasing model similar to that adopted for the calculation of energy purchase costs. The Commission accepts the proposition that a retailer is likely to progressively purchase certificates in the lead up to their surrender. The Commission must develop a model which it considers appropriately compensates ActewAGL Retail for the costs that an efficient retailer would likely incur each financial year. ActewAGL Retail suggested the adoption of a purchasing strategy that mimics that used in calculating energy purchase costs. This approach would see LGCs purchased over a period of 23 months up to 31 May preceding the start of the financial year.

The Commission does not consider that this approach is necessary for purchasing and hedging the price risk of certificates given the different characteristics they have compared to electricity contracts. A retailer may purchase certificates on the spot market and lock-in a price (a forward price), and therefore the cost of certificates, at anytime during the course of the financial year.

The Commission agrees that the five day averaging period for determining the price of LGCs is too short as it does not reflect the likely behaviour of a retailer, and only captures a small period of price history of certificates. The averaging period for estimating LGC prices for the next calendar year (2013) is extended to the 11 months prior to and including May preceding the start of the financial year. For the current calendar year (2012) the price of LGCs is the forward price, which reflects an imputed holding cost as calculated in the previous determination.

An implication of developing a model based on an estimated forward price is that there is a need to apply a holding cost to compensate the retailer for the costs it incurs in holding the certificates up to their surrender or alternatively the start of the next financial year. The Commission has applied a 10% per annum holding cost, which is consistent with that used in previous determinations.

With respect to the calculation of the RPP, estimates are provided by the Clean Energy Regulator (CER).

²⁰ Ibid., p. 15.

Small-scale Renewable Energy Scheme

The submission from ActewAGL Retail argued that SRES costs should be based on the CER's clearing house price. This was the approach adopted in the 2011–12 price reset. A liquid secondary market has developed in STCs since their inception in January 2011, and consequently the Commission now has available from ICAP a daily reference price for STCs. These prices reflect the levels at which STCs are being traded in the market.

Moreover, the Commission has investigated the volumes of certificates available in the market and is of the view that at this time there is sufficient liquidity available to comfortably service the ACT's regulated load. The Commission believes there is a robust case for the use of market data to estimate the costs of STCs and is of the view that ICAP daily STC reference price is the most relevant source.

As with LGCs, the Commission considers that it reasonable to base the cost of STCs on a forward price (reflecting an imputed holding cost) over a 12-month period. Under such an approach, it is appropriate to apply a holding cost at a funding rate of 10% per annum.

ACT Government energy efficiency scheme

The Commission supports the proposal from ActewAGL Retail to commence the cost recovery in 2012-13. In addition, the Commission supports the proposal for an adjustment mechanism to account for differences between forecast and actual costs. The Commission believes that the recovery of costs should be aligned with when they are incurred, and therefore considers it appropriate that costs incurred during 2012-13 are recovered through 2012-13 prices. Such an approach would also reduce the extent of a 'price shock' in 2013-14 should recovery be delayed.

The Commission's conclusion

The Commission considers it appropriate to allow the recovery of costs associated with achieving environmental obligations. The Commission is aware that as the RET becomes larger in future years and the LGC and STC markets develop further, the methodology adopted for determining the costs of LRET and SRES obligations will need to be reconsidered. The methodologies to be adopted for the LRET, SRES and ACT Government energy efficiency scheme in 2012–13 are summarised below. The final calculations are in chapter 3.

Large-scale Renewable Energy Target

The Commission will adopt a methodology that apportions the cost of satisfying obligations to surrender LGCs in the 2012 and 2013 calendar years over the 2012–13 financial year. The price of 2012 LGCs has been adjusted based on the average price from 1 January 2011 to 30 June 2011, and the price of 2013 LGCs is estimated using an 11 month averaging period from 1 July 2011 to 31 May 2012. A 10% per annum holding cost will be applied to the period for which the certificates are held over the financial year.

ICAP daily LGC reference price data will be used as the data source as the Commission considers this source to be reliable and it is consistent with the data source used in the calculation of the energy purchase costs. The Commission will use RPP figures based on those produced by the CER. An allowance of 10% per annum for a full year will be applied to the adjustment for the difference between actual and forecast RPP for 2012.

The costs due to the LRET scheme are incorporated into wholesale energy costs.

Small-scale Renewable Energy Scheme

The Commission will apply the same methodology to the calculation of SRES costs as it has to the calculation of LRET costs. As with the calculation of LGC prices, there will be an allowance for the holding cost of pre-purchasing certificates prior to their required surrender dates at a funding rate of 10% per annum. As with the calculation of the RPP, the Commission will draw on estimates of the STP as provided by the CER.

The costs due to the SRES scheme are incorporated into wholesale energy costs.

ACT Government energy efficiency scheme

The Commission will adopt the methodology proposed by ActewAGL Retail for calculating the cost to be included in 2012-13. The methodology and subsequent calculations are discussed further in section 3.3.

The costs of the ACT energy efficiency scheme are included as a component of retail costs. This differs from the LRET and SRES costs which are more appropriately characterised as impacting wholesale energy purchase costs.

2.4 Other issues raised in submissions

There were various other issues raised in submissions. These are addressed in the following chapters including a detailed discussion of customer impacts in chapter 6.

3 Setting the regulated electricity price for 2012-13

This chapter discusses the high-level methodology adopted by the Commission in determining the regulated retail price for 2012-13. It then discusses the individual cost elements that contribute to the calculation of prices. The chapter concludes with the Commission's decision on each of the cost elements and sets out the proposed percentage change in the regulated retail tariff bundle for 2012-13.

3.1 High-level methodology

The Commission determines a default retail electricity price for small customers who elect not to seek a negotiated contract with ActewAGL Retail or another retailer. The Commission determines the extent to which standard contract customer tariffs can be increased over those in the previous year.

The standard customer contract includes a suite of tariffs offered by ActewAGL Retail. Therefore, the Commission adopts a weighted average price cap under which ActewAGL Retail is able to rebalance the individual tariffs offered to its standard-contract customers as long as the adjustment in the weighted average price does not exceed the allowed percentage change. The final approved retail tariffs that constitute the regulated retail price are then published by the Commission as a notifiable instrument.²¹

In determining the allowed percentage change, the Commission estimates the economically efficient cost base of an incumbent electricity retailer providing retail electricity supply services to customers on standard contracts. The individual cost components that make up the efficient cost base are discussed in detail in section 3.2. In estimating the individual cost components, the Commission draws on benchmark cost information available in the marketplace, other regulatory decisions within the retail electricity sector in Australia and information provided by ActewAGL Retail.

In order to determine the change in tariffs from one year to the next, the Commission applies an index model based on year-on-year changes in the individual cost components. This index-based approach can be thought of as similar to the way in which the Australian Bureau of Statistics (ABS) compiles the consumer price index (CPI). The ABS selects a basket of goods and assigns relative weightings to each of the items. The CPI then measures how the cost of the basket of goods fluctuates over time.

The Commission has retained the broad index approach first established in 2007 (which was based on that developed in 2003) but has refined the methodology used to calculate the individual cost components. The Commission will retain this approach as part of this price direction – a view supported by ActewAGL Retail and others in their submission on the draft decision.²²

²¹ The approved schedule of tariffs is attached to the standard customer contract. For example, see Utilities (Variation of Terms—ActewAGL Retail Standard Customer Contract) Approval Notice 2010 (Notifiable Instrument NI2010-290).

²² See for example ActewAGL Retail 2012, p. 7.

The individual cost components that contribute to the overall retail cost of electricity can be grouped into the following categories:

- wholesale energy costs
 - energy purchase costs
 - LRET and SRES costs
 - energy losses
 - energy contracting costs
 - National Electricity Market (NEM) fees
- retail costs
 - retail operating costs
 - ACT energy efficiency scheme costs
- network costs
 - transmission and distribution network costs.

Once these cost components are determined, a retail margin is granted.

The Commission will adopt the approach outlined in table 3.1 to determine the percentage change to these individual cost components and hence the change required to determine 2012-13 prices.

Table 3.1 2012-13 price adjustment

Cost Component	Method
Energy purchase cost (\$/MWh)	Based on the existing energy purchase cost methodology and populated by ICAP OTC data plus the AFMA Carbon Benchmark addendum
LRET and SRES costs (\$/MWh)	2012-13 estimates from ActewAGL Retail (including an adjustment for 2011-12) which are verified and applied using the Commission's methodology
Energy losses (\$/MWh)	Determined by the Commission based on AEMO's reported DLF and MLF for 2012-13
Energy contracting cost (\$/MWh)	$0.78 \times (1 + \text{CPI})$
NEM fees (\$/MWh)	$0.78 \times (1 + \text{CPI})$
Retail operating costs (\$/MWh)	$10.86 \times (1 + \text{CPI})$
ACT Energy Efficiency Scheme (\$/MWh)	2012-13 estimates from ActewAGL Retail which are verified by the Commission
Network costs (\$/MWh)	2012-13 network costs as determined and approved by the AER and applied by ActewAGL Retail to the franchise customer load, and subsequently verified by the Commission
Retail margin	5.4% on total costs

AEMO = Australian Energy Market Operator; AER = Australian Energy Regulator

As shown in table 3.1, several of the factors are adjusted by CPI. To calculate the CPI the Commission uses the following formula, populated using the ABS All Groups Index for the weighted average of eight capital cities:

$$CPI_t = \frac{CPI_{March(t-2)} + CPI_{June(t-2)} + CPI_{Sept(t-1)} + CPI_{Dec(t-1)}}{CPI_{March(t-3)} + CPI_{June(t-3)} + CPI_{Sept(t-2)} + CPI_{Dec(t-2)}} - 1$$

The change in CPI to apply to 2012-13 prices calculated using the above formula is 3.39%.

3.2 Retail electricity cost components

This section sets out the calculations used to determine the individual cost components.

Energy purchase costs

The energy purchase costs represent the costs incurred by the incumbent retailer in purchasing electricity from the market (that is, from electricity generators) to supply customers on regulated retail tariffs. Included in the energy purchase cost are the costs associated with hedging the risks inherent in the volatile wholesale market for electricity.

In October 2009 the Commission initiated a public review of its energy purchase cost model that culminated in the release of a final technical report in March 2010.²³ The final technical report described the Commission's new energy purchase cost model.²⁴ The revised energy purchase cost model was applied to the determination of ActewAGL Retail's efficient costs of providing regulated electricity retail services in the ACT for 2010-2012 as described in the final decision released in June 2010.²⁵

As a result of the matters discussed in section 2.2 the Commission concluded that there is a need to revise the energy purchase cost model due to the introduction of the Australian Government's carbon pricing mechanism. Additionally, the Commission in its draft decision took the opportunity to refine the application of its energy purchase cost model by fully calculating the energy purchase cost on a quarterly basis. This adjustment is described in appendix 3.

Before describing the outputs of the Commission's energy purchase cost model, the first step is to present a brief overview of the model itself. Appendix 4 contains a complete description of the Commission's model as well as the full analysis of the changes, including the motivation for the changes to the model described below.

The energy purchase cost model comprises four components: the forward price, the load shape, the load ratio, and the forward price margin.

The forward price is the price that represents the cost of purchasing electricity futures contracts by an electricity retailer as part of its hedging strategy in advance of the time the electricity is supplied to end users. The Commission's model multiplies the forward price by an uplift factor in an attempt to insure that the retailer is compensated for the risks it faces. Indeed, the Commission has adopted an extremely conservative hedging strategy by assuming purchasing of forward contracts at a 10% margin above the historic maximum load.

²³ ICRC 2009b.

²⁴ ICRC 2010c.

²⁵ ICRC 2010b.

The load shape, the load ratio and the forward price markup compose the uplift factor. The load shape measures the extent to which the spot price correlates with the electricity demand. The load ratio is the ratio of the Commission's assumed forward purchases to the average load. The forward price markup is the percentage markup of the forward price to the average spot price. The following equation (which is a rearrangement of the energy purchase cost equation contained in the draft decision to improve exposition) summarises the Commission's energy purchase cost model as applied over the 2010-12 period:

$$EPC_s = FP_s \times [(1 - M_s) \times LS_s + M_s \times LR_s] \text{ and}$$

$$EPC = \sum_{i=1}^4 w_s \times EPC_s$$

where the following are defined:

- EPC_s denotes the energy purchase cost.
- FP_s denotes the forward price.
- M_s denotes the forward price margin.
- LS_s denotes the load shape.
- LR_s denotes the load ratio.
- w_s denotes the load weight.
- the subscript s denotes the quarter.
- EPC without the subscript is the annual energy purchase cost.

The portion in square brackets, $[(1 - M_s) \times LS_s + M_s \times LR_s]$, is the uplift factor for each quarter s .

Before these factors are discussed individually, it is necessary to outline the amendments to the model to account for the introduction of a price on carbon.

Incorporating the cost of carbon

The Commission has considered how the introduction of a price on carbon should be treated within the Commission's energy purchase cost model. In doing so the Commission is mindful of the need to maintain the conservative approach that it adopted in 2010 to ensure that ActewAGL Retail is able to fully recover its costs of purchasing electricity. The Commission is also guided by the requirements under the *Independent Competition and Regulatory Commission Act 1997* to consider the social and environmental consequences in its price determination.

The energy purchase cost model uses historical data in the calculation of the load shape and the load ratio – the two major components of the uplift factor. The Commission's model is an accurate measure of the true costs faced by ActewAGL Retail only if it is expected that future data is consistent with the historical data. The introduction of a price on carbon raises the question of whether this is true especially with respect to the load shape. Appendix 4 addresses this issue in detail and comes to the conclusion that the uplift factor should only apply to the forward price and not to the cost of carbon.

The following formula (where C_s is the cost of carbon) shows how a price on carbon is incorporated into this calculation:

$$EPC_s^C = FP_s \times [(1 - M_s) \times LS_s + M_s \times LR_s] + C_s$$

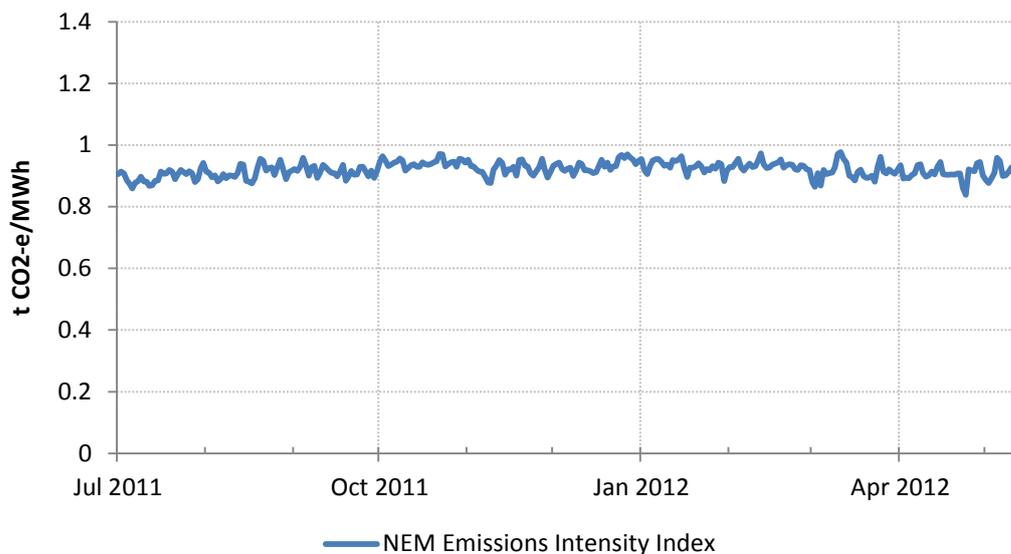
This conclusion is supported by the analysis of the model and the Commission’s understanding of the workings of the electricity wholesale market. The introduction of the price on carbon should result in changes to the load shape. This change occurs because the load-weighted spot price will not increase as much as the time-weighted spot price. The impact of the price on carbon should be greater during periods with low electricity loads as it is during these periods that the most carbon intensive generators will be determining the wholesale price. Conversely, during high load periods the wholesale price (all other factors being equal) should rise by a smaller amount as the pivotal generator for determining the spot price will usually be a gas fired power plant with a lower cost of carbon.

Based on the above formula, the Commission will determine the cost of carbon in accordance with the AFMA Carbon Benchmark addendum.²⁶ Where possible the data collection period for determining the cost of carbon should be the same as the data collection period for determining the forward price.

It is important to note that the Commission is forecasting the cost of carbon in much the same way as the energy purchase cost is forecast. To be able to determine the cost of carbon for 2012-13 the Commission must determine the carbon intensity in advance, however, the Commission does not envisage any measurable risks that need to be accounted for by forecasting future emissions intensities using historical data.

The Australian Market Operator (AEMO) calculates and reports the daily emissions intensity as the Carbon Dioxide Equivalent Intensity Index measured in tonnes of carbon dioxide equivalent gas emitted per megawatt hour. This index is reported on a daily basis by AEMO for each state in the NEM and for the entire market. The first reported daily value for the index was on 19 June 2011. Table 3.2 shows the emissions intensity index for the period from 1 July 2011 through 31 May 2012. As can be seen the index has remained stable over the past 11 months, fluctuating around 0.92.

Table 3.2 National Electricity Market Emission Intensity Factor²⁷



t CO₂-e = tonnes of carbon dioxide equivalent gas per megawatt hour

²⁶ AFMA 2012.

²⁷ AEMO 2012a.

The AFMA Carbon Benchmark addendum presents the calculation of the cost of carbon as the product of the average carbon or emissions intensity in the NEM and the carbon reference price set out in the legislation. The carbon reference price is \$23 for 2012-13. The Commission has determined for 2012-13 the cost of carbon by multiplying the average emissions intensity factor for the NEM of 0.92 over the period from 19 June 2011 through 19 May 2012 by \$23, which yields a cost of carbon of \$21.18/MWh.²⁸

The remainder of this section calculates each of the remaining factors that contribute to the energy purchase cost: the forward price, the forward price margin, the load shape, the load ratio and the load weights. Tables containing the data used to calculate the components can be found in appendix 5.

Forward price calculation

ICAP provides annual financial year contract data. This differs from the ASX data which is quarterly. Due to this difference there is a need to adopt a single annual forward price for the relevant financial year rather than individual quarterly prices.

The Commission has adopted the averaging period proposed by ActewAGL Retail which is consistent with the introduction of the AFMA Carbon Benchmark addendum. The forward prices for 2012-13 have been calculated over the period 1 April 2011 through 31 May 2012. The Commission has also calculated the forward price using ICAP over the period 1 April 2010 through 31 May 2011. Table 3.3 shows the forward prices for each quarter for the 2012 and 2013 financial years.

Table 3.3 Quarterly forward prices for 2011–12 and 2012-13

Year	Q3	Q4	Q1	Q2
2011-12	41.15	41.15	41.15	41.15
2012-13	40.69	40.69	40.69	40.69

Forward price margin determination

The Commission has determined that there is no reason to change the level of the forward price margin. Therefore, this value will continue to be set equal to 0.05 in the determination.

Load shape calculation

The load shape captures the relationship between the spot price and electricity demand. The load shape is calculated using the net system load profile for ActewAGL Distribution as reported by AEMO. The calculation of the quarterly average load shape from 2003 to 2011 and 2003 to 2012 is shown in table 3.4.

²⁸ The emissions intensity factor calculation is based on available AEMO data as at 1 June 2012. EIF is the average NEM wide Carbon Dioxide Equivalent Intensity Index from 19 June 2011 to 19 May 2012.

Table 3.4 Quarterly average load shape for 2011-12 and 2012-13

Year	Q3	Q4	Q1	Q2
2011-12	1.136	1.111	1.231	1.150
2012-13	1.126	1.102	1.273	1.135

An implication of moving to the carbon exclusive OTC contracts is that there is a need to base future calculations of the load shape on the carbon exclusive price to maintain inter-temporal consistency within the energy purchase cost model. In 2013 the Commission will make this calculation by subtracting the ex ante cost of carbon from all half-hour spot prices before calculating the load shape. As a result, in future quarterly load shape values will be consistent with past values. As per the existing approach, an average of the quarterly load shape since quarter 3 2003 will then be applied.

The effect of not making this adjustment would be to bias down the load shape calculation following the introduction of the carbon price and hence reduce the uplift factor.

Load ratio calculation

The load ratio for each quarter is calculated as the maximum of the observed ratio of the quarterly maximum load to the quarterly average load for the available data from AEMO. To complete the calculation of the load ratio the Commission adds 0.1 to the observed maximum as the observed maximum may be less than the true maximum. The Commission has not altered its methodology for determining the load ratio from the draft decision. The load ratio for 2011-12 and 2012-13 is shown in table 3.5 (including the 0.1 adjustment).

Table 3.5 Quarterly load ratio for 2011-12 and 2012-13

Year	Q3	Q4	Q1	Q2
2011-12	2.027	2.272	2.350	2.296
2012-13	2.027	2.272	2.540	2.296

Load weights

The load weights for each quarter are equal to the historic average load in that quarter divided by the sum of the historic average load for all four quarters. The historic average load for a quarter is the simple average of the average loads for that quarter for the period from 2003-04 through 2011-12. The load used is the net system load profile for ActewAGL Distribution as reported by the AEMO.

Quarterly load weights are required to calculate the annual energy purchase costs. The weightings are shown in table 3.6.

Table 3.6 Quarterly load weights for 2011-12 and 2012-13

Year	Q3	Q4	Q1	Q2
2011-12	0.321	0.203	0.199	0.277
2012-13	0.321	0.202	0.199	0.279

The energy purchase cost for 2011-12 and 2012-13

Tables 3.7 and 3.8 show the quarterly calculation of the energy purchase cost for 2011-12 and 2012-13. The energy purchase cost for 2011-12 is recalculated using the new methodology. This is done to ensure comparability between years to allow an accurate calculation of the percentage change from one year to the next for inclusion in the cost index model, see table 3.10.

Table 3.7 Energy purchase costs for 2011–12

Components	Q3	Q4	Q1	Q2
Forward price (\$/MWh) (A)	41.15	41.15	41.15	41.15
Load shape (B)	1.136	1.111	1.231	1.150
Load ratio (C)	2.027	2.272	2.350	2.296
Forward price margin (D)	0.050	0.050	0.050	0.050
Uplift factor (E=(1-D)×B+D×C)	1.180	1.169	1.287	1.207
Energy purchase cost (\$/MWh) (A×E)	48.56	48.09	52.97	49.66

Based on the load weights in table 3.6, the recalculated 2011-12 annual purchase cost is \$49.65/MWh.

Table 3.8 Energy purchase costs for 2012–13

Components	Q3	Q4	Q1	Q2
Forward price (\$/MWh) (A)	40.69	40.69	40.69	40.69
Load shape (B)	1.126	1.102	1.273	1.135
Load ratio (C)	2.027	2.272	2.540	2.296
Forward price margin (D)	0.050	0.050	0.050	0.050
Uplift factor (E=(1-D)×B+D×C)	1.171	1.160	1.336	1.193
Energy purchase cost (\$/MWh) (A×E)	47.63	47.22	54.35	48.56

Based on the load weights in table 3.6, the 2012-13 annual energy purchase cost is \$49.14/MWh. The carbon cost of \$21.18/MWh is added to the carbon exclusive purchase cost to provide the annual 2012-13 energy purchase cost of \$70.32/MWh.

Section 20 requirements

The Commission has adopted an approach based on independent and verifiable market data and a range of assumptions based on industry standards to provide a reasonable estimate of the cost of purchasing wholesale energy from a competitive market pool. In developing this approach, the Commission has applied a methodology that it considers provides appropriate weight to the social imperatives of the provision of reliable electricity to franchise customers (ICRC Act, ss. 20(2)(b) and (g)), the reduction of market power through the setting of the lowest efficient prices in an open market pool (ss. 20(2)(a), (c), (h), (i) and (k)), and the need for the financially sustainable continuation of the regulated price offer by the incumbent retailer in the ACT (ss. 20(2)(d), (e), (i) and (j)). The methodology also improves the valuation and pricing of environmental resources consistent with the principles of ecologically sustainable development (s. 20(2)(f)).

LRET and SRES costs

LRET and SRES costs are two of the three costs incurred in achieving environmental objectives. The methodology for calculating these costs was described in section 2.3. Appendix 6 contains historical ICAP LGC and STC prices.

Large-scale Renewable Energy Target

The price of LGCs for calendar year 2012 is \$37.44, and adjusted for holding costs the price becomes \$39.27. The average price from 1 July 2011 to 31 May 2012 of LGCs for calendar year 2013 is \$39.63 and increases to \$43.59 when adjusted for the holding cost.²⁹ The RPP for 2012 is 9.15% and is estimated for 2013 at 10.42%.³⁰ The combination of the LGC prices and the relevant RPPs result in an LRET allowance for 2012-13 of \$4.24/MWh.

An adjustment of \$0.11/MWh to the 2011-12 allowance due to the difference between the forecast and actual 2012 RPP is also included in the 2012-13 cost component. This allowance includes an adjustment for the opportunity holding cost of 10% for the 12 month period.

Small-scale Renewable Energy Scheme

The price of STCs for calendar year 2012 is \$32.51 including an allowance for holding costs. The average price from 1 July 2011 to 31 May 2012 of STCs for calendar year 2013 is \$29.31, and adjusted for the holding cost it becomes \$32.24. The STP for 2012 is 23.96% and is estimated for 2013 at 7.94%.³¹ The combination of the STC price and the relevant STPs result in an SRES allowance for 2012 -13 of \$5.59/MWh.

An adjustment of \$1.57/MWh to the 2011-12 allowance due to the difference between the forecast and actual 2012 STP is also included in the 2012-13 cost component. This allowance includes an adjustment for the opportunity holding cost of 10% for the 12-month period.

Total LRET and SRES costs

The total LRET and SRES cost component is \$11.50/MWh for 2012-13. The methodology used to calculate this cost modifies that adopted in the draft report as discussed in section 2.3.³²

Section 20 requirements

The Commission considers that an allowance for costs associated with achieving environmental outcomes is consistent with s. 20(2)(f), which requires the Commission to have regard to the principles of ecologically sustainable development. The green costs reflect to some extent the environmental costs incurred in the consumption of electricity that the Australian Government and ACT Government consider should be passed through to consumers.

²⁹ The average LGC price for the period 1 July 2011 to 31 May 2012 is used as an estimate for the 12 month period. The same approach is taken to calculation of the STC price.

³⁰ CER 2012a.

³¹ CER 2012b.

³² The total LRET and SRES cost component includes an adjustment of -\$0.01 for 2011-12 GGAS adjustment.

Energy losses

The ACT is part of the National Electricity Market (NEM) – an interconnected electricity grid that covers most parts of Queensland, New South Wales, the ACT, Victoria, Tasmania and South Australia. The majority of electricity consumed in the ACT is generated outside the ACT.

In transporting electricity from these generators via transmission networks, and then distributing it to households and businesses via the electricity distribution network energy is lost. These losses impose a cost on the retailer as it must purchase more electricity than it is able to sell.

The Commission calculates energy losses based on a combination of distribution and transmission losses. The loss factors are calculated by the AEMO and are used by all regulators to determine the energy loss allowances where regulated tariffs still apply.

The Commission has received no submissions suggesting a change to this methodology.

The ACT distribution loss factor for 2012-13 is 1.0508.³³

The ACT marginal loss factor (or transmission loss factor) for 2012-13 is 0.9896.³⁴

Overall electricity losses are calculated as the combination of the two loss factors applied to the energy purchase costs and LRET and SRES costs. Therefore, the electricity loss cost component to be included in the cost build-up is \$3.49/MWh.

This decision is consistent with that included in the draft report.

Section 20 requirements

The Commission notes that the recovery of these energy losses meets the objectives of ss. 20(2)(d), (e), (h) and (i) by ultimately requiring customers to pay for the energy they consume. As this approach to energy losses in the distribution and transmission system is mandated in the NEM framework, it also meets the objectives of s. 20(2)(k).

Energy contracting costs

Energy trading and management costs represent the costs incurred by the incumbent retailer in managing an electricity trading desk. An electricity trading desk is necessary to manage electricity purchases, which are typically bought using a forward-looking portfolio approach, and the associated financial risks.

Since establishing the initial regulatory model, the energy purchase cost allowance has been adjusted by annual changes in the CPI. The Commission received no submission suggesting a change to the approach to calculating energy purchase costs. The Commission will grant an allowance of \$0.81/MWh for energy trading and management costs for 2012–13. This is based on an adjustment of the 2011–12 cost allowance for movements in the CPI (0.78×1.0339).

This decision is consistent with that included in the draft report.

³³ AEMO 2012b, p. 18. The low voltage distribution loss factor is applied.

³⁴ AEMO 2012c, p. 36. The marginal loss factor (or transmission loss factor) adopted is the Canberra 132kV connection point.

Section 20 requirements

The recovery of costs associated with energy hedging, contract and management requirements meets the economic efficiency objective in s. 20(2)(c), as well as the cost-recovery provisions of s. 20(2)(e).

National Electricity Market fees

The NEM is managed by AEMO, which is funded through user fees that are ultimately borne by customers. The fees cover a range of functions provided by AEMO that are necessary for the safe and reliable delivery of electricity to all consumers.

The NEM fees take into account NEM participant fees and ancillary services charges paid by retailers. This is consistent with the approach followed in New South Wales and Queensland.

Since establishing the initial regulatory model, the cost allowance for NEM fees has been adjusted by annual changes in the CPI.

The Commission received no submission suggesting a change to the approach to calculating NEM fees. Therefore, the Commission will grant an allowance of \$0.81/MWh for NEM fees for 2012–13. This is based on an adjustment of the 2011–12 cost allowance for movements in the CPI (0.78×1.0339).

This decision is consistent with that included in the draft report.

Section 20 requirements

The Commission considers that the recovery of NEM fees meets the objective of ss. 20(2)(d), (e) and (i). The payment of ancillary services fees assists AEMO in providing for safe and reliable delivery of electricity to all consumers (s. 20(2)(b), while securing efficiencies through competition (s. 20(2)(c)).

Retail operating costs

Retail operating costs are the costs incurred by the incumbent retailer in providing retail services to regulated customers. These costs include:

- billing services, including meter reading
- call centre costs
- customer information costs (including sales and marketing costs)
- general operating overhead costs.

In section 2.1 the Commission concluded that it was inappropriate to include an additional retail operating cost associated with CAC or CARC. This conclusion was based on a range of factors including that the Commission considers that an incumbent rather than a new entrant is the relevant regulatory benchmark; it was unconvinced that the suggested increase in costs would necessarily lead to an increase in competition; and it considers that many of the suggested benefits of competition exist already in the ACT. The Commission will not include an allowance for CAC or CARC in retail operating costs.

Since establishing the initial regulatory model, the retail operating cost allowance has been adjusted by annual changes in the CPI. The Commission will grant an allowance of \$11.23/MWh for retail operating costs. This is based on an adjustment of the 2011–12 cost allowance of \$10.86/MWh for movements in the CPI (10.86×1.0339).

This decision is consistent with that included in the draft report.

Section 20 requirements

The Commission considers that the allowance granted for retail operating costs is a reasonable balance between the need to allow cost recovery (s. 20(2)(e)) and the need to require the incumbent to operate efficiently (s. 20(2)(c)). In addition, the Commission has had regard to the social impacts of its decisions (s. 20(2)(g)) by not including a customer acquisition cost on the basis that the nature and timing of any benefits resulting from a possible increase in competition in the market are uncertain.

The ACT Government’s Energy Efficiency Scheme

The ACT Government’s energy efficiency scheme is the third cost incurred in achieving environmental objectives. The rationale for including these costs was set out in section 2.3 where the Commission also stated that it would adopt the approach as suggested by ActewAGL Retail to calculate costs. This methodology is based on the costs from the Regulatory Impact Statement (RIS) associated with the bill. The RIS contained the following formula for calculating an electricity retailer’s obligation:

The amount of greenhouse abatement that must be achieved by a given supplier by undertaking eligible activities within the ACT in a given year expressed in tonnes CO₂-e.

$$\text{SESO} = \text{EST} \times (\text{Electricity Sales} \times \text{Emissions Factor}).^{35}$$

where SESO is the supplier energy savings obligation, EST is the energy savings target, electricity sales are the sales by the relevant retailer and the emissions factor is the tonnes of carbon dioxide equivalent greenhouse gas emissions attributed to the consumption in the ACT of 1MWh of electricity (to be set by disallowable instrument).

Based on the above formula, ActewAGL Retail’s estimated supplier energy savings obligation is shown in Table 3.9.

Table 3.9 Calculation of ActewAGL Retail’s supplier energy savings obligations³⁶

Energy savings target ^a	7.2%
Electricity sales (MWh) ^b	622,560
Emissions factor (T/MWh) ^c	0.89
Supplier energy savings obligation (tonnes) ^d	39,894

Note: ActewAGL Retail submission on draft report p.16.

a) Based on the proposed scheme targets contained in Table 7 of the RIS.

b) Based on the ActewAGL Retail forecast of electricity sales to those customers on the regulated tariff from 1 January 2013 to 30 June 2013.

c) Based on the NSW/ACT emissions factor as calculated by the Department of Climate Change and Energy Efficiency (this differs from the factor used in the AFMA Carbon Benchmark addendum, which is a NEM-wide figure).

d) Calculation.

T = tonnes of CO₂-e

³⁵ ESDD 2012b, p. 32.

³⁶ ActewAGL Retail 2012, p. 16.

The RIS estimated an average cost of \$37 per tonne of carbon dioxide equivalent.³⁷ Based on this estimate, a cost of \$1,476,066 is calculated for 2012-13. This is equivalent to \$1.12/MWh.

In addition, the Commission will include an adjustment mechanism in subsequent years to account for differences between actual and estimated costs.³⁸ As part of the adjustment process, the Commission will require ActewAGL Retail to provide supporting evidence to demonstrate that the costs it has incurred are prudent and efficient. The Commission will assess the proposal as part of any adjustment and as an input into forecasting costs for future years.

In developing costs for 2013-14 and making any adjustment and the Commission notes that there may be insufficient data available to accurately assess costs. In this case, the adjustment process will take place as part of the process for setting prices for 2014-15, should the Commission be involved in setting a regulated tariff at that time.

Section 20 requirements

The Commission considers the inclusion of costs incurred as a result of the ACT Government's energy efficiency scheme to be consistent with the cost of providing regulated services s.20(2)(e) and the principles of ecologically sustainable development (s.20(2)(f)). In addition, including an allowance for green costs on a cost-recovery basis ensures that consumers are protected from the potential misuse of monopoly power (s. 20(2)(a)).

Network costs

Transmission and distribution network costs are the costs paid by the retailer to transport electricity over the transmission and distribution networks. Transmission and distribution charges are determined by the Australian Energy Regulator (AER) and released each year in early June.

The Commission has received no submission suggesting a change to the current approach to determining network costs.

Based on the annual change in transmission and distribution charges determined by the AER, ActewAGL Retail's network costs for 2012-13 will increase by 8.9%. This increase will see the network cost component increase from \$77.17/MWh in 2011-12 to \$84.04/MWh in 2012-13.

The final increase in network charges differs from that contained in the draft as that figure was an estimate awaiting the release by the AER of the final 2012-13 network charges.

Section 20 requirements

The Commission believes that allowing the recovery of actual network costs incurred meets the objective of s. 20(2)(a) by protecting consumers from abuses of monopoly power, while at the same time accepting that the recovery of network cost pass-throughs is a legitimate activity for the retailer and meets the objectives of ss. 20(2)(c), (d), (e), (i) and (k).

³⁷ ESDD 2012b, p. 49.

³⁸ ActewAGL Retail 2012, p. 16.

Retail margin

The retail margin represents the return the incumbent retailer earns on the investment it must undertake to provide retail services. Without a retail margin, the incumbent retailer would be unable to attract the funds needed to provide those services.

In its 2010–12 final decision, the Commission increased the retail margin from 5.0% to 5.4%. This followed an increase from 3.0% (as applied from 2003–04 to 2006–07) to 4.0% (as applied in 2007–08) to 5.0% (as applied in 2008–09).

ActewAGL Retail proposed an increase in the retail margin to 6%. This issue was discussed in section 2.1 where the Commission concluded that there was insufficient justification for altering the retail margin.

The Commission will retain the existing retail margin of 5.4% as adopted in the most recent price direction and proposed in the draft decision.

Section 20 requirements

The Commission believes that this approach meets the objectives of s. 20(2)(d), to allow an appropriate return on investment, and s. 20(2)(i), to meet the borrowing, capital and cash flow requirements of the business.

3.3 Final decision on cost elements

Table 3.10 sets out the Commission’s final decision on the cost components used to determine the change in the regulated retail price of electricity. The Commission’s decision provides for a real increase in the regulated retail price of 13.88% and a nominal increase of 17.74%.

Table 3.10 Composition of regulated retail price for 2012–13 relative to 2011–12

	2011–12	2012–13	% change
Energy purchase cost (\$/MWh)	49.65 ^a	70.32	41.63%
LRET and SRES costs (\$/MWh)	13.14 ^b	11.50	-12.48%
Energy losses (\$/MWh)	3.32	3.49	5.25%
Energy contracting cost (\$/MWh)	0.78	0.81	3.39%
NEM fees (\$/MWh)	0.78	0.81	3.39%
Total wholesale energy costs (\$/MWh)	67.67	86.92	28.46%
Retail operating costs (\$/MWh)	10.86	11.23	3.39%
ACT energy efficiency scheme (\$/MWh)	0	1.12	N/A
Total retail costs (\$/MWh)	10.86	12.35	13.69%
Network costs (\$/MWh)	77.17	84.04	8.90%
Total wholesale + retail + network costs (\$/MWh)	155.70	183.31	17.74%
Retail margin (\$/MWh)	8.41	9.90	
Total cost (\$/MWh)	164.10	193.21	17.74%
X factor in CPI+X on MAR in \$/MWh (%)		13.88%	

a. This figure has been recalculated from that contained in the 2011–12 price reset due to the adjustments in the calculation of the energy purchase cost component and the Commission’s desire to maintain comparability across years under the index approach.

b. A figure of \$13.16/MWh was incorrectly contained in the draft report. The figure in the 2011-12 price direction was \$13.14/MWh.

CPI = consumer price index; MAR = maximum allowable revenue.

4 Setting the regulated electricity price for 2013–14

The terms of reference require the Commission to provide a ‘price direction for the supply of electricity to franchise customers for the period 1 July 2012 to 30 June 2014 with provision where appropriate for a review by 30 June 2013’.

An annual adjustment to prices is common regulatory practice in decisions that span more than a single year. Such adjustments are required to ensure that prices remain reflective of underlying costs. Within the context of this two-year price direction, it is appropriate to allow an update of prices from 1 July 2013.

In addition to the normal annual price adjustment, the terms of reference include for ‘where appropriate ... a review by 30 June 2013’. The Commission views the inclusion of this element of the terms of reference to allow for a more extensive investigation if required.

The remainder of this section sets out the Commission’s approach to:

- the 2013-14 annual price adjustment
- a review process.

2013-14 annual price adjustment

The draft report contained a proposed approach to the 2013-14 annual price adjustment. The only submissions received on the proposed approach related to the scope of the review process. These matters related to the review process are discussed below.

The Commission will adopt a process to adjust prices for 2013-14 based on that detailed in the draft report and consistent with that applied in previous years.

The approach the Commission will adopt to the annual price adjustment is as follows:

- ActewAGL Retail to submit to the Commission on or before 10 May 2013 the following information:
 - calculation of the CPI adjustment from 2012-13 to 2013-14
 - calculation of costs associated with achieving environmental objectives for 2013–14, including calculation of LRET, SRES and ACT energy efficiency scheme costs, and any proposed adjustments
 - full accounting of all proposed pass-through costs
- ActewAGL Retail to submit to the Commission for verification the updated networks costs for the franchise customer load as soon as they are approved by the AER
- the Commission to determine energy purchase cost component based on data available to 31 May 2013 and energy losses based on AEMO data.

Based on this information, the Commission will determine the X factor and the percentage by which the weighted average price cap may adjust. The Commission will provide its direction to ActewAGL Retail by 7 June 2013.

Table 4.1 shows the approach to calculating the individual cost components for the 2013-14 price adjustment.

Table 4.1 2013-14 price adjustment

Component	Method
Energy purchase cost (\$/MWh)	As determined using the existing energy purchase cost methodology (subject to revision through the mid-term review - see below)
LRET and SRES costs (\$/MWh)	2013-14 estimates from ActewAGL Retail, which are verified and applied using the Commission's methodology
Energy losses (\$/MWh)	Determined by the Commission based on AEMO's reported DLF and MLF for 2013-14
Energy contracting cost (\$/MWh)	$0.81 \times (1 + \text{CPI})$
NEM fees (\$/MWh)	$0.81 \times (1 + \text{CPI})$
Retail operating costs (\$/MWh)	$11.23 \times (1 + \text{CPI})$
ACT energy efficiency scheme (\$/MWh)	2013-14 estimates from ActewAGL Retail (including any proposed 2012-13 adjustment), which are verified and applied using the Commission's methodology
Network costs (\$/MWh)	2013-14 as determined and approved by the AER and applied by ActewAGL Retail to the franchise customer load, and subsequently verified by the Commission
Cost pass-through (\$/MWh)	Cost pass-through proposed by ActewAGL Retail and verified by the Commission
Retail margin	5.4% on total costs

Review process

In the draft report, the Commission proposed that two elements of the cost build-up be potentially subject to a review process – the energy purchase cost component and the ACT energy efficiency scheme.

As noted in section 2.3, the ACT energy efficiency scheme has now been included as a separate cost build-up component based on availability of cost estimates. The calculation of the energy purchase cost component is the sole remaining outstanding item potentially subject to a review process.

In the draft report, the Commission proposed a review of the energy purchase cost component to:

determine whether any changes are required to the method and the basis for calculating the EPC to better represent the costs and risks faced by a prudent incumbent retailer under the carbon pricing mechanism.³⁹

The Commission proposed a review process that would include the release of an issues paper, which may include one or more technical working papers, and draft and final reports.

In response to the draft report, ActewAGL Retail submitted that it:

³⁹ ICRC 2012, p. 29.

is concerned that the scope of the Commission's proposed process [i.e., the EPC review] is too broad, exposing ActewAGL to unacceptable regulatory risk. In particular, the Commission does not explicitly commit to calculation of the EPC according to the existing purchase cost model which was established by the Commission after lengthy assessment in 2010.⁴⁰

The proposal to include a review of the energy purchase cost component was based on allowing sufficient flexibility to address any further carbon price-related uncertainty and its impacts on the wholesale electricity market. In view of ActewAGL Retail's concerns the Commission will limit the scope of any review to the most appropriate data source: either ASX or OTC ICAP data. Any review would take place within the confines of the existing energy purchase cost model.

The Commission does not envisage at this stage a requirement to undertake a review. However, due to uncertainty surrounding a price on carbon, the Commission maintains its view that there is value in retaining the option to undertake such a review.

For the avoidance of doubt, the Commission will undertake a review of the energy purchase cost methodology where it believes that market developments in relation to energy purchasing arrangements have changed such that the current methodology of determining energy purchase costs is no longer appropriate. Should a review be deemed necessary, the Commission will undertake a public process based on the release of an issues paper and/or technical working paper, and draft and final reports. The development of any revised methodology would take place within the confines of the existing energy purchase cost model.

⁴⁰ ActewAGL Retail 2012, p. 24.

5 Pass-through arrangements

Pass-through arrangements are often included in regulatory decisions to allow for adjustments to prices if unforeseen events occur during the life of a price path. If a pass-through ‘trigger’ event occurs, a new investigation can be undertaken to update the prices or an automatic adjustment may be made. Pass-through arrangements typically apply to events that are unforeseen, or whose extent is uncertain, and which are beyond the ability of the regulated entity to control.

In the draft report, the Commission proposed to maintain the existing 2010-12 pass-through arrangements, subject to the inclusion of an event relating to the ACT energy efficiency scheme.

The Commission considered the proposals from ActewAGL Retail that a regulatory change event be included for changes to the ACT Government feed-in tariff scheme and that the materiality threshold be removed. The Commission did not accept the ActewAGL Retail proposal on the basis that the ACT Government has closed subscriptions to the feed-in tariff and that a materiality threshold reduces administrative and regulatory costs. The draft report also noted that ActewAGL Retail would be able to provide a submission to the Commission on pass-through events that do not meet the materiality threshold as part of the 2013-14 annual price setting process.

The major elements of the pass-through arrangements proposed in the draft report are summarised in box 5.1 below.

Box 5.1 Pass-through arrangements as contained in the draft report

Timing of pass-through applications

ActewAGL Retail may make application to the Commission for a pass-through:

- when the Commission is establishing the X^f factor for 2013–14
- at any time during either 2012–13 or 2013–14 (ActewAGL Retail may make a maximum of one application for a pass-through during each financial year).

If the Commission requires ActewAGL Retail to make a negative pass-through, it will occur during one of the pass-through events defined above.

Pass-through events

Regulatory change events and tax change events are pass-through events and may be the subject of a pass-through application by ActewAGL Retail or a negative pass-through applied by the Commission.

Regulatory change event

A regulatory change event is a decision made on or after 8 June 2012 by any ‘Authority’ (any government or any minister, agency or department, instrumentality or other authority of government and the Commission, the Australian Energy Market Commission, the AER or AEMO) that has the extent of materially varying the nature, scope, standard or risk of providing services to regulated retail tariff customers, or the manner in which those services are provided. A regulatory change event includes obligations in respect of:

- any customer hardship program
- retailer of last resort events
- a green energy scheme, excluding the Australian Government’s carbon pricing mechanism but including the RET scheme
- changes in distribution or transmission charges
- the ACT Government’s energy efficiency scheme.

A regulatory change event does not include obligations in respect of:

- any decision, determination or ruling in relation to energy loss factors
- changes to the ACT Government’s feed-in tariff scheme in relation to the extension of that scheme to generators with a capacity greater than 30 kW
- smart metering trials.

Tax change event

A tax change event means the imposition of a relevant tax, the removal of a relevant tax, or a change in the way a relevant tax is interpreted or calculated. A relevant tax is any tax, levy, impost, deduction, charge, rate, duty or withholding tax that is levied on ActewAGL Retail by any Authority (as defined above) and is payable by ActewAGL Retail, other than:

- income tax and capital gains tax
- stamp duty
- AEMO fees
- fees payable by ActewAGL Retail in respect of its retail licence
- penalties, charges, fees and interest on late payments, or deficiencies in payments, relating to any tax
- any tax that replaces or is equivalent or similar to any of the taxes referred to above (including any state-equivalent tax).

Materiality threshold

A pass-through will only be made where ActewAGL Retail incurs materially higher or lower costs in providing services to regulated retail tariff customers such that the aggregate impact of the pass-through event or events on costs is greater than 0.25% of ActewAGL Retail's revenue from regulated retail tariffs in the 12 months to March of the most recent year.

In response to the draft report, ActewAGL Retail noted the Commission's preference to maintain the existing pass-through arrangements, subject to the minor adjustment regarding the energy efficiency scheme. ActewAGL Retail also maintained that a materiality threshold was unnecessary but acknowledged that the Commission will, as part of the 2013-14 annual price setting process, consider pass-through applications that do not meet the materiality threshold.

In its submission, ACAT stated that it:

... sees no reason for 'any customer hardship program' to be treated as a regulatory change event. The NECF rules for hardship programs are already legislated. Most large energy utilities in Australia have been operating hardship programs for a number of years. There is no reason to treat the ActewAGL retail hardship program as a pass-through, simply because the company has only recently introduced a complying hardship program. ACAT opposes inclusion of 'any customer hardship program' as a pass-through in the Price Direction.

ACAT supports the proposed materiality threshold.⁴¹

In considering the pass-through arrangements for inclusion in the final price direction, given the inclusion of the ACT energy efficiency scheme as a cost component (see section 2.3), the Commission does not believe it remains necessary to include it as a separate pass-through element.

With respect to ACAT's position to exclude customer hardship programs from the pass-through arrangements, the Commission notes that the pass-through arrangements relate to costs over and above those included already in the cost build-up. The arrangements would only be called upon if ActewAGL Retail were to incur additional costs due to the transfer to the national arrangements.

The Commission does not expect that ActewAGL Retail would incur significant additional costs due to this transfer to a national regulatory regime. However, the Commission considers that it may be premature to remove the pass-through arrangements after the period of transition is completed. The Commission will maintain the customer hardship program as a regulatory change event for this price direction but reconsider its inclusion in the next price direction (should it be called upon to make a further price direction).

The Commission also maintains that it is appropriate to retain a materiality threshold of 0.25% of regulated revenue, especially given that it will review pass-through applications that do not meet the materiality threshold as part of the 2013-14 annual price-setting process.

The final issue for consideration is the implication for the pass-through arrangements of the introduction of the use of carbon exclusive contracts. The regulatory change events as proposed in the draft report specifically excluded the Australian Government's carbon pricing mechanism.

The exclusion of the carbon pricing mechanism was due to the use in previous determinations of electricity contract data which implicitly included expectations regarding the existence and level of

⁴¹ ACAT 2012, p. 2.

the carbon price. In this context the inclusion of an additional pass-through to allow for the impact of a price on carbon was inappropriate.

Where electricity contracts that are used to estimate the EPC provide for a specific allowance for the price on carbon based on the AFMA Carbon Benchmark addendum, it is no longer appropriate to exclude changes to the carbon pricing mechanism from the pass-through events. For example, if the price on carbon were altered mid-way through the regulatory period, this would alter the final contractual costs incurred by ActewAGL Retail due to the contingent nature of the OTC contracts. In this situation it would be appropriate to recalculate the energy purchase cost.

The Commission will include a specific regulatory change event based on changes to the Australian Government's carbon pricing mechanism.

Based on the above elements, the final pass-through arrangements are contained in the final price direction in appendix 2.

6 Impact on customers

The Commission's objectives stipulate that it must "facilitate an appropriate balance between efficiency ... and social considerations".⁴² For price directions, the Commission is further required to address "the social impacts" of its decisions on vulnerable customers.⁴³ This section addresses these issues by providing:

- an analysis of the impact of the Commission's price determination on ACT customers
- a summary of submissions specifically related to social considerations
- a discussion of the matters covered, including a review of compensation and assistance programs offered by the ACT Government and the Commonwealth.

6.1 Impacts on customers

The Commission's final decision will see a 17.74% increase in retail electricity prices for 2012-13. Table 6.1 presents estimated price increases for a range of 'typical' residential customers. A 'small' customer may be representative of a single person living in an apartment, an 'average' customer of a small family in a town house, and a 'large' customer of a large family in a detached house. The impact on these typical bills due to the price increase ranged from \$155 to \$391. The majority of the increase is attributable to the introduction of a price on carbon. It represents just under 80% of the absolute change or approximately 14% of the 17.74% increase in retail electricity prices.⁴⁴

Table 6.1 Estimated price increases for residential customers

Customer consumption type	Annual usage (kWh)	Estimated annual bill 2011-12 (\$)	Estimated annual bill 2012-13 (\$)	Change (\$)	Carbon contribution (\$)
Large	12,000	2,205	2,596	391	313
Average	8,000	1,538	1,811	273	218
Small	4,000	872	1,026	155	124

Table 6.2 estimates cost increases for non-residential customers. The impact on a typical bill ranged from \$436 for a 'small' non-residential customer to \$1,577 for a 'large' customer. Once again the majority of the increase is attributable to the price on carbon.

Table 6.2 Estimated price increases for non-residential customers

Customer consumption type	Annual usage (kWh)	Estimated annual bill 2011-12 (\$)	Estimated annual bill 2012-13 (\$)	Change (\$)	Carbon contribution (\$)
Large	40,000	8,891	10,468	1,577	1,261
Average	25,000	5,673	6,680	1,006	805
Small	10,000	2,456	2,892	436	348

⁴² ICRC Act 1997, section 7.

⁴³ ICRC Act 1997, section 20.

⁴⁴ The cost increase due to the price on carbon is the Commission's best estimate. It heavily depends on the manner in which it is passed through the electricity supply chain to customers.

The modelled cost implications are illustrative of some hypothetical customers and assume they use an equivalent amount of electricity in 2012-13 as they did in 2011-12. Generally, customers with greater electricity usage will experience greater cost increases. However, many interrelated factors influence a customer's annual expenditure on electricity. These include household characteristics, such as income, dwelling structure and dwelling type; energy usage (including gas), comprising its pattern and the efficiency of the appliances used; and electricity prices and rebates which may cause customers to alter their behaviour. If a customer can restrain use, their bill will not increase by as much as the percentage increase in prices. To this end both the ACT and Australian governments plan to implement programs to assist customers with reducing their electricity bills. Both levels of government also provide various concession and assistance programs.

6.2 Summary of submissions on draft report

ActewAGL Retail noted its commitment to addressing social impacts and cited its 'Staying Connected' policy.⁴⁵ However, ActewAGL Retail also stated it "expects increased bad debts as a result of the introduction of a price on carbon".⁴⁶ It argued that more customers may find it difficult to pay their electricity bill after the price on carbon is introduced.

Care Financial Counselling Services (CFCS), ACAT and ACT Council of Social Services (ACTCOSS) also addressed this point. These submissions discussed the uneven impact of electricity price rises in the community and some associated recommendations.

Generally, price rises are not equally borne by members of the community, neither in absolute terms or proportionally. Low- and moderate-income customers are especially disadvantaged as electricity charges represent a larger portion of their disposable income. CFCS summarised as follows:

There is significant disadvantage for people on low incomes in comparison to other community members when examining percentages outlaid for essential goods and services. In percentage terms their basic expenses take up far higher proportions of their income than for higher income people.⁴⁷

As a consequence, vulnerable customers may experience a significant decrease in their standard of living. ACTCOSS added:

Even a slight increase in energy bills can see people on low incomes prioritising utility payments over other essentials such as food or medical bills, and accumulating debt, or going without necessities such as heating.⁴⁸

To address the social impacts of electricity price increases, the consumer agencies suggested that the Commission:

- conduct a more detailed analysis of social impacts than in the draft report⁴⁹
- consider a more modest increase until impacts of the price on carbon and the associated compensation and assistance schemes are more certain⁵⁰

⁴⁵ ActewAGL Retail 2012, p. 5.

⁴⁶ *Ibid.*, p. 17.

⁴⁷ CFCS 2012, p. 4.

⁴⁸ ACTCOSS 2012, p. 1.

⁴⁹ CFCS 2012, p. 4; ACTCOSS 2012, p. 1.

⁵⁰ CFCS 2012, p. 3; ACTCOSS 2012, p. 2.

- support the provision of adequate government concessions to offset electricity price increases⁵¹
- map and monitor the effects of the price on carbon and its associated Commonwealth compensation in the ACT.⁵²

6.3 The Commission's consideration

The Commission is conscious of the adverse impacts of rising electricity costs on vulnerable consumers. These impacts could include:

- health effects of inadequate heating or cooling
- foregoing life essentials, such as medication or food
- risk of social isolation from a disconnected supply of electricity.⁵³

Affordability issues are an important consideration to the Commission in undertaking a price determination and it is guided by the legislative requirements of section 20 of the *Independent Competition and Regulatory Commission Act 1997*. The Commission notes that the regulated retail price is not an appropriate way to deliver targeted support as a solution to social issues and that its primary consideration needs to be ensuring that prices reflect those of an efficient provider. The Commission has noted previously that targeted energy concessions are a much better vehicle for delivering support to those in need.

The ACT Government currently provides a number of energy concessions and services to low-income households. The energy concession is calculated daily and relates to both electricity and gas services. The maximum rebate for 2011-12 is \$266.20. The utility concession is a lump sum payment of \$80.00 to eligible concession card holders for both energy and water bills. The maximum combined rebate for 2011-12 is \$346.20.⁵⁴

Moreover, the ACT Government assists low income households to reduce their utility bills. The Outreach Energy and Water Efficiency Program is funded by the Environment and Sustainable Development Directorate (ESDD) and delivered by community organisations. The program provides personalised education, hardware and labour to support those unable to afford upfront costs. Assistance includes some or all of the following:

- a home energy assessment
- efficient appliances to replace old ones
- a modest retrofit to improve energy and water efficiency.⁵⁵

A number of recent initiatives have also been undertaken. The government passed the Energy Efficiency (Cost of Living) Bill 2012 on 3 May.⁵⁶ The scheme will commence on 1 January 2013 and requires electricity retailers to undertake energy savings measures in ACT households and

⁵¹ ACAT 2012, p. 3.

⁵² CFCS 2012, p. 4; ACAT, p. 3.

⁵³ ICRC 2010a, p. 71.

⁵⁴ CSD 2012.

⁵⁵ ACT Government 2012.

⁵⁶ Cox 2012.

businesses.⁵⁷ The government stated that the scheme will provide 70,000 households a net benefit of around \$100 per year on their electricity bills. It is projected 25% of the households participating in the scheme will be low-income earners.⁵⁸

The ACT Government also commissioned local experts to develop a targeted assistance strategy. The strategy was released in early May and provides recommendations on how to reform ACT Government support for vulnerable households.⁵⁹ The ACT Government announced its intention to use the strategy in the development of the 2012-13 Budget.⁶⁰

Presently, ACT Government energy and utility concessions are comparable to those offered in NSW. In 2011, the NSW Government introduced the Low Income Household Rebate covering \$200 towards household utility expenses. The rebate will rise to \$235 by 2014, while the NSW Government is also planning to implement a Family Energy Rebate commencing 1 July 2012.

The Commission supports the provision of adequate Government concessions to offset electricity price increases for those in need. However, the Commission suggested previously that “concession rates ... be indexed to movements in the [regulated retail price], as movements in the price of electricity will not necessarily mirror changes in the CPI”.⁶¹ This would ensure that concessions provided by the ACT Government increase at the same rate as electricity tariffs.

The Commission notes that new clients approaching ACAT for assistance have increased from 411 in 2010-11 to 488 in the first 11 months of 2011-12. This follows a reduction in new clients after the introduction by ActewAGL Retail of its ‘Staying Connected’ policy in 2010-11 which saw approaches to ACAT reduce from their peak of 972 in 2009-10. ACAT expects that approaches will increase following the increase in electricity prices in 2012-13.

The electricity price impacts for franchise customers set by the Commission compare with those in NSW, both in absolute and percentage terms. The IPART draft decision on regulated retail electricity prices for 2012-13 anticipated an average increase of 16.4% across NSW.⁶² This compares to the 17.74% price increase set by the Commission. To illustrate the potential impact, IPART provided indicative monetary ranges for residential customers. The analysis suggested that the price increase will add around \$180 to \$380 for residential customers compared to \$155 to \$391 in the ACT. About half the price increase in NSW was attributed by IPART to the Australian Government’s carbon legislation.⁶³

The Commonwealth’s price on carbon legislation is the major driver for regulated electricity price increases. To offset the increased costs associated with the price on carbon, the Australian Government will provide compensation through the Household Assistance Package. The scheme is designed to increase disposable income for low- and middle-income households. The government pledged through the Clean Energy Bill 2011 that:

- all low-income households will receive assistance that at least offsets their expected average price impact

⁵⁷ ESDD 2012a.

⁵⁸ Cox 2012.

⁵⁹ CMCD 2012.

⁶⁰ Gallagher 2012.

⁶¹ ICRC 2010b, p. 64.

⁶² IPART 2012, p. 1.

⁶³ IPART based the residential estimate on 7 MWh per year, the average NSW electricity consumption. Annual bills for small business were projected to increase around \$240 to \$490, based on consumption of 10 MWh per year.

- middle-income households will receive assistance that helps offset their expected average price impact
- households that face higher electricity costs due to a medical condition or a disability will be eligible for additional assistance.⁶⁴

The National Centre for Social and economic Modelling at the University of Canberra undertook an independent analysis of the Household Assistance Package and estimated larger gains on average for low- and middle-income households than those estimated in the Australian Government's analysis.⁶⁵ Concessions will be distributed through tax reforms and direct payments. Tax reforms will be implemented through the income tax system. Meanwhile payments will be disbursed to those with a Centrelink pension or allowance or those eligible for Family Tax Benefit A or B.⁶⁶

The impacts of a price on carbon and its associated compensation measures are uncertain. As suggested by some of the consumer welfare agencies, there may be value to monitoring the effects of the price on carbon in the ACT community, especially on more vulnerable ACT residents. Such an analysis is crucial to ensure that concession arrangements provide necessary support.

6.4 The Commission's conclusion

The Commission is aware of the impact of rising utility bills on the ACT community, especially on those less well off in our society. However, the Commission considers that assistance is best delivered through targeted concession arrangements. The Commission notes that the Commonwealth Government is providing tax cuts and increased payments to assist households with the cost of living impacts following the introduction of a carbon price on 1 July 2012. The introduction of the ACT Government's energy efficiency scheme on 1 January 2013 is also aimed at addressing cost of living impacts arising from increases in energy costs. These measures combined will assist low income households in particular in meeting the impact of an increase in electricity prices.

⁶⁴ FaHCSIA 2012.

⁶⁵ Phillips 2012.

⁶⁶ FaHCSIA 2012.

Appendix 1 Terms of reference

Independent Competition and Regulatory Commission (Price Direction for the Supply of Electricity to Franchise Customers) Terms of Reference Determination 2011

Disallowable instrument DI2011–261

Made under the

Independent Competition and Regulatory Commission Act 1997 (the Act), Section 15 (Nature of industry references) and Section 16 (Terms of industry references).

Reference for investigation under Section 15

Pursuant to subsection 15(1) of the Act, I refer to the Independent Competition and Regulatory Commission (the ‘Commission’) the provision of a price direction for the supply of electricity to franchise customers for the period 1 July 2012 to 30 June 2014 with provision where appropriate for a review by 30 June 2013.

Terms of reference for investigation under section 16

Under the Act, section 16(1), I require that the Commission consider the following matters in relation to the conduct of the investigation:

1. The Commission should take into account the following matters:
 - a. The impact on direct electricity costs of changes in government policies and pass through of those costs to regulated prices including, but not restricted to:
 - i. the Commonwealth Government Carbon Tax;
 - ii. Commonwealth or ACT retailer obligation energy efficiency schemes;
 - iii. the Commonwealth Government’s Large and Small Renewable Energy Targets;
 - iv. the ACT Feed-in Tariff; and
 - v. any other schemes implemented to address climate change.
 - b. The efficient and prudent cost of managing risk in the cost of purchasing electricity.
 - c. The requirements of s. 20 of the Act.
 - d. Any other matters the Commission considers relevant.
2. The Commission must produce its final report in time sufficient to allow ActewAGL Retail to make any necessary changes to its billing system and to provide information on the new tariff to customers.

Andrew Barr MLA
Treasurer
21 September 2011

Appendix 2 Final price direction

This chapter sets out the Commission’s draft price direction for the regulated retail price for the period from 1 July 2012 to 30 June 2014.

A2.1 Period of the direction

The provisions below will apply to the period from 1 July 2012 to 30 June 2014.

A2.2 Price control

ActewAGL Retail must ensure that its regulated retail tariffs for 2012–13 and 2013–14 comply with the following weighted average price cap formula:

$$\sum_{i=1}^n \sum_{j=1}^m P_{ij}^t Q_{ij}^{t-1} \leq \left(\sum_{i=1}^n \sum_{j=1}^m P_{ij}^{t-1} Q_{ij}^{t-1} \right) (1 + X^t) (1 + CPI)$$

where

- ActewAGL Retail has n regulated retail tariffs that each have up to m components
- P_{ij}^t is the price that ActewAGL Retail proposes to charge for component j of regulated tariff i in year t
- Q_{ij}^{t-1} is the reference quantity for component j of the regulated tariff i defined as the actual quantity (in both customer numbers or megawatt hours) as reported by ActewAGL Retail for the 12-month period ending 31 March in year $t-1$
- P_{ij}^{t-1} is the price for component j of regulated tariff i for year $t-1$
- X^t is 0.1388 where year t is 2012–13 and is determined in accordance with clause 6.3 where year t is 2013–14
- CPI is 0.0339 where year t is 2012–13 and is calculated in the following manner where year t is 2013–14:

$$CPI = \frac{CPI_{March2012} + CPI_{June2012} + CPI_{Sept2012} + CPI_{Dec2012}}{CPI_{March2011} + CPI_{June2011} + CPI_{Sept2011} + CPI_{Dec2011}} - 1$$

A2.3 The value of X^t in 2013–14

X^t will be determined as set out in table A2.1.

Table A2.1 Methodology for determining X^t for 2013–14

Component	Method
Energy purchase cost (\$/MWh)	As determined using the energy purchase cost methodology as described in A2.4 (subject to revision through the mid-term review as described in chapter 4)
LRET & SRES costs (\$/MWh)	2013–14 estimates from ActewAGL Retail, which are verified and applied using the Commission's methodology
Energy losses (\$/MWh)	Determined by the Commission based on AEMO's reported DLF and MLF for 2013–14
Energy contracting cost (\$/MWh)	$0.81 \times (1 + \text{CPI})$
NEM fees (\$/MWh)	$0.81 \times (1 + \text{CPI})$
Retail operating costs (\$/MWh)	$11.23 \times (1 + \text{CPI})$
ACT Energy Efficiency Scheme (\$/MWh)	2013–14 estimates from ActewAGL Retail (including any proposed 2012–13 adjustment), which are verified and applied using the Commission's methodology
Network costs (\$/MWh)	2013–14 as determined and approved by the AER and applied by ActewAGL Retail to the franchise customer load, and subsequently verified by the Commission
Cost pass-through (\$/MWh)	Cost pass-through proposed by ActewAGL Retail and verified by the Commission
Retail margin	5.4% on total costs

AER = Australian Energy Regulator

A2.4 Calculation of energy purchase costs in 2013–14

Notwithstanding the Commission undertaking a detailed review of the energy purchase cost component (and the ACT energy efficiency scheme) as discussed in chapter 4, the Commission will calculate energy purchase cost in the manner set out below:

$$EPC_s = FP_s \times [(1 - M_s) \times LS_s + M_s \times LR_s] \text{ and}$$

$$EPC = \sum_{i=1}^4 w_s \times EPC_s$$

where the following are defined:

- EPC_s denotes the energy purchase cost.
- FP_s denotes the forward price.
- M_s denotes the forward price margin.
- LS_s denotes the load shape.
- LR_s denotes the load ratio.
- w_s denotes the load weight.
- the subscript s denotes the quarter.
- EPC without the subscript is the annual energy purchase cost.

These components are calculated as follows:

The forward price is the simple average price of the ICAP Energy Australia's 2013-14 over-the-counter prices for New South Wales from 1 July 2011 through 31 May 2013. The annual forward price is applied to all four quarters of 2013-14.

The forward price margin is set at 5%.

The load shape is the ratio of the load-weighted spot price to the time-weighted spot price where loads are based on the ActewAGL net system load profile as reported by the Australian Energy Market Operator (AEMO). The load shape is equal to the average load shape from 2003-04 through the latest data available. The load shape for quarters 3 and 4 of 2013 will be calculated after subtracting the cost of carbon for 2012-13 (which is \$21.18) from each half-hourly price.

The load ratio for each quarter is equal to the ratio of the maximum half-hourly load in the quarter to the average half-hourly load in the quarter. The load to be used is the net system load profile for ActewAGL as reported by the AEMO. The load shape to be applied for quarter s is equal maximum load shape observed to date plus 0.1.

The cost of carbon is equal to the product of the carbon reference price as determined under the Australian Government's carbon pricing mechanism multiplied by the average carbon intensity. The average carbon intensity is equal to the average of the daily emissions intensity factor across the most recent available 365 days on 31 May 2013 for the National Electricity Market as reported by the AEMO in their Carbon Dioxide Equivalent Intensity Index.

The load weights for each quarter are equal to the historic average load in that quarter divided by the sum of the historic average load for all four quarters. The historic average load for a quarter is the simple average of the average loads for that quarter for the period from 2003-04 through 2012-13. The load to be used is the net system load profile for ActewAGL as reported by the AEMO.

A2.5 Pass-throughs

Timing of pass-through applications

ActewAGL Retail may make application to the Commission for a pass-through:

- when the Commission is establishing the X^t factor for 2013–14
- at any time during either 2012–13 or 2013–14 (ActewAGL Retail may make a maximum of one application for a pass-through during each financial year).

If the Commission requires ActewAGL Retail to make a negative pass-through, it will occur during one of the pass-through application times defined above.

Pass-through events

Regulatory change events and tax change events are pass-through events and may be the subject of a pass-through application by ActewAGL Retail or negative pass-through applied by the Commission.

Regulatory change event

A regulatory change event is a decision made on or after 8 June 2012 by any ‘Authority’ (any government or any minister, agency or department, instrumentality or other authority of government and the Commission, the AEMC, the AER or AEMO) that has the extent of materially varying the nature, scope, standard or risk of providing services to regulated retail tariff customers, or the manner in which those services are provided. A regulatory change event includes obligations in respect of:

- any customer hardship program
- retailer of last resort events
- a green energy scheme including the LRET and SRES schemes
- the Australian Government’s carbon pricing mechanism
- changes in distribution or transmission charges

A regulatory change event does not include obligations in respect of:

- any decision, determination or ruling in relation to energy loss factors
- changes to the ACT Government’s feed-in tariff scheme in relation to the extension of that scheme to generators with a capacity greater than 30 kilowatts
- smart metering trials.

Tax change event

A tax change event means the imposition of a relevant tax, the removal of a relevant tax, or a change in the way a relevant tax is interpreted or calculated. A relevant tax is any tax, levy, impost, deduction, charge, rate, duty or withholding tax that is levied on ActewAGL Retail by any Authority (as defined above) and is payable by ActewAGL Retail, other than:

- income tax and capital gains tax
- stamp duty
- AEMO fees
- fees payable by ActewAGL Retail in respect of its retail licence
- penalties, charges, fees and interest on late payments, or deficiencies in payments, relating to any tax
- any tax that replaces or is equivalent or similar to any of the taxes referred to above (including any state-equivalent tax).

Materiality threshold

A pass-through will only be made where ActewAGL Retail incurs materially higher or lower costs in providing services to regulated retail tariff customers such that the aggregate impact of the pass-through event or events on costs is greater than 0.25% of ActewAGL Retail’s revenue from regulated retail tariffs in the 12 months to March of the most recent year.

For the avoidance of doubt, any changes in the components set out in table A2.1 that are applied in determining tariffs for 2013–14 do not need to meet the materiality threshold.

Calculation and application of pass-through amount

The Commission will calculate the pass-through amount, both for a within-year event and when establishing the P^t factor in respect of tariffs for 2013–14, having regard to the following principles:

- the implications for the efficient costs of ActewAGL Retail’s actions, including whether ActewAGL Retail has taken or omitted to take any action where such action or omission has increased the magnitude of the costs incurred
- the need to ensure that ActewAGL Retail does not recover costs to the extent that provisions have already been made or otherwise taken into account
- the need to ensure that ActewAGL Retail only recovers any actual or likely increment in efficient costs to the extent that such an increment is solely as a consequence of a pass-through event
- in the case of a regulatory change event, any costs that ActewAGL Retail has incurred prior to, but in preparation for, the occurrence of that regulatory change event
- in the case of a tax change event, any change in the way another tax is calculated, or the removal or imposition of another tax which in the Commission’s opinion is complementary to the tax change event concerned
- the need to ensure that, as a result of a pass-through event occurring and the indexation approach used to calculate X^t , the impact of the pass-through event is not over-recovered through being carried through in tariffs in subsequent periods. This may require the Commission to apply a negative pass-through factor (PT^t) when establishing tariffs for 2013–14 in the case where a negative pass-through event has occurred during the year.

In addition:

- Where a pass-through event is approved by the Commission during 2012–13 or 2013–14, the Commission may require ActewAGL Retail to implement the pass-through event at a particular date or in a particular manner.
- In considering any application by ActewAGL Retail in respect of a pass-through event, the Commission may consult with affected stakeholders to the extent the Commission considers appropriate.
- For the avoidance of doubt, the Commission will not have regard to the time value of money when establishing the amount of any pass-through.

For a pass-through event that occurs during 2012–13 or 2013–14, the Commission will add the annualised value of the pass-through event (either negative or positive) (APT^t) to the annual projected revenue target given in the weighted average price cap formula for that year and then require that the revised tariffs be constrained by the revised projected revenue target for the year. Thus:

$$\sum_{i=1}^n \sum_{j=1}^m \hat{P}_{ij}^t Q_{ij}^{t-1} \leq \left(\sum_{i=1}^n \sum_{j=1}^m P_{ij}^t Q_{ij}^{t-1} \right) + APT \times (1 + 5.4\%)$$

where

- \hat{P}_{ij}^t is the price that ActewAGL Retail proposes to charge for component j of regulated tariff i for the remainder of year t

- P_{ij}^t is the price that ActewAGL Retail currently charges for component j of regulated tariff i
- Q_{ij}^{t-1} is the reference quantity for component j of the regulated tariff i defined as the actual quantity (in both customer numbers or megawatt hours) as reported by ActewAGL Retail for the 12-month period ending 31 March in year $t-1$
- APT is the annualised pass-through amount, currently determined to be 5.4% of the value of sales.

If a pass-through event has occurred during 2012–13, for the purposes of determining X^t for 2013–14 as discussed in section 6.3, an additional component will be included in table A2.1, the additional component being the approved pass-through cost on an annualised basis for the year in question, such that if an approved pass-through event is included in retail prices during 2012–13, the annualised value of the pass-through (but not including an adjustment for the retail margin) will be included in the summation of costs for the purpose of determining X^t .

A2.6 Price reset for 2013–14

The approach the Commission will adopt to the annual price reset is as follows:

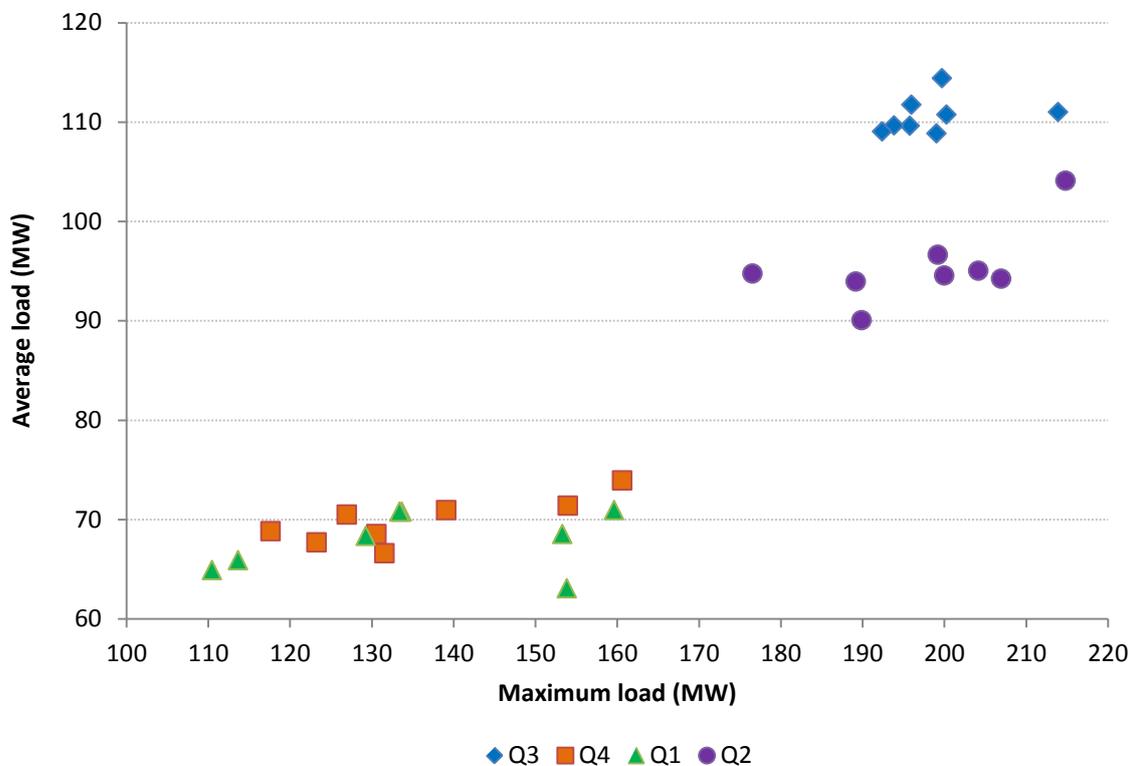
- ActewAGL Retail to submit to the Commission on or before 10 May 2013 the following information:
 - calculation of the CPI adjustment from 2012-13 to 2013-14
 - calculation of costs associated with achieving environmental objectives for 2013–14 including calculation of LRET, SRES and ACT energy efficiency scheme costs, and any proposed adjustments
 - full accounting of all proposed pass-through costs
- ActewAGL Retail to submit to the Commission for verification the updated networks costs for the franchise customer load as soon as they are approved by the AER
- the Commission to determine the energy purchase cost component based on data available to 31 May 2013 and energy losses based on AEMO data.

Based on this information, the Commission will determine the X factor and the percentage by which the weighted average price cap may adjust. The Commission will provide its direction to ActewAGL Retail by 7 June 2013.

Appendix 3 Energy purchase cost technical refinement

The calculation of quarterly load shapes and hedging costs would allow the Commission to determine the energy purchase cost on a quarterly basis and weight the quarterly energy purchase cost to determine the annual energy purchase cost. The motivation for moving to a quarterly model for determining the energy purchase cost comes from examining the average and maximum quarterly loads over the past eight years. Figure A3.1 shows a scatter diagram reproduced from the issues paper which demonstrates that the average load as well as variation in the maximum load is different across quarters.

Figure A3.1 Scatter diagram—average load to maximum load



As can be seen in Figure A3.1, the average load is higher in the second and third quarters as compared to the first and fourth quarters. There is also evidence of reduced variability in the level of the maximum load in the third quarter.

Based on its analysis, the Commission considers it appropriate to move to a quarterly load shape calculation rather than retain the existing annual averaging approach. This approach will improve the accuracy of the model.

Appendix 4 Energy purchase cost model

This appendix extends the Commission's energy purchase cost model developed in 2010 for the inclusion of a price on carbon and analytically derives the approach to determining the hedging costs described in chapter 3. The modelling uses as its foundation the Commission's 2010 hedging cost model and considers how to include the recently enacted legislation which has imposed a price on carbon on the generation of electricity.

The issue is whether there are any reasons to adjust the Commission's energy purchase cost model to account for the price on carbon. The introduction of a price on carbon results in an additional cost that will be borne by generators and will factor into generators' bids in the wholesale electricity market as well as the prices generators offer to retailers in the contract market. Thus, the price on carbon will flow through to the prices retailers pay for wholesale energy. It would seem that this increase in costs to generators is no different to, for example, an increase in wage rates for workers at generators. The consequence of treating the price on carbon as any other change in input prices would be to leave the energy purchase cost model unchanged and apply the model to the carbon inclusive forward price consistent with previous application.

There are two reasons for carefully considering the treatment of the price of carbon. First, the sheer magnitude of the impact of the price on carbon on the wholesale price of electricity merits serious reflection. The price on carbon appears to have resulted in a 50% increase in futures prices for electricity. The second reason which is fundamental to the analysis that follows is that the Commission's energy purchase cost model relies on price ratios, and the Commission needs to examine the influence of the price on carbon on these ratios. This is important as the Commission's energy purchase cost model relies on observed prices and loads for electricity. If the price on carbon causes fundamental changes to the magnitude of the price ratios that are elements of the energy purchase cost calculation, the model may need to be adjusted to compensate for these effects.

Intuition for the treatment for the price on carbon described below can be gained by contrasting the price on carbon with a flat tax per unit of electricity generated. One is a tax on an input in the production process and the other a tax on the output.⁶⁷ A tax on electricity imposed after the spot market determination of the price of electricity would result in the effective price of electricity rising by the amount of the tax in all half-hour periods.⁶⁸ Futures and forward prices for electricity would also rise by this amount plus any additional effect due to the time value attached to holding futures or forward contracts. In the analysis that follows it is demonstrated what this effect might be even though this is not the primary focus.

Now consider the price on carbon. Suppose that all generators employed identical technologies for generating electricity and that there was a constant relationship between units of carbon and output of electricity. Then the price on carbon would be equivalent to the tax on electricity. However, this supposition is not true as generating technologies are different and emit different amounts of carbon per unit of electricity generated **AND** the generator pivotal for setting the price of electricity differs depending on the size of the load in the half-hour period. Thus, the analysis

⁶⁷ The federal government has consistently referred to a 'price' on carbon and not a 'tax' on carbon. It is only for the purposes of this example that the Commission refers to it as a tax.

⁶⁸ Half hours are the fundamental period for analysing the spot market for electricity as prices used for settling the wholesale market are reported for each half hour.

needs to consider that the spot price may not always rise by the same amount as the price on carbon in each half-hour period.

To summarise, the consideration of how to incorporate the price on carbon in the Commission's energy purchase cost model is significant due to the magnitude of the price on carbon, and the Commission's determination of the impact depends on understanding how the price on carbon will flow through to the components that comprise the Commission's energy purchase cost model.

A4.1 Overview of the Commission's model

The Commission has adopted an ex post approach to the determination of the costs of hedging the risks inherent in the spot market for electricity. It is an ex post model of the hedging cost in that the model determines the 'actual' cost of an extremely conservative hedging strategy based on historical data. Using historic load and spot price data the Commission's model calculates the cost of the assumed hedging strategy to an electricity retailer for the coming year.

The time period for which these variables can be calculated could be either on a quarterly basis or annually. The Commission has decided to apply a model based on quarterly values for all of these variables, hence, in what follows period s should be considered as a quarter of a year.

Define the following for each half hour in each period:

$L_{s,t}$ be the load in period s for the half-hour trading interval t

$SP_{s,t}$ be the spot price in period s for the half-hour trading interval t

FP_s be the forward price in period s for a 'flat' or 'base load' contract

\widehat{L}_s be the quantity of 'flat' or 'base load' forward contracts that have been purchased for period s

\bar{L}_s be the average load in period s which is calculated by:

$$\bar{L}_s = \frac{1}{T} \times \sum_{t=1}^T L_{s,t}$$

\overline{SP}_s be the time-weighted average spot price in period s which is calculated by:⁶⁹

$$\overline{SP}_s = \frac{1}{T} \times \sum_{t=1}^T SP_{s,t}$$

This is contrasted with $\overline{\overline{SP}}_s$ which is the load-weighted average spot price, which is determined by:

$$\overline{\overline{SP}}_s = \frac{\sum_{t=1}^T (SP_{s,t} \times L_{s,t})}{\sum_{t=1}^T L_{s,t}}$$

Three ratios can be calculated from these defined variables:

The load shape, LS_s , defined as the ratio of the load weighted spot price to the time weighted spot price for period s :

⁶⁹ In what follows use of the term spot price generally refers to the time-weighted or simple average spot price.

$$LS_s = \frac{\overline{SP}_s}{\overline{SP}_s}$$

The load ratio, LR_s , defined as the ratio of the hedged load to the average load for period s :

$$LR_s = \frac{\widehat{L}_s}{\overline{L}_s}$$

The forward to spot price margin, M_s , for period s defined as the ratio of the forward price less the spot price to the forward price. In other words it is percentage the forward price exceeds the time-weighted spot price and is given by:

$$M_s = \frac{(FP_s - \overline{SP}_s)}{FP_s}$$

Consider a simple hedging strategy for an electricity retailer where the retailer purchases a fixed quantity of base load contracts, \widehat{L}_s , in advance. The cost of this strategy can be evaluated by analytically calculating the cost to the electricity retailer from adopting this hedging strategy. Electricity retailers can hedge their electricity purchases by purchasing flat load contracts in advance, however, the actual load electricity retailers face varies over time. Thus, electricity retailers may purchase more than their expected load as part of their risk mitigation strategy. The energy purchase cost model developed in 2010 by the Commission and described in detail in the Commission's technical report released March 2010 determined the energy purchase cost for period s as:⁷⁰

$$EPC_s = FP_s \times [(1 - M_s) \times LS_s + M_s \times LR_s]$$

Denote the part of the equation in square brackets as the uplift factor.⁷¹ Then the energy purchase cost is equal to the forward price multiplied by the uplift factor. The uplift factor denotes the cost of hedging an uncertain and variable retail electricity load. Thus the focus of this appendix is on determining an appropriate uplift factor under a price on carbon.

To determine the energy purchase cost in the Commission's model, four factors need to be determined: the forward price, the load shape, the load ratio and the forward price margin.

In 2010 the Commission adopted a method for determining the forward price of wholesale electricity based on electricity futures traded through the Australian Securities Exchange (ASX) as reported by the d-cyphaTrade. As discussed in the body of this report and the recently released draft report the Commission examined carefully whether to continue using this measure of the forward price or to switch to over-the-counter wholesale electricity trading data as reported by ICAP.

The load shape captures the relationship between the spot price for electricity and the load or quantity of electricity demanded for each half-hour period over the course of each period. As stated above it is the ratio of the load-weighted spot price to the time-weighted spot price. If the

⁷⁰ ICRC 2010c. Note that the form of the equation reported here is revised from that reported in the Final Technical Report.

⁷¹ The uplift factor is a linear combination of the load shape and the load ratio. Note that if $M_s = 0$, the uplift factor is equal to the load shape. That is, if the forward price equals the spot price, there is no cost to hedging beyond those costs associated with the load shape. Further note that as M_s gets larger there is more weight placed on the load ratio portion of the uplift factor.

spot price were independent of the level of the electricity load, the load shape should be equal to one. However, the observed outcome (consistent with economic theory) is that higher wholesale prices for electricity are more likely to occur during periods of high demand. Thus, the load shape is usually greater than one. The Commission calculates the load shape using the net system load profile for ActewAGL Distribution as reported by the AEMO.

The load ratio represents the extent by which the electricity retailer hedges the risk it faces in the electricity spot market. The Commission determined in its 2010 final decision to adopt an extremely conservative hedging strategy whereby the electricity retailer purchases forward contracts equal to the observed maximum load plus 10% of the average load. This last portion captures the fact that the observed maximum to date may be less than the true maximum in the future.

The forward price margin represents the extent to which the forward price exceeds the expected spot price. Generally, the observed forward prices exceed the actual spot price due to the nature of the risks faced by market participants in the electricity market and the fact that unlike many commodities electricity is non-storable. This effect – where the forward price declines over time as you get close to the commencement of the futures period – is called being in contango. The Commission assumed that this margin was equal to 5% in its 2010 final decision.

A4.2 Introduction of a price on carbon

The price on carbon is borne by electricity generators based on the carbon intensity of the generators' technology. The price on carbon will have impacts on spot prices as well as forward prices. Thus, the introduction of the price on carbon will potentially affect three of the four components of the Commission's energy purchase cost model, the forward price, the load shape, and the forward price margin. Note that the load ratio depends only on the electricity load and not on the price of electricity; hence there is no direct effect of the price on carbon on this ratio.⁷²

The price on carbon will have an impact on the three components listed above in complex ways. If the price on carbon was directly passed on to retailers and ultimately to electricity consumers as a flat tax per unit of electricity, the Commission could expect that the spot price would increase by that amount in each and every half-hour period given that spot prices are determined on a half hourly basis. However, the price on carbon is attached to the amount of carbon dioxide released in the generation of electricity. Given that different generation technologies generate different levels of carbon emissions per unit of electricity, this complicates the analysis.

Before beginning the modelling extension a distinction needs to be made. That is, the Commission will make a distinction between the price on carbon and the cost of carbon. The 'price on carbon' which is measured in dollars per tonne of carbon emissions refers to the price that generators face per tonne of carbon emitted. In what follows the Commission will use the term the 'cost of carbon' which will be assumed to be measured in dollars per megawatt-hour as the increase in the wholesale price of electricity resulting from the price on carbon.

⁷² If the price of carbon through an increase in the price of electricity has an effect on the demand for electricity there may be indirect effects on the load ratio that will manifest themselves over time.

A4.3 The base case

The place to start the consideration of the effects on the cost of hedging is to consider a common and identical effect of the price on carbon on forward and spot prices. The Commission will call this treatment the base case. Assume that the introduction of a price on carbon results in both the forward and spot price in all time periods rising by exactly the level given by the cost of carbon. This is consistent with what would be expected when a tax on electricity generation is instituted.

There are two forms of electricity forward price contracts, carbon inclusive and carbon exclusive. Carbon inclusive contracts are traded on the ASX futures market and carbon exclusive contracts are traded over the counter and apply the AFMA Carbon Benchmark Addendum (the Addendum) to determine the cost of carbon. ICAP collate data on these over the counter trades and the Commission proposes to adopt the ICAP data as its basis for determining the forward price. Thus, there is a clear starting point for considering the introduction of a price on carbon on the Commission's hedging model.⁷³

Let FP_s^C , $\overline{SP_s^C}$, and $\overline{\overline{SP_s^S}}$, be the carbon inclusive forward price, time-weighted spot price, and load-weighted spot price and under a price on carbon where the following hold:

$$FP_s^C = FP_s + C_s$$

$$\overline{SP_s^C} = \overline{SP_s} + C_s$$

$$\overline{\overline{SP_s^C}} = \overline{\overline{SP_s}} + C_s$$

Where C_s is the cost of carbon. This formulation assumes that the time-weighted spot price, load-weighted spot price and the forward price all increase by the cost of carbon. Denote M_s^C and LS_s^C as the forward price margin and the load shape, respectively, under a price on carbon which are given by:

$$M_s^C = \frac{FP_s^C - \overline{SP_s^C}}{FP_s^C} = \frac{(FP_s + C_s) - (\overline{SP_s} + C_s)}{FP_s + C_s}$$

which can be rewritten as:

$$1 - M_s^C = 1 - \frac{FP_s^C - \overline{SP_s^C}}{FP_s^C} = 1 - \frac{(FP_s + C_s) - (\overline{SP_s} + C_s)}{FP_s + C_s} = \frac{\overline{SP_s} + C_s}{FP_s + C_s}$$

$$LS_s^C = \frac{\overline{\overline{SP_s^C}}}{\overline{SP_s^C}} = \frac{\overline{\overline{SP_s}} + C_s}{\overline{SP_s} + C_s}$$

Finally, denote the carbon inclusive energy purchase cost as EPC_s^C which is given by:

$$EPC_s^C = FP_s^C \times [(1 - M_s^C) \times LS_s^C + M_s^C \times LR_s]$$

Substituting in for the components and their carbon exclusive elements yields:

⁷³ If all prices for electricity were carbon inclusive after 1 July 2012 when the price on carbon begins, the discussion of carbon inclusive and exclusive electricity prices that follows would be made much more difficult as the Commission would need to estimate a cost of carbon. On the other hand, as is described below using historical data based on a pre-price-on-carbon electricity market, this circumstance may provide an upward bias to the true costs of hedging.

$$EPC_s^C = (FP_s + C_s) \times \left\{ \frac{\overline{SP}_s + C_s}{FP_s + C_s} \times \frac{\overline{SP}_s + C_s}{\overline{SP}_s + C_s} + \frac{(FP_s + C_s) - (\overline{SP}_s + C_s)}{FP_s + C_s} \times LR_s \right\}$$

Rearranging the portion inside the brackets yields:

$$EPC_s^C = (FP_s + C_s) \times \left\{ \frac{\overline{SP}_s + C_s}{FP_s + C_s} \times \frac{\overline{SP}_s + C_s}{\overline{SP}_s + C_s} + \frac{FP_s - \overline{SP}_s}{FP_s + C_s} \times LR_s \right\}$$

Multiplying through by the term outside the brackets yields:

$$EPC_s^C = (\overline{SP}_s + C_s) \times \frac{\overline{SP}_s + C_s}{\overline{SP}_s + C_s} + (FP_s - \overline{SP}_s) \times LR_s$$

Resolve the first term:

$$EPC_s^C = \overline{SP}_s + C_s + (FP_s - \overline{SP}_s) \times LR_s$$

This can be reordered as:

$$EPC_s^C = \overline{SP}_s + (FP_s - \overline{SP}_s) \times LR_s + C_s$$

Multiply the first term by $\overline{SP}_s/\overline{SP}_s$ to get:

$$EPC_s^C = \frac{\overline{SP}_s}{\overline{SP}_s} \times \overline{SP}_s + (FP_s - \overline{SP}_s) \times LR_s + C_s$$

Now multiply by FP_s/FP_s which yields:

$$EPC_s^C = FP_s \times \left\{ \frac{\overline{SP}_s}{FP_s} \times \frac{\overline{SP}_s}{\overline{SP}_s} + \frac{(FP_s - \overline{SP}_s)}{FP_s} \times LR_s \right\} + C_s$$

which can be rearranged to:

$$EPC_s^C = FP_s \times \left\{ \left(1 - \frac{(FP_s - \overline{SP}_s)}{FP_s}\right) \times \frac{\overline{SP}_s}{\overline{SP}_s} + \frac{(FP_s - \overline{SP}_s)}{FP_s} \times LR_s \right\} + C_s$$

Plugging in:

$$M_s = \frac{(FP_s - \overline{SP}_s)}{FP_s} \text{ and } LS_s = \frac{\overline{SP}_s}{\overline{SP}_s}$$

yields the final result:

$$EPC_s^C = FP_s \times [(1 - M_s) \times LS_s + M_s \times LR_s] + C_s$$

Thus, the carbon-inclusive energy purchase cost is equal to carbon exclusive energy purchase cost plus the cost of carbon. This result is intuitively appealing. If all prices are to rise by the same cost of carbon, the energy purchase cost should rise by the cost of carbon and no hedging cost should be attached to this portion of the wholesale cost of electricity. Note that this is consistent with the outcome if there were a flat tax on electricity imposed instead of a price on carbon. The conclusion

in this base case is that the uplift factor should be applied only to the carbon–exclusive forward price and not be applied to the cost of carbon.⁷⁴

This formulation of the impact of a price on carbon on the energy purchase cost in this result is made under the restrictive assumption that all prices, spot and forward, rise by the cost of carbon. The next step is to explore the extent to which this assumption is truly restrictive or whether it represents a reasonable assumption for determining the energy purchase cost.

A4.4 Extending the base case

Three questions need to be addressed to determine whether this is a reasonable methodology for determining the carbon–inclusive cost of carbon:

- What is the appropriate measure of C_s ?
- Is it reasonable to assume that the spot price will rise by C_s if the forward price is expected to rise by that amount?
- Is it reasonable to assume that the load weighted and time weighted spot prices will both rise by the same amount C_s ?

An answer to the first question is to use the focal point for the price on carbon which is the product of the price per tonne of carbon by the emission intensity factor as described in the Addendum. This is consistent with the Commission’s shift from using the ASX futures price of electricity to using the over-the-counter ICAP data to model the forward price.

The issue of the measure of the cost of carbon is crucial to whether this model is a reasonable approach. In the discussion that follows the Commission makes the distinction between ex ante and ex post measures of the cost of carbon on the basis of whether or not they are based on spot market prices. The Addendum cost of carbon is an ex ante measure of the cost of carbon as it does not rely on spot market prices. The Addendum cost of carbon does rely on ex post measures of carbon intensity. AEMO calculates the emissions intensity factor on a daily basis as the weighted average of the emissions intensity for each generator.⁷⁵

The impact of the price on carbon as it flows through to the wholesale spot market for electricity will result in an ex post measure of the cost of carbon. Indeed, to be precise, to use this as a measure of the cost of carbon requires making a forecast of this element. Currently, there are no observations of a carbon–inclusive spot price to be able to make any judgements based on the data to infer how much the price on carbon will cause the spot price of electricity to rise. This issue is discussed in further detail after the modelling of the energy purchase cost as part of the determination of the calculation of the hedging costs.

The answer to the second question is dependent on the relationship between forward and spot prices. The Commission assumed in 2010 that there was a 5% margin between the forward and spot prices and this value forms the basis for the determination of the uplift factor applied to the forward price in the Commission’s energy purchase cost model. The relationship between forward and spot prices is a complex relationship that tries to capture the nature of buying a commodity (electricity) in advance whose future spot price is uncertain and volatile. The impact of a price on carbon on these prices should not change the underlying stochastic relationship between forward and futures prices unless there is an expectation that the volatility of spot prices will change. As

⁷⁴ The uplift factor applied to the cost of carbon is equal to 1.

⁷⁵ AEMO 2011.

discussed below there is a theoretical justification that the imposition of a price on carbon may reduce the volatility of the spot price and hence the expected forward price margin. Therefore, retaining the view the Commission adopted in 2010 of adopting a 5% margin appears reasonable today.

The third question is the fundamental issue germane to the analytical modelling presented in this appendix. It is dealt with in detail below. The time-weighted spot price is the average price across all half-hours in a period. The load-weighted spot price weights the average by the amount of electricity sold in the spot market in each half hour. It is the relative change in these measures of the spot prices which is the subject of the analysis below.

The issues raised in the second and third questions discussed above can be examined within the context of the Commission's model. The two effects are addressed in turn and then combined to demonstrate the energy purchase cost model applied to the cost of carbon.

A4.5 Forward to spot price case

The direct effect of the price on carbon on the forward price component is perhaps the easiest effect to anticipate. Without any reason to expect otherwise, the forward price should increase by an amount roughly equal to the expected increase in the spot price due to the imposition of a price on carbon. This relationship is not exact as there may be changes to the risk profile of the carbon-exclusive contracts which will have an impact on the expected forward price for electricity. Additionally, there may be separate time value effects consistent with forward prices being in contango.

First, consider the case where the forward price is expected to rise by C_s and the spot price is expected to rise by factor different from C_s . Assume this takes the following form:

$$FP_s^C = FP_s + C_s$$

$$\overline{SP_s^C} = \overline{SP_s} + \alpha \times C_s$$

$$\overline{\overline{SP_s^C}} = \overline{\overline{SP_s}} + \alpha \times C_s$$

where $\alpha > 0$ denotes proportional rise in the forward price as compared to the spot price. Note that in this case the assumption is maintained that the time-weighted and load-weighted spot prices are rising by the same proportional amount. The simple interpretation of this assumption is that if the forward price is increasing by C_s then the spot price is rising by a proportionally different amount. To simplify the modelling, it has been assumed that the relationship is linear in C_s .

Under this assumption and using the same techniques as applied above, the carbon-inclusive energy purchase cost becomes:

$$EPC_s^C = FP_s \times [(1 - M_s) \times LS_s + M_s \times LR_s] + C_s \times [1 + (1 - \alpha) \times (LR_s - 1)]$$

It is informative to focus on the last part of the right-hand side of the equation within the square brackets, which is the uplift factor attached to the cost of carbon:

$$1 + (1 - \alpha) \times (LR_s - 1)$$

If $\alpha = 1$, then the result derived above is returned. That is, there is no uplift factor to the cost of carbon. If $\alpha < 1$, then an uplift factor would need to be applied to the cost of carbon. For example, if an adjustment is made so that $M_s^C = 0.05$, which implies that $\alpha = 0.95$, then the carbon inclusive energy purchase cost becomes:⁷⁶

$$EPC_s^C = FP_s \times [(1 - M_s) \times LS_s + M_s \times LR_s] + C_s \times (1 + 0.05 \times (LR_s - 1))$$

If the load ratio equals 2.50 then in this example the uplift factor to the cost of carbon would be equal to 1.075, which is much less than the uplift factor applied to the forward price in the 2011–12 review (1.21475).⁷⁷

It is worthwhile to consider the determination of the energy purchase cost under this assumption. In this example the Commission is assuming that the introduction of a price on carbon will result in both the spot price rising by the cost of carbon as well as the load-weighted spot price rising by the same amount. However, in this example the Commission is assuming that the forward price has risen by an amount that retains the forward price margin at 5%. The resulting energy purchase cost has a full uplift factor based on historical data applied to it, whereas the cost of carbon has only a partial uplift.

A4.6 Time-weighted to load-weighted case

The third question can now be analysed: the relationship between time-weighted spot price and the load-weighted spot price. The assumption about the relevant spot and forward prices becomes:

$$FP_s^C = FP_s + C_s$$

$$\overline{SP}_s^C = \overline{SP}_s + C_s$$

$$\overline{\overline{SP}}_s^C = \overline{\overline{SP}}_s + \beta \times C_s$$

where $\beta > 0$ denotes proportional reduction in the load-weighted spot price as compared to the time-weighted spot price (with the time-weighted spot price rising by the same amount as the forward price for this example). Again note that a linear relationship is assumed. If $\beta > 1$, then the assumption would imply that the introduction of a price on carbon would increase the load-weighted spot price by more than the time-weighted spot price and the converse would hold if $\beta < 1$.

Under this assumption and again applying the same technique applied above the carbon inclusive energy purchase cost becomes:

$$EPC_s^C = FP_s \times [(1 - M_s) \times LS_s + M_s \times LR_s] + C_s \times \beta$$

The uplift factor as applied to the cost of carbon is β in this case. As discussed above, the magnitude of β which represents the relative effect of the price on carbon on the time-weighted and load-weighted spot price, is crucial to the analysis. Full interpretation of this result is left to the discussion of the full model. It is worth noting, however, that if $\beta < 1$ holds, the uplift factor on

⁷⁶ If the forward price rises by C_s , the spot price must rise by 0.95 times C_s if the forward price is to retain a 5% margin above the spot price as assumed in 2010.

⁷⁷ ICRC 2011.

the cost of carbon is less than one. That is, the full cost of carbon is not being included in the energy purchase costs.⁷⁸

A4.7 The full model

Now consider the case that combines the assumptions in the two cases considered above. In this case the assumption of the effects of a price on carbon on the resulting spot and forward prices is given by:

$$FP_S^C = FP_S + C_s$$

$$\overline{SP}_S^C = \overline{SP}_S + \alpha \times C_s$$

$$\overline{\overline{SP}}_S^C = \overline{\overline{SP}}_S + \beta \times \alpha \times C_s$$

The assumption maintained in this case is that the price on carbon results in the forward price rising by the cost of carbon. Subsequently, the time-weighted spot price will rise by $\alpha > 0$ proportionally to the cost of carbon and the load-weighted spot price will rise proportionally by the factor $\beta > 0$ as compared to the time-weighted spot price. Thus the load-weighted spot price will rise by the product of the two factors proportional to the cost of carbon as compared to the forward price.

Under this assumption about forward and spot prices and using the same modelling techniques the carbon-inclusive energy purchase cost becomes:

$$EPC_S^C = FP_S \times [(1 - M_S) \times LS_S + M_S \times LR_S] + C_s \times [1 + (1 - \alpha) \times (LR_S - 1) + \alpha \times (\beta - 1)]$$

The uplift factor that is applied to the cost of carbon, which is the portion inside the second square brackets, is more complex than above:

$$1 + (1 - \alpha) \times (LR_S - 1) + \alpha \times (\beta - 1)$$

The magnitude of this uplift factor depends on the relative size of α , β and the load ratio. If $\alpha = \beta = 1$, then the uplift factor is equal to 1. This is consistent with the base case results. There is one set of parameter values that generates the same uplift factor for both the forward price and the cost of carbon. Suppose that $\alpha = 0.95$ (which implies that $M_S^C = 0.05$) and $\beta = LR_S$. In this case all post-carbon prices have maintained their respective ratios at their pre-carbon levels. Note that this requires the load-weighted spot price to rise by approximately 16% more than the time-weighted spot price as the historical load shape is about 1.16.⁷⁹ The resulting outcome for the energy purchase cost is:

$$EPC_S^C = FP_S \times [(1 - M_S) \times LS_S + M_S \times LR_S] + C_s \times [(1 - M_S) \times LS_S + M_S \times LR_S]$$

The uplift factor applied to the cost of carbon is the same uplift factor applied to the carbon-exclusive forward price. This is intuitively appealing as it demonstrates that if all prices (spot and forward) maintain their relative ratio, the full uplift factor is applied to the carbon-inclusive

⁷⁸ This does not imply that the full energy purchase cost is being granted. Rather, it represents the fact that the historic load shape based solely on pre-price on carbon data is greater than the anticipated future load shape based on spot prices that incorporate the price on carbon.

⁷⁹ In the discussion on the relationship between time-weighted and load-weighted spot prices the Commission comes to the view that $\beta < 1$ holds and this example, while resulting in a full uplift applied to the cost of carbon, is not consistent with the Commission's view on the workings of the wholesale electricity spot market.

forward price. As noted previously, the load-weighted spot price is not expected to rise more than the time-weighted spot price.

Two issues can now be discussed in detail to make an assessment of the application of hedging costs to the cost of carbon: the ex ante versus ex post cost of carbon and the relationship between the time-weighted and load-weighted spot prices.

A4.8 The ex ante versus ex post cost of carbon

The Commission has decided to use the ex ante measure of the cost of carbon given by the Addendum. This is calculated by multiplying the prescribed price on carbon by the emissions intensity factor. The alternative is to determine a cost of carbon based on the expected impact of the price on carbon on the spot market which is an ex post measure of the cost of carbon.

In the final technical report on the energy purchase cost the Commission listed principles that an energy purchase cost methodology should possess. These principles are:

- The model should be simple, transparent and predictable.
- The model should provide an unbiased estimate of energy purchase costs.
- Outputs from the model should be replicable.

The ex ante measure clearly satisfies the first and third principles as it is based on publicly available information, is easy to calculate and should not vary greatly over time. On the other hand, an estimate of the ex post cost of carbon is highly subjective at this time given the absence of any data to base a forecast on. Even after several years of spot market operation under a price on carbon it will be difficult to separate out the ‘true’ cost of carbon. Thus, it is likely that an expected ex post measure of the cost of carbon will fail all three principles stated above.

Therefore, the main concern is that the ex ante measure provides a biased estimate of the energy purchase cost. The concern is that it overstates the effect of the price on carbon on the spot market price. Again, given the lack of any evidence to test this issue the Commission’s view is that the ex ante measure should be utilised now. There is comfort in the fact that this represents ActewAGL’s stated hedging strategy in that the over-the-counter market has separated the carbon exclusive price of electricity from the cost of carbon. Thus, the Commission is satisfied that using the Addendum measure of the cost of carbon is reasonable.

A4.9 Relationship between time-weighted and load-weighted spot prices

There are several steps that will be taken to analyse the relationship between the time-weighted and load-weighted spot prices and their relationship to the price on carbon. The analysis in the modelling described above boils down to a determination of the magnitude of the two parameters used to model the relative price changes between the forward, time-weighted spot price and the load-weighted spot price. These parameters, denoted α and β above, capture the relationship between the forward and time-weighted spot price and the relationship between the time-weighted and load-weighted spot prices, respectively.

The Commission’s view is that in the absence of evidence to the contrary there is no reason to change the level of forward price margin. As shown in the modelling this results on its own in a

small uplift factor (slightly greater than one but below the uplift factor on the forward price) attached to the cost of carbon. That is, $\alpha = 0.95$ is a reasonable value.

Recall the uplift factor determined for the full model:

$$1 + (1 - \alpha) \times (LR_s - 1) + \alpha \times (\beta - 1)$$

Notice that if $\beta > 1$, the last term provides a positive contribution to the uplift factor and if $\beta < 1$ there is a negative contribution. Examining the operation of the wholesale electricity market and the determination of the half-hourly spot price for electricity can provide a guide to the relative changes to these two measures.

When electricity is being produced in periods of low demand, coal fired power plants with the highest carbon emissions per MW of electricity generated effectively set the price of electricity. Thus, the expected increase in the wholesale price of electricity due to the imposition of a price on carbon would be equal to the price on carbon multiplied by the carbon intensity of coal.⁸⁰ On the other hand, when gas fired power plants with lower carbon intensities are the generators that directly affect the spot price the impact of the carbon price will be less.⁸¹ Gas fired power plants are more likely to be pivotal in setting the spot price during shoulder and peak periods when demand is higher. Thus, during periods of higher demand the impact of the price on carbon on the wholesale price of electricity should be smaller than during off-peak periods. Finally, there are critical peak periods where the demand for electricity approaches the engineering limits of the power network to provide electricity. During these periods the spot price of electricity can rise to \$12,500 per MWh as compared to the usual range of \$20 to \$40 per MWh. It is unlikely that the price on carbon would have any impact on the resulting price of electricity during critical peak periods. The conclusion is that the expected increase in the time-weighted spot price should exceed the expected increase in the load-weighted spot price.

Some additional intuition can be provided by considering an alternative charge to the price on carbon. Suppose that there was a flat tax levied per megawatt hour of electricity that therefore increased the price of wholesale electricity by a fixed amount in every half hour as described above. Thus, the time-weighted and load-weighted spot prices would both rise by the amount of the tax on electricity. The load shape is a ratio of these two averages, which is generally greater than one. This results in the pre-price on carbon load shape being greater than the carbon inclusive load shape.⁸² This tax is different from the price on carbon in that the tax results in the wholesale price of electricity rising by the same amount in every half hour whereas the price on carbon results in wholesale price of electricity rising by different amounts depending on how the price on carbon affects the generator that is pivotal for determining the wholesale price.

The conclusion is that the load-weighted spot price should rise less than the time-weighted spot price. This supports the conclusion that $\beta < 1$ is more likely as applied in the uplift factor given above. Inspecting the uplift factor with respect to the terms depending on the parameters α and β it can be seen that $\beta < 1$ results in a countervailing effect to the effect resulting from maintaining the assumption of $\alpha = 0.95$. If $\alpha = 0.95$ and $LR_s = 2.50$ then $\beta = 0.921$ would result in the uplift factor on the cost of carbon equal to one.

⁸⁰ Given that the ACT's reference price for electricity is the New South Wales region it is safe to assume that this intensity relates to the carbon intensity of black coal which is commonly used a fuel source in New South Wales.

⁸¹ Note that gas fired power plants generally have higher marginal costs of operation than coal fired power plants and are easier to dispatch on short notice than coal fired power plants. Thus, the underlying spot price of electricity rises with increases in demand.

⁸² This result follows from the simple mathematical principle: for $a > 0$ and $b > 0$, if $\frac{a}{b} > 1$ and $c > 0$ then $\frac{a}{b} > \frac{a+c}{b+c}$.

The magnitude of β is unknown and there is limited evidence on which to base a precise judgement. However, it is reasonable to consider alternative measures as proxies for the parameter β . The carbon cost pass-through rate is a commonly used measure of the portion of the price on carbon reflected in wholesale electricity prices. Frontier Economics in a supporting report to the Australian Energy Market Commission's review of the impact of climate change policies on energy markets completed in October 2009 found that 60% to 80% of generator carbon costs will be passed on to retailers.⁸³

For the carbon pass-through rate to be well less than 100% there must be many half-hour periods during the year in which the generator that is pivotal in determining the wholesale price of electricity is a generator with relatively low carbon costs. It is during these periods that carbon intensive generators, such as coal-fired power plants, are bearing a cost of carbon much greater than the increase in wholesale prices attributable to the price on carbon. This is consistent with the conclusion that $\beta < 1$ holds. The carbon pass-through rate is not a perfect measure of the parameter β as each measures a different aspect of the impact of the price on carbon, but there is enough similarity that they could be viewed as proxies for one another.

Given that the wholesale market for electricity has not operated under the carbon pricing regime to date the Commission is forced to make a judgement on the impact. Thus, the Commission considers that a reasonable outcome would be to set the uplift factor on the cost of carbon equal to one consistent with the Commission's conservative approach taken elsewhere in the energy purchase cost model.

A4.10 Final consideration

This appendix has extended the Commission's energy purchase cost model to incorporate the recently enacted legislation on the price on carbon. The Commission's determination is that the hedging costs should be determined by the equation:

$$EPC_s^C = FP_s \times [(1 - M_s) \times LS_s + M_s \times LR_s] + C_s$$

The uplift factor will be applied only to the carbon exclusive forward price for electricity and no uplift factor will be applied to the cost of carbon as determined under the Addendum.

There is an implication for future determinations of the energy purchase cost. Future calculations of the load shape need to be based on the carbon exclusive price to maintain intertemporal consistency. The mechanism for making this calculation should be to subtract the ex ante cost of carbon from all half-hour spot prices before calculating the load shape. This will result in future quarterly load shape values that are consistent with past values.⁸⁴

⁸³ Frontier Economics 2009, p. 10.

⁸⁴ Note that an alternative approach would have been to adjust the historical load shape values by adding a cost of carbon to the time-weighted and load-weighted spot prices and applying the uplift factor to the carbon inclusive forward price.

Appendix 5 Energy purchase cost final data inputs

Table A5.1 Quarterly load shape, 2003–04 through 2011–12

Year	Q3	Q4	Q1	Q2
2003-04	1.251	1.043	1.192	1.104
2004-05	1.148	1.164	1.207	1.082
2005-06	1.114	1.149	1.360	1.145
2006-07	1.161	1.080	1.207	1.387
2007-08	1.134	1.075	1.105	1.100
2008-09	1.123	1.096	1.294	1.119
2009-10	1.086	1.254	1.254	1.109
2010-11	1.067	1.024	1.561	1.036
2011-12	1.047	1.032		
Average 2003 through 2011	1.136	1.111	1.231	1.150
Average 2003 through 2012	1.126	1.102	1.273	1.135

Table A5.2 Quarterly maximum load to average load ratio, 2003–04 through 2011–12

Year	Q3	Q4	Q1	Q2
2003-04	1.786	2.156	1.702	2.013
2004-05	1.828	1.905	1.724	2.108
2005-06	1.808	1.960	1.888	2.063
2006-07	1.768	1.801	1.885	2.148
2007-08	1.927	1.708	1.891	1.863
2008-09	1.746	1.821	2.250	2.061
2009-10	1.764	2.172	2.236	2.196
2010-11	1.754	1.975	2.440	2.115
2011-12	1.868	2.137		
Maximum 2003 through 2011	1.927	2.172	2.250	2.196
Maximum 2003 through 2012	1.927	2.172	2.440	2.196
Load ratio 2011-12	2.027	2.272	2.350	2.296
Load ratio 2012-13	2.027	2.272	2.540	2.296

Table A5.3 Average load, 2003–04 through 2011–12 (MW)

Year	Q3	Q4	Q1	Q2
2003-04	109.62	71.38	64.91	93.95
2004-05	108.85	68.53	65.91	90.06
2005-06	110.76	70.95	70.79	104.10
2006-07	109.66	70.49	70.77	95.03
2007-08	111.00	68.84	68.34	94.74
2008-09	114.40	67.69	70.95	96.66
2009-10	109.03	73.94	68.54	94.25
2010-11	111.75	66.59	63.06	94.55
2011-12	102.113	62.356		
Average 2003 through 2011	110.633	69.803	68.602	95.539
Average 2003 through 2012	109.69	68.98	67.91	95.42
Load weights 2003 through 2011	0.321	0.203	0.199	0.277
Load weights 2003 through 2012	0.321	0.202	0.199	0.279

Appendix 6 LGC and STC prices

Figure A6.1 shows LGC daily spot prices as reported by ICAP since their introduction.

Figure A6.1 ICAP LGC spot price 1 January 2011 to 31 May 2012



Figure A6.2 shows STC daily spot prices as reported by ICAP since their introduction.

Figure A6.2 ICAP STC spot price 1 January 2011 to 31 May 2012



Appendix 7 Extracts from the ICRC Act

15 Nature of industry references

- (1) A referring authority may provide an industry reference to the commission in relation to any of the following matters:
 - (a) prices for regulated services;
 - (b) competition within a regulated industry;
 - (c) any other matter in relation to a regulated industry;
 - (d) any matter in relation to regulated industries in general;
 - (e) any other matter in relation to an industry, or industries in general;
 - (f) any matter provided for by another law of the Territory.
- (2) The fact that a price direction is in force in relation to a regulated industry does not preclude a further investigation of prices in the industry, or the making of a new price direction in relation to prices in the industry.
- (3) An industry reference may limit the scope of the investigation and report to a particular aspect of the regulated industry, or to a particular period during which the industry has been operating, or in any other matter.
- (4) An industry reference may relate to a number of goods or services supplied by the same or different suppliers.
- (5) An industry reference may be withdrawn or amended by the referring authority at any time before the commission has delivered its report to the person.
- (6) If an industry reference is amended or withdrawn, the referring authority must prepare a written notice setting out the reasons for the amendment or withdrawal.
- (7) The referring authority must give a copy of the notice to the commission.
- (8) The notice is a notifiable instrument.

Note A notifiable instrument must be notified under the Legislation Act.

16 Terms of industry references

- (1) The referring authority may determine terms of reference for an investigation on an industry reference.
- (2) The terms of reference may include 1 or more of the following:
 - (a) a specification of a period within which a report is required to be submitted to the referring authority;
 - (b) a requirement that the commission consider specified matters;
 - (c) except in relation to price regulation, the making of a price direction and any related investigation and report—a requirement that the commission exercise its functions subject to any subsequent written direction of the authority.
- (3) A determination under subsection (1) is a disallowable instrument.

Note A disallowable instrument must be notified, and presented to the Legislative Assembly, under the Legislation Act.

- (4) A referring authority must cause a direction mentioned in subsection (2) (c) to be presented to the Legislative Assembly within 6 sitting days after it is given.

20 Directions about prices

- (1) At the conclusion of an investigation on a reference authorising the commission to make a price direction in a regulated industry, the commission must decide on the level of prices for services in relation to the period specified in the reference and give a price direction accordingly to each person providing regulated services.
- (2) In making a decision under subsection (1), the commission must have regard to—
 - (a) the protection of consumers from abuses of monopoly power in terms of prices, pricing policies (including policies relating to the level or structure of prices for services) and standard of regulated services; and
 - (b) standards of quality, reliability and safety of the regulated services; and
 - (c) the need for greater efficiency in the provision of regulated services to reduce costs to consumers and taxpayers; and
 - (d) an appropriate rate of return on any investment in the regulated industry; and
 - (e) the cost of providing the regulated services; and
 - (f) the principles of ecologically sustainable development mentioned in subsection (5);
 - (g) the social impacts of the decision; and
 - (h) considerations of demand management and least cost planning; and
 - (i) the borrowing, capital and cash flow requirements of people providing regulated services and the need to renew or increase relevant assets in the regulated industry; and
 - (j) the effect on general price inflation over the medium term; and
 - (k) any arrangements that a person providing regulated services has entered into for the exercise of its functions by some other person.
- (3) Also, in making a decision under subsection (1), the commission must allow a declared fee under section 4C (Declared fees to be passed on to consumers) to be passed on in full to consumers of the service.
- (4) In a price direction, the commission must indicate to what extent it has had regard to the matters referred to in subsection (2).
- (5) For subsection (2) (f), *ecologically sustainable development* requires the effective integration of economic and environmental considerations in decision-making processes through the implementation of the following principles:
 - (a) the precautionary principle—that if there is a threat of serious or irreversible environmental damage, a lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
 - (b) the inter-generational equity principle—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
 - (c) conservation of biological diversity and ecological integrity;
 - (d) improved valuation and pricing of environmental resources.

Abbreviations and acronyms

ABS	Australian Bureau of Statistics
ACAT	ACT Civil and Administrative Tribunal
ACB	Australian Carbon Benchmark
ACG	Allen Consulting Group
ACT	Australian Capital Territory
ACTCOSS	ACT Council of Social Services
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AFMA	Australian Financial Markets Association
ASX	Australian Securities Exchange
CARC	customer acquisition and retention costs
CFCS	Care Financial Counselling Services
CER	Clean Energy Regulator
CO ₂ -e	carbon dioxide equivalent
Commission	Independent Competition and Regulatory Commission
CPI	consumer price index
CPI	consumer price index
CSD	Community Services Directorate
ESDD	Environment and Sustainable Development Directorate
FaHCSIA	Department of Families, Housing, Community Services and Indigenous Affairs
ICAP	ICAP Energy Australia
ICRC	Independent Competition and Regulatory Commission
ICRC Act	<i>Independent Competition and Regulatory Commission Act 1997 (ACT)</i>
IPART	Independent Pricing and Regulatory Tribunal of New South Wales
kW	kilowatt
LGC	large-scale generation certificate
LRET	Large-scale Renewable Energy Target

MAR	Maximum Average Revenue
MWh	megawatt hour
NEM	National Electricity Market
OTC	over the counter
RET	Renewable Energy Target
RPP	Renewable Power Percentage
SFE	Sydney Futures Exchange
SRES	Small-scale Renewable Energy Scheme
STC	small-scale technology certificate
STP	Small-scale Technology Percentage

References

ACAT, see ACT Civil and Administrative Tribunal.

ACG, see Allen Consulting Group.

ACT Civil and Administrative Tribunal 2012, *Response to Draft Report – Report No 2 of 2012: Retail prices for franchise electricity customers 2012-14*, Submission 9, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0006/248145/Submission9_7_May_2012_ACAT.pdf>.

ACT Council of Social Services Inc. 2012, *Draft report: Retail prices for franchise customers 2012-14*, Submission 10, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0010/248158/Submission10_7_May_2012_ACTCOSS.pdf>.

ACT Government 2012, ‘Assistance – Outreach Energy and Water Efficiency’, 26 April, see <http://www.assistance.act.gov.au/adult/utilities/outreach_energy_and_water_efficiency>.

ACTCOSS, see ACT Council of Social Services Inc.

ActewAGL Retail 2012, *Retail prices for non-contestable electricity customers 2012–2014: ActewAGL Retail Response to the Independent Competition and Regulatory Commission Draft Report*, Submission 11, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0010/248239/Submission_11_of_2012_ActewAGL.pdf>.

AEMO, see Australian Energy Market Operator.

AFMA, see Australian Financial Markets Association.

AGL, see AGL Energy Limited.

AGL Energy Limited 2012, *Re: Draft Report – Retail prices for non-contestable electricity customers 2012-14*, Submission 12, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0020/248240/Submission_12_of_2012_AGL_Retail.pdf>.

Allen Consulting Group 2012, *Calculating the CARC for an efficient full-market electricity retailer in the ACT*, Submission 11 Attachment, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0008/248237/ACG_report_Calculating_CARC_att_for_Actewagl.pdf>.

Australian Energy Market Operator 2011, *Carbon Dioxide Equivalent Intensity Index Procedure*, see <http://www.aemo.com.au/en/Electricity/Settlements/~/_media/Files/Other/electricityops/0910-0009%20pdf.ashx>.

— 2012a, *Carbon Dioxide Equivalent Intensity Index*, see <<http://www.aemo.com.au/en/Electricity/Settlements/Carbon-Dioxide-Equivalent-Intensity-Index>>.

— 2012b, *Distribution Loss Factors for the 2012/13 financial year*, 30 March, see <http://www.aemo.com.au/en/Electricity/Market-and-Power-Systems/Loss-Factors-and-Regional-Boundaries/~/_media/Files/Other/electricityops/0171-0012%20pdf.ashx>.

— 2012c, *List of regional boundaries and marginal loss factors for the 2012-13 financial year*, 5 May, see <<http://www.aemo.com.au/en/Electricity/Market-and-Power-Systems/Loss-Factors-and-Regional-Boundaries/~media/Files/Other/loss%20factors/01720014.ashx>>.

Australian Financial Markets Association 2012, *The AFMA Carbon Benchmark Addendum explained*, May, see <http://www.afma.com.au/afmawr/_assets/main/lib90047/ca%20website%20note%20v4.pdf>.

Care Inc. Financial Counselling Service 2012, *Submission to ICRC – Draft Report: Retail prices for franchise electricity customers 2012-14*, Submission 8, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0003/247980/Submission8_1_May_2012_CFCS.pdf>.

CER, see Clean Energy Regulator.

CFCS, see Care Inc. Financial Counselling Service.

Chief Minister and Cabinet Directorate 2012, ‘ACT Targeted Assistance Strategy – Background’, *ACT Government*, 24 Apr, see <<http://www.cmd.act.gov.au/policystrategic/archive/targetedassistance>>.

Clean Energy Regulator 2012a, ‘Renewable Power Percentage’, *Australian Government*, 29 May, see <<http://ret.cleanenergyregulator.gov.au/For-Industry/Liable-Entities/rpp>>.

— 2012b, ‘Small-scale Technology Percentage’, *Australian Government*, 29 May, see <<http://ret.cleanenergyregulator.gov.au/For-Industry/Liable-Entities/stp>>.

CMCD, see Chief Minister and Cabinet Directorate.

Community Services Directorate 2012, ‘Energy Concession’, *ACT Government*, 21 Mar, see <http://www.dhcs.act.gov.au/wac/concessions/energy_concession>.

Cox, L 2012, “Energy efficiency drive is ‘big business welfare’”, *Canberra Times*, 4 May, see <<http://www.canberratimes.com.au/act-news/energy-efficiency-drive-is-big-business-welfare-20120503-1y1z7.html>>.

CSD, see Community Services Directorate.

Department of Families, Housing, Community Services and Indigenous Affairs 2012, ‘Clean Energy Future – Household Assistance Package’, *Australian Government*, 9 May, see <<http://www.fahcsia.gov.au/about/benefits/Pages/CleanEnergyFuture%E2%80%93HouseholdAssistancePackage.aspx>>.

Energy Efficiency (Cost of Living) Improvement Act 2012, Australian Capital Territory A2012-17, see <<http://www.legislation.act.gov.au/a/2012-17/current/pdf/2012-17.pdf>>.

Environment and Sustainable Development Directorate 2012a, ‘Energy Efficiency’, *ACT Government*, 10 Apr, see <http://www.environment.act.gov.au/energy/energy_efficiency>.

— 2012b, *Energy Efficiency Improvement Scheme – Regulatory Impact Statement*, ACT Government, see <http://www.environment.act.gov.au/__data/assets/pdf_file/0003/244434/Energy_Efficiency_Improvement_Bill_-_Regulatory_Impact_Statement_2012.pdf>.

ESDD, see Environment and Sustainable Development Directorate.

FaHCSIA, see Department of Families, Housing, Community Services and Indigenous Affairs.

Frontier Economics 2009, *Impacts of climate change policies on electricity retailers—a report prepared for the Australian Energy Market Commission*, see

<<http://www.aemc.gov.au/Media/docs/Frontier%20Economics%20-%20Generator%20Impacts%20-%20Final%20Report%20-%20Public%20Version-6ed86612-779f-4e82-ab0b-4354773fc3b4-0.pdf>>.

Gallager, K 2012, 'Targeted Assistance Strategy', *ACT Chief Minister – Blog*, 9 May, see <<http://www.katygallagher.net/?p=1159>>.

ICRC, see Independent Competition and Regulatory Commission.

Independent Competition and Regulatory Commission (Price Direction for the Supply of Electricity to Franchise Customers) Terms of Reference Determination 2011, Australian Capital Territory Disallowable Instrument DI2011–261, see <<http://www.legislation.act.gov.au/di/2011-261/current/pdf/2011-261.pdf>>.

Independent Competition and Regulatory Commission 2003, *Final determination—investigation into retail prices for non-contestable electricity customers in the ACT*, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0009/16677/finaldeterminationretailpricesmay2003cw.pdf>.

— 2006, *Final report—retail prices for non-contestable electricity customers*, Report 8/2006, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0018/22572/Report_8_of_2006.pdf>.

— 2007, *Final report and price direction—retail prices for non-contestable electricity customers*, Report 7/2007, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0004/113773/2007report07_web1.pdf>.

— 2008, *Final decision and price direction—retail prices for non-contestable electricity customers*, Report 4/2008, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0006/113766/Final_Report_No_4_08-06-20_TFT.pdf>.

— 2009a, *Final decision—retail prices for non-contestable electricity customers 2009–2010*, Report 3/2009, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0005/152636/Report_3_of_2009_5_Jun_2009_Web.pdf>.

— 2009b, *Issues Paper—model for determining the energy purchase cost component of the transitional franchise tariff*, Report 7/2009, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0006/166911/Report_7_of_2009_October_2009.pdf>.

— 2010a, *Draft decision—retail prices for non-contestable electricity customers 2010–12*, Report 5/2010, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0008/193688/Report_5_of_2010_16_April_2010.pdf>.

— 2010b, *Final decision—retail prices for non-contestable electricity customers 2010–2012*, Report 7/2010, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0018/194310/Report_7_of_2010_11_June_2010.pdf>.

— 2010c, *Final technical paper—model for determining the energy purchase cost of the transitional franchise tariff*, Report 3/2010, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0009/184878/Report3_2010_Technical_Paper_Final_ICRC_Web.pdf>.

— 2011, *Final decision—retail prices for non-contestable electricity customers 2011–12*, Report 3/2011, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0010/227908/2011-12_Electricity_Rpt3_of_2011_20June11.pdf>.

— 2012, *Draft report—retail prices for non-contestable electricity customers 2012–14*, Report 2/2012, see <http://www.icrc.act.gov.au/__data/assets/pdf_file/0009/245655/Report_2_of_2012_April_2012.pdf>.

Independent Competition and Regulatory Commission Act 2007 (ICRC Act 2007), Australian Capital Territory A1997-77, see <<http://www.legislation.act.gov.au/a/1997-77/current/pdf/1997-77.pdf>>.

Independent Pricing and Regulatory Tribunal 2012, *Electricity – Draft Report: Changes in regulated electricity retail prices from 1 July 2012*, see <http://www.ipart.nsw.gov.au/files/53a0236f-f94e-4148-9740-a03100a00b15/Draft_Report_-_Changes_in_regulated_electricity_retail_prices_from_1_July_2012_-_April_2012.pdf>.

IPART, see Independent Pricing and Regulatory Tribunal.

Phillips, B 2012, *An independent analysis of the carbon pricing Household Assistance Package*, NATSEM Seminar Series, University of Canberra, see <http://www.canberra.edu.au/centres/natsem/publications?sq_content_src=%2BdXJsPWh0dHAlM0EIMkYIMkZ6aWJvLndpbi5jYW5iZXJyYS5lZHUuYXUIMkZuYXRzZW0lMkZpbmRleC5waHAlM0Ztb2RlJTNEcHVibGljYXRpb24lMjZwdWJsaWNhdGlvbiUzRDE0MzcmYWxsPTE%3D>.

Utilities (Variation of Terms—ActewAGL Retail Standard Customer Contract) Approval Notice 2010, Australian Capital Territory Notifiable Instrument NI2010-290, see <<http://www.legislation.act.gov.au/ni/2010-290/current/pdf/2010-290.pdf>>.