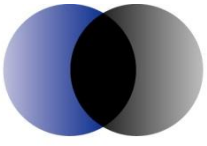
Confidential

ACIL Tasman's methodology for estimating energy costs

Response to commentary by Frontier Economics

Prepared for Queensland Competition Authority

16 April 2013



ACIL Tasman

Economics Policy Strategy

ACIL Tasman Pty Ltd

ABN 68 102 652 148
Internet www.aciltasman.com.au

Melbourne (Head Office)
Level 4, 114 William Street
Melbourne VIC 3000

Telephone (+61 3) 9604 4400
Facsimile (+61 3) 9604 4455
Email melbourne@aciltasman.com.au

Brisbane
Level 15, 127 Creek Street
Brisbane QLD 4000
GPO Box 32
Brisbane QLD 4001

Telephone (+61 7) 3009 8700
Facsimile (+61 7) 3009 8799
Email brisbane@aciltasman.com.au

Canberra
Level 2, 33 Ainslie Place
Canberra City ACT 2600
GPO Box 1322
Canberra ACT 2601

Telephone (+61 2) 6103 8200
Facsimile (+61 2) 6103 8233
Email canberra@aciltasman.com.au

Perth
Centa Building C2, 118 Railway Street
West Perth WA 6005

Telephone (+61 8) 9449 9600
Facsimile (+61 8) 9322 3955
Email perth@aciltasman.com.au

Sydney
Level 20, Tower 2 Darling Park
201 Sussex Street
Sydney NSW 2000
GPO Box 4670
Sydney NSW 2001

Telephone (+61 2) 9389 7842
Facsimile (+61 2) 8080 8142
Email sydney@aciltasman.com.au

For information on this report

Please contact:

Paul Hyslop
Telephone 07 3009 8700
Mobile 0417 392 079
Email p.hyslop@aciltasman.com.au

Contributing team members

Marcus Randell

Executive summary

The Energy Retailers Association of Australia and the Energy Supply Association of Australia provided a submission to the QCA titled *Commentary on ACIL Tasman's approach for measuring energy costs* by consultant Frontier Economics (FE) in March 2013. The submission presents a critique of ACIL Tasman's market based approach to measuring energy costs and takes an adverse view of the approach. Consequently the submission recommends two alternative methods to modifying ACIL Tasman's method to overcome the difficulties that FE considers exist with the approach.

FE has three main criticisms of the report:

- that its adoption would discourage investment in generation by retailers and reduce economic welfare
- that ACIL Tasman ignores the legitimate generation and tolling costs incurred by electricity retailers in the normal course of their business
- that ACIL Tasman misunderstands how LRMC should be calculated if it is to be applied.

As set out in the discussion throughout our report, there are a number of flaws in the FE analysis in relation to a number of key matters of which some of the more obvious include:

- an apparent failure to recognise that retailers are margin businesses operating in a competitive wholesale market
- an apparent misunderstanding of the incentives on retailers (and other investors) to invest in generation options
- a willingness to believe that retailers investing in generation may somehow appropriate any resulting lowering of wholesale market prices rather than be forced through competition to pass the lower prices onto their electricity customers
- an apparent misunderstanding of the difference between the sunk and average costs of investments in generation and power purchase agreements and the current market value of those investments
- an apparent lack of appreciation that complex hedging arrangements can be represented through a combination of standard hedging arrangements.

These flaws in their analysis are central in FE coming to its adverse view of the ACIL Tasman approach and on our reading of the submission, correcting these errors removes the basis for Frontier Economics taking this adverse view.

In our view, FE has failed to identify any serious flaws in ACIL Tasman's method for determining an energy-cost allowance to be included in regulated retail prices in Queensland:

- Its contention that adoption of the ACIL Tasman approach would discourage efficient investment by retailers in generation is based on an invalid assumption that a retailer investing in generation would appropriate the benefits of lower wholesale electricity prices rather than be forced to pass them on to customers as a consequence of wholesale and retail market competition. Moreover, FE's discussion fails to recognise that regulation can just as easily encourage inefficient investment as discourage efficient investment. In our view, the adoption of either of the procedures that FE favours in place of ACIL Tasman's methodology may encourage inefficient investment.
- In arguing for the explicit inclusion of the historical costs of PPAs and retailer-owned generation in the energy-cost estimate, FE overlooks a number of practical difficulties associated with the appropriate valuation of such long dated assets for the purposes of estimating energy costs in a particular year.
- In its discussion of ACIL Tasman's comments on the use of LRMC, FE does not address the three main points that we make in the sections of our report that it cites. These are:
  - our general reasons for not using an estimate based on LRMC
  - the need to specify an LRMC method if it is to be used (especially to choose between green-fields and brown-fields approaches)
  - our contention that brown-fields estimates of LRMC would be low in current market conditions.

In our view, neither of FE's proposed alternatives to the adoption of the ACIL Tasman approach is attractive.

- The first – to include explicit consideration of a wider range of hedging instruments (including generation options) is based on an unrealistic assessment of the effects of retail-price regulation on retailer behaviour in the current Queensland environment and an incorrect assessment of how those hedging instruments should be valued in the particular year in question.
- The second – to use a floor between the market based approach and LRMC, while primarily a matter for the QCA, would arbitrarily limit to the floor, the estimation of actual energy cost of retailers in supplying customer retail services to non-market customers through the NEM.

Contents

Executive summary ii

1 Introduction 1

2 Consideration of FE arguments 2

2.1 Investment incentives 2

2.2 PPAs, generation costs and tolling costs ignored 4

2.2.1 Rationale for generation options investment 5

2.3 LRMC 7

2.4 FE's proposals to modify the ACIL Tasman approach 8

3 Conclusion 10

4 References 11

Appendix A Background material A-1

1 Introduction

ACIL Tasman has been contracted by the QCA to provide expert advice on the energy-cost allowance to be included in regulated retail electricity prices for the year 2013-14. Small retail customers outside South-East Queensland (SEQ) are not able to access competitive retail offers and so are all supplied at regulated tariffs. Customers within SEQ can access competitive offers but, for their own reasons, many have chosen to remain on regulated tariffs.

ACIL Tasman has been provided with a paper prepared by consultant Frontier Economics (FE) titled *Commentary on ACIL Tasman's approach for measuring energy costs* dated March 2013. We understand this was submitted to the QCA jointly by the Energy Retailers Association of Australia (ERAA) and the Energy Supply Association of Australia (esaa). The FE *Commentary*, as we understand it, relied on the ACIL Tasman report, *Estimated energy costs for use in 2013-14 electricity retail tariffs* published in December 2012. We understand that the ERAA and esaa are happy for the FE *Commentary* to be released publicly. We request that this response be released along with the *Commentary*.

The *Commentary* (p. 2) states that FE has "formed an adverse view of ACIL Tasman's recommended approach". FE subsequently recommends two alternative approaches:

- a "modified market based approach" under which energy-cost allowances "include a wider range of energy hedging options and properly specify the services they each provide retailers" (*Commentary*, p. 13)
- a "modified form of regulation" where "wholesale energy costs are based on generation costs" (*Commentary*, p. 14).

This paper reviews the FE *Commentary* to assess whether FE's objections to ACIL Tasman's approach are sound and whether either of FE's recommended alternative approaches would improve the current ACIL Tasman methodology. It is structured as follows:

- Section 2 considers the arguments made by FE and provides our responses.
- Section 3 contains our conclusions.
- An Appendix sets out some background material with the aim of clarifying a number of important matters that have formed part of the broader debate over the ACIL Tasman process including:
  - the policy context of the process and ACIL Tasman's specified role
  - a short review of the NEM institutional arrangements relevant to the issues considered
  - various matters relevant to considering the treatment of non-standard hedging arrangements.

2 Consideration of FE arguments

It is apparent on reading the *Commentary* that FE has three material objections to ACIL Tasman's approach:

- that its adoption would discourage investment in generation by retailers and reduce economic welfare
- that ACIL Tasman ignores the legitimate generation and tolling costs incurred by electricity retailers in the normal course of their business
- that ACIL Tasman misunderstands how LRMC should be calculated if it is to be applied.

In subsections 2.1–2.3 (below), we explain why we do not accept FE's arguments on these three issues. Finally, in subsection 2.4, we consider and reject both of the proposed FE modifications to the ACIL Tasman approach.

2.1 Investment incentives

FE's main objection to the ACIL Tasman method appears to be that its adoption could discourage retailers from investing in generation and that this would reduce economic welfare:

> … *we will explain why ACIL Tasman's logic for disregarding generation costs is incorrect and how the translation of this flawed logic into a regulated retail price could distort the incentives to make investments in new generation capacity. … this is likely to result in a loss of economic welfare.* (*Commentary*, page 5)

The details of the FE objection are set out on pages 8-11 of the *Commentary*. There a number of difficulties with FE's investment analysis, correction of which obviates FE's conclusions.

FE states:

> …*a retailer will compare the wholesale energy purchase costs it would face in the absence of making the generation investment to the energy purchase costs it would face if it did make the investment. If the savings in the retailer's wholesale energy purchase costs exceed the cost of developing and operating the generator, then all other things being equal, it would be profitable for the retailer to invest in the generator.* (*Commentary*, page 8)

This does not appear to be consistent with how electricity retailing or the wholesale electricity markets actually work in Australia (or internationally). Unless saved formally by "*all other things being equal*", FE's statement is incorrect as an investment criterion. It assumes that the retailer could keep the savings in wholesale energy purchase costs and would not have to pass them on to its customers. However, as FE acknowledges in referring to "*spillover effects to all*

buyers from any new generation investment" (*Commentary*, footnote 13) downward pressure on spot and contract prices following generation investments may be accessed by any competing retailer including retailers seeking to enter the market. Hence the investing retailer would have to pass on the savings in wholesale energy purchase costs in a competitive retail market, just as they are passed on into regulated prices determined using the ACIL Tasman methodology.

FE does not appear to recognise that electricity retailing in a competitive market is primarily a margin business; i.e., retailers profit from selling customer retail services at a margin above the cost of supplying those services. In a competitive market, competing retailers endeavour to acquire electricity at least cost and the margin that can be achieved is limited by competitive forces.

The correct way to look at the incentives of a retailer (or any other investor) to invest in generation is to recognise that if the present value of the proceeds that the generator expects to receive from its sales to the wholesale market exceed the cost of developing and operating the generator, it would be profitable for the retailer (or indeed any other investor) to invest in the generator. It may well be (as FE outlines on pages 5 and 6 of the *Commentary*) that retailers derive company-specific benefits from investing in generation as distinct from the benefits that FE claims (incorrectly) that they derive on account of the reduction in wholesale electricity prices that flows from additional generation capacity. But it is difficult to see how ACIL's methodology for determining the energy-cost component of regulated prices would prevent large retailers from using generation investments to secure those company-specific advantages over their rivals.

FE's view that a retailer has an additional incentive to invest in generation because it can capture the consequent reduction in energy purchase costs rather than passing the reduction on to customers implies that the retail market is not subject to competition or perhaps just recognises that the customer base of a large retailer includes a rump of sticky customers who remain on regulated prices even though they could access discounted competitive offers. If the reduction in energy purchase costs is not reflected in regulated prices, the retailer would be able to capture benefits beyond competitively derived returns in supplying this rump of customers.

In the *Commentary*, the above flaws in the FE analysis of retailers' generation-investment incentives are followed by flaws in the FE analysis of the implications of "transient" fluctuations in wholesale electricity prices. ACIL's methodology implies that these transient fluctuations will be passed through into regulated retail prices – if wholesale prices are cyclically low (as may well now be the case), customers on regulated prices benefit but if wholesale prices move cyclically higher, those customers will pay higher prices. This should not

prevent a retailer who has committed to a long-term average price for obtaining electricity (through a PPA or a generation investment) from recovering its costs over the cycle as a whole unless the long-term average price to which it has committed is materially higher than the average of wholesale prices over the cycle. If it is materially higher, then this indicates that the investment in the PPA or in generation has other benefits unrelated to hedging, or was based on assumptions that did not eventuate or were not well founded.

If retail-price regulation somehow protected retailers from the downside consequences of poorly performing investments in PPA's or in generation (perhaps through the rump effect described in the previous paragraph), then it would be providing inefficient incentives for overinvestment – to paraphrase page 7 of the *Commentary*:

> (*lower) electricity prices caused by inefficient behaviour will result in lower economic welfare.*

FE focusses on the danger that regulation might reduce investment incentives below economically efficient levels but the opposite is also possible. Overinvestment is just as capable of reducing economic welfare as is underinvestment. A retailer (or indeed any investor), committing to a generation investment too early, may lower electricity prices. However it also consumes scarce resources including capital, labour and any incremental fuel usage[1]. By definition, it is unlikely that the benefits of lower electricity prices would outweigh the costs of the resources consumed in investing in generation too early.

2.2 PPAs, generation costs and tolling costs ignored

FE claims that ACIL Tasman ignores the costs that retailers incur in acquiring physical generation options.

> *Having recognised that retailers do, in practice, employ physical generation options such as plant ownership, tolling or PPAs to minimise their energy purchases, ACIL Tasman then proceeds to ignore the costs retailers have incurred in securing these options: (Commentary , p.4)*
>
> *… ACIL Tasman has effectively said that the actual costs of procuring physical generation options can be safely ignored for the purposes of determining the regulated cost allowance. (Commentary , p.5).*

[1] Incremental fuel usage may occur where heat rates differ between the investment and the displaced plant, where the investment displaces non-fossil fuel powered plant or fossil fuel powered plant of a different fuel type.

> … *ACIL Tasman's disregard of physical generation costs represents a significant misunderstanding of retailer behaviour and of the economics of the Australian (and indeed international) power markets. (Commentary , p.5).*

It is quite clear in our December 2012 Report, that ACIL Tasman recognised that retailers enter into a variety of hedging arrangements including physical generation options. The usefulness of considering generation options as hedging costs was considered in some detail with the conclusion being that using the face-value costs of these instruments had little merit.
FE's contention that these costs were ignored and disregarded by ACIL Tasman is plainly incorrect and further, FE appears to misunderstand a number of aspects of electricity markets and of ACIL Tasman's methodology for estimating wholesale energy costs. These matters are discussed below, drawing on the background material from the Appendix.

2.2.1 Rationale for generation options investment

FE implies that the primary and largely exclusive reason for retailers investing in physical generation is to hedge their retail loads at minimum cost. Further it might reasonably be concluded from a reading of the *Commentary* that FE considers that the benefits of generation investments to retailers over other investors are substantial. According to FE, these benefits include:

- superior risk management and especially the natural-hedge qualities of generation options;
- management of credit risk;
- management of hold-out and recontracting risk;
- increasing spot market competition to put downward pressure on spot prices;

It is clear that investment in generation remains a matter of choice for retailers in covering the matters identified by FE as the reasons for making such investments. Despite FE statements to the contrary[2], retailers could utilise a portfolio of standardised instruments to achieve the benefits identified by FE:

---

[2] FE under the heading of "Apples and Oranges and dynamic efficiency" states that the value of generation to a retailer is multidimensional (which ACIL Tasman assumes refers to the four reasons that FE identifies for retailers investing in generation), and that some aspects of the value cannot be achieved, or achieved at the same cost, through the use of standard hedging contracts. FE uses as examples credit exposure and recontracting risk. In citing credit exposure, FE appears to misunderstand one of the fundamental principles of exchange traded markets which is to provide the highest quality credit through daily mark-to-market and margining. FE also appears to misunderstand the benefits in managing credit risk through standard hedging which allows the credit exposure to be spread over a greater number of parties, In relation to recontracting risk, ACIL Tasman recognises that recontracting may result in higher prices but any such risk can be managed through effective portfolio management and the willingness to pay the higher prices.

- While generation provides a natural hedge it is not necessarily superior to a well-constructed portfolio of standardised instruments – which could provide largely the same benefits but without the operational risk associated with reductions in plant capacity or unplanned plant outages.
- Credit risk is arguably better managed through a portfolio of hedges that are spread across a number of players rather than concentrated in the vertically integrated entity's own portfolio – this is especially the case in the use of exchange traded instruments that are marked to market on a daily basis and which are considered to have the highest credit rating available.
- Hold out or recontracting risk implies excessive market power in the hands of generation entities which implies that generation is a valuable investment regardless of the retail load that it may be hedging – regardless it is usually related to a disagreement between counterparties about price, especially where rapid changes in the environment lead to rapid increases in price expectations – this can be effectively managed through maintaining a well diversified portfolio of hedges of varying tenors such that the "holdout" effect is not overly material[3].
- Acquiring hedge contracts increases the demand and consequently price for contracts from existing generation, which provides a basis for entrants to enter the market increasing supply and competition and placing downward pressure on spot prices.

This is not to say that a portfolio of hedges provides an identical outcome to owning generation in respect to the reasons that have been identified by FE. However the use of hedges reasonably approximate these benefits, although the use of hedges rather than generation in terms of these matters may in fact result in higher costs to the retailer.

Sunk costs versus current value

As is discussed in some detail in the background material in the Appendix, generation investments are typically long dated and may have been committed some time ago. The nominal price in a PPA or the annualised historical cost of generation would reflect the value of the generation anticipated at the time of commitment, when the investor was faced with a variety of uncertain futures. Once an investment is committed, the costs are sunk. As time proceeds, the

[3] In ACIL Tasman's experience independent generators would prefer to contract longer term with retailers as it has a range of financial benefits for the independent generator. The primary limiting factor in entering into long dated hedges is from electricity retailers, which, as margin businesses, prefer to avoid such arrangements in case they become uncompetitive on a relative cost basis with respect to other retailers. The fact that retailers are at the same time willing to enter into long term PPAs or generation investments may indicate that the benefits of generation options are far greater than simply the hedging benefits that they provide or alternatively, these retailers expect PPA or generation costs to be lower over the cycle compared with hedge acquisition costs.

value of the generation asset is determined by the actual future that eventuates and may be quite different to the value expected at the time of commitment. As a consequence, unlike FE, ACIL Tasman recognises that there are considerable difficulties in using the nominal price of PPAs or the annualised historical cost of generation as a basis for estimating current hedging costs.

2.3 LRMC

Apart from arguing about details of references to LRMC in our report, it is hard to see the main point of FE's discussion of LRMC on pages 15 and 16 of its *Commentary*. In contrast, the passage from our report that FE reproduces on page 15 of the *Commentary* makes three main points:

a) that the use of LRMC is not our recommended approach to determining the energy-cost allowance

b) that if LRMC is to be used, the method of its estimation would have to be specified and that proponents of this approach have not supplied such a specification

c) that estimates of LRMC recognising the current oversupply of generation capacity in the NEM would likely be low.

As noted in the passage that FE reproduces, the first of these is canvassed extensively in the documentation of the QCA's recent tariff reviews. Our preference for a market-based approach reflects the view that retail prices set in a competitive market would reflect current wholesale prices, just as a range of competitive offers in SEQ currently seem to do.

The second point is crucial. In relying on Turvey, FE should know that there are many possible estimates of LRMC that could be specified. The demand increment underlying the cost differential is important but perhaps the most important issue in the current environment is whether a "green fields" or a "brownfields" approach should be adopted. The legislation governing the QCA's previous BRCI methodology, which required the inclusion of an LRMC element in the updating of regulated retail prices, mandated the former. This requires estimation of the costs of meeting a demand increment in a generation system that has been designed to minimise the total costs of meeting the without-increment load. In other words, it does not allow for excess capacity or sub-optimal plant composition in the pre-increment state. In contrast, the "brownfields" approach, requires the estimation of the costs of meeting a demand increment in whatever generation system actually exists, which need not be the system that is optimal for meeting the pre-increment load. Were we to advocate the use of LRMC in setting regulated retail prices, we would certainly recommend the brownfields approach, particularly in light of the legislative requirement to consider actual costs faced by an electricity retailer supplying customer retail services to non-market customers.

This brings us to our third main point. It is widely believed that excess generation capacity exists currently in the NEM, due mainly to the failure of investors in generation to anticipate factors such as the onset of the GFC, the end of the millennium drought in south-eastern Australia, changes in the domestic natural gas market and the policy-induced stimulation of domestic solar and wind generation. FE acknowledges (*Commentary*, pp.15-16) that this will reduce LRMC but it prefers not to emphasise that this, rather than the details of the calculation of LRMC, is the main point that we are making.

2.4 FE's proposals to modify the ACIL Tasman approach

After identifying what it considers flaws in the ACIL Tasman method, FE proposes two alternative approaches for measuring energy costs. The first is to include a wider range of hedging options (including generation options) in the assessment and the second is to use a method based on generation costs, or more specifically the higher of market costs and the LRMC of generation. FE's discussion of these alternative approaches is brief.

With respect to the first, its discussion seems to assign to ACIL Tasman's estimation method a degree of influence over what retailers do that is not warranted: *"Use of such a simplistic approach will drive retailers to make economically sub-optimal decisions …"* (*Commentary*, p. 13). We have already discussed this proposition insofar as it refers to retailers' decisions to invest in generation. Our conclusion is that there is no reason to think that ACIL Tasman's approach to determining the energy-cost allowance in regulated prices has discouraged efficient generation investment. On the other hand to include an allowance with the intention of making a provision for retailer/generators to recoup some of the losses that they may otherwise suffer from investments which have not turned out as expected, would be inconsistent with the competitive nature of the wholesale market. If in doing so, retailer/generators' investments in generation options were insulated from NEM competition, then this would tend to encourage inefficient investment. Apart from the obvious loss of economic welfare if this were to be the case, making such an allowance would in ACIL Tasman's view be beyond our specified role in estimating energy costs.

ACIL Tasman recognises that electricity retailers choose to structure themselves in a variety of ways. It has no particular view on the various structures employed. We simply assume that each business is in the best position to determine its own optimal structure and develops those structures for its own purposes to maximise competitive advantage and to manage, inter alia, internal cash flow, exposure to risk and exposure to the creditworthiness of counterparties. In this sense vertical integration through owning generation

or acquiring long dated power purchase agreements (PPA) is one of a number of structures that retailers may employ in supplying customer retail services.

FE's second alternative is to use LRMC as a floor for regulated retail prices. ACIL Tasman notes that this alternative method of regulating electricity retail prices falls outside ACIL Tasman's Terms of Reference and is primarily a matter for the QCA. However, ACIL Tasman has identified a range of difficulties with the use of LRMC as a benchmark for the actual energy costs that electricity retailers face in supplying retail electricity services to the premises of non-market customers. In our view this makes it an inferior method of estimating energy costs for the purposes of setting regulated retail prices. In particular, there are a wide range of potential LRMC estimates which depend on how incremental supply is specified, and whether a "greenfields" or "brownfields" approach was used. The likelihood of an LRMC based approach reflecting the actual energy costs for energy purchased through the NEM by an electricity retailer in supplying customer retail services to non-market customers would, as we have noted previously, be largely a matter of coincidence.

Therefore the proposed use of a floor between market based costs (which FE advocate should be calculated, inter alia, with reference to sunk PPA and generation costs) and LRMC, would likely result in a less accurate and relevant estimate of energy costs. Like the ACIL Tasman method, the proposed floor approach would pass higher (if somewhat different) energy cost allowances into regulated retail prices when wholesale prices were cyclically higher. However, when wholesale prices were cyclically lower, the floor (as the higher of the market based and LRMC approaches) would arbitrarily limit to the floor, the estimation of actual energy cost of retailers in supplying customer retail services to non-market customers through the NEM.

3 Conclusion

In our view, FE has failed to identify any serious flaws in ACIL Tasman's method for determining an energy-cost allowance to be included in regulated retail prices in Queensland:

- Its contention that adoption of the ACIL Tasman approach would discourage efficient investment by retailers in generation is based on an invalid assumption that a retailer investing in generation would appropriate the benefits of lower wholesale electricity prices rather than be forced to pass them on to customers as a consequence of wholesale and retail market competition. Moreover, FE's discussion fails to recognise that regulation can just as easily encourage inefficient investment as discourage efficient investment. In our view, the adoption of either of the procedures that FE favours in place of ACIL Tasman's methodology may encourage inefficient investment.
- In arguing for the explicit inclusion of the historical costs of PPAs and retailer-owned generation in the energy-cost estimate, FE overlooks a number of practical difficulties associated with the appropriate valuation of such long dated assets for the purposes of estimating energy costs in a particular year.
- In its discussion of ACIL Tasman's comments on the use of LRMC, FE does not address the three main points that we make in the sections of our report that it cites. These are:
  - our general reasons for not using an estimate based on LRMC
  - the need to specify an LRMC method if it is to be used (especially to choose between green-fields and brown-fields approaches)
  - our contention that brown-fields estimates of LRMC would be low in current market conditions.

In our view, neither of FE's proposed alternatives to the adoption of the ACIL Tasman approach is attractive.

- The first – to include explicit consideration of a wider range of hedging instruments (including generation options) is based on an unrealistic assessment of the effects of retail-price regulation on retailer behaviour in the current Queensland environment and an incorrect assessment of how those hedging instruments should be valued in the particular year in question.
- The second – to use a floor between the market based approach and LRMC, while primarily a matter for the QCA, would arbitrarily limit to the floor, the estimation of actual energy cost of retailers in supplying customer retail services to non-market customers through the NEM.

4 References

Origin Energy Electricity Ltd &Anor v Queensland Competition Authority & Anor, QSC 414 (Supreme Court of Queensland December 19, 2012).

ACIL Tasman. (2012, December*). Estimated energy costs for use in 2013-14 electricity retail tariffs*. Retrieved March 30, 2013, from QCA Regulated Retail Electricity Prices 2013-14: http://www.qca.org.au/files/ER-ACIL-EstimatedEnergyCostsForUseIn2013-14ElectrictyRetailTariffs-1212.pdf

Frontier Economics. (March 2013*). Commentary on ACIL Tasman's approach for measuring energy costs*. Submission to QCA by the Energy Retailers Association of Australia and the Energy Supply Association of Australia.

Smithson, C. W., Smith, C. W., & Wilford, D. S. (1995). *Managing Financial Risk: A Guide to Derivative Products*. Financial Engineering, and Value Maximization (Revised ed.). Chicago: Irwin Professional Publishing.

Turvey, R., (2000),*What Are Marginal Costs And How To Estimate Them?,* Technical Paper 13, Centre for the Study of Regulated Industries, University of Bath, Retrieved March 30, 2013, from http://www.bath.ac.uk/management/cri/pubpdf/Technical_Papers/13_Turvey.pdf.

Appendix A Background material

This Appendix sets out some background material to assist in understanding the ACIL Tasman analysis in context with the policy and regulatory environment in operation in Queensland for setting regulated prices for electricity customers. It is also covers NEM institutional arrangements in place with respect to electricity retailing. Finally it provides some important considerations and matters in relation to the treatment of non-standard hedging arrangements. These are all covered in some detail below.

A1. Delegation

The QCA has been delegated by the Minister for Energy and Water Supply to determine the prices that a retail entity may charge its non-market customers for customer retail services. This delegation sets out a number of requirements on the QCA including having regard for:

- the actual costs of making, producing or supplying the goods or services
- the effect of the price determination on competition in the Queensland retail electricity market
- a requirement that non-market customers of the same class should have access to uniform tariffs and pay the same price
- must use a building block N+R framework in setting the prices.

For the purposes of clarity the goods or services that are the subject of the delegation are customer retail services which are clearly defined as "for premises, means the sale of electricity to the premises". This definition was confirmed by the Supreme Court of Queensland in a recent court case which unsuccessfully challenged aspects of the process used for setting notified prices in 2012-13 (Origin Energy Electricity Ltd &Anor v Queensland Competition Authority & Anor, 2012, pp. 6, paragraph 19)

A2. Role for ACIL Tasman

The role of ACIL Tasman in estimating the energy costs to be incurred by retailers supplying customers on notified prices for 2013-4 is set out in the Terms of Reference (TOR) supplied by the QCA. Specifically the TOR requires ACIL Tasman to have regard to the actual costs of making, producing or supplying the customer retail services.

Consequently ACIL Tasman is required to provide estimates for:

1. wholesale energy costs

2. the costs of complying with state and federal government policies such as the Queensland Gas Scheme, the Enhanced Renewable Energy Target Scheme and the carbon tax
3. NEM fees and ancillary services charges
4. losses in the transmission and distribution of electricity to customers.

The remainder of this discussion focusses on the estimates for wholesale energy costs as it was this aspect that FE sets out to critique in its *Commentary*.

In considering these matters it is recognised that electricity retailers choose to structure themselves in a variety of ways. ACIL Tasman has no particular view on the various structures employed. We simply assume that each business is in the best position to determine its own optimal structure and develops those structures for its own purposes to maximise competitive advantage and to manage, inter alia, internal cash flow, exposure to risk and exposure to the creditworthiness of counterparties. In this sense vertical integration through owning generation or acquiring long dated PPA is one of a number of structures that retailers may employ in supplying customer retail services.

A3. NEM institutional arrangements

In estimating wholesale energy costs for retailers in supplying customer retail services, the institutional arrangements governing wholesale energy costs must be considered. Queensland is in fact part of the NEM. The NEM operates as a compulsory gross pooling arrangement where all electricity producers must sell all generated output to the pool and all electricity customers must purchase all electricity from the pool[4] (retailers are usually NEM customers).

It is also well recognised, as a consequence of the extreme volatility of the NEM, that retailers enter into various arrangements to manage this volatility and that these arrangements include various types of standard and bespoke hedging arrangements of various tenors, PPA and investment in own generation.

In this sense estimating the wholesale energy cost for a retailer supplying customer retail services requires:

- estimating the cost of acquiring electricity from the NEM pool;
- determining or estimating the cost of hedging arrangements; and
- estimating the wholesale energy cost as the estimated NEM pool costs modified by the hedging arrangements.

[4] There are a small set of exempt circumstances where generators and customers may bypass the pool but these are not material.

As the QCA must determine notified prices prior to the start of a financial year, NEM pool costs are by definition an *ex-ante* or modelled estimate. Hedges on the other hand are traded on a forward basis and significant forward hedge contract price data is usually observable and available prior to the time at which the QCA must make a determination, from the futures exchange and over-the-counter (OTC) brokers. ACIL Tasman of course recognises that this data relates to standardised hedging instruments (FE refers to these as vanilla hedges).

A4. Treatment of non-standard arrangements

This leads to the matter of where retailers, supplying customer retail services, choose to hedge through bespoke hedges, PPAs (we include tolling agreements within the scope of PPAs) or through owning generation. These costs may be materially different to the observable forward market for hedges. Specifically the issue is whether these different costs should be taken into account by ACIL Tasman in estimating wholesale energy costs and if so how they should be taken into account.

It is well understood in the literature covering derivative instruments that any hedging instrument, regardless of its complexity, can be disaggregated into a series of standard forwards and options (Smithson, Smith, & Wilford, 1995). This means that any bespoke hedge, PPA or physical generation to the extent that it provides a hedge against electricity prices in the future could be represented by a combination of standard forwards and options.

This property of non-standard hedge instruments would be expected to be well understood by retailers operating in the NEM. It is after all the basis for the ongoing fine tuning of an electricity retailer's hedge portfolio with the underlying physical obligations to the NEM.

The ability to disaggregate a complex instrument into a set of standardised swaps and options is also an important basis for assessing the fair market value of any such non-standard hedge facility.

Having noted this property on non-standard hedging arrangements, there are other factors beyond the current year's cost of hedging built into the price of non-standard hedging arrangements including:

- other benefits not related to the current year's hedging benefit;
- smoothing of costs over the investment cycle;
- questions of whether the investment was efficient or inefficient; and
- guidance from the recent Supreme Court challenge of the 2012-13 decision.

A4.1. Other benefits

In the case of PPAs and owned generation, there are usually additional benefits to the owner beyond the hedge benefits per se. These are likely to include:

- the right to dispatch the associated plant (the ability to vary the volume and price at which it is offered and by implication the ability to have some influence on the market price outcome including benefiting from price rises);
- the ability to profit from market price rises when there are substantial rises in new entrant capital costs (PPA costs are typically linked to the associated plant's sunk capital costs with or without indexing usually in some way linked to inflation) – as an example capital costs rose between 50% and 100% between 2004 and 2008 as commodity prices and labour costs rose significantly;
- the ability to profit when rises in alternative fossil fuel costs occur – i.e. a gas fired plant benefits when rises in coal prices occur driving up electricity prices in the future and similarly a coal fired plant benefits when rises in gas prices occur;
- in the case of gas fired plant which has much lower carbon intensities than coal fired plant, benefiting when carbon prices are introduced or rise as NEM price rises linked to carbon are expected to be dominated by coal fired plant over that period; and
- the bringing forward of the monetisation of own fuel resources that otherwise may have taken many years to market and sell.

PPAs may also have other embedded options such as the option to purchase the underlying asset on expiry on favourable terms or options to extend the PPA on favourable terms.

Owned generation generally have additional benefits:

- operational control of the asset including the ability to manage costs and plan outages at optimal times; and
- site ownership which may be redeveloped as a brownfield facility (lower cost) when the existing asset reaches the end of its useful life, or alternatively sold.

These other benefits may be valued differently by entities depending on the shape and structure of each entities underlying portfolio of assets and liabilities.

A4.2. Investment cycle smoothing

Historically investments in generation capacity have tended to be lumpy reflecting relatively large economies of scale in generating plant. As a consequence electricity markets tend to exhibit prices which cycle from high

prices (when capacity is scarce) to low prices (following new investments when large surplus capacity exists).

PPAs and owned generation typically operate over long periods of time, often through several market investment cycles. However, PPA prices typically smooth out these cycles. Similarly, the annualised cost of owned generation smooths out the investment cycle variation[5]. The PPA price and/or annualised generation cost reflect the expected dips and peaks over investment cycles.

This smoothed price is likely to be quite different to the costs in any particular year which may be at the bottom, peak or at some other point in the investment cycle.

A4.3. Efficient investment

Hedging is by definition an *ex-ante* decision making process. Commitment to long-dated arrangements, in particular PPAs and owned generation, requires those involved to take a long-term view on the market. An efficient investment would be expected to provide an economic return over the life of the instrument or asset. This expected return is likely to include benefits in addition to the electricity hedge price benefits, as was discussed in subsection A4.1

The key issue in committing to an investment is in assessing the expected return. There is not a single known future for any investment, be it a PPA or owned generation. The investor must assess the performance of an investment against a range of futures. Each investor may have different criteria, but in proceeding with an investment, an investor's expected outcome would be to meet or exceed its performance criteria within a level of confidence that is acceptable to the investor. There are various techniques that might be used in making this assessment including sensitivity analysis, scenario planning and the more sophisticated real options analysis.

It is very likely that any PPA or generation investment that proceeds has a non-zero probability of performing below the investor's expectations or even fail as an investment – i.e. there is one or more potential futures where the returns would not meet the investor's performance criteria. Examples of such futures may include:

- demand for electricity turning out to be much less than was assumed
- input costs such as the price of gas turning out to be much higher than assumed

[5] Annualised cost is used in this paper to mean the average cost that a new entrant generator would need to recover in each year in order to achieve an economic return on the investment – at the appropriate weighted average cost of capital.

- unforeseen changes to government policy occurring after the commitment to the investment which affect the investment's performance
- more rapid shifts in technology than assumed leading to earlier technological obsolescence of the investment.

At the time that the generation investment is committed it could be reasonable to expect that it would provide an economic return across the range of potential futures, notwithstanding that in some specific futures it would not do so. However, should the future that eventuates be one where it does not perform well, it may in actual terms, not provide an economic return to the investor. Regardless of the reasonable expectation at the time of the generation investment, once the investment decision is sunk, the actual return will be determined by the specific future that eventuates.

In the NEM, the future is uncertain and competition[6] between generation entities ensures that generation investments are valued against the actual future that eventuates through the market. Generation investments that were committed on the reasonable expectation that they would provide an economic return across the range of potential futures, may turn out to provide much lower returns when they are on the wrong side of history. Once the investment decision is made (sunk) the value of the asset is determined by the market rather than by the cost associated with the investment in the first place[7]. The value of the investment may change over time and at any point in time is the market value in the future that eventuates. This risk of alternative futures is usually built into the WACC that is applied to the generation investment in assessing its expected future performance.

A4.4. Inefficient investment

At times investors make mistakes in investing in PPAs or generation assets. They might be poor judges of the future, take into account irrelevant factors, make errors in projections, give too much weight to one particular potential future or simply suffer from an optimistic bias. Once the investment is committed, the value associated with such mistakes is lost. These investments may be considered inefficient as they were unlikely to provide an economic return on an expected basis at the time of investment, although it is unlikely that the investors would have been aware of this at the time of commitment.

To some extent, inefficient investments are indistinguishable from efficient investments in that the resulting value of the investment becomes apparent

6 While the NEM could not be described as perfectly competitive, there is enough evidence to indicate that it is workably competitive.

7 This may include some of the other benefits discussed in subsection A4.1

over time as a particular future eventuates. However, inefficient investments are less likely to achieve an economic return compared with efficient investments.

Importantly the value of the investment may change over time and at any point in time is the market value in the future that eventuates.

A.5. Origin Energy Supreme Court challenge

At this point it is worth considering the Judgement in the unsuccessful court case that Origin Energy and related parties brought against the QCA and the Minister for Energy and Water Supply in 2012 in relation to the 2012-13 QCA Determination.

Justice Jackson, in his Judgement, accorded with ACIL Tasman's view on a number of critical points.

As noted in subsection A1, Justice Jackson clearly accepted the definition of customer retail services as "*for premises, means the sale of electricity to the premises*" (2012, pp. 6, paragraph 19).

In dealing with the institutional arrangements Justice Jackson states:

> *For practical purposes, all electricity to be sold to a customer connected to a supply network who receives customer retail services is acquired by the relevant retail entity by purchase through the NEM. The retail entity does not sell electricity produced by it as a generator directly to such a customer. Whether or not the retail entity might itself (or via a related corporation) be (or have an interest in) a generation entity which generates electricity does not affect the fact that it acquires the electricity which it provides as customer retail services through the NEM by purchase. This industry structure has operated from a time prior to the introduction of s 90(5) in its current form on 13 September 2011. It separates the activities of a generation entity from the activities of a retail entity, under the Act, whether or not a retail entity may "invest" in generation assets* (2012, pp. 24, paragraph 107).

Further Justice Jackson notes:

> *… it must be kept steadily in mind that the costs to which regard must be had are those of the customer retail services. It is only a retail entity which supplies those services. And it is only for the purpose of fixing the price of those services for regulated tariffs that the costs are being examined. All that supports the conclusion that it is the costs of a retail entity in providing the customer retail services which are the relevant costs….*

> *Further, because the tariff which is to be fixed is for all retail entities in that class of tariff, the costs which are referred to in the sub-paragraph are not specific to an individual retailer* (2012, pp. 24-25, paragraphs 110-111).

In considering what should be construed as actual costs, Justice Jackson sets out the following statement and conclusion:

> *Both QCA and the Minister submitted that there was no warrant to read s 90(5)(a)(i) as though it provided "making, producing and supplying". They submitted that "making" or "producing" were apt words to apply to "goods" whereas "supplying" applied to "services". The applicants responded by submitting that whether the subject was goods or services, a sale constituted "supplying", which supported reading the sub-paragraph as extending to the cost of "underlying" goods or services. The applicants submitted that QCA and the Minister's arguments should not be accepted because "in order to undertake the sale of electricity, the retailer must first have electricity to sell. It achieved this by either producing the electricity itself, or by purchasing it. Thus the cost of selling electricity includes the cost associated with either generating or purchasing electricity".*
>
> *I reject the last part of the applicants' submissions, for the reasons previously outlined. They seek to construe s 90(5)(a)(i) by reference to a false assumption, namely that a retail entity which provides customer retail services has not acquired the electricity the subject of the sale through the NEM by purchasing it. Whether or not that entity has itself or by a related corporation simultaneously engaged in generation, the costs associated with purchasing electricity as a retail entity will have been incurred* (2012, pp. 25-26, paragraphs 115-116).

In relation to the view that generation costs should be taken into account Justice Jackson concluded:

> … *QCA was not bound to take into account the costs of generation of electricity as the actual costs of making, producing or supplying customer retail services, because the costs of generation of electricity, per se, are not those actual costs* (2012, pp. 27, para 125)

Similarly in relation to the view that PPA costs should be taken into account Justice Jackson concluded:

> *The conclusion I have reached is that QCA was not bound to take into account the costs of PPAs as a relevant consideration in making the price determination because the costs of PPAs are not, per se, the actual costs of making, producing or supplying customer retail services* (2012, pp. 34, paragraph 164).

A reading of the Judgement quite clearly supports the approach taken by the QCA as based on the ACIL Tasman advice, as estimating the costs of an electricity retailer supplying customer retail services to regulated customers by

purchasing electricity through the NEM. It is also quite clear that Justice Jackson rejects the concept that where retailers choose to embrace alternative business structures such as vertical integration, that the QCA and ACIL Tasman should be required to consider the costs of generation and PPAs, as he considers them not to be the actual costs of making, producing or supplying customer retail services.

A.6. Non-standard hedge conclusions

ACIL Tasman recognises that retailers may choose to enter into non-standard hedging arrangements including bespoke hedges, PPAs and owned generation. However, the sunk cost of these arrangements does not, in ACIL Tasman's opinion, reflect the actual costs of making, producing or supplying customer retail services for a variety of reasons that have been discussed in the preceding sections and which are summarised below.

- Electricity retailers supply customer retail services with electricity purchased through the NEM, and it is the cost of acquiring electricity through the NEM that is relevant in estimating retailer costs.
- Non-standard hedging arrangements can be reasonably represented by a combination of standardised hedging arrangements (notably this is the usual method of determining fair market value of such instruments where markets for standard hedging arrangements exist).
- PPAs and/or owned generation usually incorporate benefits to the owner beyond electricity price hedging which may explain some of the substantial differences in price compared with standardised hedging arrangements.
- Notwithstanding the other benefits that are likely to accrue to owners, PPAs and/or owned generation smooth the variation in prices over the investment cycle and it would be largely a matter of coincidence if the prices specified in PPAs or the annualised costs of owned generation reflected the market value of hedges in any particular year.
- As PPAs and/or owned generation are invested *ex ante* over long time frames and are subject to the risk of alternative futures, the PPA price or annualised cost of generation may be a poor indicators for the plant's current market value and once other benefits are considered is unlikely to reflect the cost of hedging electricity in a particular year when engaged in supplying customer retail services.
- Some PPAs and/or owned generation may be inefficient investments and in such cases the PPA price or annualised cost of generation is likely to be an even poorer indicator for the plant's market value and once other benefits are considered is even more unlikely to reflect the cost of hedging electricity in a particular year when engaged in supplying customer retail services.