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Cost escalation factors

Final report

Seqwater

Supporting documentation for Seqwater's regulatory submission

17 July 2017

pwc

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Executive summary

Overview

Seqwater has engaged PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) to determine appropriate cost escalation factors for the following expenditure items:

- employee and contract labour costs
- contractors (service delivery) costs
- electricity
- chemicals
- other materials and services
- capital expenditure.

The development of cost escalation factors is a key component underpinning a regulated business' estimated revenue requirements over a regulatory period. Required revenue can be sensitive to changes in input prices, and therefore robust cost escalation factor estimates are required to ensure that these changes are accurately captured and reflected.

Approach

This report identifies and analyses expected movements in the drivers of operating and capital expenditure, and develops cost escalation factors for each of the cost categories specified above. The analysis has drawn on financial data provided by Seqwater along with relevant regulatory precedent and broader industry best-practice.

Proposed escalation factors

The table below summarises proposed escalation factors by cost category for the purpose of informing Seqwater's upcoming submission to the Queensland Competition Authority.

Proposed escalation factors by cost category

Cost category	Recommended escalation factor	Source
Employee and contract labour expenses	Seqwater Enterprise Agreement to 2018/19	Seqwater Enterprise Agreement 2016 – 2019
	Queensland Treasury WPI forecast for 2019/20 and 2020/21	Queensland Treasury (2017/18 Budget)
	Long-term (15 year) historical growth in the Queensland WPI for the remainder of the forecast period	Australian Bureau of Statistics (Queensland WPI)
Contractors (service delivery)	Weighted index of the Queensland WPI (forecasts and long run average growth) and CPI (RBA inflation forecasts to 2018/19 and mid-point of RBA inflation target) for remainder of period.	Queensland Treasury (2017/18 Budget), Australian Bureau of Statistics (Queensland WPI)
	Escalation factor = 0.56(WPI) + 0.44(CPI)	Reserve Bank of Australia
Electricity	Average annual growth rate in AEMO Queensland commercial electricity price forecasts between 2020 and 2030 over the regulatory period.	Australian Energy Market Operator (2016 National Electricity Forecasting Report) – forecasts developed by Jacobs for AEMO.
	Annual growth in AEMO Queensland commercial electricity price forecasts for the remainder of the forecast period.	

Cost category	Recommended escalation factor	Source
Chemicals	RBA inflation forecasts (to 2018/19), mid-point of RBA inflation target range for the reminder of the forecast period	Reserve Bank of Australia
Other materials and services	RBA inflation forecasts (to 2018/19), mid-point of RBA inflation target range for the reminder of the forecast period	Reserve Bank of Australia
Capital expenditure	Queensland Engineering Construction Activity Implicit Price Deflator for historical capital expenditure to 2015/16.	Australian Bureau of Statistics (Engineering Construction Activity, Australia)
	RBA inflation forecasts (2016/17 to 2018/19), mid-point of RBA inflation target range for the reminder of the forecast period	Reserve Bank of Australia

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1 Project overview

1.1 Background

In order to support the development of recommended bulk water prices for customers, Seqwater is required to submit operating and capital expenditure forecasts to the Queensland Competition Authority (QCA) as part of its regulatory submission process.

The current regulatory period expires on 30 June 2018. A new regulatory submission is required to inform prices that will apply over the next regulatory period, beginning 1 July 2018. Seqwater's submission to the QCA for the upcoming pricing period requires the development of forecasts of operating and capital expenditure to 30 June 2028 to align pricing to the recovery horizon and mechanics of the Queensland Government's Bulk Water Price policy. A key component of forecasting operating and capital expenditure is determining and applying reasonable and robust cost escalation factors to apply to major expenditure categories over the relevant period.

Seqwater has engaged PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) to determine appropriate cost escalation factors for the following expenditure items:

- employee and contract labour costs
- contractors (service delivery) costs
- electricity
- chemicals
- other materials and services
- capital expenditure.

1.2 Cost escalation

The development of cost escalation factors is a key component underpinning a regulated business' estimated revenue requirements over a regulatory period. Required revenue can be sensitive to changes in input prices, and therefore robust cost escalation factor estimates are required to ensure that these changes are accurately captured and reflected.

A range of possible approaches can be taken to determine an appropriate escalation factor to apply to a particular cost category. For example, it may be reasonable to assume that some costs will move in line with a measure of underlying inflation, such as the Consumer Price Index (CPI). While this measure reflects a 'basket of goods' that may not be directly comparable to goods and services purchased by a water supply businesses, this index has been adopted by regulators in the past on the basis that it is transparent, readily accessible and a familiar measure of inflation.

Alternatively, movements for some cost categories may be more closely linked to a composite index, reflecting that a range of underlying factors are expected to drive input prices over time. Where a cost category comprises a significant proportion of total costs, and is driven by a range of factors other than general inflation, a more tailored approach (such as the development of a bespoke index) may be warranted.

Regardless of the proposed escalation method, there must be a clear basis for its application and a detailed justification of how the measure aligns with anticipated changes in input prices over time. This justification is particularly important when a regulated business deviates from specifically defined and universally accepted measures of inflation such as CPI or other publicly available indices.

1.3 Approach

This report identifies and analyses expected movements in Seqwater's operating and capital expenditure and develops cost escalation forecasts for each of the cost categories specified above.

This assessment reviews each of the specified cost categories separately to determine an appropriate escalation factor. Each chapter:

- Describes the major components of each cost category, including the share of Seqwater's total costs the category comprises.
- Reviews alternative escalation measures which could be applied to the specific cost category (or cost sub-categories where relevant), including a review of precedent from recent regulatory determinations made by a range of Australian regulators.
- Assesses broader market and economic trends which may influence future input price movements.
- Determines an escalation factor (or factors) for the relevant cost category taking into consideration the extent to which any proposed escalation factor:
  - is transparent, repeatable and the data readily accessible
  - reflects the range of applicable cost pressures
  - accounts for uncertainty, if appropriate.

In determining the most appropriate indexation factor for each cost category, we have drawn on relevant publicly available indices, such as the CPI and Wage Price Index (WPI) published by the Australian Bureau of Statistics (ABS) along with related indices developed by other third-parties. Where appropriate, the construction of composite or weighted indices combining publicly available indices has also been considered. Nominal and real forecasts for each escalation factor have been included for each cost category.

Nationwide forecasts of general inflation have been used to calculate the real escalation factors. CPI estimates out to 2018/19 are based on forecasts published by the Reserve Bank of Australia (RBA) in the Statement of Monetary Policy (February 2017). Beyond this period, forecasts of CPI are based on the mid-point of the RBA national inflation target range, described in Box 1.

We have applied forecasts of national CPI (as opposed to Brisbane-specific CPI) as the measure of inflation, as it is calculated from a larger sample and allows for consistent comparisons of real price increases nation-wide. This approach is supported by regulatory precedent, with regulated businesses generally applying a national inflation forecast (often the mid-point of the RBA inflation target) to develop escalation factors. In certain cases, we have compared movements in specific CPI series at a national level to movements in Brisbane general inflation for illustrative purposes.

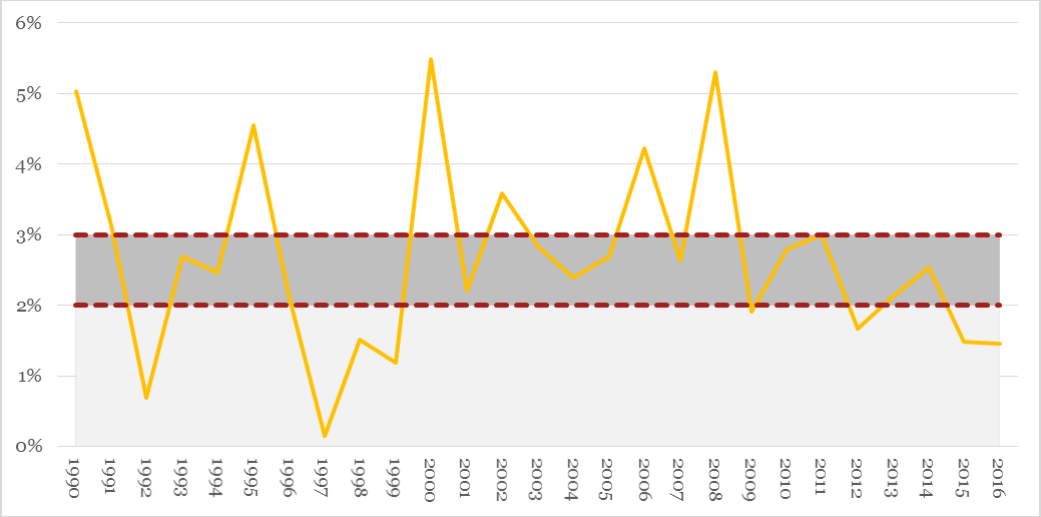
As presented below, movements in the CPI – All groups, Brisbane series have generally been consistent with the RBA's target range, suggesting that the national inflation target range also provides a reasonable indication of general price movements in Brisbane.

Box 1: Forecasting using estimates of the Consumer Price Index (CPI)

The Consumer Price Index measures quarterly changes in the price of a 'basket' of goods and services which represent a high proportion of expenditure by metropolitan households[1]. CPI estimates are developed for Australia and each capital city.

The Reserve Bank of Australia (RBA) is responsible for Australia's monetary policy. In determining monetary policy, the RBA has a duty to maintain a range of policy objectives including price stability. To achieve these objectives, the RBA has an 'inflation target' of between 2 to 3 per cent annual growth, on average, over the medium term.

The graph below displays how annual changes (December to December) in the Brisbane All Groups CPI index published by the ABS move within the RBA's inflation target range.



During the period between 1990 and 2016, Brisbane CPI fluctuated around a mean annual increase of 2.4 per cent. This indicates that despite instances of large year-on-year fluctuations in CPI, price increases in Brisbane have remained, on average, within the RBA's target range.

For the purposes of forecasting CPI over the regulatory period (beyond available RBA forecasts), we have adopted the mid-point of the RBA's target range (2.5 per cent). While over shorter time frames there are likely to be fluctuations below and above this value (for example over the past two years inflation has fallen below the RBA target), it is likely that when measured over longer periods, these fluctuations will counteract each other.

Recent developments regarding CPI forecasts

In its February 2017 Statement on Monetary Policy, the RBA noted that inflation remained low, but showed signs of having stabilised. Weak labour cost growth, low inflation expectations, increased competitive pressures and lower rent inflation were key contributors to the low inflation outcomes over the past year. Looking forward, measures of underlying inflation are expected to gradually pick up, returning to trend growth by the end of the forecast period (to June 2019). Increasing labour costs over coming years are expected to contribute to growth in overall inflation.[2]

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1 These goods include food and beverages (both alcoholic and non-alcoholic), tobacco, clothing and footwear, housing, furnishings, household equipment and services, health, transport, communication, recreation and culture, education, and insurance and financial services.

2 Reserve Bank of Australia (2017) *Statement on Monetary Policy, February 2017*. Available at: http://www.rba.gov.au/publications/smp/

1.3.1 Report structure

This report is structured as follows:

- Chapter 2 – Employee and contract labour costs
- Chapter 3 – Contractors (service delivery)
- Chapter 4 – Electricity
- Chapter 5 – Chemicals
- Chapter 6 – Other materials and services
- Chapter 7 – Capital expenditure
- Chapter 8 - Summary

1.4 Limitations

As part of this review, estimates of Seqwater's operating expenditure for 2017/18 have been analysed, however data provided was not final and is therefore subject to change. We do not expect that any future revisions to these figures (unless significant) will have a material impact on the cost escalators recommended in this report.

Finally, the assessment does not evaluate the efficiency or prudency of Seqwater's current expenditure levels.

2 Employee and contract labour costs

We recommend that Seqwater escalate its annual employee and contract labour costs in line with the current Enterprise Agreement to 2018/19, the Queensland Treasury WPI forecast for 2019/20, and the long-term historical growth in the Queensland WPI for the remainder of the forecast period.

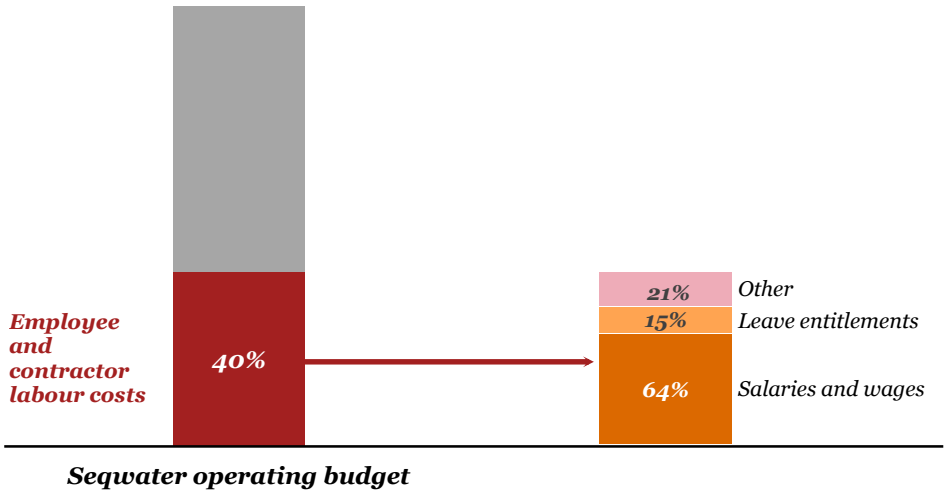
2.1 Overview

Seqwater employees, including permanent, fixed term and casual staff, are employed in accordance with the Seqwater Enterprise Agreement (EA, the Agreement). The Agreement governs a number of employment conditions including working hours, allowances, non-salary benefits and annual wage increases. The current Agreement covers the period 1 July 2016 to 30 June 2019.

2.1.1 Estimated employee and contract labour costs

Employee and contract labour costs are the largest operating cost incurred by Seqwater and accounted for approximately 40 per cent of Seqwater's total operating expenditure for 2017/18 (Figure 1). The majority of these costs are comprised of salaries and wages, with leave entitlements and other employee costs making up remaining expenses.

Figure 1: Major cost components of employee and contract labour expenditure, Seqwater operating expenditure estimates 2017/18[3]



[3] Seqwater data, PwC analysis

2.2 Alternative approaches for the escalation of employee and contract labour costs

2.2.1 Current indices and data sources

The ABS publishes a range of data sets and indices that can potentially form the basis of labour cost escalation forecasts. These include:

- wage price index
- average weekly ordinary time earnings
- compensation of employees.

Wage price index (WPI)

The wage price index (WPI) is a key measure of inflationary pressure on wages and salaries that specifically measures price changes independently to changes in the quantity or quality of work performed. WPI measures the weighted average change in the labour cost per hour of all jobs performed in an industry. The weights used in this calculation are the labour hours required to perform each job.

Wage price indices are calculated similarly to consumer price indices in that price-determining characteristics (such as changes in the location where work is performed, changes in the composition of the labour force and changes in the nature of work performed) are held constant to ensure these changes do not influence index movements. Index numbers are determined through a comparison of the current period price for labour and the previous period price for labour, weighted by standard hours worked. The base year for the series is 2008/2009, meaning that wage increased are calculated based on the employee composition observed in 2008/09. The WPI strictly refers to wage-related payments to employees, and does not include non-wage payments such as superannuation, leave, payroll tax and workers compensation payments.

Average weekly ordinary time earnings (AWOTE)

The average weekly ordinary time earnings (AWOTE) data series published by the ABS is intended to measure average earnings in Australia at a given point in time. AWOTE is the sum of regular cash payments made to employees divided by the total number of employees.

Unlike WPI indices, AWOTE estimates are sensitive to changes in the quality or quantity of work performed in a given period. AWOTE estimates are particularly sensitive to compositional changes in the underlying workforce, including changes in the mix of full time/casual staff, levels of staff seniority and changes in hours worked in a given period.

Compensation of employees

Compensation of employees (COE) data encompasses all payments made to employees, including bonuses, payments from profit sharing schemes and employer superannuation contributions. Where AWOTE estimates are the sum of regular cash payments to employees, COE estimates encompass the full remuneration of employees in Australia.

2.2.2 *Review of current regulatory precedent*

There have been a number of alternative approaches to labour cost escalation proposed by regulated businesses. These are summarised in Table 1 below.

Table 1 Application of alternative labour escalation factors, regulatory review

Business	Regulator	Proposed approach	Approved approach
Seqwater (*2015/16 to 2017/18 regulatory period)*	Queensland Competition Authority (QCA)	• Seqwater proposed to escalate labour costs by two different indices during the period 2014/15 to 2016/17. • Seqwater proposed to escalate labour costs according to the escalation provisions provided for in its Certified Agreement (CA) for the period of the agreement (to June 2016) of 2.5% per year (nominal). • For the remainder of the regulatory period (to 2016/17), Seqwater applied the Queensland WPI forecast developed by Queensland Treasury of 3.5% (nominal) annually.[4]	• The QCA appointed CH2M HILL to review Seqwater's proposed approach. • CH2M HILL accepted the proposed approach, noting that the QCA preferred approach in its price monitoring of SEQ water businesses was to escalate employee costs in line with Enterprise Agreements. • CH2M HILL accepted Seqwater's proposed post EBA escalations. The QCA accepted CH2M HILL's recommendation[5]
Gladstone Area Water Board (GAWB) (*2015/16 to 2019/20 regulatory period)*	Queensland Competition Authority (QCA)	• GAWB proposed labour escalation cost indices averaging 3.5% per annum (nominal) for the period 2015 to 2020. • These figures were calculated based on forecasts of remuneration movements conducted by Mercer.[6]	• The QCA appointed Jacobs to assist in its assessment of GAWB's operating expenditure. • Jacobs recommended that labour costs be escalated by the Queensland State Budget forecast of WPI growth for three years, and by the ten year average of the Queensland WPI for the remaining two years of the regulatory period • The QCA accepted that the proposed approaches by GAWB and Jacobs are both reasonable for GAWB and that the difference in escalation factors was immaterial. • The QCA adopted Jacob's approach in their modelling[7].

4 Seqwater (2015) *Seqwater Bulk Water Prices, 2015 to 2018: Submission to the Queensland Competition Authority*. Available at: http://www.qca.org.au/getattachment/2d256f0e-b12c-48fb-8e1d-7a4ac4fd577b/Seqwater-submission.aspx

5 Queensland Competition Authority (2015) *Seqwater Bulk Water Prices: 2015-18*. Available at: http://www.qca.org.au/Water/Urban-bulk-water/SEQ-bulk-water/Final-Report/Seqwater-Bulk-Water-Prices-2015-18#finalpos

6 Gladstone Area Water Board (2014) *2015 Price Monitoring Investigation: Submission to the Queensland Competition Authority*. Available at: http://www.qca.org.au/getattachment/c1488851-1b83-4e27-b9f8-1b6b2458d298/GAWB-submission.aspx

7 Queensland Competition Authority (2015) *Gladstone Area Water Board Price Monitoring 2015-2020*. Available at: http://www.qca.org.au/Water/Urban-bulk-water/Gladstone-Area-Water-Board/Final-Report/GAWB-2015-2020#finalpos

Business	Regulator	Proposed approach	Approved approach
Aurizon Network (*2013/14 to 2016/17 regulatory period)*	Queensland Competition Authority (QCA)	• 4.98% per annum (nominal) on average cost indexation applied to labour. • This figure was calculated based on BIS Shrapnel's proprietary forecasts for Average Weekly Ordinary time earnings.[8]	• The QCA did not accept Aurizon's proposed approach to escalate labour costs using AWOTE forecasts. • The QCA considered the ABS WPI index to be a better estimate of wage cost inflation because it is designed to measure pure prices changes in wages independent of workforce composition factors.[9]
Hunter Water (*2016/17 to 2019/20 regulatory period)*	IPART	• Hunter Water proposed to escalate labour costs by their Enterprise Agreements for the period 2016/17 to 2019/20. • Hunter Water is bound by the NSW Public Sector Wages Policy (2011) which requires any real wages growth to be offset by productivity savings. • Accordingly, Hunter Water proposed to offset any wage increases above 2.5% provided by Enterprise Agreement negotiations to be offset by productivity improvements.[10]	• IPART accepted this approach. • IPART noted that Hunter Water had made an allowance for real labour cost increases of between 0.5% and 0.6% per annum. • IPART noted that the new Enterprise Agreement required that any real labour cost increases be offset by productivity savings, resulting in no net increases in costs.[11]
Melbourne Water (*2016/17 to 2020/21 regulatory period)*	Essential Services Commission (ESC)	• Melbourne Water proposed labour cost escalation indices of 3.3% per annum (nominal), on average in the period 2016/17 to 2020/21. • This figure is consistent with Melbourne Water's Enterprise Agreement. • The proposed wage escalation was to be offset by implementing a nine day fortnight.[12]	• The ESC engaged Deloitte Access Economics to assist in its assessment of operating expenditure. • Deloitte assessed the cost escalation factors for wage escalation and noted that the approach is consistent with their own estimates provided to the AER for the Victorian utilities sector. • Deloitte considered Melbourne Water's forecasts for labour reasonable. • The ESC accepted that there are no further adjustments to labour costs.[13]

8 Aurizon Network (2014) *Aurizon Network 2014 Draft Access Undertaking: a response to the Queensland Competition Authority (QCA) Stakeholder Notice of August 2014*. Available at: http://www.qca.org.au/getattachment/3211c2f4-eee2-474a-9a46-10fbfcbb04fd/Aurizon-Network.aspx

9 Queensland Competition Authority (2016) *Aurizon Network Access Undertaking – Volume IV – Maximum Allowable Revenue*. Available at: http://www.qca.org.au/getattachment/fd4c6285-69b1-4ebb-8c0f-5d990310b0b2/QCA-UT4-Final-Decision-Volume-IV-MAR-(FINAL.aspx

10 Hunter Water (2015) *Submission to IPART on Prices to Apply from 1 July 2016*. Available at: https://www.ipart.nsw.gov.au/Home/Industries/Water/Reviews/Metro-Pricing/Prices-for-Hunter-Water-Corporation-from-1-July-2016

11 IPART (2016) *Prices for Hunter Water Corporation from 1 July 2016*. Available at: https://www.ipart.nsw.gov.au/Home/Industries/Water/Reviews/Metro-Pricing/Prices-for-Hunter-Water-Corporation-from-1-July-2016

12 Melbourne Water (2015) *2016 Price Submission*. Available at: http://www.esc.vic.gov.au/document/water/30356-melbourne-water-2016-price-submission/

13 Essential Services Commission (2016) Melbourne Water Price Review 2016. Available at: http://www.esc.vic.gov.au/document/water/34990-melbourne-water-price-review-2016-final-decision/

Business	Regulator	Proposed approach	Approved approach
SA Water (*2016/17 to 2019/20 regulatory period)*	Essential Services Commission of South Australia (ECOSA)	• SA Water proposed to escalate labour costs by 3% per annum (nominal) for the period 2016 to 2020. • This figure was based on forecasting conducted by BIS Shrapnel and the long term average of real labour price growth in Australia. • The proposed cost escalation indices for labour included the additional costs of movements in pay scales and general wage escalation.[14]	• ESCOSA did not accept SA Water's proposed approach. • ECOSA noted that a pure CPI based approach had worked well in other jurisdictions in driving efficiency. • It also noted that while past labour prices may have risen at a rate higher than CPI, this does not necessarily reflect future trends. • Accordingly, ECOSA determined that price increases to labour input prices be capped at the rate of change in the Australia-wide CPI.[15]
Energex (*2015/16 to 2019/20 regulatory period)*	Australian Energy Regulator (AER)	• Energex engaged PwC to assist in determining appropriate cost escalation factors. • Energex proposed to escalate labour costs be escalated by 0.24% (real) in 2015/16 and 0.98% each year thereafter to 2019/20. • Labour cost escalation forecasts are based on the Queensland Treasury published WPI for Queensland subject to wage movement guidance set out in relevant Queensland Government legislation or policy.[16]	• The AER engaged Deloitte Access Economics to develop forecasts of the WPI for the utilities sector for the National Electricity Market regions of Australia. • The forecasts estimated average annual growth in the Queensland utilities sector WPI of between -0.1 and 1.0% (real) per year over the regulatory period. • The AER noted that the Deloitte Access Economics forecasted Queensland WPI to be higher than Queensland's utilities sector WPI. The AER determined that the use of the Queensland WPI to forecast the Queensland utilities sector WPI may result in an upwardly biased forecast. • Accordingly, the AER averaged PwC and Deloitte Access Economics WPI forecasts for the Queensland utilities sector to derive an escalation rate for labour costs.[17]

14 SA Water (2015) *SA Water Regulatory Business Proposal 2016-2020*. Available at: https://www.sawater.com.au/about-us/legislation-and-policies/regulation-of-sa-water/regulatory-business-proposal-2016-2020

15 Essential Services Commission of South Australia (2016) *SA Water regulatory determination 2016*. Available at: http://www.escosa.sa.gov.au/projects-and-publications/projects/water/sa-water-regulatory-determination-2016/sa-water-regulatory-determination-2016

16 Energex (2014) *Energex Regulatory Proposal July 2015 to June 2020, Appendix 35: cost escalation rates and application*. Available at: https://www.aer.gov.au/system/files/Energex%20-%2035.%20Cost%20Escalation%20Rates%20and%20Application%20-%20October%202014.pdf

17 Australian Energy Regulator (2015) *Final Decision. Energex Determination 2015-16 to 2019-20. Attachment 7 – Operating expenditure*. Available at: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/energex-determination-2015-2020/final-decision

Business	Regulator	Proposed approach	Approved approach
Ergon (*2015/16 to 2019/20 regulatory period)*	Australian Energy Regulatory (AER)	• Ergon engaged Jacobs to develop its cost escalation forecasts. • Jacobs proposed to escalate labour costs in-line with the current Enterprise Agreement at 3.5% (nominal) in the short term, escalating to 4.15% (nominal) in the medium to long term. • The post-EA escalation rates are based on the ABS' AWOTE.[18]	• The AER determined that AWOTE is not a reasonable methodology to forecast labour costs. • The AER applied the average of Energex's utilities sector forecast as determined by PwC and Deloitte Access Economics' forecasts for the utilities sector WPI. • The AER noted that it determined this forecasting method as the best forecast of the Queensland utilities sector available.[19]
TasNetworks (formerly Aurora Energy) (*2017/18 to 2019/20 regulatory period)*	Australian Energy Regulator (AER)	• TasNetworks proposed to escalate labour costs at CPI during the period 2017 to 2019[20]. • This decision reflected a commitment to addressing customers' concerns about increasing electricity rates.	• The AER accepted TasNetworks approach.[21]

2.2.3 Summary of findings

The ABS currently publishes three estimates of labour earnings: the WPI, AWOTE and COE. The WPI and AWOTE are published on a quarterly basis and have been most commonly proposed by regulated businesses as a basis from which to develop labour cost escalation factors. There are fundamental differences between the two series that have led to debate regarding which series most accurately represents the labour costs for which regulated businesses should be compensated.

Our analysis of recent regulatory submissions indicates that regulators have expressed a preference for the use of escalation factors based on long run historical growth or forecasts of WPI as opposed to AWOTE-based estimates. The QCA in particular has accepted WPI based escalation factors for water businesses (Seqwater's 2014/15 submission, and its own consultant's proposal for GAWB's 2015 – 2020 price monitoring period). In instances where businesses have proposed an escalation factor based on a different labour price estimate (for example, Aurizon's proposed application of an AWOTE based forecast), the QCA has rejected this in favour of a WPI based forecast.

The AER has expressed a similar preference for WPI-based escalation factors. Recent determinations for both Energex and Ergon have applied the mid-point of PwC and Deloitte estimates that were both based the WPI (either historical growth or forecasts). In the case of Ergon, a proposed approach based on a forecast of AWOTE was rejected in favour of escalation in line with WPI.

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18 Jacobs (2014) *2015/2020 Regulatory Submission, Ergon Energy: Cost Escalation Factors.* Available at: https://www.aer.gov.au/system/files/Ergon%20Energy%20-%2006.02.02%20Cost%20Escalation%20Factors%202015-20%20SKM%20-%20October%202014.pdf

19 Australian Energy Regulatory (2015) *Final Decision Ergon Energy determination 2015-16 to 2019-20. Attachment 7 – Operating expenditure.* Available at: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/ergon-energy-determination-2015-2020/final-decision

20 TasNetworks (2016) *Tasmanian Distribution Regulatory Proposal – Regulatory Control Period 1 July 2017 to 30 June 2019.*Available at: https://www.aer.gov.au/system/files/TasNetworks%20-%20Reguatory%20Proposal%202017-22%20-%20January%202016.pdf

21 Australian Energy Regulatory (2016) *Draft Decision – TasNetworks distribution determination. 2018-18 to 2018-19.* Available at: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/tasnetworks-formerly-aurora-energy-2017-2019/draft-decision

Where water businesses have proposed to base labour escalation on existing Enterprise Agreements (EAs), regulators have generally been accepting of this approach. Seqwater (for the first year of its 2014/15 regulatory period), Melbourne Water and Hunter Water have all proposed escalation based on existing EAs, which has been accepted by the respective regulators. The rates contained in these EAs were generally in line with or lower than broader wage growth across the economy, which has supported their acceptance by regulators.

Escalation based on other approaches such as CPI are not as common, though recent regulatory determinations for SA Water and TasNetworks have been based on broader measures of inflation as opposed to wage growth specifically.

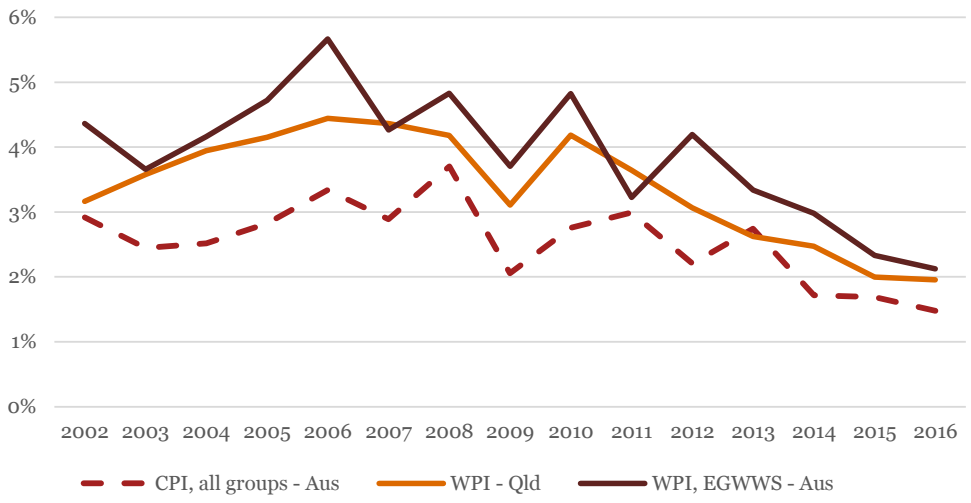
2.3 Market trends

2.3.1 Historical movements in wage price indices

Figure 2 compares movements in the wages of employees in the electricity, gas, water and waste (EGWWS) sector in Australia to general wage growth in the Queensland economy between 2002 and 2016. Both indices have consistently grown above general inflation, with real growth in Queensland wages averaging 0.8 per cent annually and those in the national EGWWS sector averaging 1.3 per cent annually over the period (applying the annual increase in CPI - All Groups (Australia) as the measure of inflation). In nominal terms, the Queensland WPI has averaged 3.4 per cent growth annually, while the EGWWS WPI has averaged 3.9 per cent.

There has been a high degree of correlation between both indices over the past 15 years, with a correlation in movement of 0.88. More recently, there has been a consistent downward trend in nominal wages growth in Queensland, averaging 2.4 per cent annually, with real wage growth continuing (though at a lower rate) at 0.4 per cent on average. Nominal wages growth in the national EGWWS sector was strong between 2009 and 2013, though has fallen consistently since this time. In real terms EGWWS sector wage growth has been higher than Queensland wages on average over the past five years, and comparable to the 15 year average, at 1.0 per cent annually (compared to 1.3 per cent annually since 2002).

Figure 2: Comparison of historic inflation to national EGWWS industry and Queensland WPI, 2002 to 2016 (year to December)[22]



[22] Australian Bureau of Statistics (2016) *Consumer Price Index, Australia – December 2016 Cat. No 6401.0 Tables 1 and 2.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0. Australian Bureau of Statistics (2016) *Wage Price Index, Australia – December 2016 Cat. No 6345.0 Tables 8a and 9a.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6345.0

2.3.2 *Labour demand*

Figure 3 details Queensland EGWWS industry employment between 2009 and 2016.[23] Demand for labour within the Queensland EGWWS industry grew strongly from late 2009 to mid-2012 (growing by 60 per cent over this period), before falling sharply over the next three quarters. Since early 2014 labour demand has been relatively steady in the industry, though there appears to have been a decline in total employed persons over the second half of 2016.

Trends in the Queensland water supply, sewerage and draining sector have largely reflected the broader EGWWS industry, with total employment remaining steady since 2013 at around 5,000 persons.

Figure 3: Queensland EGWWS industry employed persons, November 2009 to November 2016 (Four quarter moving average)[24]

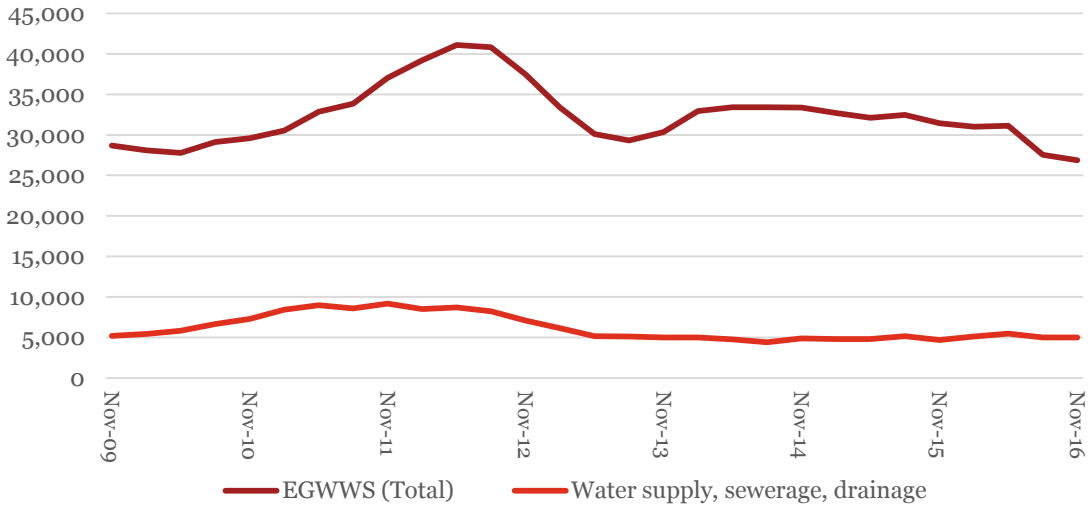
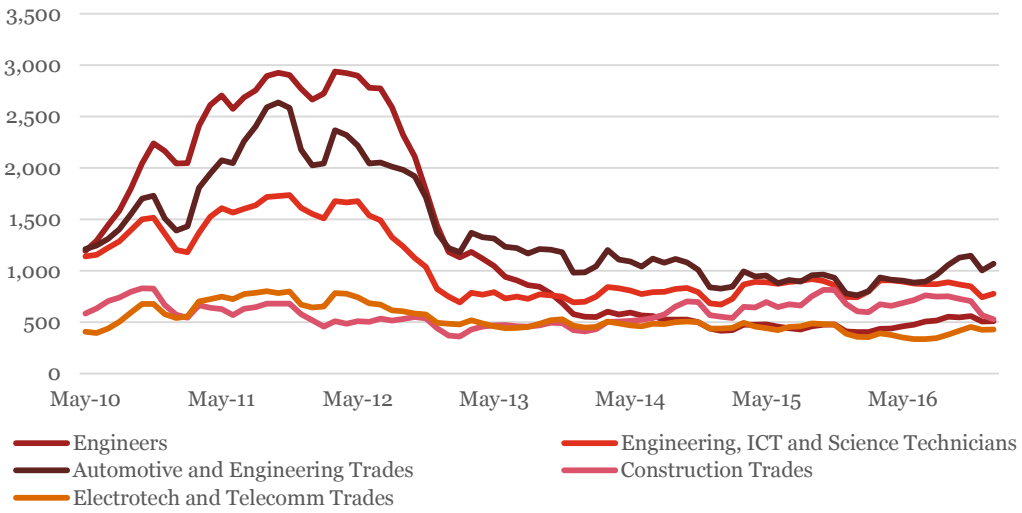


Figure 4 details the number of vacant positions recorded within occupations relevant to the Seqwater workforce between May 2010 and February 2017. The increase in occupational vacancies between 2010 and 2012 broadly reflects growth in employment in the sector during the same period (shown in Figure 3). Between mid-2012 and mid-2013 vacancies declined sharply, most notably for engineers. Since this time, unmet labour demand across related occupations has remained relatively stable, with marginal increases observable for engineers and automotive and engineering trades workers over the past 12 months.

[23] Smoothed using a four quarter moving average

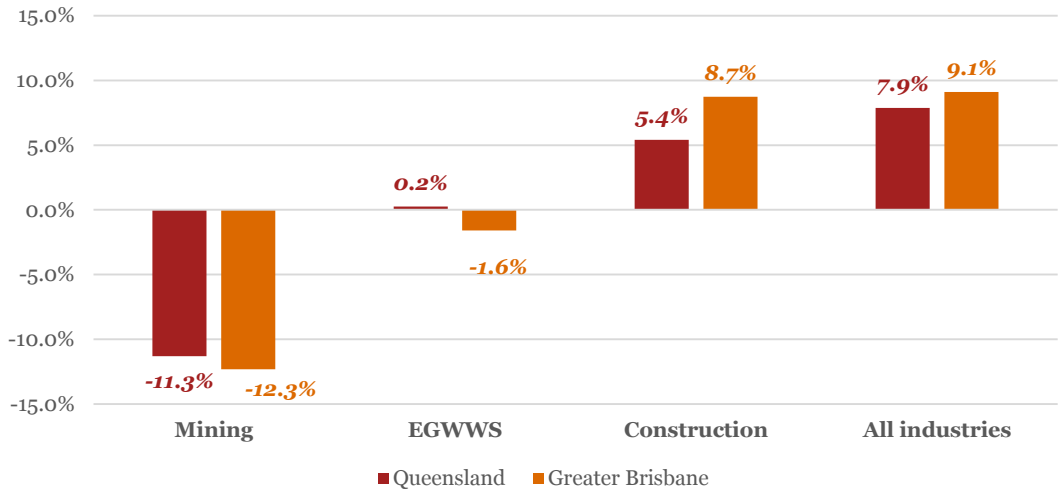
[24] Department of Employment (2017) *Labour Economics Office (LEO) Reports – Queensland*. Available at: http://lmip.gov.au/default.aspx?LMIP/Publications/LabourEconomicsOfficeLEOReports/Queensland

Figure 4: Growth in the number of Queensland EGWWS related vacancies, May 2010 to February 2017[25]



Forecasts of future labour demand vary considerably across related industries between 2015 and 2020 (Figure 5). The mining sector is expected to see a significant reduction in mining employment in both Queensland and Greater Brisbane to 2020, reflecting a moderation industry growth that has occurred in recent years in line with lower commodity prices and decreasing capital investment. Employment growth in the EGWWS sector is expected to remain relatively stable over the next five years, with construction industry employment growth expected to largely align with growth across all industries in Brisbane and Queensland.[26]

Figure 5: Projected employment growth by industry, 2015 to 2020



[25] Department of Employment (2016) *Vacancy Report*. Available at: http://lmip.gov.au/default.aspx?LMIP/VacancyReport

[26] Department of Employment (2016) *Employment Projections*. Available at: http://lmip.gov.au/default.aspx?LMIP/EmploymentProjections

2.3.3 Projections of the wage price index

As part of its annual budgeting process, Queensland Treasury develops forecasts of the WPI. The most recent forecasts of movements in the Queensland WPI during the period between 2015/16 to 2020/21 are outlined in Table 2 below.

Table 2: Queensland Treasury forecast movements in the Queensland WPI, 2015/16 to 2019/20[27]

	2015/16*	2016/17**	2017/18^	2018/19^	2019/20^^	2020/21^^
Qld WPI (% change)	1.9%	2.0%	2.25%	2.5%	3.0%	3.0%

*Note: actual
**Note: estimated actual
^Note: Forecasts
^^Note: Projections

The 2017/18 Queensland Budget noted that wages were growing below long-run averages in nominal terms, though slower consumer price inflation growth meant that wages were still growing in real terms. Wage growth is expected to remain subdued in 2017/18, reflecting continued spare capacity in the labour market, with growth expected to pick-up as conditions in the Queensland economy and labour market improve.

2.3.4 Current Seqwater Enterprise Agreement

The current Seqwater EA covers the three year period from 1 July 2016 to 30 June 2019, setting out annual increases to employee base salaries. Table 3 details the timing of the wage increases contained in the current Agreement.

The EA also sets out a framework for identifying and implementing productivity initiatives, with the Seqwater workforce committed to generating operating savings over the life of the agreement. Any efficiencies realised through productivity initiatives are then offset in Seqwater's cost forecasts.

Table 3: Wage increases stipulated in Seqwater's Enterprise Agreement[28]

	1 July 2016	1 July 2017	1 July 2018
Annual wage increase	3%	3%	3%

2.4 Discussion

Overall our analysis suggests that despite the current low inflationary environment, moderate increases in real wages are likely to continue over the upcoming regulatory period.

Nominal wages for both the Australian EGWWS industry and the Queensland economy have grown at rates above inflation over the past 15 years, averaging 3.9 per cent and 3.4 per cent respectively (while inflation has averaged 2.5 per cent annually). In real terms this equates to growth of 1.3 per cent and 0.8 per cent respectively. While nominal wages growth has decreased in recent years, so too has inflation, meaning real wages growth has been maintained (albeit at a lower rate than long-term averages).

Analysis of labour demand in related industries and occupations indicates a relatively stable outlook in terms of both employment levels and vacancies.

Queensland Treasury (as part of the 2017/18 budget) has forecast WPI growth to remain subdued in coming years, however by 2020/21 a return to growth rates resembling historical averages is expected.

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[27] Queensland Treasury (2017) *Queensland Budget 2017-18, Budget Strategy and Outlook, Budget Paper No. 2.* Available at: https://s3.budget.qld.gov.au/budget/papers/2/bp2-2017-18.pdf

[28] Seqwater (2016) *Seqwater Enterprise Agreement.* Provided to PwC by Seqwater on 9 January 2017, not publicly available.

Recent regulatory determinations indicate a preference across a range of regulators for the application of historical averages or forecasts of the WPI as a basis for escalating labour costs. Where wage increases stipulated in regulated businesses' EAs broadly align with WPI growth trends, these have also been accepted as a basis for escalating labour costs.

While we have not examined costs associated with permanent staff and contract labour separately as part of this analysis, previous analysis of Seqwater operating costs[29] has indicated that contract labour comprises only a minor share of total labour costs, suggesting the development of a separate escalation factor for these costs is not likely to have a material impact of overall labour cost growth patterns.

Based on this analysis, we recommend applying the following escalation rates for employee and contract labour costs:

- For the remainder of the current term of Seqwater's EA (to 2018/19), we recommend escalating employee costs in-line with wage increases stipulated in the EA (3 per cent per annum in nominal terms). This is more conservative than average nominal growth in Queensland wages (3.4 per cent over the past 15 years) and wages growth in the national EGWWS section (3.9 per cent over the past 15 years).
- For 2019/20 and 2020/21 (the period for which forecasts are available), we recommend applying the Queensland Treasury forecast of WPI growth (3.0 per cent in both years). This reflects Treasury's current expectation that while nominal wage growth is expected to pick-up from current levels over coming years, it will not have yet returned to long-term historical trends by the end of the forecast period.
- For the remainder of the period (to 2021/22 to 2027/28), we recommend applying the long-term average growth in the Queensland WPI of 3.4 per cent in nominal terms (between 2002 and 2016). This is the more conservative of the two WPI estimates commonly applied in the water sector (the other being the WPI for the national EGWWS sector, which has an average long-term growth rate of 3.9 per cent annually over the same period).

We propose to apply these escalation rates to both permanent and fixed-term staff. We consider that the broader market conditions which influence wages will apply equally to employees and fixed term contractors, and note that the employment conditions of both groups are governed by the same EA.

2.4.1 Employee and contract labour escalation factors

The following escalation factors are proposed for employee and fixed term contractors. The forecast CPI used to calculate real growth rates are based on the current forecasts published by the RBA.[30]

Table 4: Forecast employee and contractor labour escalation rates

Escalation factor	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22 - 2027/28
Inflation estimate	2.00%	2.00%	2.50%	2.50%	2.50%	2.50%
Nominal escalation rate (%)	3.00%	3.00%	3.00%	3.00%	3.00%	3.39%
Real escalation rate (%)	0.98%	0.98%	0.49%	0.49%	0.49%	0.87%

Regulatory period

[29] PricewaterhouseCoopers (2014) *Cost escalation forecasts, Seqwater*. Available at: http://www.qca.org.au/getattachment/3ac62779-0f78-4743-a5c7-2c11f1435329/Seqwater-submission-Appendix-E.aspx

[30] The CPI estimate for 2016/17 is based on estimates published by the Reserve Bank of Australia (February 2017) for the year to June 2017. The RBA has estimated CPI for the year ending June 2018 to grow between 1.5% and 2.5% and for the year ending June 2019 between 2% and 3%. For the purposes of developing real estimates, the midpoint of these ranges have been applied. For all remaining years, the midpoint of the RBA inflation target (2% to 3%) has been applied. RBA estimates of inflation are published in its *Statement on Monetary Policy*, available at http://www.rba.gov.au/publications/smp/

3 Contractors (service delivery)

We recommend that Seqwater escalate its contractors (service delivery) costs using a weighted index comprised of Queensland WPI and CPI estimates.

3.1 Overview

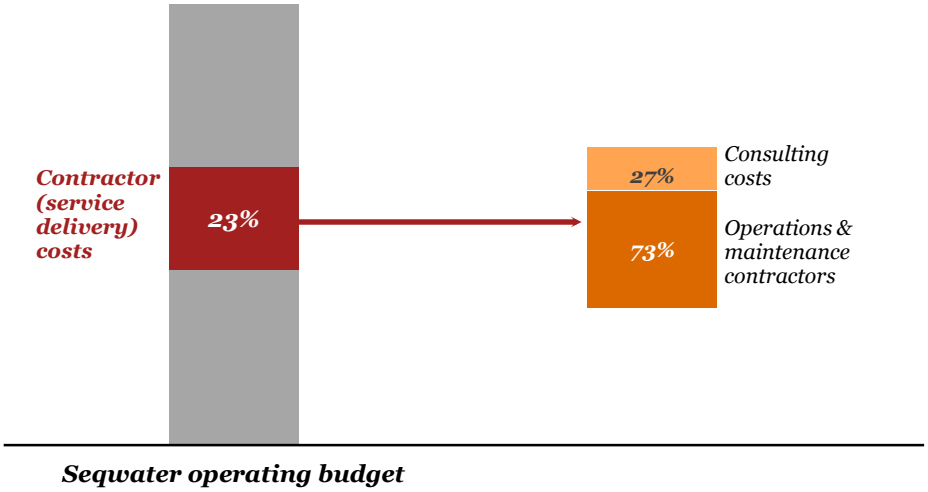
Seqwater outsources a number of services to third party providers on a contract basis, including collaborative maintenance contracts, standard operations and maintenance service contracts, and consulting services.

In order to develop an appropriate escalation factor for these operating items, Seqwater has provided an overview of its major service contracts, which have been used to developed an appropriated weighted escalation factor for this category.

3.1.1 Estimated contractor (service delivery costs)

Contractor (service delivery) costs comprise approximately 23 per cent of Seqwater's total operating expenditure. Of total contractor (service delivery) costs, approximately three quarters relate to operations and maintenance contractors, with the remaining cost relating to consulting and general contractor (Figure 6).

Figure 6: Major cost components of contractors (service delivery) expenditure, Seqwater operating expenditure estimates 2017/18[31]



[31] Seqwater data, PwC analysis.

3.1.2 Seqwater service contracts

Seqwater outsources a number of services to third party providers on a contract basis. Major service contracts include:

- Long-term operation and maintenance contracts for the Western Corridor Recycled Water Scheme and Gold Coast Desalination Plant.
- A long-term collaborative maintenance contract for services relating to scheduled, reactive and planned maintenance, as well as asset condition inspections and assessments, and tactical asset management. This has replaced a maintenance and minor works panel agreement which was previously relied on for the performance of these services.
- Smaller-scale, shorter-term contracts for the provision of specialist services such as sludge handling.
- Consulting and contractor engagements for short-term or ad-hoc service provision.

Long-term operation and maintenance contracts for major assets

Seqwater has long-term contracts in place for the delivery of operation and maintenance services for its major assets (namely the Western Corridor Recycled Water Scheme and Gold Coast Desalination Plant).

These contracts include rise and fall provisions in relation to the fixed and variable components comprising the contracted services.

Seqwater Collaborative Maintenance Contract (SCMC)

The Seqwater Collaborative Maintenance Contract (SCMC) commenced in October 2016, replacing the previous approach to asset maintenance that largely relied on a panel agreement with a number of contractors.

The collaborative contract represents a departure from traditional sourcing approaches, whereby Seqwater staff and the contractor's staff work as a single team to deliver services.

Smaller-scale specialist contractor services

Seqwater holds a number of smaller-scale, specialist contracts covering a range of services including maintenance, construction, pest / animal control, vegetation management and specialist services. Costs associated with individual service providers tend to be relatively minor in scale, however contracting relationships exist with multiple providers and therefore become relatively significant in aggregate. Contracts with these service providers tend to be shorter term in nature and do not include escalation clauses from year to year.

Ad-hoc consulting / contractor engagements

In addition to longer-term and specialist contracted services, Seqwater engages consultants and contractors for short-term engagements on an ad-hoc basis. The costs associated with these engagements vary from year to year, and we have not reviewed in detail the costs associated with such services given their shorter duration.

3.2 Alternative approaches for the escalation of employee and contract labour costs

3.2.1 Review of current regulatory precedent

Table 5 summarises recent decisions of Australian regulators relating to the escalation of contractor (service delivery) costs.

Table 5 Application of alternative contractor escalation factors, regulatory review

Business	Regulator	Proposed approach	Approved approach
Seqwater (*2015/16 to 2017/18 regulatory period)*	Queensland Competition Authority (QCA)	• Seqwater proposed 3.46% (nominal) for 2013/14 and 2014/15 and 3.38% (nominal) for each year thereafter • This figure is based on a composite index of Qld WPI forecasts, forecast CPI and the 10 year average of the non-residential building index. • Costs were weighted based on assumptions regarding rise and fall provisions in Seqwater contracts.[32]	• The QCA engaged CH2M HILL to review Seqwater's proposed approach. • CH2M HILL determined Seqwater's approach was reasonable, though recommended updating the indices for new information. • The updated indices were lower than initially proposed, being 2.5% for the period 2013/14 to 2015/16 and 3.5% each year thereafter to 2027/28. • The QCA accepted CH2M HILL's recommendation.[33]
SA Water (*2016/17 to 2019/20 regulatory period)*	Essential Services Commission of South Australia (ECOSA)	• SA Water proposed CPI as its labour cost escalation factor for its contracted delivery costs[34]	• ECOSA accepted the use of CPI as an appropriate escalation factor for contracted delivery costs.[35]

[32] Seqwater (2015) *Seqwater Bulk Water Prices, 2015 to 2018: Submission to the Queensland Competition Authority*. Available at: Available at: http://www.qca.org.au/getattachment/2d256f0e-b12c-48fb-8e1d-7a4ac4fd577b/Seqwater-submission.aspx

[33] Queensland Competition Authority (2015) *Seqwater Bulk Water Prices: 2015-18*. Available at: http://www.qca.org.au/Water/Urban-bulk-water/SEQ-bulk-water/Final-Report/Seqwater-Bulk-Water-Prices-2015-18#finalpos; CH2M Hill (2015) *Seqwater Operating and Capital Expenditure Review: Assessment of Prudency and Efficiency*. Available at: http://www.qca.org.au/getattachment/5a96203c-1e63-4f9c-b92b-9273e4c5a5ad/CH2M-HILL-s-Final-Report.aspx

[34] SA Water (2015) *SA Water Regulatory Business Proposal 2016-2020*. Available at: https://www.sawater.com.au/about-us/legislation-and-policies/regulation-of-sa-water/regulatory-business-proposal-2016-2020

[35] Essential Services Commission of South Australia (2016) *SA Water regulatory determination 2016*. Available at: http://www.escosa.sa.gov.au/projects-and-publications/projects/water/sa-water-regulatory-determination-2016/sa-water-regulatory-determination-2016

Business	Regulator	Proposed approach	Approved approach
Energex (*2015/16 to 2019/20 regulatory period)*	Australian Energy Regulator (AER)	• Proposed contractor costs be escalated by -0.26% and -0.11% in 2015/16 and 2016/17 respectively (real) and 0.00% in each year thereafter. • This figure is based on a weighted average of CPI (as published by the RBA), WPI (as published by the ABS) and a fixed component (from service delivery contracts).[36]	• The AER determined that only EGWWS labour should be applied for the labour component of price growth for contractor costs. • The AER noted that while work outsourced by Energex includes installation and management of overheads services lines and distribution works, the contracts are EGWWS in nature. • The AER noted that the forecast of contractor costs escalates closely to CPI for the forecast period and is consistent with the AER's overall view that labour price growth adjusted for productivity is equal to CPI in the long term[37]
Ergon (*2015/16 to 2019/20 regulatory period)*	Australian Energy Regulator (AER)	• Ergon engaged Jacobs SKM to develop cost escalation factors for labour and contract labour. • Jacobs proposed general labour and utilities sector labour be escalated by between 0.98% (real) in 2013/14 and 1.62% (real) in 2019/20. Jacobs proposed professional services labour be escalated by between 2.09% in 2013/14 and 1.48% in 2019/20. • These figures are based on the AWOTE of contractor/professional costs.[38]	• The AER rejected this approach. • The AER determined that contractor costs should be escalated at forecast utilities sector WPI. • The AER found that the AWOTE includes compositional productivity making it more volatile than WPI[39].

[36] Energex (2014) *Energex regulatory proposal – October 2014. Appendix 35: Cost escalation rates and application*. Available at: https://www.aer.gov.au/system/files/Energex%20-%2035.%20Cost%20Escalation%20Rates%20and%20Application%20-%20October%202014.pdf

[37] Australian Energy Regulator (2015) *Final Decision. Energex Determination 2015-16 to 2019-20. Attachment 7 – Operating expenditure.* Available at: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/energex-determination-2015-2020/final-decision

[38] Jacobs (2014) *2015/2020 Regulatory Submission, Ergon Energy: Cost Escalation Factors.* Available at: https://www.aer.gov.au/system/files/Ergon%20Energy%20-%2006.02.02%20Cost%20Escalation%20Factors%202015-20%20SKM%20-%20October%202014.pdf

[39] Australian Energy Regulatory (2015) *Final Decision Ergon Energy determination 2015-16 to 2019-20. Attachment 7 – Operating expenditure.* Available at: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/ergon-energy-determination-2015-2020/final-decision

Business	Regulator	Proposed approach	Approved approach
SunWater *(2012/13 to 2016/17 regulatory period)*	QCA	• SunWater proposed to escalate both materials and contractor costs by 4 per cent, based on forecasts produced by Macromonitor and historical movements in the Building Construction and Non-Residential Building Construction producer price indices. • This method was proposed on the basis it provided the best reflection of the types of contractor costs incurred.	• Upon consultants' review, ARUP and Aurecon both considered SunWater's 4 per cent escalation factor to be appropriate, while Halcrow and GHD believed SunWater had not provided enough rationale for this decision, and suggested that contractor costs be escalated at the general rate of inflation. • The QCA determined that 4 per cent was a reasonable escalation rate for contractor costs when compared against construction cost index data from the short-to-medium term investment trend analysis.[40]

3.2.2 *Summary of findings*

A range of approaches have been applied by regulated businesses and regulators in order to escalate costs associated with service delivery contractors. The approaches vary based on the underlying drivers associated with costs, which tend to be captured by indexation clauses in the associated contracts.

In its previous regulatory submission, Seqwater proposed the use of a weighted index comprised of the CPI, WPI and non-residential construction index, with relevant weights informed by existing contracts. Energex proposed a similar approach for its 2015 – 2020 regulatory submission, based on the CPI, WPI and a fixed component.

SunWater developed an escalation index for contractor costs based on forecasts of the Building Construction and Non-Residential Building Construction indices for Queensland, as these were considered to closely align with the types of contractor costs incurred by the business. Where contractor costs have related to labour, regulators have preferred the application of a relevant WPI in order to escalate these costs (similar to preferred approaches for escalating general labour costs).

Based on this analysis, it would appear prudent, where possible, to identify the underlying cost drivers associated with major service contracts as a basis from which to develop an appropriate cost escalation index.

[40] Queensland Competition Authority (2012) *Sunwater Irrigation Price Review: 2012-17 (Volume 1): Final Report*. Available at: http://www.qca.org.au/getattachment/5fad8dc9-2101-4097-bdc8-d90d25fbfbbb/SunWater-Irrigation-Price-Review-2012-17-Volum-(1).aspx

3.3 Market trends

3.3.1 Historical movements in price indices

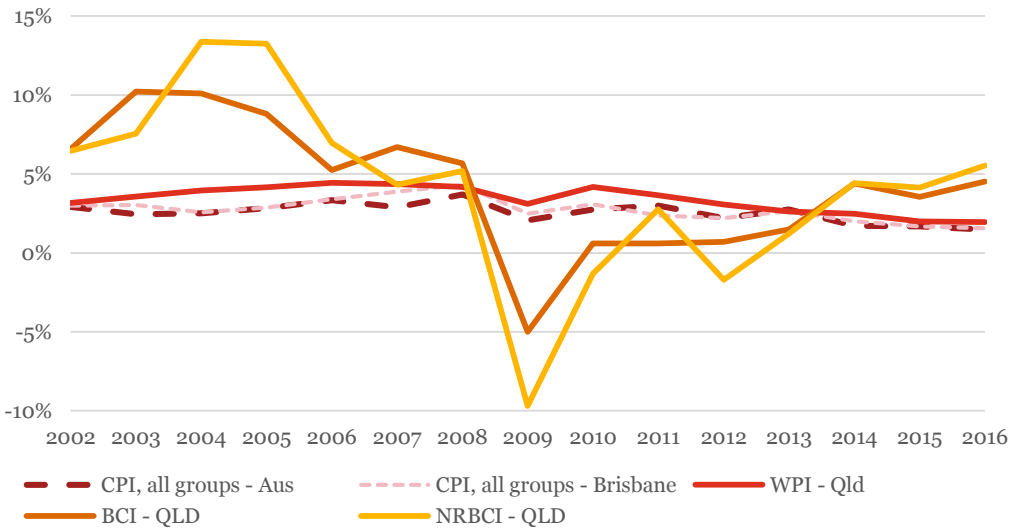
Figure 7 shows historical movements in five price indices that have informed contractor cost escalation factors in recent regulatory reviews for the period 2002 to 2016. These include:

- CPI (all groups, Australia)
- CPI (all groups, Brisbane)
- WPI (Queensland)
- Building construction index (Queensland)
- Non-residential building construction index (Queensland).

Growth in the Queensland building construction index (BCI) and non-residential building construction index (NRBCI) has fluctuated significantly over the past fifteen years (with average annual growth of 4.2 per cent and 4.0 per cent respectively). In the first half of the decade to 2010, annual growth in both indices was consistently above 10 per cent, before growth rates fell and then became negative in the years following the global financial crisis. Over recent years, growth rates in both indices have once again increased above inflation, with the BCI averaging 2.9 per cent growth since 2011 and the NRBCI averaging 2.7 per cent growth.

CPI growth for both Australia and Brisbane has been more stable, averaging 2.5 per cent and 2.7 per cent respectively over the past 15 years. Movements in both indices have been highly correlated, particularly over the past decade (with a correlation in movement of 0.88 since 2006). Growth in the Queensland WPI has also been relatively stable, though has consistently grown at rates above that of inflation (averaging 3.4 per cent growth over the past 15 years).

Figure 7: Comparison of service contract price indices to general inflation (year to December)[41]



[41] Australian Bureau of Statistics (2016) *Consumer Price Index – December 2016 Cat. No. 6140.0 Tables 1 and 2*. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0. Australian Bureau of Statistics (2016) *Wage Price Index – December 2016 Cat. No. 6345.0 Table 8a*. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6345.0. Australian Bureau of Statistics (2016) *Producer Price Indexes – Dec ember 2016 Cat. No. 6427.0 Table 17*. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6427.0

Table 6 below summarises the average compound annual growth rate of the above price indices across different time periods. Price growth across the producer price indices (PPIs) for building construction and non-residential building construction was significantly higher in the period 2011 to 2016 compared to growth rates between 2006 and 2011.

Price growth in the Australia-wide CPI and Queensland WPI was lower between 2011 and 2016 compared to growth during 2006 and 2011. Over the longer term, growth across Queensland WPI and Australia-wide CPI has been moderate, increasing by 3.4% and 2.4% on average per year, respectively. Longer term growth in the PPIs for building construction and non-residential building construction has been relatively subdued, growing at 2.3% and 1.4% on average per year, respectively.

Table 6: Comparison of price growth in construction and wage price indices (year to December)[42].

Index	CAGR		
	2001 – 2016 (15 yr)	2006-2016 (10 yr)	2011-2016 (5 yr)
PPI – Building Construction, Qld	4.2%	2.3%	2.9%
PPI – Non-residential Building Construction, Qld	4.0%	1.4%	2.7%
WPI, QLD	3.4%	3.2%	2.4%
CPI – All groups, Australia	2.5%	2.4%	2.0%
CPI – All groups, Brisbane	2.7%	2.6%	2.0%

3.4 Discussion

There has been a range of approaches applied by regulated businesses in order to escalate costs associated with service contractors.

The most recent reviews for Seqwater and SunWater saw the QCA accept both a composite index based on underlying cost drivers in contracts (Seqwater) as well as forecasts based on the Queensland building construction and non-residential building construction indices (SunWater). In accepting the application of construction-based indices, the QCA has noted that these are an imperfect match with a water business's operating activities (which are more closely related to operating and maintaining infrastructure associated with water supply as opposed to commercial building activity).

Some regulators have taken a view that contractor costs (specifically in relation to labour) should be able to be contained in line with growth in general inflation (ESCOSA), whereas others have allowed labour costs associated with contractors to be escalated in line with relevant wage price indices (AER).

Our review of current Seqwater service contracts indicates that approaches vary considerably in regard to cost escalation. Whereas some contracts have specified rise and fall provisions (generally based on measures of inflation, labour costs and other major inputs such as

[42] Australian Bureau of Statistics (2016) *Consumer Price Index – September 2016 Cat. No. 6140.0 Tables 1 and 2.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0. Australian Bureau of Statistics (2016) *Wage Price Index – December 2016 Cat. No. 6345.0 Table 8b.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6345.0. Australian Bureau of Statistics (2016) *Producer Price Indexes – December 2016 Cat. No. 6427.0 Table 17.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6427.0

electricity), others are largely reliant on cost pass through mechanisms (in which case escalation clauses are not specified in the contract) or are silent in terms of any escalation provisions.

Given the varying approaches to cost escalation across Seqwater's major service contracts, we propose the application of a weighted index in order to escalate prices over time.

3.4.1 Weighted index for contractor (service delivery) escalation

Based on our review of Seqwater's current service contracts, there appear to be two key input cost categories that drive price changes over time:

- labour costs, which comprise a significant share of operations and maintenance contract costs (particularly long term operations and maintenance contracts for major assets, and the recently implemented collaborative maintenance contract) and are expected to drive the vast majority of general consulting and contractor costs (of which labour is the major input)
- general materials or 'other' costs, which represent a range of goods and services associated with service contracts (for example, equipment purchases).

In order to develop a weighted index for service contractor costs, we have used the following publicly available sources:

- for labour costs, we have used the Queensland Treasury forecast of the Queensland WPI[43] (for years this is available), and beyond this period applied the long term (15 year) average historical growth rate in the Queensland WPI (as produced by the ABS)[44]
- for general materials or 'other' costs, we have applied the CPI forecast produced by the RBA[45] (for years this is available), and beyond this period the mid-point of the RBA's inflation target (2.5 per cent).

The following assumptions have been applied to allocate contract costs to one of the two 'buckets' noted above:

- for the two major service contracts currently in place, Seqwater was able to provide a disaggregation of labour costs and other costs. These allocations have been applied to the weighted index calculations
- for consulting and contractor costs, we have assumed that the major cost driver is labour, and allocated all costs to this bucket to be escalated using future WPI growth estimates (consistent with the approach applied in the previous Seqwater regulatory submission)[46]
- general operations and maintenance contract costs (which tend to represent shorter-term, smaller-scale contracts) have been allocated to the 'other' cost bucket, to be escalated using estimates of CPI

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43 Queensland Treasury (2017) *Queensland Budget 2017-18, Budget Strategy and Outlook, Budget Paper No. 2*. Available at: https://s3.budget.qld.gov.au/budget/papers/2/bp2-2017-18.pdf

44 Australian Bureau of Statistics (2016) *Wage Price Index, Australia – December 2016 Cat. No 6345.0 Tables 8a and 9a*. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6345.0

45 Reserve Bank of Australia (2017), Statement on Monetary Policy (February 2017). Available at: http://www.rba.gov.au/publications/smp/index.html

46 PricewaterhouseCoopers (2014) *Cost escalation forecasts, Seqwater*. Available at: http://www.qca.org.au/getattachment/3ac62779-0f78-4743-a5c7-2c11f1435329/Seqwater-submission-Appendix-E.aspx

Based on these assumptions, the weights applied to each index to develop the weighted contractor (service delivery) index are:

- WPI (Queensland) – 56 per cent
- CPI – 44 per cent.

3.4.2 Contractor (service delivery) escalation factors

Table 7 summarises the weighted index developed to escalate contractor (service delivery) costs.

Table 7: Forecast contractor (service delivery) escalation rates

Escalation factor	Weight	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22 -2027/28
WPI	56%	2.00%	2.25%	2.50%	3.00%	3.00%	3.39%
CPI	44%	2.00%	2.00%	2.50%	2.50%	2.50%	2.50%
Weighted index		2.00%	2.14%	2.50%	2.77%	2.77%	2.99%
Inflation estimate		2.00%	2.00%	2.50%	2.50%	2.50%	2.50%
Nominal escalation rate (%)		2.00%	2.14%	2.50%	2.77%	2.77%	2.99%
Real escalation rate (%)		0.00%	0.13%	0.00%	0.27%	0.27%	0.48%

Regulatory period

4 Electricity

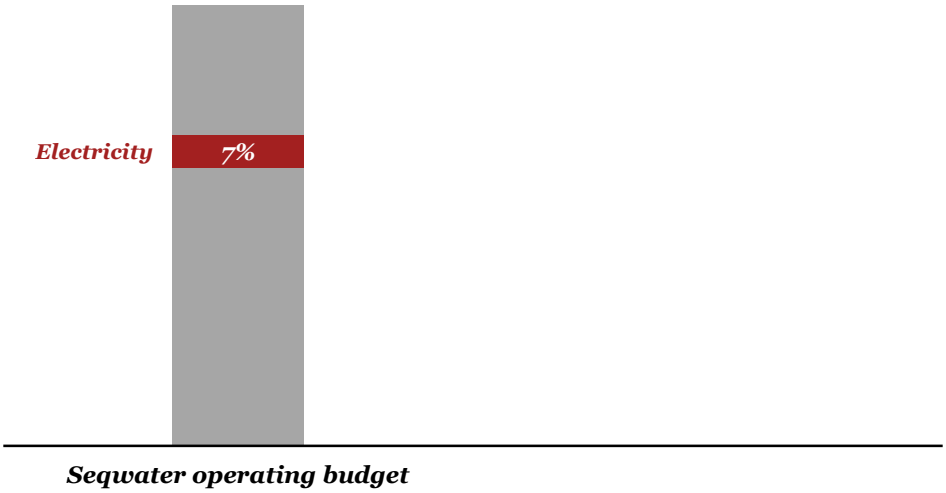
We recommend that Seqwater escalate its electricity costs by the average growth rate in Queensland commercial electricity prices contained in the AEMO National Electricity Forecasting Report between 2020 and 2030 over the regulatory period. For remaining years, we recommend escalating electricity costs in line with annual estimates contained in the AEMO series.

4.1 Overview

4.1.1 Estimated electricity costs

Figure 8 outlines Seqwater's estimated electricity costs as a share of its operating expenditure in 2017/18, equal to approximately 7 per cent of total operating costs. This represents a decline in electricity's share of costs compared with analysis undertaken as part of the previous regulatory submission, where electricity costs represented 9 per cent of operating expenditure.[47]

Figure 8: Estimated electricity expenditure, Seqwater operating expenditure estimates 2017/18[48]



[47] PricewaterhouseCoopers (2014) *Cost escalation forecasts, Seqwater*. Available at: http://www.qca.org.au/getattachment/3ac62779-0f78-4743-a5c7-2c11f1435329/Seqwater-submission-Appendix-E.aspx

[48] Seqwater data, PwC analysis

4.1.2 Overview of Seqwater approach to energy procurement

Seqwater's current retail electricity contract does not stipulate any escalation factors to apply to Seqwater's electricity prices. The contracted component for electricity varies every three months, therefore movements in Seqwater's electricity costs largely reflect movements in the market price for electricity.

4.2 Alternative approaches for the escalation of electricity costs

4.2.1 Review of current regulatory precedent

There have been a number of alternative approaches to electricity cost escalation proposed by regulated businesses, summarised in Table 8.

Table 8: Application of alternative labour escalation factors, regulatory review

Business	Regulator	Proposed approach	Approved approach
Seqwater (*2015/16 to 2017/18 regulatory period)*	Queensland Competition Authority (QCA)	• Seqwater proposed growth in electricity 6% per annum (nominal) over the period 2015 to 2028. • Escalation factors based on the average annual growth rate of SKM MMA's electricity price index.[49]	• QCA revised the escalation factors applicable to electricity. • For the period 2015 to 2018, QCA proposed 2.5% per annum growth in prices. • For the period 2018-2028, QCA proposed average price growth of 2.7% per annum. • The QCA revised figures based on network businesses submissions to the AER that foreshadow declining costs to 2020.[50]
Gladstone Area Water Board (GAWB) (*2015/16 to 2019/20 regulatory period)*	Queensland Competition Authority (QCA)	• GAWB proposed 9.83% in 2016, 9.82% in 2017, 9.60% in 2018 and 6.25% to 2020 (nominal). • Escalation factors based on independent advice from Wedgewood White Ltd.[51]	• The QCA engaged Jacobs to assist with reviewing GAWB's operating costs. • QCA updated the Distribution Use of System (DUOS) component made by Jacobs to reflect the AER's decision on Ergon (2015). • The QCA revised the electricity escalation factors to 3.5% in 2015-16, 6.1% in 2016-17 and 4.2% for each year to 2019/20.[52]

[49] Seqwater (2015) *Seqwater Bulk Water Prices, 2015 to 2018: Submission to the Queensland Competition Authority.* Available at: Available at: http://www.qca.org.au/getattachment/2d256f0e-b12c-48fb-8e1d-7a4ac4fd577b/Seqwater-submission.aspx

[50] Queensland Competition Authority (2015) *Seqwater Bulk Water Prices: 2015-18.* Available at: http://www.qca.org.au/Water/Urban-bulk-water/SEQ-bulk-water/Final-Report/Seqwater-Bulk-Water-Prices-2015-18#finalpos

[51] Gladstone Area Water Board (2014) *2015 Price Monitoring Investigation: Submission to the Queensland Competition Authority.* Available at: http://www.qca.org.au/getattachment/c1488851-1b83-4e27-b9f8-1b6b2458d298/GAWB-submission.aspx

[52] Queensland Competition Authority (2015) *Gladstone Area Water Board Price Monitoring 2015-2020.* Available at: http://www.qca.org.au/Water/Urban-bulk-water/Gladstone-Area-Water-Board/Final-Report/GAWB-2015-2020#finalpos

Business	Regulator	Proposed approach	Approved approach
Melbourne Water *(2016/17 to 2020/21 regulatory period)*	Essential Services Commission (ESC)	• Melbourne Water forecast an average annual growth in network costs of 7.6 per cent across the regulatory period. • Melbourne Water estimated an increase in contract rates of 7.9% annually over the regulatory period.	• For network costs, the ESC applied the most recent decision of the AER for Victorian electricity network tariffs • For wholesale prices, a benchmark efficient energy cost approach was adopted. • The ESC applied the wholesale energy price derived by its consultant (Deloitte Access Economics) of $40.19 per MWh, with an additional 20% allowed to cover retail margins and potential fluctuations over the period (resulting in a wholesale price of $48 per MWh, held constant over the regulatory period).

4.2.2 Summary of findings

The QCA has indicated a preference for electricity cost escalation factors that refer to recent decisions made by the Australian Energy Regulator (AER). In recent reviews for both Gladstone Area Water Board (GAWB) and Seqwater, the QCA revised the proposed electricity escalation factor estimates down to reflect recent decisions by the AER that resulted in downward revisions in relation to network cost growth.

The Essential Services Commission (ESC) in Victoria also relied on recent determinations of the AER in order to estimate network prices over regulatory period for Melbourne Water. In order to derive a wholesale electricity price to apply over the regulatory period, the ESC adopted the wholesale energy price used by its consultant (Deloitte Access Economics) of $40.19 per MWh, and allowed for a 20 per cent uplift to account for additional costs such as retail costs, retail margin and the likely fluctuation in prices over the five year regulatory period.

4.3 Market trends

4.3.1 Key factors influencing electricity prices

Electricity prices in Australia are influenced by a range of market, economic and climatic factors to varying degrees. While some of these factors (such as network costs) will exhibit relatively consistent trends over the medium-term, and can therefore be forecast with a relative degree of confidence, others (such as wholesale prices) can be extremely volatile, creating significant challenges in developing robust forward price estimates.

The National Electricity Market (NEM) is currently undergoing a significant structural adjustment. There are a range of factors contributing to this change, which are impacting the market to varying degrees and exerting price pressures in varying directions. Some of the major factors currently affecting electricity prices (and expected to continue to impact prices in coming years) include:

- ***Changes to the mix of generation capacity in the NEM***, as large generators are retired and replaced by smaller-scale, intermittent sources. The closure of the Northern power station in May 2016, and the closure of the Hazelwood power station in the first quarter of 2017, are expected to reduce generation capacity in the NEM and increase the wholesale cost of electricity. The replacement of large-scale synchronous generation with smaller-scale non-synchronous generation is also increasing volatility in wholesale prices. However, we note that the impact of the plant closures on Queensland wholesale prices is expected to be relatively minor compared to other jurisdictions.[53]
- ***Government environmental policy***, particularly the Large Scale Renewable Energy Target (LRET). The LRET policy requires electricity retailers to source a proportion of electricity from renewable sources, which is supporting investment in renewable generation capacity. The AEMC notes that the LRET places upward pressure on retail prices (due to costs of purchasing large-scale generation certificates, which are passed on to consumers), and also affects wholesale prices (with price pressure supressed in the short term due to the lower operating costs of renewable sources, but potentially increased over the medium to longer term if retirement of large-scale generation is brought forward, reducing competition and leading to higher cost gas-fired generators being the 'price setter' more frequently in the market).[54]
- ***Rising gas prices*** (decreasing competition from gas-fired generation) resulting from competing demand from the LNG sector (with domestic and world gas prices becoming linked following commencement of LNG exports from Curtis Island near Gladstone in 2016).[55]
- ***Increased electricity demand in Queensland from some sectors***, most notably the Curtis Island LNG plants.[56] Demand for electricity from LNG exporters has increased electricity price volatility, which in turn affects operating costs of gas generators and wholesale prices.[57]
- ***A countervailing trend of softening electricity demand in the Australian economy more broadly*** as energy-intensive manufacturing activity continues to decline.[58]

The cumulative impact of these factors on electricity prices is uncertain, though on balance would appear to be increasing price volatility and placing upward pressure on prices over the short to medium term (particularly on the wholesale component of prices). This uncertainty

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53 Australian Energy Market Commission (2016) Residential Electricity Price Trends. Available at: http://www.aemc.gov.au/Markets-Reviews-Advice/2016-Residential-Electricity-Price-Trends/Final/AEMC-Documents/2016-Electricity-Price-Trends-Report

54 Australian Energy Market Commission (2016) Residential Electricity Price Trends. Available at: http://www.aemc.gov.au/Markets-Reviews-Advice/2016-Residential-Electricity-Price-Trends/Final/AEMC-Documents/2016-Electricity-Price-Trends-Report

55 Queensland Productivity Commission (2016) *Electricity Pricing Inquiry*. Available at: http://www.qpc.qld.gov.au/inquiries/electricity-pricing/

56 Australian Energy Market Commission (2016) Residential Electricity Price Trends. Available at: http://www.aemc.gov.au/Markets-Reviews-Advice/2016-Residential-Electricity-Price-Trends/Final/AEMC-Documents/2016-Electricity-Price-Trends-Report

57 Queensland Productivity Commission (2016) *Electricity Pricing Inquiry*. Available at: http://www.qpc.qld.gov.au/inquiries/electricity-pricing/

58 Australian Energy Market Operator (2016) *National Electricity Forecasting Report*. Available at: https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/National-Electricity-Forecasting-Report

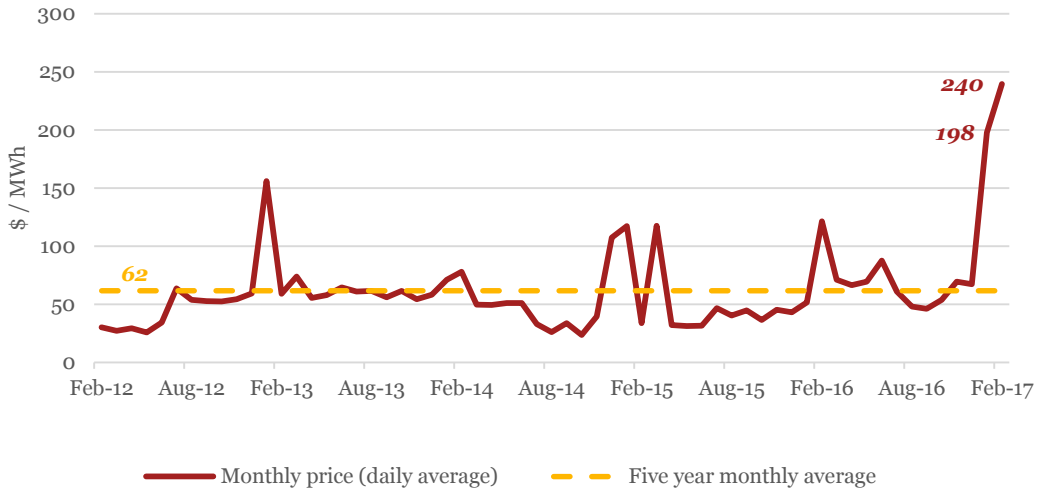
creates significant challenges in developing cost escalation factors for electricity prices going forward.

4.3.2 Recent trends in wholesale electricity prices

Figure 9 summarises average monthly wholesale prices for Queensland in the NEM over the past five years. While there are significant fluctuations from month to month (with significant spikes tending to occur during summer months during periods of high demand), it is clear that in recent months there has been a considerable increase in spot wholesale prices, averaging $198 / MWh in January 2017 and $240 / MWh in February 2017. These prices are considerably higher than any other monthly average over the past five years and well above the five year monthly average of $62 / MWh.

Given the very short period of time over which the price spike has occurred, further analysis in future would allow for a more informed assessment of whether higher wholesale prices are likely to persist going forward, or are more likely a shorter term trend.

Figure 9: National Electricity Market, Queensland average monthly prices ($ / MWh)[59]



4.3.3 Historical movements in electricity price indices

Figure 10 compares movements in electricity prices for Brisbane and Australia (based on the electricity sub category of the ABS Consumer Price Index series) with general inflation over the previous decade.

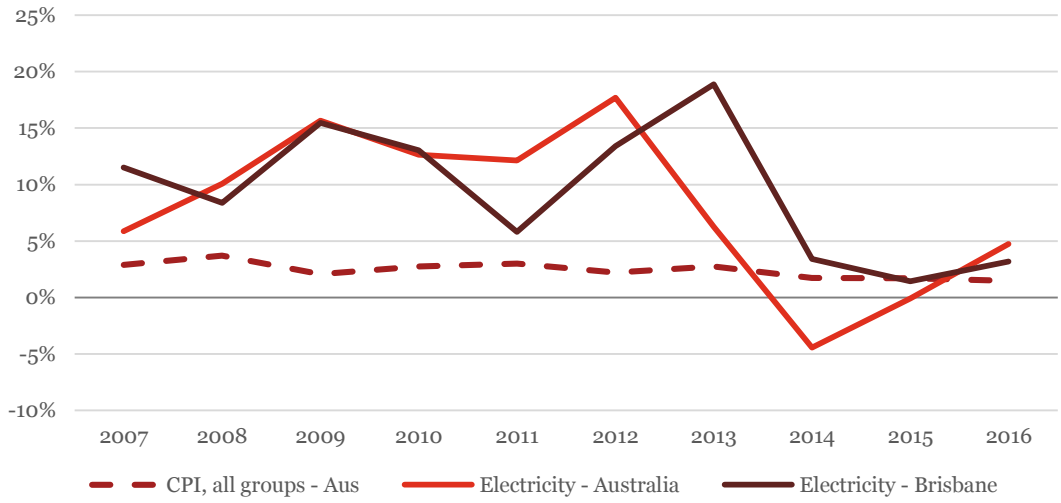
Over the decade to 2016 there has been consistently high real growth in electricity prices, particularly up to 2014. Over the decade, Australian electricity prices grew by 7.8 per cent on average each year, while Brisbane prices grew by 9.3 per cent on average each year (in nominal terms). In real terms, this equates to average annual growth of 5.3 per cent and 6.7 per cent respectively.

These significant cost increases were largely driven by increasing network costs, as major investment was occurring across electricity distribution networks in most states to cope with expected demand growth. More recent regulatory determinations for electricity distributors (eg Ergon Energy and Energex determinations for the 2015 to 2020 regulatory period) saw a significant curtailing in network costs (in line with a moderation in expected demand

[59] Australian Energy Market Operator (2016), Average Price Tables. Available at: https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Data-dashboard#average-price-table

growth), which has subsequently seen reduced price growth in recent years. However in the year to December 2016 there is evidence of prices again increasing, with both Australia and Brisbane seeing real price increases.

Figure 10: Comparison of historical inflation to Brisbane and Australia electricity prices, 2006 to 2016 (year to December)[60]



4.3.4 Australian Energy Market Operator forecasts

The Australian Energy Market Operator (AEMO) publishes electricity price forecasts annually as a part of the National Electricity Forecasting Report[61]. The most recent forecasts (released in June 2016) were developed by Jacobs SKM using a 'bottom up' approach. Forecasts are developed for each state in the National Electricity Market, based on assumptions of growth in wholesale, transmission, distribution, retail and green scheme costs. Three scenarios are developed by AEMO, based on high, medium and low demand assumptions.

Figure 11 summarises the contribution of components of electricity prices to overall retail price growth forecasts for the Queensland commercial medium series (used as a proxy for Seqwater) between 2016 and 2036. This indicates that going forward, wholesale prices are expected to be the main driver of overall retail price movements. Whereas network charges, green schemes and other cost components are expected to contribute only moderately to total price growth, there is a close correlation between forecast movements in the wholesale price and retail price.

The Jacobs SKM forecasts include a decline in retail prices to 2020 (a decrease of 2.5 per cent each year on average in real terms), largely as a result of projected reduced network tariffs and lower wholesale prices. The assumption of lower wholesale prices is based on an expectation that a large amount of renewable energy capacity will enter the market to satisfy the Renewable Energy Target scheme.

From 2020 to 2030, real price growth is forecast to resume based on an assumption that Australia's emission abatement targets are achieved, resulting in the closure of coal-fired power stations and an increase in wholesale prices. Over this period growth in wholesale

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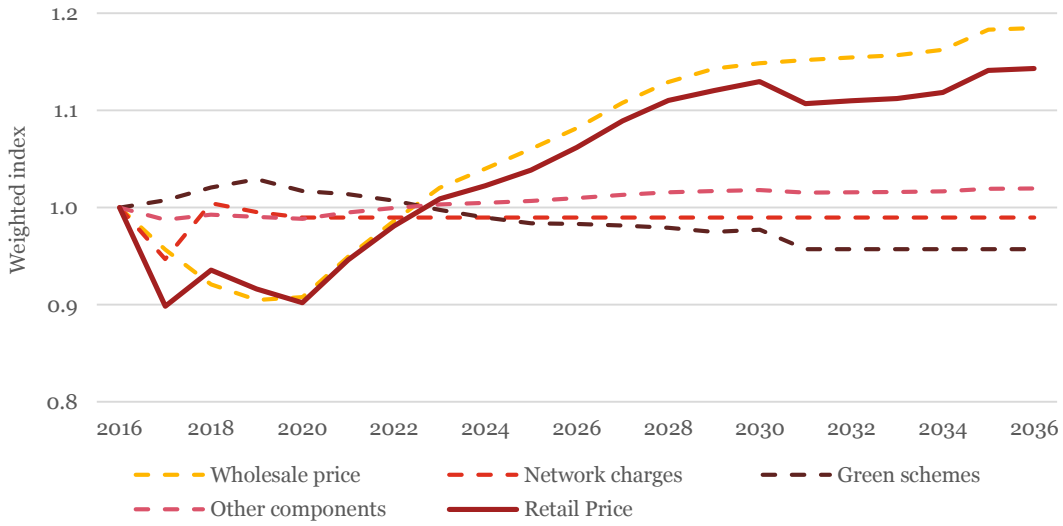
[60] Australian Bureau of Statistics (2016) *Consumer Price Index – December 2016 Cat. No. 6140.0 Tables 1, 2 and 7*. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0.

[61] Australian Energy Market Operator (2016) *National Electricity Forecasting Report 2016*. Available at: http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/National-Electricity-Forecasting-Report

prices is estimated to average 2.4 per cent annually in real terms, while retail price growth averages 2.3 per cent annually in real terms.

Figure 11: Contribution of components to electricity retail price growth (real), Queensland Commercial Neutral Series, 2016 to 2036[62]



4.3.5 *Australian Energy Market Commission Residential Electricity Price Trends*

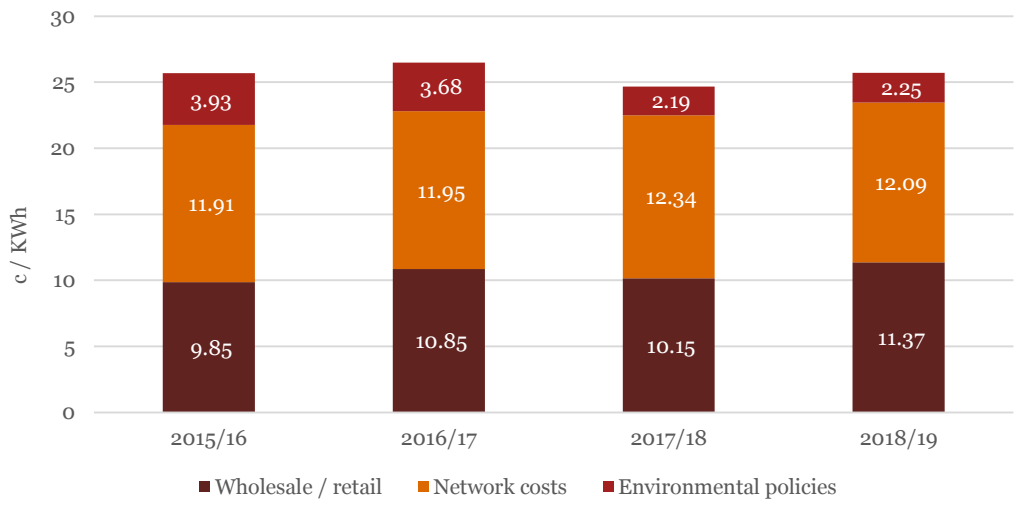
The Australian Energy Market Commission releases a Residential Electricity Price Trends report each year, which identifies key factors influencing electricity prices at the time of the report's release, as well as a two year forward view. While the review relates to residential prices specifically (which may differ from those paid by a relatively large consumer of electricity such as Seqwater), the trends identified provide a useful insight into potential future movements in prices across all sectors.

The 2016 report[63] projects relatively stable trends for Queensland electricity prices going forward in nominal terms. Figure 12 summarises the major components comprising the Queensland market offer for the years 2015/16 to 2018/19. The 2015/16 and 2016/17 figures are based on actual pricing data, and show that network costs increased marginally over the year (by 0.3 per cent in nominal terms), whereas wholesale costs increased significantly (by 10.2 per cent in nominal terms). Overall there was a 3.1 per cent nominal increase in electricity costs over the period. In the year to 2017/18, prices are expected to fall by 6.8 per cent in total (due to a continuing decline in costs associated with environmental policies and a decline in wholesale and retail components), before increasing again in the year to 2018/19 (by 4.2 per cent).

[62] Forecasts developed by Jacobs SKM for the Australian Energy Market Operator as part of the 2016 National Electricity Forecasting Report. Data provided to PwC by the Australian Energy Market Operator on 25 January 2016.

[63] Australian Energy Market Commission (2016) Residential Electricity Price Trends. Available at: http://www.aemc.gov.au/Markets-Reviews-Advice/2016-Residential-Electricity-Price-Trends/Final/AEMC-Documents/2016-Electricity-Price-Trends-Report

Figure 12: AEMC retail electricity price trends, South East Queensland market offer, 2015/16 to 2018/19 (nominal)[64]



4.3.6 *Queensland Productivity Commission Electricity Pricing Inquiry*

The Queensland Government requested the Queensland Productivity Commission (QPC) to examine electricity pricing in Queensland[65] (with a final report released in May 2016). As part of its inquiry, the QPC engaged ACIL Allen to provide projections of future electricity prices in Queensland.

The ACIL Allen modelling estimated that commercial prices would decline by 2.3 per cent annually between 2015/16 and 2019/20, while industrial prices would fall by 2.1 per cent annually over the same period (in real terms). From 2020/21 to the end of the forecast period (2034/35), prices for both commercial and industrial businesses are forecast to increase by around 1 per cent annually.

The major driver of price growth is expected to be wholesale prices, which are forecast to increase by 2.1 per cent annually on average over the 20 year period to 2034/35. The major driver of this growth is from the LNG industry, which will support higher demand for gas and reduce access to cheaper gas domestically (increasing generation costs).

4.4 Discussion

Electricity prices are influenced by a range of complex factors, and have exhibited significant volatility historically, making the development of robust escalation factors (particularly over the medium to longer term) challenging. The NEM is currently in a state of transition, which is adding further complexity to the task of forecasting price movements.

Price growth over the past decade was largely driven by growth in networks costs. This component of electricity prices is tightly regulated (with distribution and transmission businesses submitting proposed costs and revenues to the AER for approval over a five year period), and therefore under a scenario where wholesale prices and demand are relatively

64 Australian Energy Market Commission (2016) Residential Electricity Price Trends. Available at: http://www.aemc.gov.au/Markets-Reviews-Advice/2016-Residential-Electricity-Price-Trends/Final/AEMC-Documents/2016-Electricity-Price-Trends-Report

65 Queensland Productivity Commission (2016) *Electricity Pricing Inquiry*. Available at: http://www.qpc.qld.gov.au/inquiries/electricity-pricing/

stable, future growth in retail prices could be expected to follow a similar trend to network cost growth.

More recently however, network cost growth has moderated to a degree, and is expected to remain relatively stable over the medium term. Looking forward, growth in retail prices are expected to largely be driven by wholesale prices, which are exhibiting signs of increased growth and greater volatility. Factors contributing to this include:

- changes to the mix of generation capacity in the NEM, as large-scale synchronous generation is replaced by smaller-scale, intermittent, non-synchronous sources
- government environmental policy, particularly the LRET (which is further supporting investment in smaller-scale renewable generation)
- rising gas prices (reducing gas-fired generation competitiveness) as the domestic and international gas prices have become linked
- increased electricity demand in Queensland from some sectors (namely the LNG sector).

Conversely, electricity demand more broadly across the NEM is expected to moderate going forward as the Australian economy moves away from energy-intensive manufacturing activity.

With future prices expected to be driven largely by wholesale prices (influenced to a greater degree by market forces compared to network costs which have historically driven prices), forecasting price movements with any degree of certainty presents a significant challenge.

Varied approaches have been adopted recently by water businesses to escalate electricity prices. In its previous regulatory submission, Seqwater applied average growth rates contained in a bespoke electricity price forecast (developed by SKM MMA) over the regulatory period, though this was not accepted by the QCA (which adopted its own approach incorporating outcomes from recent AER determinations to revise proposed escalation factors downwards). GAWB engaged specialist consultants to develop specific price escalation factors for electricity, though once again the QCA utilised recent outcomes from the AER determinations to revise escalation factors downwards. In Victoria, the ESC applied a 'bottom up' approach to develop an efficient electricity price for Melbourne Water, drawing on recent AER determinations to estimate future network cost movements, and using a benchmark efficient energy cost approach for wholesale prices.

A range of forecasts of future electricity price movements are available, including from AEMO (with forecasts developed by Jacobs SKM), AEMC and QPC (with forecasts developed by ACIL Allen). The AEMC forecasts relate to residential prices (which may not align with price movements experienced by a large consumer of electricity such as Seqwater), and QPC estimates are not readily available on a year-to-year basis. Given this, the forecasts developed by Jacobs SKM (for AEMO) are the most relevant and readily available from which to base escalation factors for Seqwater.

The Jacobs forecasts exhibit two major trends – an expected decrease in prices to 2020 due to lower network and wholesale costs, with a subsequent rise in prices from 2020 onwards due to the retirement of large-scale coal-fired generation capacity, replaced by smaller-scale renewable sources.

It appears reasonable to expect that the trend identified by Jacobs as occurring from 2020 onwards (retirement of coal-fired generation with a greater reliance on higher-cost gas generation and more intermittent energy sources) is in fact more likely to occur in the shorter-term (and is in fact already occurring). Since the release of its forecasts in June 2016, the Hazelwood power station (previously a major source of energy supply in Victoria) has ceased operations, following on from the closure of the Northern power station in South

Australia in May 2016. The AEMC recently noted that coal-fired generator retirement will likely increase wholesale costs, retail electricity prices and wholesale spot price volatility going forward. [66]

Data from the ABS supports the notion that electricity prices are once again rising in real terms after a period of relative stability in 2015 and early 2016. In the year to December 2016, electricity costs (as measured by the relevant CPI sub-category) increased by 3.2 per cent in Brisbane and 4.7 per cent nationally, compared with 1.4 per cent and -2.0 per cent growth (Brisbane and national) in the year to June 2016. Average monthly wholesale spot prices have also increased sharply in recent months (January and February 2017), with the averages higher than any point over the previous five years. While these trends are only short-term in nature, limiting the ability to draw any longer-term inferences, it seems reasonable to conclude that the expected trends noted by AEMO to prevail to 2020 are unlikely to eventuate, and instead increasing wholesale prices and price volatility will continue for the foreseeable future (similar to AEMO's expectations from 2020 onwards).

On this basis, we propose to escalate electricity prices over the regulatory period by the 10 year average of the AEMO forecasts between 2020 and 2030 (given current trends in the NEM align closely with the assumptions applied during this period). For subsequent years we propose to apply the actual annual growth figures contained in the AEMO estimates.

4.4.1 Electricity escalation factors

Table 9 summarises the proposed escalation factors for electricity costs over the forecast period. Estimates of inflation based on RBA forecasts (to 2018/19) and the mid-point of the RBA inflation target (2020/21 to 2027/28) are used to inflate real estimates derived from Jacobs forecasts (produced for AEMO's 2016 National Electricity Forecasting Report).

Escalation factors over the regulatory period (to 2020/21) are based on the 10-year average growth in Queensland commercial retail prices (neutral scenario) produced for AEMO's 2016 National Electricity Forecasting Report between 2020 and 2030 (as the assumptions underpinning forecasts over these years appear to align closely with current trends in the market). For the remainder of the forecast period (to 2027/28), annual estimates in the AEMO series are applied.

66 Australian Energy Market Commission (2016) Residential Electricity Price Trends. Available at: http://www.aemc.gov.au/Markets-Reviews-Advice/2016-Residential-Electricity-Price-Trends/Final/AEMC-Documents/2016-Electricity-Price-Trends-Report

We consider these estimates to be conservative given current market trends and recent fluctuations in wholesale electricity prices. To the extent possible, we would recommend Seqwater review the next series of forecasts produced by AEMO (expected in mid-2017) and consider the application of these forecasts as escalation factors (given trends that have emerged since the 2016 report can be incorporated into the forecasts).

Table 9: Forecast electricity escalation rates

Year	Inflation estimate (%)	Real escalation rate (%)	Nominal escalation rate (%)
2016/17	2.00%	2.27%	4.32%
2017/18	2.00%	2.27%	4.32%
2018/19	2.50%	2.27%	4.83%
2019/20	2.50%	2.27%	4.83%
2020/21	2.50%	2.27%	4.83%
2021/22	2.50%	3.70%	6.29%
2022/23	2.50%	2.86%	5.43%
2023/24	2.50%	1.34%	3.87%
2024/25	2.50%	1.56%	4.09%
2025/26	2.50%	2.24%	4.80%
2026/27	2.50%	2.59%	5.16%
2027/28	2.50%	1.93%	4.48%

Regulatory period

5 Chemicals

We recommend that Seqwater escalate its other materials and services costs by CPI during the forecast period.

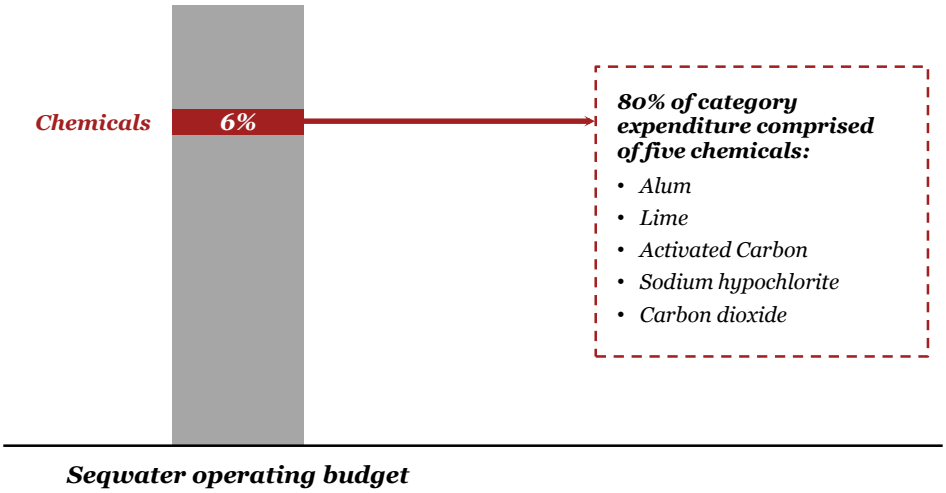
5.1 Overview

Seqwater purchases chemicals primarily for use in its water treatment operations. Seqwater currently purchases 20 chemicals from eight different suppliers.

5.1.1 Estimated chemical costs

Seqwater forecast chemical expenditure in 2017/18 is expected to comprise approximately 6 per cent of Seqwater's total operating expenditure. Of total chemical costs, approximately 80 per cent are comprised of five chemicals – alum, sodium hypochlorite, lime, activated carbon and carbon dioxide.

Figure 13: Major cost components of chemicals expenditure, Seqwater operating expenditure estimates 2017/18[67]



[67] Seqwater data, PwC analysis

5.2 Alternative approaches for the escalation of chemical costs

5.2.1 Review of current regulatory precedent

There have been a number of alternative approaches to chemical cost escalation proposed by regulated businesses (summarised in Table 10).

Table 10 Application of alternative chemical escalation factors, regulatory review

Business	Regulator	Proposed approach	Approved approach
Seqwater (*2015/16 to 2017/18 regulatory period)*	Queensland Competition Authority (QCA)	• Seqwater proposed to escalate chemical costs at CPI during the regulatory period.[68] • The proposed CPI forecasts are based on forecasts published by the RBA.	• The QCA accepted this approach but revised the proposed CPI estimates in-line with more recent publications of the RBA's inflation estimates[69]
Gladstone Area Water Board (*2015/16 to 2019/20 regulatory period)*	Queensland Competition Authority (QCA)	• Proposed a 2.5% escalation factor be applied to chemicals expenditure during the regulated period. • This figure is based on the midpoint of the RBA's inflation target.[70]	• The QCA rejected this approach. • The QCA determined that a 2.7% escalation factor (nominal) based on the 10 year average of ABS published PPI for output of the manufacturing industries (basic chemicals) provides a reasonable indicator of cost movements compared to CPI.[71]
Melbourne Water (*2016/17 to 2020/21 regulatory period)*	Essential Services Commission (ESC)	• Melbourne Water expected total chemical costs to remain constant in real terms over the regulatory period (ie increase in line with CPI) [72]	• The Essential Services Commission engaged Deloitte to assess Melbourne Water's operating costs forecasts • Following this analysis, Deloitte Access Economics made no comment regarding the escalation methodology applied, however, it did recommended Deloitte reduce its forecast total chemical costs by 1% in real terms each year.[73]

68 Seqwater (2015) *Seqwater Bulk Water Prices, 2015 to 2018: Submission to the Queensland Competition Authority*. Available at: Available at: http://www.qca.org.au/getattachment/2d256f0e-b12c-48fb-8e1d-7a4ac4fd577b/Seqwater-submission.aspx

69 Queensland Competition Authority (2015) *Seqwater Bulk Water Prices: 2015-18*. Available at: http://www.qca.org.au/Water/Urban-bulk-water/SEQ-bulk-water/Final-Report/Seqwater-Bulk-Water-Prices-2015-18#finalpos

70 Gladstone Area Water Board (2014) *2015 Price Monitoring Investigation: Submission to the Queensland Competition Authority*. Available at: http://www.qca.org.au/getattachment/c1488851-1b83-4e27-b9f8-1b6b2458d298/GAWB-submission.aspx

71 Queensland Competition Authority (2015) *Gladstone Area Water Board Price Monitoring 2015-2020*. Available at: http://www.qca.org.au/getattachment/9af15c7f-4eae-406b-8f96-5383bd017a7f/QCA-Final-Report-May-2015.aspx

72 Melbourne Water (2015) *2016 Price Submission*. Available at: http://www.esc.vic.gov.au/document/water/30356-melbourne-water-2016-price-submission/

73 Essential Services Commission (2016) *Melbourne Water Price Review 2016: Final Decision*. Available at: http://www.esc.vic.gov.au/document/water/34990-melbourne-water-price-review-2016-final-decision/

Approaches adopted by Queensland distribution and retail water businesses

As part of previous price monitoring reviews undertaken by the QCA, Queensland distribution and retail water businesses Queensland Urban Utilities (QUU), Unitywater and Allconnex[74] each proposed escalating chemical costs using various measures of inflation.

In its submission to the 2013-15 Interim Price Monitoring Review, QUU proposed the use of inflation estimates produced by the RBA, citing a lack of publicly available forecasts suitable for escalating chemicals costs. In submissions to the 2011-12 Interim Price Monitoring Review, Unitywater also proposed the application of RBA forecasts of inflation, whereas Allconnex applied inflation forecasts reported by the Australian Government. All three proposed approaches were accepted by the QCA.

5.2.2 Summary of findings

Water businesses appear to have adopted a reasonably uniform approach to escalating chemical costs, using various estimates of general inflation. This approach has generally been based on a lack of appropriate indices or forecasts with which to develop a specific escalation factor for chemicals, and has been accepted by the respective regulators.

The QCA did depart from previous approaches as part of its 2015 – 2020 Price Monitoring Review for GAWB, accepting the recommendation of its consultant (Jacobs) to escalate chemical costs using a 10 year average of the PPI for Output of the Manufacturing Industries (Basic Chemicals). The QCA accepted that the historical average of the PPI provided a reasonable indicator of costs movements (relative to CPI) for the category.

5.3 Market trends

5.3.1 Historical movements in chemical price indices

One method to examine historical movements in chemical prices is to use ABS published indices in relation to producer prices. The ABS publishes detailed manufacturing PPIs at the national level, including a basic chemical manufacturing index. This group is then separated into industrial gas manufacturing, basic organic chemical manufacturing and basic inorganic chemical manufacturing. The majority of Seqwater's chemical expenditure relates to inorganic chemicals.

Figure 14 compares changes in general inflation with both the basic chemical manufacturing series and the more specific basic inorganic chemical manufacturing series. It is clear that chemical prices have been significantly more volatile than general inflation since 2001, particularly for the more granular 'inorganic chemical' series. While inflation has generally remained within the RBA's target band of 2 to 3 per cent, the chemical indices have consistently grown and contracted by over 10 per cent from year to year. Basic inorganic chemical price growth has generally tracked the broader basic chemical index, although has been more volatile.

[74] Allconnex was disbanded in 2012, with its functions handed back to the Gold Coast, Redlands and Logan City Councils.

Figure 14: Comparison of chemical price movements with general inflation (year to December)[75]

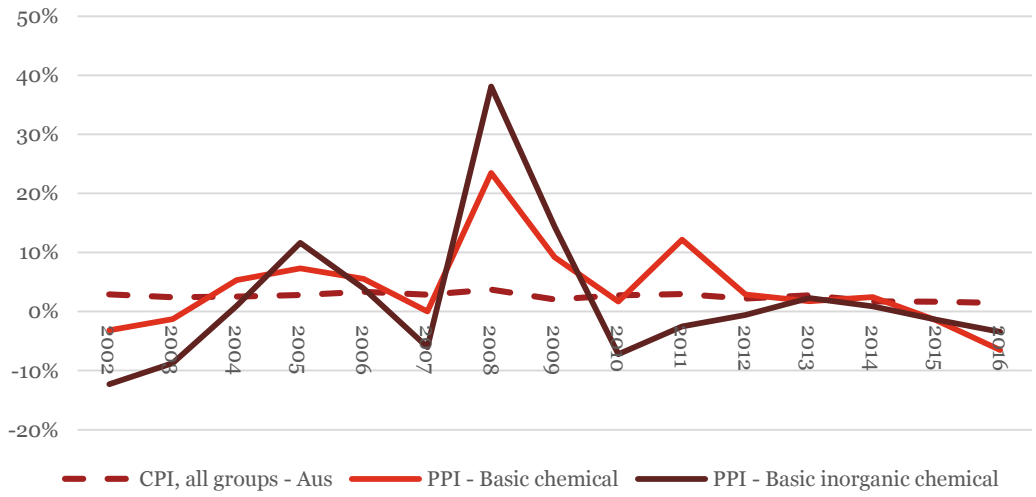


Table 11 shows average growth rates across the three indices over a 5 year, 10 year and 15 year period. While inflation has been relatively steady over the period, average growth rates for both chemicals indices do not display a consistent trend. Over the longer term, the basic chemicals index has consistently grown above inflation (3.7 per cent on average over 15 years, and 4.3 per cent on average over 10 years), though growth has been flat over the past five years (-0.2 per cent on average).

The basic inorganic chemicals index has grown only moderately over the past 15 years on average, however there have been periods of significant growth and contraction during this time that are not apparent from examining average growth in isolation.

Table 11: Comparison of chemical price growth and inflation[76]

Index	CAGR		
	2011 – 2016 (5 yr)	2006 – 2016 (10 yr)	2001 -2016 (15 yr)
CPI - All groups, Australia	2.0%	2.4%	2.5%
PPI - Basic chemicals	-0.2%	4.3%	3.7%
PPI - Basic inorganic chemicals	-0.5%	2.8%	1.4%

75 Australian Bureau of Statistics (2016) Australian Bureau of Statistics (2016) *Consumer Price Index – December 2016 Cat. No. 6140.0 Tables 1 and 2*. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0. ; Australian Bureau of Statistics (2016) *Producer Price Index – December 2016 Cat. No. 6427.0 Table 12*. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6427.0. As the Basic Chemicals series does not commence until September 2001, the 2001 figure is represented by a September rather than June figure for this series.

76 Australian Bureau of Statistics (2016) Australian Bureau of Statistics (2016) *Consumer Price Index – December 2016 Cat. No. 6140.0 Tables 1 and 2*. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0. ; Australian Bureau of Statistics (2016) *Producer Price Index – December 2016 Cat. No. 6427.0 Table 12*. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6427.0. For the Basic Chemicals series, the 2001 index figure is based on the September 2001 figure as the series did not commence until this date.

5.4 Discussion

Analysis of ABS data indicates that manufactured chemical prices have been volatile over the past 15 years. While the basic chemicals index has increased in excess of general inflation on average over a longer-term horizon (10 – 15 years), the significant volatility in the index limits its usefulness as the basis of a robust, consistent cost escalator to be applied to forward years (given that the average growth rates produced can vary significantly depending on the base period chosen and the number of years the average is calculated over).

There are a number of additional factors that further limit the suitability of these indices as the basis to develop a long-run escalator. Firstly, the ABS indices are based on national data, which may result in geographical areas not directly relevant to Seqwater's water business being included in index calculations. Secondly, the chemicals that comprise the ABS indices may not be directly comparable to the chemicals that comprise the majority of Seqwater's expenditure, in which case the price movements in the index may not correlate strongly with price movements in Seqwater's chemical costs.

An alternative approach to developing an escalator could be the development of a composite index based on actual costs incurred by Seqwater (for example, by using the rise and fall provisions contained in relevant chemicals contracts). Seqwater has advised that escalation clauses in existing contracts relate to two key factors – movements in the market price of underlying commodities, and CPI. While CPI data is readily available, the relevant escalator to apply to underlying commodities is less clear. Historical data relating the bulk price movements of relevant chemical compounds are not as readily available, nor are forecasts of future price movements.

A review of recent regulatory precedent indicates that regulators of water businesses have generally accepted chemical cost escalation factors based on CPI forecasts. This approach has the benefit of being transparent, repeatable and easily accessible. The QCA's most recent review in relation to GAWB departed from this approach however, accepting the application of historical growth in the ABS basic chemicals PPI.

Given the aforementioned issues in relation to the application of ABS chemical PPIs to develop future escalators, and a lack of readily available data in relation to historical and forecasts price movements of chemical commodities (which are required to develop a weighted index), we do not recommend the application of either approach. Instead, we consider that CPI growth represents a reasonable basis from which to escalate chemical costs over the forecast period.

5.4.1 Chemical escalation factors

Table 12 summarises the proposed escalation factors for chemical costs. Forecasts of CPI to 2018/19 are based on current forecasts published by the RBA.[77] For remaining years, estimates of inflation are based on the mid-point of the RBA's inflation target.

Table 12: Forecast chemical escalation rates

Escalation factor	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22 - 2027/28
Inflation estimate	2.00%	2.00%	2.50%	2.50%	2.50%	2.50%
Nominal escalation rate (%)	2.00%	2.00%	2.50%	2.50%	2.50%	2.50%
Real escalation rate (%)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Regulatory period

[77] The CPI estimate for 2016/17 is based on estimates published by the Reserve Bank of Australia (February 2017) for June 2017. The RBA has estimated CPI for the year ending June 2018 to grow at between 1.5 and 2.5 per cent. For the purposes of developing real estimates, the mid-point of this range has been applied. RBA estimates of inflation are published in its Statement on Monetary Policy, available at http://www.rba.gov.au/publications/smp/index.html

6 Other materials and services

We recommend that Seqwater escalate its other materials and services costs by CPI during the forecast period.

6.1 Overview

Other materials and services include operating costs that are not captured by the major categories discussed previously. Costs comprising this category include but are not limited to:

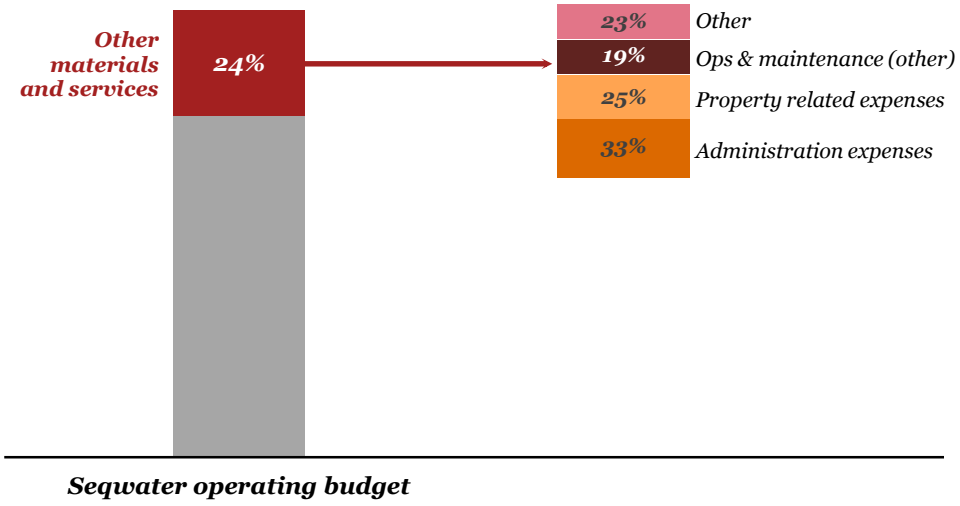
- Administrative expenses
- Property related expenses
- Operations and maintenance costs (not related to external contractors or internal labour)
- Insurance costs
- Residuals disposal.

Given the heterogeneous nature of the 'other materials and services' category, there are likely to be a wide range of factors that will influence future price movements to varying degrees.

6.1.1 Estimated other materials and services costs

Other materials and services account for approximately 24 per cent of Seqwater's forecast operating expenses in 2017/18. The major categories comprising other materials and services costs are administration expenses and property related expenses (Figure 15).

Figure 15: Major cost components of other materials and services expenditure, Seqwater operating expenditure estimates 2017/18[78]



[78] Seqwater data, PwC analysis

6.2 Alternative approaches for the escalation of materials and services costs

6.2.1 Review of current regulatory precedent

There have been a number of alternative approaches to materials and services cost escalation proposed by regulated businesses. These are summarised in Table 13 below.

Table 13 Application of alternative other materials and services escalation factors, regulatory review

Business	Regulator	Proposed approach	Approved approach
Seqwater (*2015/16 to 2017/18 regulatory period)*	Queensland Competition Authority (QCA)	• Seqwater proposed escalation factor based on future movements in CPI. • This CPI estimate was based on RBA forecasts for available years, and the mid-point of the RBA's inflation target for future years.[79]	• The QCA engaged CH2M HILL to assess Seqwater's operating cost proposal. • CH2M HILL considered Seqwater's proposal to escalate other materials and services costs at CPI reasonable • The QCA accepted this assessment, but updated the escalation factors for the RBA mid-point forecast published after CH2M HILL's assessment.[80]
Gladstone Area Water Board (*2015/16 to 2019/20 regulatory period)*	Queensland Competition Authority (QCA)	• GAWB proposed all in-house operations, maintenance and general expenditure be escalated at forecast CPI of 2.5%, based on the midpoint of the RBA's inflation target. • GAWB proposed insurance costs be escalated at 5% per annum. This figure is based on forward-looking estimates provided by its insurance broker, Marsh.[81]	• The QCA engaged Jacobs to assess GAWB's operating cost proposal. • Jacobs considered a 2.6% escalation factor be applied to maintenance costs, based on the 10 year average of the ABS PPI for Output of the Construction Industries (Non-Residential Construction, Queensland). The QCA accepted this approach. • Jacobs considered GAWB's proposed escalation factor of 2.5% to be appropriate for escalating motor vehicle maintenance costs. • Jacobs considered GAWB's proposed insurance cost escalation factors as a price ceiling, and recommended escalation rates of 2.5% in 2015/16 and 5% each year thereafter. The QCA approved this approach.[82]

79 Seqwater (2015) *Seqwater Bulk Water Prices, 2015 to 2018: Submission to the Queensland Competition Authority.* Available at: http://www.qca.org.au/getattachment/2d256f0e-b12c-48fb-8e1d-7a4ac4fd577b/Seqwater-submission.aspx

80 Queensland Competition Authority (2015) *Seqwater Bulk Water Prices: 2015-18.* Available at: http://www.qca.org.au/getattachment/0cddd37b-2d7b-499c-81c4-bd477c3db2dc/Seqwater-s-Bulk-Water-Prices-2015-18.aspx

81 Gladstone Area Water Board (2014) *2015 Price Monitoring Investigation: Submission to the Queensland Competition Authority.* Available at: http://www.qca.org.au/getattachment/c1488851-1b83-4e27-b9f8-1b6b2458d298/GAWB-submission.aspx

82 Queensland Competition Authority (2010) *Gladstone Area Water Board: Investigation of Pricing Practices.* Available at: http://www.qca.org.au/getattachment/478dc5a6-4981-459d-800f-018003607aa4/Final-Report-Gladstone-Area-Water-Board-Investigat.aspx

Business	Regulator	Proposed approach	Approved approach
Aurizon Network (*2013/14 to 2016/17 regulatory period)*	Queensland Competition Authority (QCA)	• Aurizon Network proposed that non-labour costs to be escalated at CPI.[83]	• QCA approved this proposal, noting that Aurizon's revenue cap adjustment process incorporates an adjustment for the difference between forecast and actual inflation.[84]
Energex (*2015/16 to 2019/20 regulatory period)*	Australian Energy Regulator (AER)	• Energex engaged Jacobs SKM to provide advice on the appropriate cost escalation factors for materials. • Energex proposed to escalate general materials costs by CPI.[85]	• The AER accepted this approach, determining that there was no real price growth in non-labour costs expected to occur during the period 2015 to 2020.[86]
Ergon (*2015/16 to 2019/20 regulatory period)*	Australian Energy Regulator (AER)	• Ergon engaged Jacobs SKM to determine escalation factors for materials. • Jacobs proposed to escalate materials and other costs at inflation during the 2015 to 2020 regulatory period.[87]	• The AER approved Ergon's proposed approach • The AER noted that sensitivity analysis undertaken by Economic Insights showed there was no material difference between using the CPI or the PPI in economic benchmarking since the change in PPIs typically follow a similar trend to changes in CPI. • The AER determined the appropriate CPI index to be to the end of the forecast period in the RBA's Statement of Monetary Policy and the mid-point of the RBA's target band for each year thereafter.[88]

6.2.2 *Summary of findings*

In the absence of a more suitable measure, regulated entities have tended to escalate general expenditure on materials and services by expected growth in CPI. This approach reflects the heterogeneous nature of the cost category –the development of a bespoke weighted index (or similar measure) would introduce significant complication into the derivation of the escalation factor, and on balance price growth across the category is likely to reflect general inflation growth. Regulators (including the QCA) have consistently accepted this approach across a range of regulated sectors and over an extended period of time.

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83 Aurizon Network (2014) *Aurizon Network 2014 Draft Access Undertaking: a response to the Queensland Competition Authority (QCA) Stakeholder Notice of August 2014*. Available at: http://www.qca.org.au/getattachment/3211c2f4-eee2-474a-9a46-10fbfcbb04fd/Aurizon-Network.aspx

84 Queensland Competition Authority (2016) *Aurizon Network Access Undertaking – Volume IV – Maximum Allowable Revenue*. Available at: http://www.qca.org.au/getattachment/fd4c6285-69b1-4ebb-8c0f-5d990310b0b2/QCA-UT4-Final-Decision-Volume-IV-MAR-(FINAL.aspx

85 Energex (2014) *Energex Regulatory Proposal July 2015 to June 2020, Appendix 35: cost escalation rates and application*. Available at: https://www.aer.gov.au/system/files/Energex%20-%2035.%20Cost%20Escalation%20Rates%20and%20Application%20-%20October%202014.pdf

86 Australian Energy Regulator (2015) *Final Decision. Energex Determination 2015-16 to 2019-20. Attachment 7 – Operating expenditure*. Available at: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/energex-determination-2015-2020/final-decision

87 Jacobs (2014) *2015/2020 Regulatory Submission, Ergon Energy: Cost Escalation Factors*. Available at: https://www.aer.gov.au/system/files/Ergon%20Energy%20-%2006.02.02%20Cost%20Escalation%20Factors%202015-20%20SKM%20-%20October%202014.pdf

88 Australian Energy Regulatory (2015) *Final Decision Ergon Energy determination 2015-16 to 2019-20. Attachment 7 – Operating expenditure*. Available at: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/ergon-energy-determination-2015-2020/final-decision

6.3 Discussion

The 'other materials and services' cost category is comprised of a broad range of expenses including property, insurance, fees and licence costs.

Items are allocated to the other materials and services cost category on the basis that they do not form a part of Seqwater's major cost categories (such as labour and service contractor costs) and do not represent a large enough share of total operating costs to warrant a separate cost category classification. Consequently, the other materials and services category includes expenses that are not necessarily closely related in respect of underlying drivers of price movements.

Due to the heterogeneity of the items within the other materials and services cost category, it is difficult to robustly and accurately forecast an escalation index that aligns with actual price increases in any given year. A weighted average comprising multiple indices may be developed in certain cases, although it is less suitable in instances where there are a large number of items included in the category, and no single item captures a significant share of total expenditure.

We note that price movements for some costs within the other materials and services category can exhibit significant volatility and be difficult to estimate with certainty. Insurance costs in particular are influenced by a range of external factors (for example, major weather events) that can lead to large year on year price movements. Indeed, there is regulatory precedent for escalating insurance costs over and above general inflation. In its most recent regulatory submission, GAWB proposed a 5 per cent nominal escalation factor for insurance prices, which was accepted by the QCA for the latter four years of its regulatory period.

Alternatively, CPI presents a number of benefits as an escalator in terms of simplicity and data availability. CPI is a price index reflecting a basket of goods and services, and while the items comprising CPI may not directly align in a given year to Seqwater's other materials and services expenses, it is likely to provide the most accurate forecast given the lack of suitable alternatives. This approach has also been accepted by regulators consistently across a range of regulated sectors over an extended period of time.

Accordingly, we propose that CPI be used for the purposes of forecasting unit price movements in general materials over the regulatory period and to 2027/28.

6.3.1 Other materials and services escalation factors

The following escalation factors are proposed for other materials and services costs. Forecasts of CPI to 2018/19 are based on current forecasts published by the RBA.[89] For remaining years, estimates of inflation are based on the mid-point of the RBA's inflation target.

Table 14: Forecast other materials and services escalation rates

Escalation factor	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22 - 2027/28
Inflation estimate	2.00%	2.00%	2.50%	2.50%	2.50%	2.50%
Nominal escalation rate (%)	2.00%	2.00%	2.50%	2.50%	2.50%	2.50%
Real escalation rate (%)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Regulatory period

[89] The CPI estimate for 2016/17 is based on estimates published by the Reserve Bank of Australia (February 2017) for June 2017. The RBA has estimated CPI for the year ending June 2018 to grow at between 1.5 and 2.5 per cent. For the purposes of developing real estimates, the mid-point of this range has been applied. RBA estimates of inflation are published in its Statement on Monetary Policy, available at http://www.rba.gov.au/publications/smp/index.html

7 Capital expenditure

We recommend Seqwater rebase its capital expenditure to 2018/19 dollars using the Queensland engineering construction activity implicit price deflator for available years (to 2015/16), and using actual and forecast CPI growth for remaining years (to 2027/28)

7.1 Overview

Seqwater is currently in the process of developing its capital program as part of its submission to the QCA for the next regulatory period commencing in 2018/19. Capital project appraisals have been carried out over a number of preceding years and as such cost estimates need to be rebased to 2018/19 dollars. Future capital expenditure will also require escalation factors to be developed out to 2027/28.

This section examines the different approaches that have been adopted in recent regulatory submissions for capital expenditure with a view to recommending an appropriate escalation factor for Seqwater's capital program.

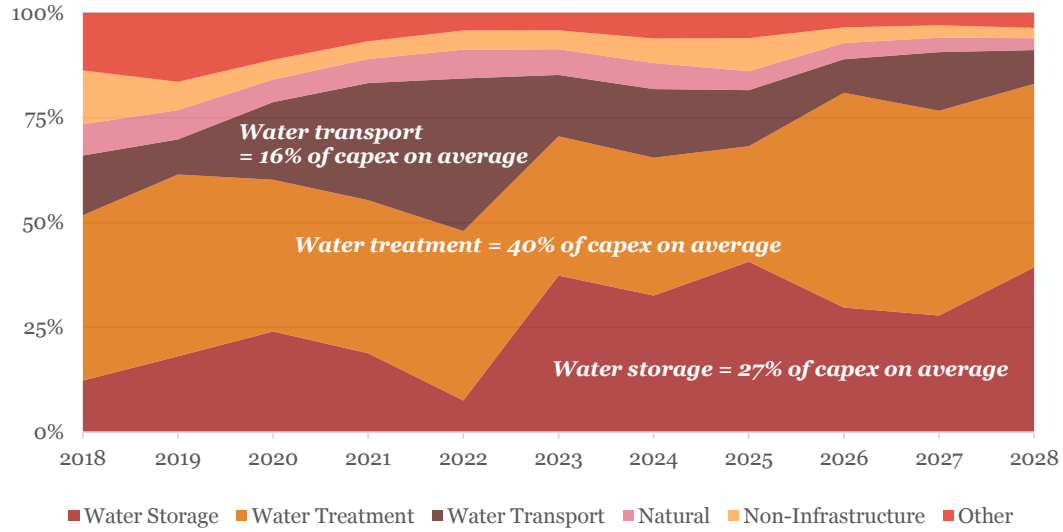
7.1.1 Composition of Seqwater's capital expenditure

Figure 16 summarises Seqwater's forecast capital expenditure across its major asset groups (as a proportion of total capital expenditure) to 2027/28. Over the forecast period, three asset groups comprise over 80 per cent of total capital expenditure, these being:

- ***Water treatment*** (40 per cent of total capital expenditure) – comprising capital expenditure on water and wastewater treatment plants
- ***Water storage*** (27 per cent of total capital expenditure) – comprising major storage assets such as dams and weirs; and
- ***Water transport*** (16 per cent of total capital expenditure) – comprising bulk water supply pipelines and pipeline interconnectors.

Remaining capital expenditure relates to smaller categories such a recreation, irrigation and non-water infrastructure capital (such as ICT, buildings and fleet).

Figure 16: Seqwater capital expenditure profile (proportion of capital expenditure by asset group), 2017/18 to 2027/28



7.2 Alternative approaches for the escalation of capital expenditure

7.2.1 Current indices and data sources

Regulated entities have referenced a range of industry price indices in order to escalate capital expenditure forecasts as part of their regulatory submissions. These include:

- Producer price indices for the construction sector
- Engineering construction activity implicit price deflator
- Australian Construction Industry Forum engineering construction price index

Construction sector producer price indices

The ABS produces a number of producer price indices for the construction sector, including:

- Building construction
- House construction
- Other residential building construction
- Non-residential building construction
- Road and bridge construction.

The QCA has previously examined long term movements in the building construction, non-residential construction and road and bridge construction price indices when evaluating construction cost escalation rates for water businesses. [90] While noting a number of limitations in using these indices to estimate construction price movements in the water sector, the QCA stated using these indices was a reasonable approach given the limited information available on disaggregated cost indices.

Engineering construction activity implicit price deflator

The ABS produces estimates of engineering construction activity in Australia, compiled from the Engineering Construction Survey. An implicit price deflator can be derived from the series to provide an estimate of price changes over time. In reviewing irrigation prices for SunWater and Seqwater in 2012 and 2013 respectively, the QCA examined the Queensland Engineering Construction Activity Implicit Price Deflator to provide additional insights into civil construction cost movements.

Australian Construction Industry Forum Engineering Construction Price Index

The Australian Construction Industry Forum (ACIF) previously developed an Engineering Construction Price Index as part of its twice-yearly construction industry forecasts. The index provided both historical and 10 year forecasts of price movements in the engineering construction sector and was used by a range of regulated entities as a basis for escalating capital expenditure costs.[91]

The ACIF has recently adjusted its methodology to develop its construction activity forecasts in real terms (otherwise known as chain volume measures), as opposed to the previous approach which modelled changes in nominal terms. As a result, the Engineering Construction Price Index is no longer available as part of the ACIF forecasts.

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[90] See *Final Report SunWater Irrigation Price Review 2012-2017* and *Final Report Seqwater Irrigation Price Review 2013-17*.

[91] Examples include Ergon Energy as part of its 2010/11 to 2014/15 submission to the AER, Energex as part of its 2010/11 to 2014/15 and 2015/16 to 2019/20 submissions to the AER, Seqwater as part of its 2015/16 to 2017/18 submission to the QCA, and QUU as part of its 2012/13 price monitoring submission to the QCA.

However, by providing construction activity estimates in chain volume measures, the ACIF data does allow for the development of implicit price deflators for sub-components of engineering construction activity, the most relevant to this analysis being for water storage and supply sector, sewerage and drainage construction. The price deflator is developed by comparing historical ACIF estimates (in chain volume measures) against ABS estimates (in current prices), which allows for price changes to be isolated.

7.2.2 Review of current regulatory precedent

Queensland Competition Authority – water sector reviews

The QCA has historically accepted a range of approaches put forward by water businesses in order to escalate capital costs over time. Table 15 summarises previous proposals and determinations by the QCA in relation to South-East Queensland distribution and retail water businesses.

Table 15: Proposed approaches to escalate capital expenditure costs (Queensland water retail businesses)

Business	Period	Proposed approach	Approved approach
Queensland Urban Utilities	2012/13	QUU indexed capital costs by applying the Construction Forecasting Council Engineering Construction Price Index for Australia.	The QCA noted that the index includes data from construction types and geographic areas that are not directly relevant to QUU's water and sewerage business, however given the conservative nature of the estimates, the QCA accepted the escalation factors.[92]
Unitywater	2011/12	Unitywater[93] escalated its capital expenditure costs according to data sourced from the Producer Price Index Road and Bridge series for Queensland, published by the Australian Bureau of Statistics (ABS).	The Authority noted that historical price pressures would not necessarily be sustained over the long term, and the index may be affected by market conditions no relevant to water and sewerage operations, however the proposed indexation rate was deemed to be reasonable, though on the high side.[94]
Allconnex	2011/12	Similar to Unitywater, Allconnex escalated its capital expenditure according to the Queensland Road and Bridge Construction Index. [95]	The Authority noted similar issues to the Unitywater methodology (discussed above), however the indexation was considered to be reasonable.

Table 16 summarises proposed escalation approaches put forward by Queensland bulk water businesses to the QCA as part of recent regulatory submissions.

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92 Queensland Competition Authority (2013) *Final Report, SEQ Price Monitoring for 2012-13 Part B – Detailed Assessment*. Available at: http://www.qca.org.au/getattachment/ba92fecc-d488-44f8-8bb7-ad7ecda7bf65/SEQ-Interim-Price-Monitoring-for-2012-13-Draft-Rep.aspx

93 Queensland Competition Authority (2012) *Final Report. SEQ Interim Price Monitoring for 2011-12. Part B Detailed Assessment*. Available at: http://www.qca.org.au/getattachment/c618d45b-ecc7-4aad-a49d-ff184e3d263f/SEQ-Interim-Price-Monitoring-for-2011-12-Final-(1).aspx

94 Queensland Competition Authority (2012) *Final Report. SEQ Interim Price Monitoring for 2011-12. Part B Detailed Assessment*. Available at: http://www.qca.org.au/getattachment/c618d45b-ecc7-4aad-a49d-ff184e3d263f/SEQ-Interim-Price-Monitoring-for-2011-12-Final-(1).aspx

95 Allconnex (2011) *Allconnex Water Price Monitoring Submission 2011-12*. Available at: http://www.qca.org.au/getattachment/92467ed8-8125-4496-9ce5-8a4e88989b91/Allconnex-Water-Submission-1.aspx

Table 16: Application of alternative capital cost escalation factors, Queensland bulk water businesses

Business	Proposed approach	Approved approach
Seqwater (*2015/16 to 2017/18 regulatory period)*	• Seqwater proposed escalation factors based on the Australian Construction Industry Forum's engineering construction price index for the period 2013/14 to 2022/23 and the midpoint of the RBA's target band for Australian wide inflation for the period 2023/24 to 2027/28.[96]	• The QCA engaged CH2M HILL to review Seqwater's proposed capital expenditure escalation. • CH2M HILL acknowledged that the QCA had accepted the use of ACIF forecasts in the past, and therefore found Seqwater's proposal reasonable. • CH2M Hill further noted that Seqwater's proposal to escalate capital expenditure by forecast CPI to be appropriate given the level of uncertainty of capital cost inflation over the longer term. • The QCA accepted CH2M Hill's findings. [97]
Gladstone Area Water Board (*2015/16 to 2019/20 regulatory period)*	• GAWB proposed that capital cost forecasts be escalated using forecast CPI for the 2016-2035 regulatory planning period.[98] • The forecast CPI figures are based off the midpoint of the RBA's target inflation bands. • This escalation factor was adopted by GAWB in accordance with the QCA's recommendation during the 2010-2015 regulatory period.	• The QCA recommended that CPI be adopted as the escalation factor for capital expenditure during the 2015-2020 regulatory periods. [99]
Gladstone Area Water Board *(2010/11 to 2014/15 regulatory period)*	• GAWB proposed to escalate its capital expenditure according to the three year (2007 to 2009) average of the general Queensland construction industry index.[100] GAWB did not provide details of the publishers of this data.	• The QCA determined that GAWB's application of the construction index was not appropriate. • The QCA considered that a three year average of construction price increases would not provide a reliable indication of cost escalation over the period 2012 to 2015. • It noted that market conditions may now be markedly different from those in the period 2007 to 2009, and therefore proposed that the CPI be applied over the regulatory period. [101]

96 Seqwater (2015) *Seqwater Bulk Water Prices, 2015 to 2018: Submission to the Queensland Competition Authority*. Available at: http://www.qca.org.au/getattachment/2d256f0e-b12c-48fb-8e1d-7a4ac4fd577b/Seqwater-submission.aspx

97 Queensland Competition Authority (2015) *Seqwater Bulk Water Prices: 2015-18*. Available at: http://www.qca.org.au/getattachment/0cddd37b-2d7b-499c-81c4-bd477c3db2dc/Seqwater-s-Bulk-Water-Prices-2015-18.aspx

98 Gladstone Area Water Board (2014) *2015 Price Monitoring Investigation: Submission to the Queensland Competition Authority*. Available at: http://www.qca.org.au/getattachment/c1488851-1b83-4e27-b9f8-1b6b2458d298/GAWB-submission.aspx

99 Queensland Competition Authority (2010) *Gladstone Area Water Board: Investigation of Pricing Practices*. Available at: http://www.qca.org.au/getattachment/478dc5a6-4981-459d-800f-018003607aa4/Final-Report-Gladstone-Area-Water-Board-Investigat.aspx

100 Gladstone Area Water Board (2010) *Expenditure proposals for the 2010 price review*. Accessed online at http://www.qca.org.au/getattachment/50efda4f-8b93-4006-ba7e-978302642d1c/Submission-2-Expenditure-Proposals.aspx

101 Queensland Competition Authority (2010) *Gladstone Area Water Board: Investigation of Pricing Practices*. Accessed online at http://www.qca.org.au/getattachment/478dc5a6-4981-459d-800f-018003607aa4/Final-Report-Gladstone-Area-Water-Board-Investigat.aspx

Other regulated sectors – electricity

Table 17 summarises cost escalation approaches put forward by regulated entities in the electricity sector as part of recent regulatory submissions.

Table 17: Application of alternative capital cost escalation factors, electricity sector

Business	Regulator	Proposed approach	Approved approach
TasNetworks (*2017/18 to 2019/20 regulatory period)*	AER	• TasNetworks proposed to escalate capital costs at CPI during the 2017 to 2019 regulatory period.[102]	• The AER approved this approach.[103]
Energex (*2015/16 to 2019/20 regulatory period)*	Australian Energy Regulator (AER)	• Energex engaged Jacobs SKM to develop real cost escalation factors for the inputs into its capital program. • Jacobs SKM proposed a methodology based on modelling the independent forecast movements in the price of key inputs, weighted by their relative contribution to the final cost of equipment for system assets. • Jacobs SKM used a range of different sources to develop their forecasts, including futures contracts published by Bloomberg, RBA published inflation and ACIF published construction indices. [104]	• The AER rejected Jacobs SKM's approach in escalating real material costs and proposed that CPI be used instead. • The AER noted that their approach to real materials cost escalation does not impact the proposed application of labour and construction cost escalators that apply to forecast capex for standard control services. [105]

[102] TasNetworks (2016) *Tasmanian Distribution Regulatory Proposal, Regulatory Control Period 1 July 2017 to 30 June 2019.* Available at: https://www.aer.gov.au/system/files/TasNetworks%20-%20Reguatory%20Proposal%202017-22%20-%20January%202016.pdf

[103] Australian Energy Regulator (2016) *Draft Decision TasNetworks distribution determination. 2017-78 to 2018-19. Attachment 6 – Capital expenditure.* Available at: https://www.aer.gov.au/system/files/AER%20-%20Draft%20decision%20-%20TasNetworks%20distribution%20determination%20-%20Attachment%206%20-%20Capital%20expenditure%20-%20September%202016.pdf

[104] Energex (2014) *Energex Regulatory Proposal July 2015 to June 2020, Appendix 35: cost escalation rates and application.* Available at: https://www.aer.gov.au/system/files/Energex%20-%2035.%20Cost%20Escalation%20Rates%20and%20Application%20-%20October%202014.pdf

[105] Australian Energy Regulator (2015) *Final Decision. Energex Determination 2015-16 to 2019-20. Attachment 7 – Operating expenditure.* Available at: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/energex-determination-2015-2020/final-decision

Business	Regulator	Proposed approach	Approved approach
Ergon Energy *(2010/11 to 2014/15 regulatory period)*	AER	• For Ergon Energy's 2010/11 to 2014/15 regulatory period, it sought advice from SKM to develop forecast building costs escalators. SKM analysed ABS data and sought additional information from a range of organisations to determine a forecast for building costs. • SKM considered that insufficient publicly available historical or forecast data existed to derive a relevant escalator. In the absence of a reputable building cost escalation forecast, SKM considered it reasonable to assume that building costs will escalate at least in line with the rate of growth in construction costs as based on the ACIF engineering construction price index.[106]	• In the AER's draft determination it considered Ergon Energy's approach to apply the ACIF engineering construction price index forecasts as a proxy for a building cost escalator to be reasonable, particularly as the construction cost forecasts are derived from the ABS data. • In its final determination, the AER maintained its decision that use of the ACIF engineering construction price forecasts were appropriate, however updated these values to reflect the most recent nominal forecasts, which were then deflated using the Australia National State and Industry Outlook (ANSIO) CPI forecasts.[107]
Energex *(2010/11 to 2014/15 regulatory period)*	AER	• Energex proposed to apply construction cost escalation rates developed by KPMG and based upon ABS data to account for movements in building costs in its proposal for the 2010/11 to 2014/15 regulatory period. [108] • KPMG developed the rates based on ABS engineering construction activity data[109] over the period 1998 to 2008. It considered this to be an appropriate data source as it was also applied by Econtech to develop its construction cost forecasts for the ACIF Construction Forecasting Council, approved by the AER in its recent ACT and NSW final electricity distribution determinations.[110] [111]	• In considering Energex's proposed approach the AER noted that the ACIF forecasts also consider ABS building activity data[112] and macroeconomic projections when determining its construction cost forecasts. The AER therefore considered that the ACIF forecasts would more accurately reflect the volatility and uncertainty of economic conditions as it incorporates more historical data and macroeconomic projections. • The AER did not consider KPMG's construction cost escalation forecast to be reasonable, and determined that Energex should apply the construction cost index developed by the ACIF.[113]

[106] Australian Energy Regulator. 2009. *Queensland Draft Determination Decision – Appendices – 2010-15*. Available at: http://www.aer.gov.au/sites/default/files/QLD%20draft%20decision%20-%20appendices.pdf.

[107] Australian Energy Regulator (2012) *Final Distribution Determination Aurora Energy Pty Ltd 2012–13 to 2016–17*. Available at http://www.aer.gov.au/sites/default/files/Final%20distribution%20determination%20for%20Aurora%20Energy.pdf

[108] Energex (2009), *Regulatory proposal*, Accessed online at https://www.energex.com.au/__data/assets/pdf_file/0020/26705/ENERGEX_s_Regulatory_Proposal_2010-2015.pdf

[109] ABS, Engineering Construction Activity, Cat No. 8762.0. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/8762.0

[110] AER (2009) *Australian Capital Territory distribution determination 2009-10 to 2013-14*. Accessed online at http://www.aer.gov.au/sites/default/files/AER%20Final%20decision%20-%20ACT%20determination%202009-10%20to%202013-14%20-%20April%202009.pdf

[111] AER (2009) *New South Wales distribution determination 2009-10 to 2013-14*. Accessed online at http://www.aer.gov.au/sites/default/files/NSW%20DNSPs%20final%20decision%2028%20April%202009_1.pdf

[112] ABS, *Building Activity*, Cat No. 8762.0

[113] Australian Energy Regulator (2012) *Final Distribution Determination Aurora Energy Pty Ltd 2012–13 to 2016–17*. Available at http://www.aer.gov.au/sites/default/files/Final%20distribution%20determination%20for%20Aurora%20Energy.pdf

7.2.3 Summary of findings

There does not appear to be a universal approach to escalating capital costs adopted by regulated entities.

Queensland water businesses have typically adopted one of the following approaches to escalating capital costs:

- Applying a long-term historical average of the road and bridge construction index for Queensland (produced by the ABS). While the QCA has noted that the nature of construction associated with this index may not align perfectly with construction activity for a water businesses, it has generally been accepted on the basis the escalation rates were reasonably conservative
- Applying the engineering price index forecasts produced by the ACIF. Again, the QCA has generally considered these forecasts to be a reasonable basis from which to escalate capital costs. As the index is no longer available, it is no longer a feasible approach for escalating capital costs.
- Applying CPI as a measure of general inflation. This approach has the benefit of being simple, transparent and easily repeatable and has generally be accepted.

Where the QCA has tended to not accept a proposed approach, it has been due to the escalation factor being based on an unclear data source (which was unable to be easily verified), or a growth rate based on historical growth over too short of a time frame (which was considered to not be representative of longer term trends).

Other sectors (namely electricity) have tended to apply similar approaches, with the use of the ACIF engineering price index forecasts and CPI the most common approaches to escalation. The AER has generally accepted these approaches, noting that the ACIF forecasts derived from ABS data and account for the uncertainty of future economic conditions by incorporating historical data as well as macroeconomic projections.

7.3 Market trends

7.3.1 Historical movements in construction price indices

Figure 17 compares movements in the building construction, non-residential building construction and road and bridge price indices for Queensland. The building construction and non-residential building construction indices followed similar trends over the period, exhibiting strong growth through the early and mid-2000s, before falling sharply (a result of the economic slowdown associated with the global financial crisis) and resuming moderate growth over the first half of the current decade.

The road and bridge index has been less volatile, though a consistent trend of lower rates of growth (and more recently, negative growth) is apparent since 2010.

Figure 17: Comparison of historical inflation to construction price indices, 2001 to 2016 (June to June)[114]

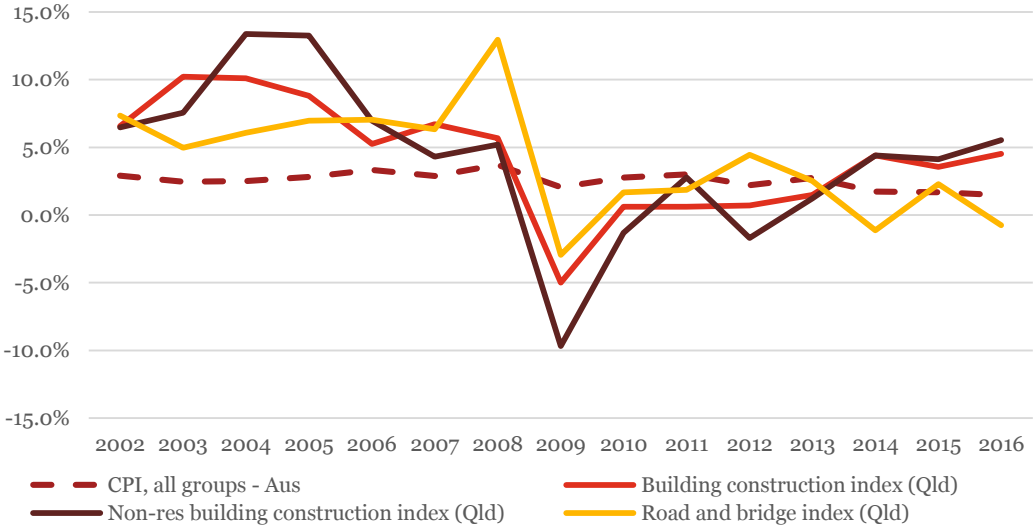


Table 18 summarises average annual growth for the same indices over the past 5, 10 and 15 year periods. This indicates that over a longer time-frame, construction prices have exhibited real growth of between 1.3 per cent and 1.6 per cent on average. However, over shorter periods (such as 5 or 10 years), which exclude the rapid growth of the early 2000s, and lend greater weight to the sharp contraction in prices during the global financial crisis, price growth in the construction sector has broadly matched trends in general inflation growth.

Table 18: Comparison of price growth across various construction price indices (year to June)[115]

Index	CAGR		
	2011 – 2016 (5 yr)	2006 – 2016 (10 yr)	2001 -2016 (15 yr)
PPI – Building Construction, Qld	2.9%	2.3%	4.2%
PPI – Non-residential Building Construction, Qld	2.7%	1.4%	4.0%
PPI - Road and Bridge, Qld	1.5%	2.6%	3.9%
CPI – All groups, Australia	2.0%	2.4%	2.5%

[114] Australian Bureau of Statistics (2016) *Producer Price Index – December 2016 Cat. No. 6427.0, Table 17.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6427.0. Australian Bureau of Statistics (2016) *Consumer Price Index – December 2016. Cat. No. 6401.0.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0

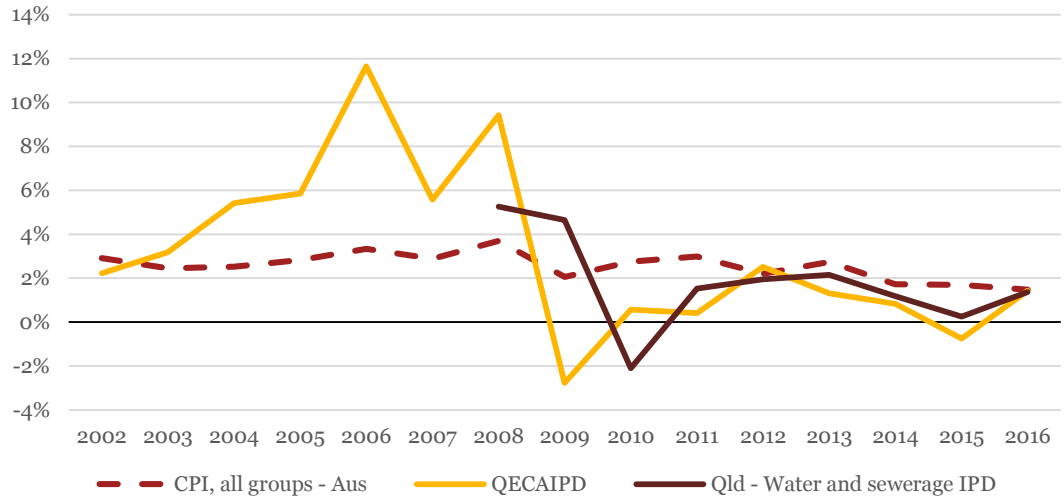
[115] [115] Australian Bureau of Statistics (2016) *Producer Price Index – December 2016 Cat. No. 6427.0, Table 17.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6427.0. Australian Bureau of Statistics (2016) *Consumer Price Index – December 2016. Cat. No. 6401.0.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0

7.3.2 Historical movements in implicit price deflators

Figure 18 compares movements in the Queensland engineering construction activity implicit price deflator (IPD) and the Queensland water and sewerage construction (one of seven categories that comprise engineering construction activity) IPD with general inflation.

Similar to the construction producer price indices, the engineering construction activity IPD grew well above inflation over the first half of the previous decade, before moderating from 2009 onwards. While historical growth for the water and sewerage IPD is only available from 2008 onwards, the trend appears to correlate relatively closely with the broader engineering index, particularly over the past five years.

Figure 18: Comparison of historical inflation to Queensland engineering construction activity and water and sewerage construction activity IPDs, 2002 to 2016[116]



Note: QECAIPD data are year to September, Qld – Water and sewerage IPD data are year to June.

Table 19 compares recent price movements in the engineering construction activity and water and sewerage construction activity IPDs with movements in general inflation. Similar to the construction industry producer price indices, there is a clear trend of lower growth in recent years. While there appears to have been real growth in engineering construction prices on average over the past 15 years, over shorter periods (5 to 10 years) construction sector price growth has been broadly aligned with, or marginally lower than, CPI growth.

[116] Australian Bureau of Statistics (2016) *Engineering Construction Activity, September 2016 Cat. No. 8762.0. Tables 2 and 4.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/8762.0. Australian Bureau of Statistics (2016) *Consumer Price Index – December 2016. Cat. No. 6401.0.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0. The Queensland water and sewerage IPD is derived from ABS Cat. No. 8762.0 (Table 19) and the Australian Construction Industry Forum (ACIF) November 2016 forecasts, available by subscription only.

Table 19: Comparison of price growth across various construction price indices[117]

Index	CAGR		
	2011 – 2016 (5 yr)	2006 – 2016 (10 yr)	2001 -2016 (15 yr)
Queensland engineering construction activity IPD	1.1%	1.8%	3.1%
Queensland water and sewerage construction activity IPD	1.4%	1.8%[118]	n/a
CPI – All groups, Australia	1.8%	2.4%	2.5%

7.4 Discussion

In general, there is no universal approach to escalating capital costs which is consistently applied to regulated water businesses in Australia.

The most common approaches adopted by regulated entities have been the application of average growth in a construction sector produce price index (such as the road and bridge index) over a long-term period (such as 10 years), the application of a suitable construction sector forecast such as the former engineering price index produced by the ACIF, or escalation based on CPI growth.

These approaches have generally been accepted by regulators, though it has been noted that factors influencing price growth for some of these indices (such as the road and bridge index) may not necessarily be consistent with factors influencing growth in capital expenditure prices experienced by a water business. In relation to engineering price index forecasts produced by the ACIF, while they previously provided a generally accepted means by which to escalate future capital expenditure costs, the cessation of this index means this option is no longer available to regulated businesses.

More recently, the application of CPI as an escalation factor has become more common. Comparing price growth across a range of construction sector PPIs to CPI shows that over the past decade, average price growth in the construction sector appears to have broadly moved in line with general inflation growth. Similarly, engineering construction activity prices (estimated by the derivation of implicit price deflators) have generally moved in line with inflation over the past decade, and more recently have grown marginally below CPI.

Given the broadly comparable historical movements in CPI and more specific construction indices, the application of the broader index (being CPI) appears to be a reasonable approach to escalate future capital expenditure costs.

In addition to capital expenditure escalation factors for future years, Seqwater requires an appropriate methodology by which to bring historical capital expenditure data forward to 2018/19 dollars.

In our view, changes in engineering construction prices (as reflected by the engineering construction activity implicit price deflator) provide a more accurate reflection of year-to-year price movements in Seqwater's capital program, relative to general inflation (even

[117] Australian Bureau of Statistics (2016) *Producer Price Index – September 2016 Cat. No. 6427.0, Table 17.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6427.0. Australian Bureau of Statistics (2016) *Consumer Price Index – December 2016. Cat. No. 6401.0.* Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0. ACIF Forecasts (Customised Forecasts Dashboard) November 2016, accessed on 5 March 2017.

[118] ACIF data are only available from 2006/07 onwards, and therefore the growth figure presented is average annual growth over 9 years rather than 10 years.

though average annual growth in both indices over the decade are generally comparable). Further, while the water and sewerage construction activity IPD is likely to more closely align with Seqwater's capital program compared to the broader engineering construction activity IPD, it relies on data that is not as readily accessible (the ACIF data requires a subscription), and data are not available over as long a period.

7.4.1 Capital expenditure escalation factors

Table 20 outlines our proposed escalation factors for Seqwater's capital expenditure. For years which the data are available, we propose to use historical growth in the Queensland engineering construction activity implicit price deflator to escalate capital expenditure (ie to 2015/16). Beyond this period, we propose to escalate capital costs in line with CPI.

Table 20: Proposed escalation rates, Capital expenditure

Year	Inflation estimate (%)	Nominal growth rate (%)	Nominal index	Real growth rate (%)	Real index
2008/09	1.42%	0.61%	87.7	-0.80%	109.4
2009/10	3.12%	-0.32%	87.4	-3.34%	105.7
2010/11	3.55%	1.79%	89.0	-1.70%	103.9
2011/12	1.21%	1.94%	90.7	0.72%	104.7
2012/13	2.39%	1.21%	91.8	-1.16%	103.4
2013/14	3.02%	1.12%	92.9	-1.84%	101.5
2014/15	1.51%	-1.19%	91.8	-2.66%	98.8
2015/16	1.02%	2.20%	93.8	1.17%	100.0
2016/17	2.00%	2.00%	95.6	0.00%	100.0
2017/18	2.00%	2.00%	97.6	0.00%	100.0
2018/19	2.50%	2.50%	***100.0***	0.00%	***100.0***
2019/20	2.50%	2.50%	102.5	0.00%	100.0
2020/21	2.50%	2.50%	105.1	0.00%	100.0
2021/22	2.50%	2.50%	107.7	0.00%	100.0
2022/23	2.50%	2.50%	110.4	0.00%	100.0
2023/24	2.50%	2.50%	113.1	0.00%	100.0
2024/25	2.50%	2.50%	116.0	0.00%	100.0
2025/26	2.50%	2.50%	118.9	0.00%	100.0
2026/27	2.50%	2.50%	121.8	0.00%	100.0
2027/28	2.50%	2.50%	124.9	0.00%	100.0

Regulatory period

8 Summary

Table 21 summarises the proposed approaches for developing cost escalation factors for the six cost categories identified by Seqwater over the period covering 2016 to 2028.

Table 21: Proposed cost escalation factors by cost category

Cost category	Recommended escalation factor	Source
Employee and contract labour expenses	Seqwater Enterprise Agreement to 2018/19	Seqwater Enterprise Agreement 2016 – 2019
	Queensland Treasury WPI forecast for 2019/20 and 2020/21	Queensland Treasury (2017/18 Budget)
	Long-term (15 year) historical growth in the Queensland WPI for the remainder of the forecast period	Australian Bureau of Statistics (Queensland WPI)
Contractors (service delivery)	Weighted index of the Queensland WPI (forecasts and long run average growth) and CPI (RBA inflation forecasts to 2018/19 and mid-point of RBA inflation target) for remainder of period.	Queensland Treasury (2017/18 Budget), Australian Bureau of Statistics (Queensland WPI)
	Escalation factor = 0.56(WPI) + 0.44(CPI)	Reserve Bank of Australia
Electricity	Average annual growth rate in AEMO Queensland commercial electricity price forecasts between 2020 and 2030 over the regulatory period.	Australian Energy Market Operator (2016 National Electricity Forecasting Report) – forecasts developed by Jacobs for AEMO.
	Annual growth in AEMO Queensland commercial electricity price forecasts for the remainder of the forecast period.	
Chemicals	RBA inflation forecasts (to 2018/19), mid-point of RBA inflation target range for the reminder of the forecast period	Reserve Bank of Australia
Other materials and services	RBA inflation forecasts (to 2018/19), mid-point of RBA inflation target range for the reminder of the forecast period	Reserve Bank of Australia
Capital expenditure	Queensland Engineering Construction Activity Implicit Price Deflator for historical capital expenditure to 2015/16.	Australian Bureau of Statistics (Engineering Construction Activity, Australia)
	RBA inflation forecasts (2016/17 to 2018/19), mid-point of RBA inflation target range for the reminder of the forecast period	Reserve Bank of Australia

To ensure the ongoing applicability of the specific indices and escalation methodologies outlined in this report, we recommend that Seqwater continue to monitor actual price movements compared to those forecast, to determine if the methodologies recommended provide accurate forecasts of cost movements.

8.1 Accounting for uncertainty

Beyond the selection of an escalation factor, it is prudent to acknowledge that forecasts provide estimates of likely price movements, based on the best available data at a point in time. Accordingly, any forecast may not accurately predict unexpected macroeconomic or market trends which significantly alter movements in key inputs (e.g. interest rates, changes in labour market dynamics, or significant fluctuations in exchange rates).

Therefore, there is a degree of risk businesses are exposed to in the application of escalation factors given unexpected macroeconomic or market events can result in higher (or lower) unit price movements which can subsequently have an impact on revenue.

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