Background paper
QCA review of irrigation prices

Electricity Cost Re-forecast

September 2011

Contents

Pricing Note

All financial figures in this paper are reported in real dollars ($2011).

1 Introduction

The Queensland Competition Authority (QCA) is to recommend prices for SunWater's bulk water and distribution customers. SunWater has prepared Network Service Plans (NSPs) that set out the forecast operating and capital expenditure for each water supply scheme and distribution system. Electricity volume forecasts in the NSPs were determined by SunWater by selecting representative periods from the historical data for each service contract. These were then converted to costs using electricity prices that only increased at CPI.

Electricity costs are difficult to predict due to the variability in water usage and the risk that electricity prices rise at a rate different to CPI. This unpredictability led to SunWater proposing to recover the electricity cost variances via cost pass-through arrangements[1]. SunWater still presents this as their preferred position to manage electricity costs.

Under SunWater's proposal, where irrigation pricing includes a consumption charge: "The consumption tariff would then be adjusted each year to reflect the impact of changes to the retail electricity prices." [2] For service contracts without a consumption charge: "…SunWater proposes to maintain a running balance across the price path with a revenue neutral 'unders and overs' adjustment applied to prices for the next price path to account for differences between forecast and actual electricity costs." [3]

Both the NSP electricity volume forecasting methodology and the escalation of electricity prices at CPI drew criticism from the cost reviewing consultants. SunWater has addressed the criticisms of its electricity forecasting methodology by taking a more systematic approach to forecasting each service contract. All five years of actual cost data from 2007-11 are now included when determining average costs rather than tailoring the approach to specific service contracts.

To address the criticisms of electricity price escalation at CPI, SunWater has estimated the impact of potential Franchise tariff increases on electricity costs; SunWater has also allowed for the additional price increases estimated due to the introduction of the carbon tax. In the absence of an accepted forecast for retail price increases, SunWater has used the 2008-12 average BRCI increase of 10.5% for price indexation. SunWater considers this to be a conservative approach but a reasonable assumption in the face of considerable uncertainty, and one that should result in a more accurate forecast of electricity costs. However, SunWater is not an expert in forecasting electricity costs, given that this is very difficult to do in the face of considerable tariff and usage uncertainty. SunWater submits that the magnitude of any 'unders and overs' to be recovered under pass-through arrangements would be reduced if the tariff increases and carbon tax are allowed for in the electricity cost estimates. However, SunWater still proposes that pass-through arrangements should be established to cater for the volume and price risks related to electricity.

[1] See SunWater submission "Background paper QCA Review of irrigation prices – Electricity Costs", February 2011, on the QCA's website.

[2] Ibid.

[3] Ibid.

2 Overview of Bulk Water and Distribution Electricity Costs

Electricity costs for SunWater's bulk water and distribution schemes were previously forecast as $7m[4] pa representing approximately 15% of operating costs. Ten of SunWater's total of thirty service contracts account for around 94% of SunWater's total electricity costs. Electricity costs for these ten service contracts are highly correlated with water usage because the electricity consumption is predominantly associated with water pumping. These service contracts include all eight distribution systems and the two bulk water schemes that involve pumping to supplement streams[5].

The remaining twenty service contracts have electricity costs that are not correlated with water usage. These twenty service contracts are all bulk water contracts that have relatively consistent electricity usage from year to year, irrespective of water usage.

All of SunWater's bulk water and distribution sites remain on Franchise tariffs because these have been assessed over many years as being consistently lower for SunWater's sites than contestable market prices[6]. Franchise tariffs are escalated each year according to the Benchmark Retail Cost Index (BRCI)[7] which has increased by an average of 10.5% pa between 2008 and 2012.

[4] Source: NSP data January 2011. All financial figures in this paper are GST exclusive.

[5] Barker Barambah Redgate Relift and Upper Condamine North Branch.

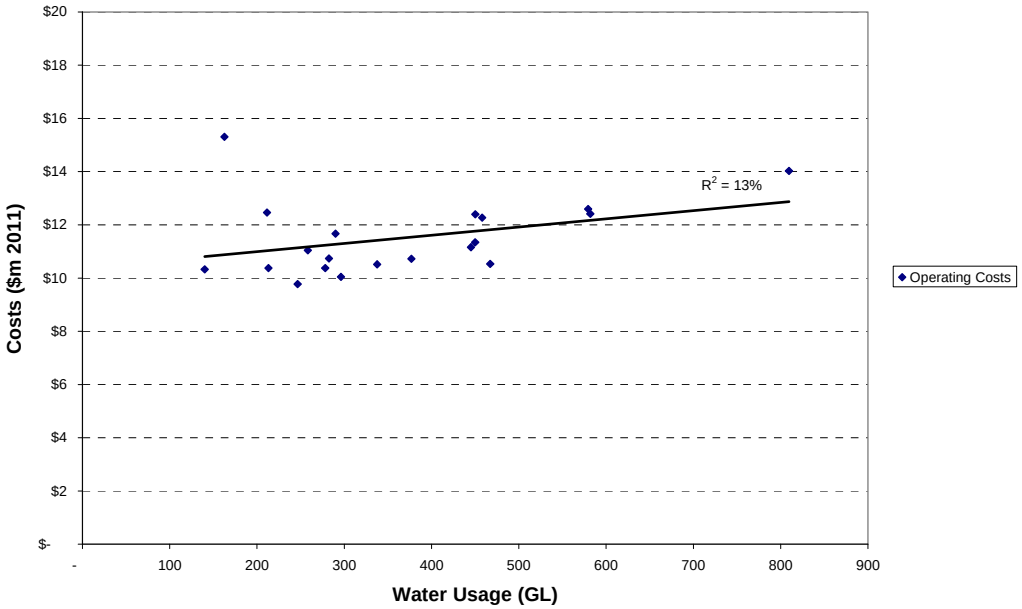
[6] See the separate SunWater submission "Supplementary Information on Electricity Cost Management" for an overview of SunWater's bulk water and distribution electricity procurement.

[7] The BRCI is indexed annually in a process managed by the QCA.

3 Overall Correlations to Water Usage

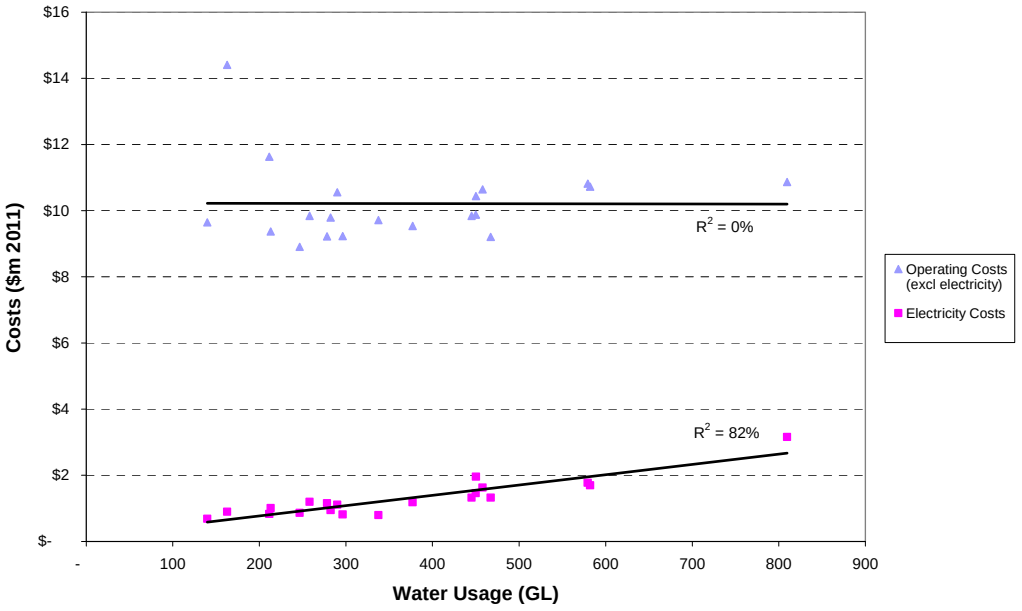
The ten service contracts that have electricity costs correlated to water usage were identified by performing regression analysis across five years of actual data. It is often mistakenly assumed that all of SunWater's operating costs are driven by water usage. However, the chart of operating costs versus water usage below shows that the relationship is weak.

Figure 1 – Operating Costs Relationship to Water Usage



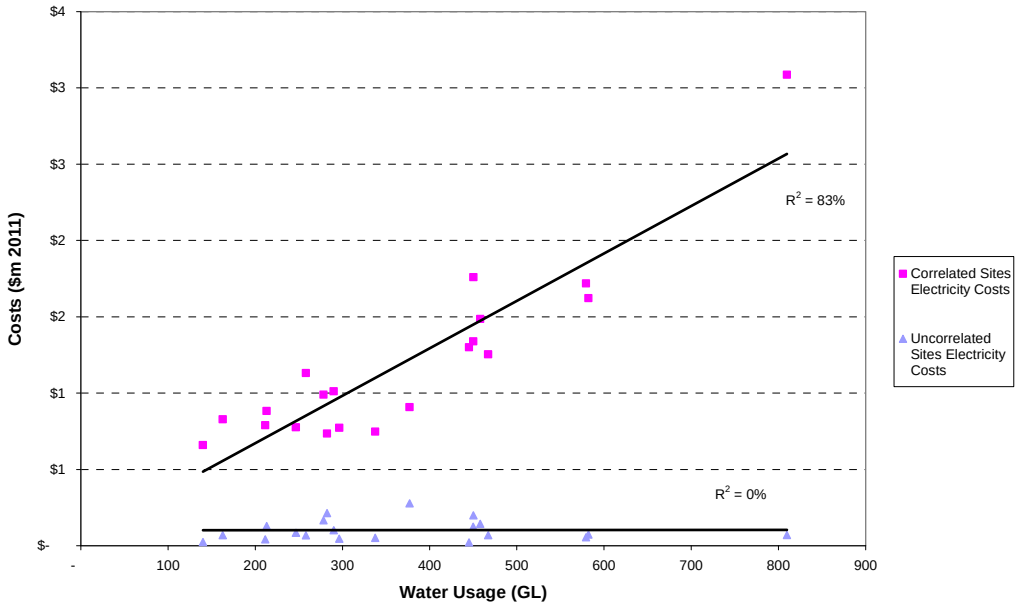
When electricity costs are separated out from the operating costs, it becomes clear that electricity is strongly correlated to water usage, while the balance of operating costs have no relationship to water usage.

Figure 2 – Electricity Costs Strongly Correlated to Water Usage



Further investigation has shown that the relationship between electricity costs and water usage can be pinpointed to 10 of the 30 SunWater service contracts. The relationship between electricity costs and water usage for the two groups of service contracts is shown in the chart below.

Figure 3 –Correlation to Water Usage Driven by Ten Service Contracts



These results suggest that electricity costs for the ten correlated service contracts should be determined by first characterising the electricity cost/water usage relationship for each of the ten correlated service contracts and then using this relationship to forecast electricity costs based on the individual water usage forecasts.

Water usage forecasts are irrelevant to electricity costs for the remaining 20 service contracts. Some of these bulk schemes have off-stream storage where pumping is dependent on stream flow events rather than water usage. For the remaining sites, electricity consumption is related to ancillary services, such as security lighting and other site facilities. For these uncorrelated contracts, electricity costs should be forecast using a simple average of electricity costs over the past five years.

For both the correlated and uncorrelated service contracts, electricity costs must be normalised to account for electricity price increases under the BRCI process, otherwise the resulting forecasts will be distorted. This point is discussed in more detail in Section 4.

The findings regarding the correlated and uncorrelated service contracts also have implications for the irrigation water pricing structures for the different types of service contracts. The analysis suggests that irrigation prices should only include a variable price component for the 10 correlated service contracts and it follows that the variable component should be restricted to the recovery of electricity costs. The balance of costs for these ten service contracts should therefore be recovered via the fixed charge component. By contrast, the remaining 20 service contracts should not include a variable pricing component in their irrigation prices because none of their operating costs have been shown to be correlated to water usage. All costs for these contracts should therefore be recovered under the fixed charge component of the irrigation pricing structure.

4 Electricity Price Increases under the BRCI

Electricity prices for SunWater's bulk water and distribution sites are indexed annually according to movements in the BRCI. The BRCI is designed to reflect changes in total retail electricity costs over time. As shown in the chart below, the changes in the BRCI have been well above the Consumer Price Index[8] (CPI) for every year since its inception.

Figure 4 – BRCI increases versus CPI increases

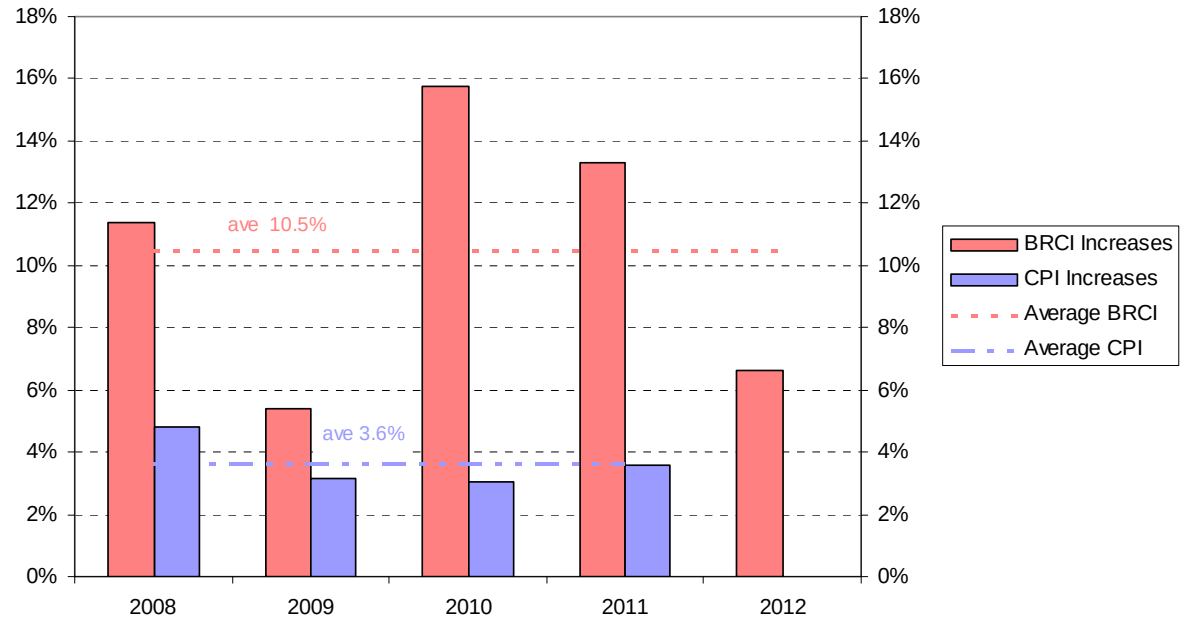


Figure 4 shows that electricity cost increases have averaged 10.5% per year, compared to the CPI average of 3.6%. It is important to take into account the movements in the BRCI in any analysis of SunWater's historical electricity costs, otherwise the analysis will erroneously confuse the BRCI-CPI differential with the underlying relationship between kWh and water usage. This would in turn distort the results of the cost correlations performed for both the 10 correlated service contracts and average electricity cost calculations for other 20 service contracts.

Halcrow noted this issue in their review of operating costs when they said "... Halcrow notes that a forecast based on electricity consumption (kWh) would eliminate the impact of the movement in historical expenditure resulting from tariff increases." SunWater has addressed this issue by taking into account increases in Franchise tariffs due to the BRCI over the 2007-11 period, thereby effectively basing forecasts on the kWh consumption for each service contract.

The issue of accounting for BRCI increases in SunWater's electricity forecasts was also picked up by several consultants and in feedback from irrigators. SunWater's previous forecasts of electricity costs were escalated from 2010 values using the 13.29% BRCI increase for 2011. Electricity cost escalations beyond 2011 were made entirely at CPI, which

[8] Brisbane All Groups March-to-March CPI.

meant that electricity costs showed no real increase for any of the service contracts over the 2012-17 price path. The expectation was that any shortfalls between forecast and actual electricity costs, including shortfalls attributable to the BRCI-CPI differential, would be picked up via cost pass-through arrangements.

Arup's comment on SunWater's proposed escalation approach was "Although the approach of using 'overs and unders' to adjust its revenue in line with costs each year is accepted in some regulatory frameworks, there remains considerable risk and some increased costs associated with using CPI as an escalator for future electricity price increases."

GHD also questioned SunWater's use of CPI as an electricity price escalator, stating that "SunWater's argument does not provide sufficient justifiable reason for GHD to accept this approach." Consequently, GHD recommended that "escalations ... for electricity be set to the BRCI."

SunWater has accepted GHD's recommendation to use BRCI increases to index electricity prices. The question then becomes where to source a BRCI forecast. While the Reserve Bank publishes targets for the CPI which are widely quoted and used for a basis for forecasting, there are no similar targets or forecasts published for the BRCI. SunWater has not been able to source an alternative forecast BRCI in the public domain. In the absence of an accepted forecast for retail price increases, SunWater has used the 2008-12 average BRCI increase of 10.5% for price indexation. SunWater considers this to be a conservative approach but a reasonable assumption and one that should result in a more accurate forecast of electricity costs. However, SunWater is not an expert in forecasting electricity costs, given that this is very difficult to do in the face of considerable tariff and usage uncertainty. SunWater is considering the option of obtaining alternative indexation figures from an external forecasting expert.

While the BRCI process is currently under review by the QCA[9], the intention is that the new retail tariff indexation methodology will still be cost reflective and therefore the changes being considered by the review are a refinement of the existing BRCI methodology rather than a major overhaul of the process.

Both the tariff increases and the current tariff review present risks that are beyond SunWater's control. The indexation of prices by estimated BRCI has been implemented in an attempt to reduce the potential unders and overs claim by SunWater through the proposed pass-through arrangements. With the BRCI being determined before the start of each financial year, there is the potential to apply the next year's BRCI increase to the relevant components of irrigation tariffs before each year begins to remove the price risk.

[9] Further details on the "Review of Regulated Retail Electricity Tariffs and Prices" can be found at the QCA's website: www.qca.org.au/electricity-retail/RevEPandTS/

5 The Impact of Carbon Pricing

The Commonwealth Government has announced the introduction of a carbon tax starting at $23/tonne from July 2012. Federal Treasury modelling shows an initial step change in electricity prices of 10% for the 2013 year followed by another step-change of 1% when carbon trading commences in 2016[10]. These are real price increases above the real increases estimated under the BRCI, are beyond SunWater's control and need to be included in SunWater's cost base for determining irrigation prices.

The following table shows the combined impact of the BRCI increases and the carbon pricing scheme in terms of real increases to electricity prices. The escalators including the carbon pricing impact have been applied to the forecast electricity costs for each service contract to determine the real increases estimated for each service contract over the price path.

Table 1 –Forecasting Electricity Price Increases under Carbon Pricing

	2011	2012	2013	2014	2015	2016	2017
BRCI Increases		6.6%	10.5%	10.5%	10.5%	10.5%	10.5%
Forecast CPI		2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Index for Real Increase in Electricity Prices	100%	104.0%	112.1%	120.8%	130.2%	140.3%	151.3%
Carbon Pricing Impact		0%	10.0%	0%	0%	1%	0%
Index for Real Increases including Carbon	100%	104.0%	123.3%	132.9%	143.2%	155.9%	168.0%

[10] See "Strong growth, low pollution: modelling a carbon price" at http://www.treasury.gov.au/carbonpricemodelling/content/default.asp, Table 5.19.

6 Cost Forecasts for Individual Service Contracts

6.1 Overall Improvements to the Electricity Forecasting Methodology

Forecasts presented in the NSPs were based on SunWater's judgement of the period that best represented electricity consumption for each service contract. This meant that individual service contract forecasts were based on between one to three years of historical electricity cost data either converted to a $/ML for correlated service contracts or a total $ figure for uncorrelated service contracts.

Halcrow's report took issue with SunWater's approach to forecasting, stating that: "The varying interpretations of what constitutes an average year, particularly where there are varying definitions for expenditure associated with a particular scheme, means that it is very difficult to gain assurance that SunWater's adopted approach in developing forecasts is reasonable. SunWater's approach to forecasting electricity differs between schemes, and the base data used to develop forecasts also varies."

SunWater believes it has addressed Halcrow's concerns by including the entire historical data set for 2007-11 in its forecasting analysis, thereby making no judgement about what constitutes an 'average year'. For contracts that are correlated to water usage, the $/ML rate was determined by the line-of-best-fit across the whole five years of historical data. The water usage forecasts are unchanged from the NSP figures. For service contracts not correlated to water usage, the forecast cost is the average cost across the whole five years of historical cost data. The base data used to develop forecasts was sourced from SAP electricity expenses for every service contract, ensuring consistency across all contracts and also consistency with the reported NSP cost data.

This approach also seems to satisfy the Eton Irrigators Advisory Committee's suggestion that SunWater "… the most appropriate method to determine unit cost for electricity is to take actual electricity consumption figures from accounts and divide by actual water volumes for water meters for similar periods."

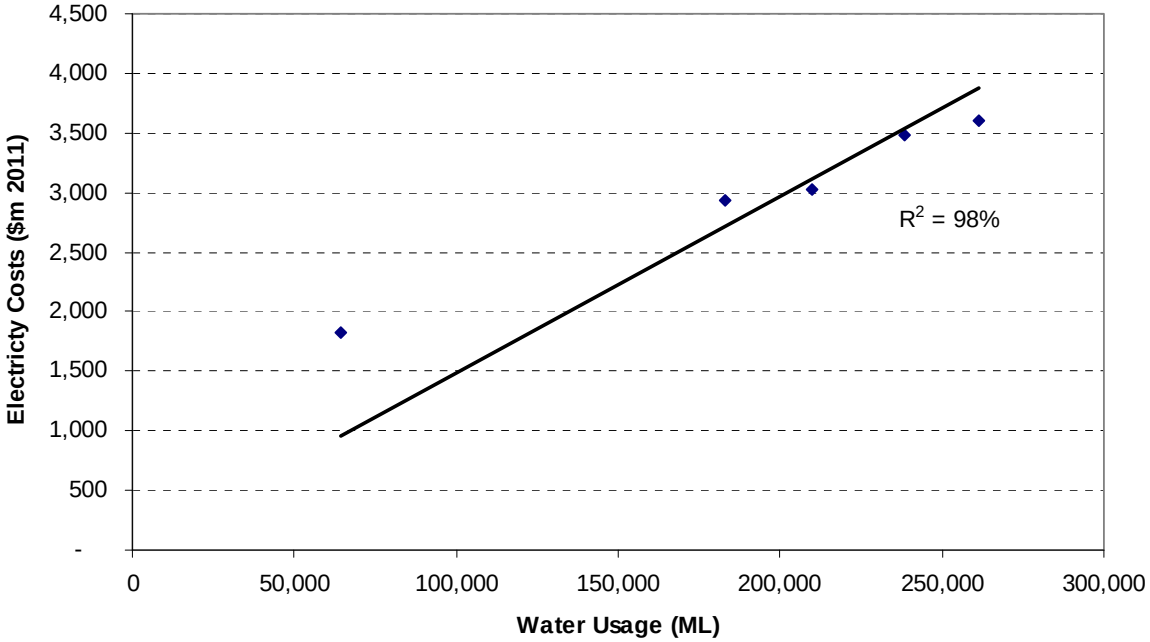
Electricity cost forecasts for both the correlated and uncorrelated service contracts are now indexed for the estimated BRCI increases and the estimated impact of carbon pricing. This means the electricity forecasts now reflect the estimated real increases in costs over the price path and the magnitude of any 'unders and overs' to be recovered under pass-through arrangements should be reduced. However, SunWater still proposes that pass-through arrangements should be established to cater for volume and price risks related to electricity costs.

6.2 Cost Forecasts for the 10 Correlated Service Contracts

As discussed in Section 3, electricity costs for the 10 correlated service contracts were determined by first characterising the electricity cost/water usage relationship for each service contract and then using this relationship to forecast electricity costs based on the individual water usage forecasts. These 10 service contracts account for 94% of SunWater's total electricity costs; the remaining 6% of electricity costs coming from the other 20 bulk water service contracts. The Burdekin distribution service contract on its own accounts for around 47% of SunWater's total electricity costs and it is used to illustrate the forecasting methodology adopted for the correlated service contracts.

The chart following shows the correlation of electricity costs to water usage for Burdekin distribution.

Figure 5 – Burdekin Distribution Electricity Cost Correlation to Water Usage



The analysis for Burdekin distribution reveals that electricity costs averaged $14.80/ML ($2011) which is higher than the previous forecast of electricity costs for Burdekin distribution of $13.27/ML. This increase is due to the fact that the best-fit rate across the five-year data set is higher than the previous value, which was taken from 2010.

To produce a forecast of electricity costs for Burdekin distribution, the $14.80/ML rate for 2011 was inflated by the BRCI escalator and the carbon pricing impact, and then deflated by the estimated CPI to return to $2011. The previous forecasts of electricity costs shown in the Network Service Plans had no real increases in electricity costs because the inflator and deflator were one and the same (i.e. CPI). The required adjustments to produce the new forecast are shown for Burdekin distribution in Table 2.

Table 2 –Details of Electricity Cost Forecasting for Burdekin Distribution

	2011	2012	2013	2014	2015	2016	2017
Forecast Water Usage (ML)		247,181	247,181	247,181	247,181	247,181	247,181
Original $/ML rate - with no real increase in electricity costs	$13.27	$13.27	$13.27	$13.27	$13.27	$13.27	$13.27
Original Forecast ($2011)		$3.28m	$3.28m	$3.28m	$3.28m	$3.28m	
BRCI		6.60%	10.47%	10.47%	10.47%	10.47%	10.47%
CPI		2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
Carbon Pricing Impact		0%	10.0%	0%	0%	1%	0%
Effective Indexation	100%	104.0%	123.3%	132.9%	143.2%	155.9%	168.0%
Original $/ML rate - with BRCI and carbon tax	$13.27	$13.80	$16.36	$17.63	$19.01	$20.69	$22.30
New forecast $/ML ($2011)	$14.80	$15.39	$18.25	$19.67	$21.20	$23.08	$24.87
New Forecast Electricity Cost ($2011)			$4.51m	$4.86m	$5.24m	$5.70m	$6.15m

The majority of the increase in forecast electricity costs for Burdekin distribution is due to the allowance for estimated increases in the BRCI and the impact of carbon pricing. The remainder of the cost increases were due to a higher base rate resulting from the correlation analysis. Correlations performed across the 10 service contracts have resulted in increased $/ML rates for six of the service contracts and decreased rates for four of the service contracts. These rates and the subsequent forecast electricity costs for 2013 are shown in Table 3.

Table 3 –Forecast 2013 Electricity Costs for the 10 Correlated Service Contracts

Service Contract	Original $/ML rate for 2011	New $/ML rate for 2011	New $/ML rate for 2013 (first year of new price path)	Water Usage Forecast (ML)	New Electricity Forecast for 2013 ($'000 2011)
Barker Barambah Bulk	$12.66	$11.46	$14.13	1,288	$18
Upper Condamine Bulk	$7.14	$6.15	$7.58	7,062	$54
Bundaberg Distribution	$29.12	$30.99	$38.21	75,652	$2,891
Burdekin Distribution	$13.27	$14.80	$18.25	247,181	$4,511
Emerald Distribution	$1.36	$1.57	$1.93	69,854	$135
Eton Distribution	$8.53	$13.13	$16.18	26,940	$436
Lower Mary Distribution	$30.55	$29.11	$35.89	4,647	$167
Mareeba Distribution	$50.25	$50.10	$61.78	5,013	$310
St George Distribution	$0.97	$0.83	$1.02	43,170	$44
Theodore Distribution	$10.65	$11.13	$13.72	11,166	$153

Special mention needs to be made regarding Lower Mary electricity cost data. Aurecon found in their report regarding Lower Mary Distribution: "... it is difficult to identify a relationship between water usage rates and Electricity costs incurred for the scheme." The apparent lack of correlation was due to the some of the distribution costs being incorrectly allocated to Lower Mary bulk in 2007 (as was noted by Aurecon in their report). These costs were reallocated to distribution for SunWater's regression analysis in this paper and Lower Mary distribution electricity costs were then clearly correlated to water usage.

6.3 Cost Forecasts for the 20 Uncorrelated Service Contracts

Water usage forecasts are irrelevant to electricity costs for the remaining 20 service contracts. For these contracts, electricity costs have been forecast using a simple average of these costs over the past five years after taking into account past movements in the BRCI. The largest of the uncorrelated bulk water service contracts is Eton and is used to illustrate the forecasting methodology adopted for the uncorrelated service contracts.

As mentioned earlier, all five years of actual cost data and the impact of past Franchise tariff increases on electricity costs are taken into account in the forecasting methodology. This is an appropriate approach given that electricity consumption and water usage are not correlated for the 20 service contracts being forecast in this section.

Table 4 –Determining Average Electricity Costs for Eton Bulk Water

	2007	**2008**	**2009**	**2010**	**2011**	**average**
Electricity Costs ($'000 2011)	$175	$202	$163	$172	$87	**$160**
Costs normalised to 2011 BRCI	$235	$251	$198	$189	$87	**$192**

The original forecast of Eton bulk water electricity cost was made excluding 2007 data and with some moderation of the impact of 2008 data. SunWater's improved forecasting approach for the uncorrelated service contracts electricity costs includes costs over the entire 5-year data set. The data is also normalised to BRCI, which is particularly significant for the 2007 and 2008 data for Eton Bulk. The impact of carbon pricing is also taken into account. When this approach is taken for Eton bulk water the estimated electricity cost for 2011 is $192k ($2011). Table 5 shows the calculation of the new forecast for Eton bulk water and compares this to the original forecast, with both indexed for BRCI and carbon pricing impacts.

Table 5 –Forecasting Electricity Costs for Eton Bulk Water

($'000 2011)	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Original Forecast	$172	$172	$172	$172	$172	$172	
Effective Indexation	100%	104.0%	123.3%	132.9%	143.2%	155.9%	168.0%
Original Forecast normalised to BRCI	$172	$179	$212	$229	$246	$268	$289
New Forecast Electricity Cost	$192	$200	$237	$255	$275	$299	$323

A summary of the changes in forecast electricity costs for the uncorrelated service contracts is shown in Table 6. For most service contracts the changes are insignificant. Comparing costs on a like-for-like basis in $2011 shows that eleven of the service contracts are unchanged, five have decreased forecast costs and four have increased forecast electricity costs.

Table 6 –Forecast Electricity Costs for the 20 Uncorrelated Service Contracts

Service Contract	Original Forecast for 2011 ($'000 2011)	New Forecast for 2011 ($'000 2011)	New Forecast for 2013 ($'000 2011)
Bowen Broken Bulk Supply	$102	$97	$119
Dawson Bulk Supply	$41	$28	$35
Eton Bulk Supply	$172	$192	$237
Burdekin Bulk Supply	$75	$80	$98
Proserpine Bulk Supply	$4	$4	$5
Mareeba Bulk Supply	$4	$5	$6
Bundaberg Bulk Supply	$8	$8	$10
Lower Mary Bulk Supply	$-	$-	$-
Upper Burnett Bulk Supply	$7	$6	$8
Boyne Bulk Supply	$-	$-	$-
Callide Bulk Supply	$5	$6	$7
Lower Fitzroy Bulk Supply	$1	$1	$1
Three Moon Bulk Supply	$9	$8	$9
Chinchilla Weir Bulk	$-	$-	$-
Maranoa Bulk Supply	$-	$-	$-
Cunnamulla Weir Bulk	$-	$-	$-
St George Bulk Supply	$7	$7	$9
Macintyre Brook Bulk	$1	$1	$2
Pioneer Bulk Supply	$3	$3	$4
Nogoa Bulk Supply	$12	$11	$14

6.4 *Cost Forecasts for all Service Contracts for the 2013-17 Price Path*

The forecasts for both the correlated and uncorrelated service contracts are brought together in the following table where they have been adjusted for estimated BRCI increases over the entire price path. These new forecasts replace the forecasts previously provided in the NSPs.

Table 7 –Forecast Electricity Costs for all Service Contracts

($'000 2011)	**2013**	**2014**	**2015**	**2016**	**2017**
Correlated Service Contracts					
Barker Barambah Bulk[11]	$22	$24	$25	$28	$30
Upper Condamine Bulk[12]	$60	$64	$69	$76	$81
Bundaberg Distribution[13]	$3,011	$3,245	$3,498	$3,808	$4,104
Burdekin Distribution	$4,511	$4,862	$5,240	$5,704	$6,148
Emerald Distribution	$135	$145	$157	$170	$184
Eton Distribution	$436	$470	$506	$551	$594
Lower Mary Distribution	$167	$180	$194	$211	$227
Mareeba Distribution	$310	$334	$360	$392	$422
St George Distribution	$44	$48	$51	$56	$60
Theodore Distribution	$153	$165	$178	$194	$209
Uncorrelated Service Contracts					
Bowen Broken Bulk Supply	$119	$129	$139	$151	$163

[11] Barker Barambah forecast includes the fixed costs associated with Bjelke-Petersen Dam ($4k in 2013).

[12] Upper Condamine includes the fixed costs associated with Leslie Dam ($6k in 2013).

[13] Burdekin Distribution forecast includes the fixed costs associated with Burnett Water ($120k in 2013).

($'000 2011)	2013	2014	2015	2016	2017
Dawson Bulk Supply	$35	$37	$40	$44	$47
Eton Bulk Supply	$237	$255	$275	$299	$323
Burdekin Bulk Supply	$98	$106	$114	$124	$134
Proserpine Bulk Supply	$5	$6	$6	$7	$7
Mareeba Bulk Supply	$6	$6	$7	$8	$8
Bundaberg Bulk Supply	$10	$10	$11	$12	$13
Lower Mary Bulk Supply	$-	$-	$-	$-	$-
Upper Burnett Bulk Supply	$8	$8	$9	$10	$10
Boyne Bulk Supply	$-	$-	$-	$-	$-
Callide Bulk Supply	$7	$7	$8	$9	$9
Lower Fitzroy Bulk Supply	$1	$2	$2	$2	$2
Three Moon Bulk Supply	$9	$10	$11	$12	$13
Chinchilla Weir Bulk Supply	$-	$-	$-	$-	$-
Maranoa Bulk Supply	$-	$-	$-	$-	$-
Cunnamulla Weir Bulk Supply	$-	$-	$-	$-	$-
St George Bulk Supply	$9	$9	$10	$11	$12
Macintyre Brook Bulk Supply	$2	$2	$2	$2	$2
Pioneer Bulk Supply	$4	$4	$5	$5	$6
Nogoa Bulk Supply	$14	$15	$16	$17	$19

7 Specific Issues Raised for Dawson and Emerald

Halcrow raised some specific issues regarding the electricity costs for Dawson bulk and Emerald distribution that SunWater believes are addressed through the improved forecasting methodology.

For Dawson bulk, Halcrow noted "…the significant variability in the requirement to pump water (as reflected in the fluctuation of expenditure). Halcrow is of the opinion that an average expenditure, calculated over a longer term period, is likely to result in a more accurate reflection of actual expenditure." Halcrow also noted that SunWater had used nominal electricity costs to calculate the average cost rather than real costs.

SunWater's improved forecasting approach now includes 2007 data, as suggested by Halcrow, and also allows for real increases in Franchise tariffs over the previous price path. These changes together have reduced the forecast for Dawson bulk to $28k for 2011 (see Table 6), which is below the $33k suggested by Halcrow in their report (Table 7-10).

In Emerald distribution, Halcrow proposed re-forecasts for the first three years of the price path because "only the Selma sub-system requires pumping, and only when Fairbairn Dam drops below 66.8% capacity" and "…Fairbairn Dam has been operating at 100 percent capacity since September 2010, and that it is unlikely that SunWater will be required to operate the Selma sub-system pumps for the next two to three years. Halcrow is of the opinion that the forecast expenditure should be re-phased, to more accurately reflect the likely incurrence of the expenditure."

SunWater's improved approach to electricity forecasting appropriately accounts for the issue raised by Halcrow and an ad hoc adjustment to the electricity forecast for Emerald distribution is inappropriate and unnecessary.

Firstly, SunWater's approach is based on determining average $/ML over the range of conditions that have been experienced over the past five years and applying this average to the expected average water usage. There will be unders and overs due to variables beyond the scope of the forecasting model, but costs should revert to the average in the longer term. Given that Halcrow thinks these levels may only exist until the end of 2013, it would be inappropriate to adjust the forecast in this ad hoc manner for only the first year of the revised price path. SunWater does not believe that it is appropriate to 'cherry-pick' a lower rate for Emerald for part of the price path and then return to average rates for the remainder of the price path.

Secondly, Fairbairn Dam has been above the 66.8% level since 18th January 2008 for all but 28 days, and even then it only dropped to 65.1%. So 2½ years of the 5 years of actual data used in the analysis has been collected under the conditions that Halcrow is attempting to correct for in their ad hoc adjustment to the forecast. The electricity costs for Emerald distribution have averaged $54k pa during the period since 18th January 2008, well above the $0k pa proposed by Halcrow. This is primarily due to the fact that relift pumps in the Selma section operate regardless of the dam level and independent of the operating modes of the Selma pump station. These points further highlight the problematic nature of Halcrow's approach to electricity forecasting.

Halcrow has only provided a part solution when they suggested amended electricity costs for Emerald distribution in their report. The only way to rigorously implement Halcrow's suggested approach would be to perform regression analysis that included dam levels as a variable and then to forecast dam levels over the entire price path. SunWater contends that dam levels cannot be forecast accurately over five years. Halcrow has effectively forecast the dam levels for Fairbairn Dam to remain above 66.8% until the end of 2014, however their forecasting method is unclear and does not appear to be supported by rigorous analysis of expected inflows and outflows. They state "that it is unlikely that SunWater will be required to operate the Selma sub-system pumps for the next two to three years". SunWater does not believe that this ad hoc approach is appropriately robust and rigorous, and it is certainly not an approach that can be applied to the entire price path. SunWater's electricity forecasting approach is a rigorous and robust approach and should be maintained for Emerald, as it is for all of the other correlated service contracts.

8 Conclusion

Electricity costs are difficult to predict due to the variability in water usage and the risk that electricity prices rise at a rate different to CPI. This unpredictability led to SunWater proposing to recover the electricity cost variances via cost pass-through arrangements[14]. SunWater still presents this as their preferred position to manage electricity costs.

Despite SunWater's preference for pass-through of electricity cost variances, SunWater has responded to criticisms of its electricity forecasting methodology by taking a more systematic approach to forecasting each service contract. All five years of actual cost data from 2007-11 are now included when determining average costs, rather than tailoring the approach for specific service contracts. For the ten service contracts correlated to water usage, average $/ML rates have been determined using regression analysis over the five years of actual data. For the remaining twenty service contracts, electricity costs were based on the average total electricity cost over the five years.

SunWater has also changed its approach to escalation of the electricity pricing used to forecast electricity costs by taking into account the impact of estimated Franchise tariff increases on electricity costs. In the absence of an accepted forecast for retail price increases, SunWater has used the 2008-12 average BRCI increase of 10.5% for price indexation. SunWater considers this to be a conservative but reasonable approach. SunWater is not an expert in forecasting electricity costs, given that this is very difficult to do in the face of considerable tariff and usage uncertainty. The estimated price increases due to the carbon tax have also been incorporated using estimates from the Federal Treasury modelling. This means the electricity forecasts now reflect the estimated increases in costs for electricity over the price path. Any 'unders and overs' to be recovered under pass-through arrangements should therefore be reduced, however SunWater still proposes that pass-through arrangements should be established to cater for volume and price risks related to electricity costs.

The updated forecasts presented in this paper replace the previous NSP forecasts.

[14] See SunWater submission "Background paper QCA Review of irrigation prices – Electricity Costs", February 2011, on the QCA's website.