



19 May 2009

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By email

Dear Mr Henry

Benchmark Retail Cost Index for Electricity 2009-10

Following judicial review of the Queensland Competition Authority's (QCA) Final Decision for the 2008-09 Benchmark retail Cost Index (BRCI), the Supreme Court of Queensland (Court) found, in essence, that the method for calculating energy purchase cost must be based on the Queensland NEM Load (that is, the Total NEM load excluding Direct Connected customers, Mt Isa and flows to NSW customers).

The Court's judgment requires the QCA to remake the 2008-09 decision but also has direct implications for the method used by the QCA to calculate energy purchase costs in its 2009-10 BRCI Final Decision.

Origin Energy (Origin) notes that the QCA released a Consultation Paper on 8 May 2009 proposing an alternative method for estimating the Queensland NEM load to be used in the energy purchase cost calculation. A paper prepared by ACIL Tasman gave further details on the proposed methodology for forecasting the half hour load traces. The QCA indicated in its Consultation Paper that, subject to consultation with stakeholders, it intended to use the proposed ACIL Tasman methodology for both the 2009-10 BRCI calculation and the 2008-09 recalculation.

First, it is essential that any methodology adopted by the QCA be consistent with the findings of the Court regarding the BRCI methodology. Origin therefore welcomes the opportunity for consultation in relation to this issue to ensure that the proposed methodology is consistent with the Court's interpretation of the legislation.

However, this submission can only be considered a preliminary view as Origin has not seen the relevant load trace data sets from either CRA's 2009-10 approach or the ACIL Tasman alternative method. Origin has particular concerns regarding:

- (a) how the financial year "actuals" for 2007-08 and for 2008-09 are being constructed given the need to "splice" data to make a financial year (by adding Qtr 4 from the previous year to Qtr 4 of the current financial year); and
- (b) how the forecasting of the load shape is undertaken. In particular, we are concerned that there are unintended consequences on the relevancy of the load

shape created by simultaneously attempting to satisfy of various constraints (APR peak summer and APR peak winter for both Total Load and direct connected customer loads plus a minimum constraint). The satisfaction of these constraints, given the total of the annual load must comply with the agreed total, will inevitably impact in (often unexpected) ways with the overall shape of the load(s).

Origin has several other areas of concern with the recalculation of the 2008-09 BRCI (and therefore the 2009-10 BRCI) that are not discussed in the current QCA Consultation Paper. We propose to address these matters directly with the QCA rather than within this paper.

In other words, our response in this paper focuses entirely on the relevant actual and forecast loads to be used as part of the recalculation of the NEM load for the purposes of the energy cost calculation and the denominator in the BRCI. The absence of discussion on any of the other parameters of the BRCI from this submission should not be taken as agreement or otherwise with the QCA's proposed method of dealing with these other matters.

In Origin's view, the errors in the QCA's 2008-09 BRCI decision illustrate the importance of maintaining a consistent approach wherever possible, to avoid having to address the question of which data set to use. Origin assumes from the QCA Consultation Paper that there is no proposal to amend any other aspect of the CRA approach to the analysis of the energy purchase cost. By this, Origin assumes that the ACIL Tasman approach (or any other) will not lead to the recreation of the contract and pool energy costs that were the "cost" components of the energy purchase cost calculations in the 2008-09 Final Decision. (energy purchase costs being a function of these cost inputs of swaps/caps/spot and the load trace forecasts discussed in this submission).

Finally, by responding to the Consultation Paper, Origin does not necessarily accept that any proposed modification to the load forecast methodology represents a change in the framework of the energy purchase cost calculation for the purposes of s.107(1) of the Electricity Regulation as the QCA seems to suggest in its Consultation Paper.

The extent to which the previous forecast load data should be adjusted in the calculation of future tariffs, established under a BRCI that includes a change in forecast approach is a moot point and requires further investigation in the context of the findings of the Court. However, it appears from the Court's decision that an important consideration in making such judgements is the impact on the tariffs and on the "self-correcting" properties required in an index such as the BRCI.

Origin's specific comments with regard to the CRA and the ACIL Tasman (ACIL) methodologies follow.

Understanding the SOO/APR Forecasts

Origin is concerned that in all the discussions, both current and in the May 2008 Price Determination process, the SOO/APR forecasts of the total Queensland load are treated as the starting point, and that this has been justified in various places by the claim that this is the more reliable forecast data.

It is important to understand that the SOO/APR forecasts are in fact "bottom-up" forecasts which while tested against macro forecasts are essential no more accurate than the forecasts of their sub-components. For instance, the 2008 APR Planning Report states¹:

¹ See Powerlink, 2008 Annual Planning Report, page 20.

In accordance with the National Electricity Rules (NER), Powerlink has obtained summer and winter demand forecasts over a ten year horizon from Distribution Network Service Providers (DNSPs) ... and from directly connected customers, at each connection supply point in Powerlink's transmission network. ...

Energy forecasts for each connection supply point were also obtained from the DNSPs and directly connected customers, and these have been aggregated for the Queensland region and for each of the ten geographical zones in Queensland.

Given therefore that both the peak demand (summer and winter) and the energy demand forecasts for the total Queensland NEM load are built up from the sum of the DNSP forecasts and the Direct Connect customer forecasts, Origin can see no analytic purpose or benefit from approaches such as that put forward by ACIL, and by CRA in their modified form that:

- *Begins with the total forecast Queensland NEM load trace (optimised to the constraints); and*
- *Deduct the direct customers load traces; and then*
- *Derive the DNSP forecasts as a residual - which were provided to APR in the first place (and which when aggregated across all the relevant connection points make up the NEM load, the subject of interest in this process)*

In fact, what the approach does do, is introduce a new source of error which is the error in the APR forecast of the direct customer load shape, energy demand and peak summer and winter demand, and separately, in the optimisation exercise as set out by ACIL for this direct customer demand.

From a conceptual standpoint, given the way the SOO/APR forecasts are constructed from DNSP plus Direct Customer forecasts we believe it is far more appropriate to go directly to the NEM load forecasts for the load profile.²

Origin understands from the various discussion papers that CRA may indeed have approached the NEM load as a direct forecast in their original 2009-10 analysis (rather than the residual of total Queensland load - direct customers), and perhaps in their 2008-09 analysis as well. However, as noted below, this was rejected because of various anomalies that emerged.

As discussed below in detail, Origin would like to have seen some further investigation of these anomalies before a whole new approach to forecasting load traces is introduced by the QCA. We do not yet accept CRA's conclusion (reported in the QCA report on page 4) that "estimating the small load in isolation from the total load was not appropriate. We propose there should be further investigation of the reasons for this error rather than move directly to the aggregate Queensland load profile.

The Problem with the CRA Method of Load Forecasting

As discussed above, the greatest preference must be given to using the original CRA approach to load forecasting for the small NEM load excluding direct connected customers ("NEM load"). The QCA, CRA and ACIL have all suggested that the CRA forecast NEM load trace is unsuitable for use in 2009-10 BRCI as, it appears, some 1,600 half hourly observations for the NEM load exceed the total State NEM. In our view, however, the alternatives must be able to be tested to ensure that in solving one problem (which may or

² For various reasons the total volume of the sum of the DNSP forecasts may not add to the NEM load exactly, but this difference should be minor in nature and adjustment, if required at all, would have minimal affect on the load shape.

may not be a problem - see below), new issues that effectively distort the shape of the load trace, are not introduced.

Origin has not seen the relevant CRA load trace. We are however most surprised with the reported outcome, given our understanding that the 2009-10 NEM load trace developed by CRA is based on:

- actual half hourly load data for the NEM load for periods September Qtr 08, December Qtr 08, March Quarter 09, June Qtr 08 load traces (The June Qtr 08 being added to the previous 3 quarters to represent the June Qtr of 09);
- The load data is increased on the basis of the SOO/APR medium economic forecast growth in annual load
- The half hourly load shape is modified to satisfy the Powerlink 2008 APR forecast for 2009-10 peak demand (it is not clear from the current papers if this is for both summer and winter peak demand);
- This profile represents the 50% POE demand forecast load trace. It is weighted 40% in the final load shape;
- Two additional load traces are included, one representing the 90% POE, the other representing the 10% POE. These two load traces are each weighted 30% in the final load shape. However, only the top 400 half hourly loads are changed in this manner, the remainder (some 17,300 data points) remain the same as in the 50% POE.

Given this approach to forecasting the NEM load shape, it is difficult to see how the reported problem could arise, ie that some 1,600 half hourly data points exceeded the total Queensland NEM load. [*Note: It is not clear from the discussion whether this is the total Queensland NEM load BEFORE or AFTER adjustment to the SOO/APR forecast for peak demand - this could be important as well as the factors set out below*].

The NEM load accounts for an average of around 80% of the total Queensland load (e.g see Table 3.1 of the QCA Report). We are extremely surprised that the approach outlined above, could generate 1,600 data points that exceeded the total Queensland load at any one half hour.

We suggest the following as possible explanations:

- Data errors by CRA in the "actual" 2008/09 data or the forecasting of the 2009-10 NEM load shape (noting that a number of data errors were found in their previous calculation of the 2009-10 total Queensland load shape);
- Errors in the optimisation process or its specification (as suggested by ACIL, with reference to the failure to include a minimum value);
- The fact that the growth in actual demand between 2007-08 and 2008-09 (as calculated) has been relatively small and below the SOO/APR forecasts (this growth rate appears to form the basis of the growth in both the NEM load and the total Queensland load)
 - Total State load growth 1.4%³ (vs 2008 APR forecast of 3.2%⁴)
 - NEM load growth 1.6%⁵
- Summer peak load in 2008 was significantly below:
 - The summer peak load in 2007; and
 - The trend line peak load for 2008 as set out in the APR (based on annual trend increase of 3.6%).⁶

³ Comparison of Table 3.2 and 3.1 in the QCA May 2009 report.

⁴ See for instance Powerlink 2008 Annual Planning Report, page 1, 10 year average.

⁵ Comparison of Table 3.2 and 3.1 in the QCA May 2009 report

⁶ See for instance, the Powerlink 2008 Annual Planning Report, page 1, 10 year average.

The last two observations are particularly relevant and could explain the CRA anomalous findings for 2009-10.

For instance, the total State load for each half hour used by CRA would be forecast under the CRA/ACIL approach to grow by an average of 1.4% between 2008-09 and 2009-10 (based on the previous year growth, which sets the forecast year average growth). However, the load shape for the NEM load (which grows on average 1.6%) is also "optimised" to fit an APR forecast peak demand which may be some 20% higher than the peak load observed in 2008-09⁷.

Any optimisation attempting to adjust load shape to satisfy a peak forecast that is significantly higher than the one that underpins the historical load shape, will create a major risk of distortion of the overall shape. It is this overall shape (of which the peak load is an important but only one component) that drives the swap contract/cap and spot volume exposures.

Origin suggests that while the ACIL approach of including a minimum demand constraint may mathematically limit the extent to which the optimisation of the peak load can "drag" half hourly consumption for the NEM load above the total Queensland load, it may not address the fundamental issues outlined above. If these points highlighted by Origin are valid, they will infect the ACIL approach as well (even if they are not as extreme in their impact).

Origin would suggest that before adopting an alternative model for forecasting the load traces for 2009-10 a thorough and transparent investigation of the 4 issues identified by Origin is undertaken.

The Underlying Modelling Issue

A general issue that will apply to both the Total Queensland Load and the NEM load is that the legislative requirements do not provide for the weather normalisation of the actual loads that are used in the BRCI process. What this in practice means is that the actual load and the peak characteristics of this load and the load shape that are used as the base for the subsequent forecast may be significantly different from the SOO/APR forecasts for the future years. This is particularly the case in the 2007-08 year (and more specifically, summer of 2008).

Origin agrees that it is preferable that the modelling exercise for the next BRCI year seeks to capture for the purposes of the forecast the expected return to "normalised" characteristics of the relevant load (as at the end of the day, the average price has to be made on the best forecast available, which in this instance, is the trend line forecast). However, as noted, this creates practical difficulties for the BRCI approach when the "actual" load is significantly different in terms of both total energy and peak demand, as has occurred in the last year.

The particular difficulty facing both CRA and ACIL equally is the attempt to modify an actual load trace when forecasting the future financial year by a series of data manipulations that include inter alia (as noted previously):

⁷ This figure is an estimate only, and based on data provided in Table 3.9, page 36 of the 2008 APR. This data is not directly comparable, and figures are therefore a guide only. However, CRA or ACIL should be able to provide the exact step up between the peak demand derived from the extension of the 2008-09 "actual" load shape and the peak demand found in the respective optimised models.

- Use of the last quarter of the previous financial year to represent the last quarter of the current financial year, such that the base year “actual” load trace is in fact a mix of actual load shape data and substituted load shape data. This also requires the careful alignment of day types in the substitution process, and (assuming some underlying growth), depresses the last quarter of the base financial year against the trend growth patterns;
- Increasing the half hourly load shape in total by the average growth for the previous financial year (which may or may not align with the energy growth forecasts in the SOO/APR);
- Optimising the half hourly load shape to match the forecast peak winter and summer demands (which may be as in this case, considerably higher than the observed peak demands for the base year); and
- In the case of the ACIL model, imposing a minimum constraint.

The last two steps involve various forms of transformation. For instance, ACIL reports that it uses “a non linear transformation to adjust the recorded load trace to fit the forecast elements (from APR) using a goal seek method akin to a linear programming solution” (page 5).

Given this degree of data manipulation (and the modifications to meet the various POE scenarios), there is a high risk that the resultant load shape will be significantly distorted from a realistic load shape (whether this is the load shape of the Total Queensland load or the NEM load - although the latter NEM load shape benefits from not including the additional errors created by the direct customer forecast load errors - assuming it is derived directly and not indirectly as ACIL proposes).

More generally, the proposed approach to forecasting appears to include an assumption that it is more important to get the peak half hour points aligned with the forecast than it is to ensure that the half hourly load shape is maintained within a sensible range of outcomes.

Origin is therefore most concerned that neither CRA nor ACIL have provided any statistical details of the load shapes that derive from these various data manipulations and how they compare to the original actual load traces. Without this type of information it is difficult to validate the approaches.

Recalculating the 2008-09 energy purchase costs

Origin confirms that the 2008-09 energy purchase costs need to be calculated in accordance with the directions of the Court. The QCA has concluded (page 6) that the change in method for calculating the energy purchase cost component of the 2009-10 BRCI is of sufficient magnitude to warrant recalculating the 2008-09 energy purchase costs.

We would note here that a calculation for 2008-09 of an energy purchase costs using the NEM load (as directed by the Court) has been done by CRA and previously reported in Table 25 of the May 2008 report. As we have highlighted previously in this submission, it has not been clearly established that the anomalies reported by CRA in the use of the same approach for 2009-10 are:

- Anomalies that also infect the 2008-09 Table 25 analysis;
- Are not the result of data errors in the 2009-10 NEM load data rather than methodological errors (the QCA has not published the NEM load traces from CRA); and/or
- Are not the result of attempts to optimise/manipulate the 2009-10 load traces to fit SOO/APR forecasts which (in this particular year) are significantly different from the base “actual” year.

Given the importance of stability in approaches, and the difficulties potentially raised by the QCA's recommendation to recalculate the 2008-09 using the new approach as well as the 2009-10 in terms of ensuring the BRCI tariff outcomes are not biased by this change in approach and recalculation, Origin believes that the assumption of recalculating 2008-09 is premature.

In the absence of this evidence, Origin is concerned that we are "changing approaches" regarding the forecast without adequately assessing the CRA approach or the new ACIL approach. The potential for ACIL approach to distort the load shape while optimising to the SOO forecast remains as much as CRA remains and is untested.

Calculating the NEM load Denominator for 2007 and 2008.

The QCA has identified 2 errors in their previous calculations of the NEM load for the purposes of the denominator in the BRCI calculations.

We understand the concern of the QCA to recalculate the 2008-09 and the 2009-10 BRCI figures using the corrected denominator. From one perspective, it makes sense to have a consistent approach through the two years. However, in Origin's view, a correction of past errors - similar to the updating of past data inputs - has the potential to distort the BRCI outcomes.

Such changes to 2008-09 at least cannot therefore be made lightly, and the full impacts in terms not only of the BRCI %, but the tariffs that arise from them, must be fully understood.

Origin would also highlight, that if such amendments/corrections were to be made, they must also apply to the appropriate elements in the denominator (for instance, where the average energy cost is multiplied by the NEM load to get to the total cost).

Other Comments

(1) Origin agrees with the QCA's comments that CRA's alternative "ratio" model is not based on a realistic assumption. However, as stated previously, we do not see the reason to introduce the question of the total Queensland load into the analysis at all, let alone maintain a ratio to it. (QCA: page 4)

(2) For reasons outlined previously, we do not agree with the statement by the QCA (when referring to the ACIL method in page 5) that "forecasts are generally based on historical half hourly data for the total national NEM load adjusted to reflect forecasts of likely future peak demand and total energy consumption". The SOO/APR forecasts are based on the aggregation of forecasts by the DNSPs and separate forecasts for each of the direct connection customers. We contend that the more accurate approach for the purposes of energy purchase costs is to use the disaggregate forecasts without reference to the Total Queensland NEM load.

(3) Origin generally agrees with the QCA's comment (page 5) that the economic changes may lead to forecasts that show lower load factors. Origin notes that (a) this may be more keenly seen in the NEM load shape than in the total Queensland load shape - modelling on the NEM load shape directly (rather than as a residual) will address this more appropriately in future years; and (b) this in turn will influence the average energy purchase price.

(4) The QCA comments (page 6) that "it is worth noting that more recent forecasts for the Queensland load alone would not be able to be used without similar contemporaneous

forecasts for the rest of the NEM jurisdictions". Origin agrees with this in principle, but considers that it may not be relevant in the context of assessing any approaches to the load trace used for the purposes of the Energy Purchase Costs.

To our understanding, while the spot market prices may require modelling of the whole of the NEM, there is no proposal to change these from those identified by CRA in their May 2008 study. The only variable that is being considered here is the calculation of the relevant load traces against which these prices will apply.

Concluding Comments:

Both CRA and ACIL forecast approaches are affected by the assumption that the aggregate Queensland load forecast by SOO/APR is more accurate than the component forecasts of which it is made. This has led to approaches that seek to derive the NEM load forecast shape by deduction from the total Queensland load forecast shape and the Direct Customers load shapes that are themselves manipulated to align historical actual load shape to meet specific forecast parameters (total load, and peak summer and winter load).

The approaches adopted also appear to assume that matching forecast peak loads (as per the SOO/APR) is more important than maintaining a realistic load shape overall (noting that the load shape is different than the peak load, and it is the load shape that is an important driver for the portfolio mix of contracts and caps).

Origin has separately suggested to the QCA that there may be a more simple and direct way to develop forecast load shapes that are based on a direct usage of the existing historical load shape.

Such an approach avoids the risks of distortion of the load shape that is a problem for both CRA and ACIL as discussed previously. Such an approach can in turn be used as a benchmark to assess the load shapes derived under the proposed ACIL model (or QCA model). We would appreciate the earliest opportunity to discuss these matters with you directly, as well as the matters raised in our current submission.

Yours sincerely



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