



Development of cost escalation factors

Final

ActewAGL

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Contents

Executive summary	1
1. Introduction	1
1.1 Objective and Scope of Work	1
1.2 Deliverables	1
1.3 Limitations and assumptions	2
1.4 Assumptions.....	2
2. Method.....	3
3. Key cost drivers	5
3.1 Commodity prices	5
3.2 Australian Dollar to US Dollar exchange rate	6
3.3 Labour costs.....	6
3.4 Construction costs	6
3.5 Australian Trade Weighted Index (TWI)	6
3.6 Australian Consumer Price Index (CPI)	7
4. Conclusion	9

Figures

Figure 1	Historic Australian International Trade Price Index.....	7
Figure 2	Australian Consumer Price Index.....	8

Tables

Table 1	Real annual cost escalation % change forecast of primary cost drivers.....	1
Table 2	Real aggregated annual cost escalators 2018/19 to 2023/24	2
Table 3	Material and labour proportions by asset class.....	4
Table 4	Real annual cost escalation indices for commodities	5
Table 5	Real annual cost escalation for labour	6
Table 6	Engineering construction cost escalation factors.....	6
Table 7	Annual Australian ITPI % change	7
Table 8	Annual Australian CPI % change forecast	8
Table 9	Real annual cost escalation % change forecast of primary cost drivers.....	9
Table 10	Real annual material and labour cost escalation indices forecast.....	9
Table 11	Real annual material cost escalation indices forecast 2018/19 to 2023/24.....	12

Appendices

Appendix A - Material cost escalators 12

Executive summary

In previous decisions for electricity network service providers, the Australian Energy Regulator (AER) has allowed for costs related to capital and operational expenditure provisions to be escalated in real terms. Prior to these decisions the Australian Consumer Price Index (CPI) was used by the AER to represent cost escalation in relation to network material costs. The method currently accepted by the AER involves the modelling of the change in equipment prices through combining independent forecast movements in the real price of input commodities, with weightings for relative contribution of each commodity to the final equipment cost. This in turn generates real cost forecasts for the regulatory control period under review.

GHD was engaged by ActewAGL to undertake the development of cost escalation factors for the electricity network asset categories to be used in the regulatory period 2018/19-2023/24.

ActewAGL has provided GHD with real commodity and labour cost escalation factors developed by BIS Oxford Economics for use in developing escalation factors specific to various asset classes to assist ActewAGL in the preparation of its regulatory proposal. GHD has developed cost escalation indices for Australian Consumer Price Index and Australian Trade Weighted Index (TWI) independently of the BIS Oxford Economics advice.

The real annual escalation indices presented in this report are specific to the operating environment faced by ActewAGL, and are based on the most recent information available.

The following two tables present the forecast results of GHD analysis and modelling of underlying cost drivers and economic indicators, and material and labour cost aggregated to ActewAGL's standard asset classes respectively. The forecasted annual time period referenced in all the tables in this report runs from 1 July to 30 June in the following year. The base annual period for the real dollar term is the 2017/18 financial year.

Table 1 presents the forecast percentage change in the real annual cost escalation against the underlying cost drivers of electricity network infrastructure and economic indicators.

Table 1 Real annual cost escalation % change forecast of primary cost drivers

Primary cost driver	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Aluminium	1.88%	2.83%	-4.01%	-1.76%	-2.00%	-1.65%	7.05%
Copper	1.74%	5.07%	-0.24%	-0.48%	-4.19%	-3.73%	4.89%
Steel	0.43%	-2.69%	-2.44%	1.20%	2.89%	3.20%	1.16%
Oil	7.63%	6.07%	0.81%	-0.02%	-4.14%	-3.69%	4.94%
Utility sector labour	0.68%	0.95%	0.78%	1.27%	1.64%	1.73%	1.43%
General labour	0.57%	0.74%	0.57%	1.11%	1.55%	1.49%	1.25%
Professional services	0.44%	0.33%	0.09%	0.77%	1.21%	1.27%	0.88%
Construction costs	-0.95%	-0.54%	-1.75%	-0.89%	-1.35%	-1.22%	0.22%
Australian TWI	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%
Australian CPI	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 2 presents forecast real annual asset cost escalation indices based on the movements in underlying cost drivers and economic indicators, but aggregated at common standard asset class level used by ActewAGL.

Table 2 Real aggregated annual cost escalators 2018/19 to 2023/24

ActewAGL standard asset class	Forecast					
	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Transmission Overhead	1.003	0.991	1.005	1.007	1.009	1.019
Transmission Underground (Cu)	1.015	1.004	1.008	1.005	1.006	1.018
Distribution Overhead Lines	1.010	1.006	1.012	1.015	1.016	1.017
Distribution Underground Lines (Al)	1.011	1.006	1.011	1.013	1.014	1.017
Zone Substation Switchgear	1.014	1.006	1.012	1.010	1.012	1.021
Zone Substation Transformer	1.015	0.999	1.009	1.006	1.008	1.027
Zone Substation Electronics/Other	1.025	1.020	1.022	1.019	1.019	1.027
Zone Substation Civils	0.997	0.987	0.995	0.992	0.993	1.004
Distribution Substations	1.017	1.009	1.014	1.013	1.014	1.023
Meters	1.018	1.014	1.017	1.018	1.018	1.021
Relays (Protection & Control)	1.014	1.011	1.015	1.017	1.018	1.018
IT & Communication Systems (Networks)	1.014	1.014	1.017	1.019	1.019	1.018
Other Non-System Assets (Corporate)	1.000	1.000	1.000	1.000	1.000	1.000
Other Non-System Assets (Networks)	1.000	1.000	1.000	1.000	1.000	1.000
Motor Vehicles	1.000	1.000	1.000	1.000	1.000	1.000

1. Introduction

GHD was engaged by ActewAGL to undertake the development of cost escalation factors for the electricity network asset categories to be used in the regulatory period 2018/19-2023/24.

Regulatory Proposals are required to be developed according to a building block methodology, requiring annual predictions of ActewAGL's forecast capital and operational expenditure over the next regulatory period. An integral part of developing suitable forecasts of annual capital and operational expenditure is the production of a set of reasonable assumptions with respect to the rate of annual material and labour cost escalation.

GHD has been actively researching the capital costs of electricity network infrastructure works for some time. It has developed a material cost escalation modelling process which captures the likely impact of expected movements of specific input cost drivers on future electricity networks infrastructure equipment pricing, providing robust material cost escalation rates.

For this submission the data for commodity and labour cost movements has been produced by other consultants, specifically BIS Oxford Economics.

Statements in this report that are not based on historical fact are forward looking statements. Although such statements are based on GHD current estimates and expectations, and currently available competitive market economic data, forward looking statements are inherently uncertain. GHD, therefore, cautions the reader that there are a variety of factors that could cause business conditions and results to differ materially from what is contained in forward looking statements in this report.

The annual real asset escalation indices presented are specific to the operating environment faced by ActewAGL, and are based on the most up-to-date information available at the time of compilation.

1.1 Objective and Scope of Work

GHD understands the objective of this assignment is to:

Utilise the real commodity and labour cost escalation factors developed by third party and develop escalation factors specific to various asset classes to assist ActewAGL in the preparation of its regulatory proposal.

The delivery of this objective will assist ActewAGL in preparing for the forthcoming regulatory period. This delivery will be provided through the production of an independent consultant's report (this report), which can be submitted to the AER and published in the public domain.

GHD understands that ActewAGL has undertaken a separate assignment by engaging BIS Oxford Economics to determine the annual real escalation indices forecast for material cost (covering aluminium, copper, steel and crude oil), labour cost (covering various classification of in-house or contract labour to build, operate and maintain the power network), and construction labour cost (covering various classification of in-house or contract labour preliminary for site related work). The resulting report¹ has been provided to GHD by ActewAGL.

GHD was not engaged to review the supplied data, but to use the information as base data for forecasting annual real asset escalation indices for ActewAGL.

1.2 Deliverables

The primary deliverable for this assignment is a clear and concise independent consultancy report (this report) which supports the resulting escalation factors including an explanation of the approach adopted in developing the annual real asset cost escalation factors and how this approach is consistent with recent electricity network decisions.

¹ BIS Oxford Economics, *Real Cost Escalation Forecasts to 2023/24*, September 2017

1.3 Limitations and assumptions

This report has been prepared by GHD for ActewAGL and may only be used and relied on by ActewAGL for the purpose agreed between GHD and ActewAGL as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than ActewAGL arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section 1.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

1.4 Assumptions

In preparing the cost escalation factors for nominated asset classes, GHD has assumed the following in relation to the material it received, unless otherwise specifically stated, and cost escalation modelling is therefore subject to these assumptions and to the other limitations and assumptions which appear in the body of this cost escalation modelling report ("the Assumptions"):

- The information provided in the material was true and accurate in all respects and contained no material errors or omissions
- All documents and records examined by GHD were genuine, complete and up to date
- There are no defaults or contraventions under any permit or licence conditions, agreement or instrument other than those set out in the material reviewed by GHD

Nothing has come to the attention of GHD that has led it to believe that such Assumptions are not correct or that it would be unreasonable to rely on the Assumptions in the circumstances. However, if any of our assumptions are not accurate or the advice GHD has relied on is incorrect, the opinions GHD has expressed will need to be re-examined and may need to be changed.

GHD disclaims liability arising from any of the Assumptions being incorrect.

2. Method

In past decisions for electricity network service providers, the AER has allowed the costs related to capital and operational expenditure provisions to be escalated in real terms. Prior to these decisions, the Australian Consumer Price Index CPI was generally used as a proxy to account for the escalation expected in relation to these network costs.

The methods more recently accepted by the AER sought to better characterise the likely escalation in price of equipment/project costs through combining independent forecast movements in the price of input components, with 'weightings' for the relative contribution of each of the components to final equipment/project costs. This in turn generates real cost forecasts for the regulatory control period under review.

In its 2009 final decision for the NSW Electricity Distribution Businesses, the AER stated:

In light of these external factors, it was considered that cost escalation at CPI no longer reasonably reflected a realistic expectation of the movement in some of the equipment and labour costs faced by electricity network service providers (NSPs). It was also communicated by the AER at the time of allowing real cost escalations that the regime should systematically allow for real cost decreases. This was to allow end users to receive the benefit of real cost reductions as well as facing the cost of real increases.²

The primary factors (in no particular order) influencing material cost movements are considered to be changes in the market pricing position for:

- Metals – copper, aluminium and steel;
- Oil – as a material in itself, as a proxy for energy costs, and as a proxy for plastics (primarily High Density Polyethylene HDPE, Cross Linked Polyethylene XLPE);
- Foreign exchange rates – primarily the USD to AUD relationship to convert commodities in international market quoted in USD;
- Foreign price inflation index – primarily the US Consumer Price Index (CPI) to convert price quoted in nominal USD terms into real USD term (and vice versa);
- Construction costs;
- Australian Trade Weighted Index (TWI) – as weighted average purchasing power of Australian dollar in overseas market and as a proxy for imported manufactured goods; and
- Australian Consumer Price Index (CPI) – as a general price inflation index in itself to convert nominal AUD quotes into real AUD term (and vice versa) and as a proxy for local manufacturing costs.

Having identified these key cost drivers, GHD examined each of the main items of plant equipment and materials within its database, in order to establish a suitable percentage contribution, or weighting, by which each of these underlying cost drivers are considered to influence the total price of each completed item.

In its determination and application of final cost driver weightings for these network assets, GHD drew on a wide range of information such as its knowledge of commercial rise and fall clauses contained within confidential network procurement contracts sighted by GHD during market price surveys, information passed on during its interviews with equipment suppliers and manufacturers; as well as industry knowledge held within its large internal pool of professional estimators, EPCM project managers, economists, engineers and operational personnel.

With appropriate weightings developed and assigned to each component, the key cost drivers thus provided a means by which changes in the forecast price of each underlying cost driver might be foreseen to affect the overall material cost of the network asset itself. These key cost drivers are discussed in section 3 and the material cost escalators developed by GHD are shown in Appendix A.

² AER, NSW DNSP Final Decision 2009, p. 478. <http://www.aer.gov.au/content/index.phtml/itemId/728076>

Labour costs are also key cost drivers for network assets and the labour divisions considered within the GHD model are:

- Utility sector labour
- General labour
- Professional services

GHD has used the labour cost movements developed by BIS Oxford Economics as an input to the asset cost escalation factors.

ActewAGL developed percentage breakdowns of each asset class into material cost and labour cost proportions based on their recent history with asset construction and management. This data was received and analysed by GHD to assess whether the nominated proportions of material and labour were reasonable. A comparison was undertaken between the supplied information, GHD database of unit rates and a number of comparative bottom-up asset estimates that GHD has previously undertaken. The analysis confirmed that the breakdowns supplied by ActewAGL (shown in Table 3) were reasonable and this data was utilised to determine the effect that each escalator has on the overall installed price of an asset.

Table 3 Material and labour proportions by asset class

ActewAGL standard asset class	Cost proportion split			
	Material	Utility sector labour	General labour	Professional services
Transmission Overhead	70%	30%	0%	0%
Transmission Underground (Cu)	38%	32%	10%	20%
Distribution Overhead Lines	17%	80%	0%	3%
Distribution Underground Lines (Al)	16%	81%	0%	3%
Zone Substation Switchgear	70%	30%	0%	0%
Zone Substation Transformer	95%	5%	0%	0%
Zone Substation Electronics/Other	77%	23%	0%	0%
Zone Substation Civils	79%	9%	0%	12%
Distribution Substations	67%	30%	0%	3%
Meters	40%	60%	0%	0%
Relays (Protection & Control)	23%	74%	0%	3%
IT & Communication Systems (Networks)	49%	0%	24%	27%
Other Non-System Assets (Corporate)	100%	0%	0%	0%
Other Non-System Assets (Networks)	100%	0%	0%	0%
Motor Vehicles	100%	0%	0%	0%

With this combination of labour cost escalators, material cost escalators, appropriate weightings and breakdowns of each asset, GHD has aggregated the base material and labour escalators into total installed asset cost escalation factors for each ActewAGL selected asset class.

3. Key cost drivers

In order to ensure all forecasts incorporate current and recent market information, GHD updates key cost drivers and economic indicators within our internal model for each assignment. This ensures the most practical recent/current date information is used. For this assignment, GHD has been provided with data for commodity and labour cost movements by ActewAGL in the form of a BIS Oxford Economics report which contains supporting market information for all of the applicable key cost drivers except TWI. GHD has developed cost escalation indices for Australian TWI and Australian CPI independently of the supplied BIS Oxford Economics report.

The following sections include a discussion of the methods by which the forecast movements of Australian TWI and Australian CPI are updated within the GHD model. For the escalation factors that have been supplied by ActewAGL, the following sections contain a summary of the input data.

3.1 Commodity prices

This section of the report presents the commodity price inputs sourced from the supplied BIS Oxford Economics report as inputs to GHD cost escalation model. The supplied material escalation factors were presented as percentage annual change of the material cost.

Table 4 Real annual cost escalation indices for commodities

Commodity	Parameter	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Aluminium	Annual average price per metric tonne in base year 2017-18 real AUD	\$ 2,175	\$ 2,236	\$ 2,146	\$ 2,109	\$ 2,067	\$ 2,033	\$ 2,176
	% annual change	-	2.83%	-4.01%	-1.76%	-2.00%	-1.65%	7.05%
Copper	Annual average price per metric tonne in base year 2017-18 real AUD	\$ 6,617	\$ 6,953	\$ 6,936	\$ 6,903	\$ 6,614	\$ 6,367	\$ 6,679
	% annual change	-	5.07%	-0.24%	-0.48%	-4.19%	-3.73%	4.89%
Steel	Annual average price per metric tonne in base year 2017-18 real AUD	\$ 594	\$ 578	\$ 564	\$ 571	\$ 587	\$ 606	\$ 613
	% annual change	-	-2.69%	-2.44%	1.20%	2.89%	3.20%	1.16%
Oil	Annual average price per barrel in base year 2017-18 real AUD	\$ 65	\$ 69	\$ 69	\$ 69	\$ 67	\$ 64	\$ 67
	% annual change	-	6.07%	0.81%	-0.02%	-4.14%	-3.69%	4.94%

3.2 Australian Dollar to US Dollar exchange rate

The GHD cost escalations modelling process uses the forecast AUD/USD exchange rates, to restate USD based forecast market prices of commodities, namely copper, aluminium, steel and oil, into their comparable AUD pricing movements. This is undertaken in order to account for any potential movements of base currency commodity market price movements through a strengthening or weakening of the AUD.

For this project, material cost escalators have been supplied by ActewAGL in the form of the BIS Oxford Economics report. Therefore, GHD did not investigate the forecast AUD/USD exchange rates for the period 2018/19 to 2023/24.

3.3 Labour costs

The annual labour escalation factors used during GHD modelling were sourced from wage escalation factors supplied in the BIS Oxford Economics report.

Table 5 Real annual cost escalation for labour

Labour type	Parameter	Forecast					
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Utility sector labour	% annual change	0.95%	0.78%	1.27%	1.64%	1.73%	1.43%
General labour	% annual change	0.74%	0.57%	1.11%	1.55%	1.49%	1.25%
Professional services	% annual change	0.33%	0.09%	0.77%	1.21%	1.27%	0.88%

3.4 Construction costs

The annual engineering construction costs escalation factors used in the GHD model were sourced from the supplied BIS Oxford Economics Report and are presented in Table 6.

Table 6 Engineering construction cost escalation factors

Parameter	Forecast					
	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Annual % change	-0.54%	-1.75%	-0.89%	-1.35%	-1.22%	0.22%

3.5 Australian Trade Weighted Index (TWI)

The Australian TWI is a multilateral weighted average exchange rate index. It is the weighted average of exchange rates of Australian dollar against currencies of its most important trading countries, weighted to reflect the importance or the volume of trade with those countries. Therefore, the movement in the currencies of those countries with greater share of Australian's trade has greater effect on the index. The weightings of the various foreign currencies which make up the Australian TWI is annually updated or revised by the RBA based on the actual or new Australian-international trading data.

As a proxy for the TWI, GHD has relied upon the International Trade Price Index³ published by the Australian Bureau of Statistics (ABS), which relates to changes in the import price for electrical machinery and parts thereof.

³ ABS index 6457.0, tables 1,3 and 12, series ID A2295909J. Series has been recorded on quarterly basis since June 1983.

The annual Australian TWI forecast used during GHD modelling is based on the 10-year long-term average annual cost escalation rate for the International Trade Price Index (ITPI) as presented in Table 7 and illustrated in Figure 1.

Table 7 Annual Australian ITPI % change

Parameter	Historic										
	Jun 2007	Jun 2008	Jun 2009	Jun 2010	Jun 2011	Jun 2012	Jun 2013	Jun 2014	Jun 2015	Jun 2016	Jun 2017
Australian ITPI	109.2	102.5	120.1	108.0	100.1	100.8	101.0	108.5	118.5	114.4	110.4
Annual % change (nominal)		-6.1%	17.2%	-10.1%	-7.3%	0.7%	0.2%	7.4%	9.2%	-3.5%	-3.5%

The historical annual Australian ITPI data as recorded by the ABS and GHD projection for the future is illustrated in the following figure. Due to the annual volatility in this index due to international market pressures, GHD has relied upon the most recent 10-year period between June 2007 and June 2017 in establishing a forecast projection. The 10-year average annual change is 0.11%.

Figure 1 Historic Australian International Trade Price Index



3.6 Australian Consumer Price Index (CPI)

The Australian CPI is used as a proxy for the local manufacturing price index. GHD acknowledges that while the historic Australian Producer Price Index (PPI) for electrical equipment manufacturing is available⁴, the forecast for such precise activity is not. More importantly, such Australian PPI provides composite price movement indication of the entire input (or output) mix of the manufacturing process, and as such is not an exact indicator of manufacturing activity (or manufacturing labour) only price movement. GHD has therefore relied on the

⁴ Australian Bureau of Statistics, PPI Table 12.

Australian CPI, for which credible forecast is readily available, to represent the forecast trend of the manufacturing activity (manufacturing labour) price index.

The Australian CPI is also used to account for those materials or cost items in equipment whose price trend cannot be readily or conclusively explained by the movement of commodities prices, and to convert the Australian based input data from nominal to real term and vice versa.

This annual Australian CPI % change forecast used during GHD modelling is presented in Table 8.

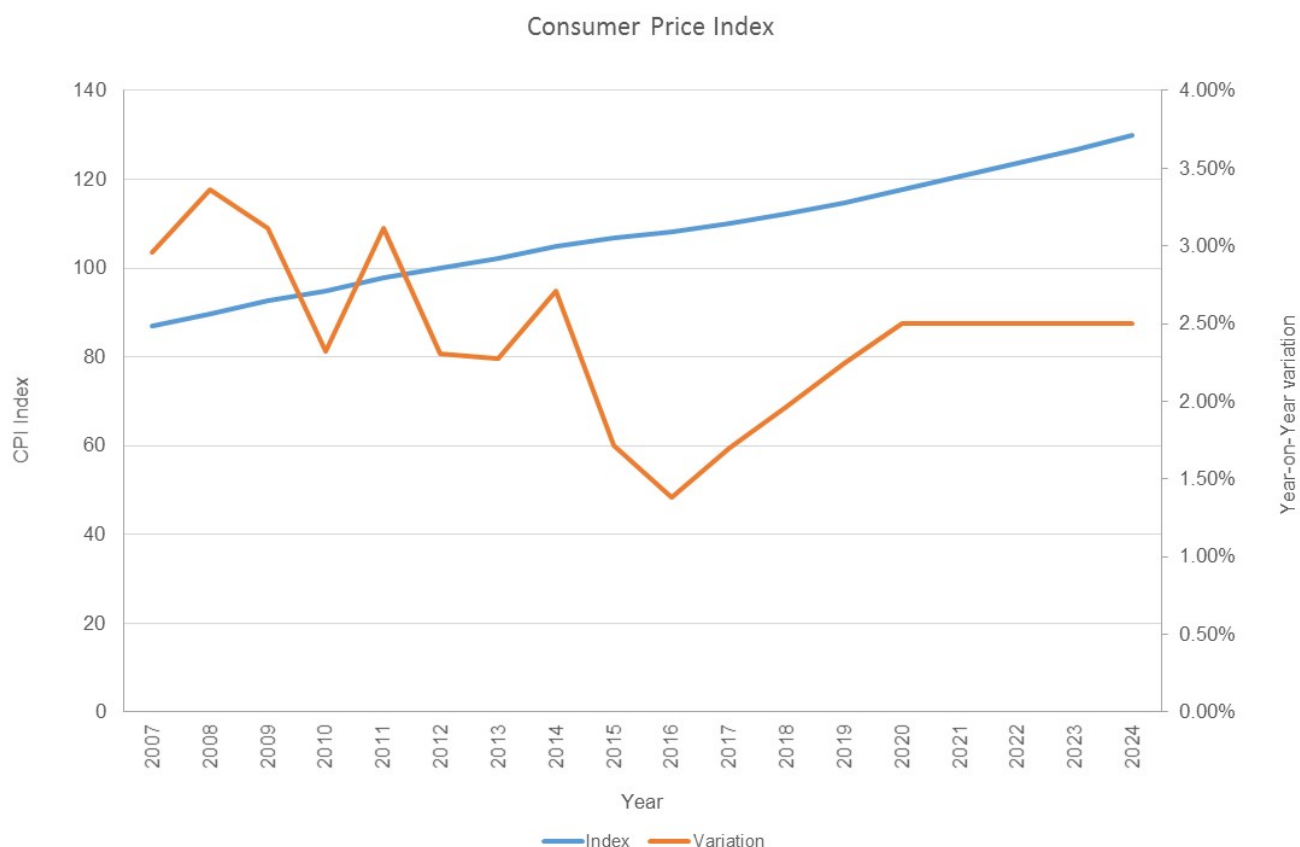
Table 8 Annual Australian CPI % change forecast

Parameter	Forecast					
	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Annual % change	2.24%	2.50%	2.50%	2.50%	2.50%	2.50%

In seeking to understand the overall reasonableness of such annual Australian CPI % change forecast, GHD established that since first targeting its current range of 2-3% in 1993, the RBA has historically achieved an actual average of 2.55% and over the most recent 10-year period, an actual average of 2.40%.

Figure 2 shows the past 10-year period from 2007 to 2017, and the projected values to June 2024.

Figure 2 Australian Consumer Price Index



The 2018/19 escalation is based on advice from BIS Oxford Economics using projected market conditions in Australia for FY2019. Based on the recent and long-term average annual escalation, GHD considers it reasonable to adopt the mid-point of the RBA preferred range of 2 to 3% for CPI as the forecast CPI escalation per annum for the period 2019/20 to 2023/24.

4. Conclusion

The GHD cost escalation modelling methodology provides a rigorous and transparent process through which reasonable and appropriate cost escalation indices are able to be developed.

The real escalation factors established during this assignment were developed with specific consideration of the operating environment faced by ActewAGL, and were based on the most up-to-date information readily available at the time of compilation. These real indices therefore constitute GHD's calculated opinion of appropriate asset cost escalation rates that can reasonably be expected to affect ActewAGL over the upcoming revenue regulation period.

The summary of all the forecast indices of input cost drivers and economic indicators, as explained in section 3 in detail, are presented in Table 9.

Table 9 Real annual cost escalation % change forecast of primary cost drivers

Primary cost driver	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Aluminium	1.88%	2.83%	-4.01%	-1.76%	-2.00%	-1.65%	7.05%
Copper	1.74%	5.07%	-0.24%	-0.48%	-4.19%	-3.73%	4.89%
Steel	0.43%	-2.69%	-2.44%	1.20%	2.89%	3.20%	1.16%
Oil	7.63%	6.07%	0.81%	-0.02%	-4.14%	-3.69%	4.94%
Utility sector labour	0.68%	0.95%	0.78%	1.27%	1.64%	1.73%	1.43%
General labour	0.57%	0.74%	0.57%	1.11%	1.55%	1.49%	1.25%
Professional services	0.44%	0.33%	0.09%	0.77%	1.21%	1.27%	0.88%
Construction costs	-0.95%	-0.54%	-1.75%	-0.89%	-1.35%	-1.22%	0.22%
Australian TWI	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%
Australian CPI	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 10 presents the real annual asset cost escalation indices forecast based on the movements in underlying cost drivers and economic indicators, but aggregated at common standard asset class level used by ActewAGL. In order to aggregate the input cost drivers at this level, GHD assigned appropriate weightings for the relative contribution of each of the input cost drivers and economic indicators to the final asset or project costs.

Table 10 Real annual material and labour cost escalation indices forecast

ActewAGL standard asset class	Forecast					
	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Transmission Overhead	1.003	0.991	1.005	1.007	1.009	1.019
Transmission Underground (Cu)	1.015	1.004	1.008	1.005	1.006	1.018
Distribution Overhead Lines	1.010	1.006	1.012	1.015	1.016	1.017
Distribution Underground Lines (Al)	1.011	1.006	1.011	1.013	1.014	1.017
Zone Substation Switchgear	1.014	1.006	1.012	1.010	1.012	1.021
Zone Substation Transformer	1.015	0.999	1.009	1.006	1.008	1.027
Zone Substation Electronics/Other	1.025	1.020	1.022	1.019	1.019	1.027

ActewAGL standard asset class	Forecast					
	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Zone Substation Civils	0.997	0.987	0.995	0.992	0.993	1.004
Distribution Substations	1.017	1.009	1.014	1.013	1.014	1.023
Meters	1.018	1.014	1.017	1.018	1.018	1.021
Relays (Protection & Control)	1.014	1.011	1.015	1.017	1.018	1.018
IT & Communication Systems (Networks)	1.014	1.014	1.017	1.019	1.019	1.018
Other Non-System Assets (Corporate)	1.000	1.000	1.000	1.000	1.000	1.000
Other Non-System Assets (Networks)	1.000	1.000	1.000	1.000	1.000	1.000
Motor Vehicles	1.000	1.000	1.000	1.000	1.000	1.000

The underlying cost drivers for some asset classes such as Other Non-System Assets (Corporate), Other Non-System Assets (Networks) and Motor Vehicles closely reflects the Australian CPI trend and as such no real cost escalation is forecast.

In applying the expected cost pressures on ActewAGL's capital expenditure activities, GHD concludes that these real escalation forecasts form a component of efficient prices for an Australian electricity network business. GHD therefore recommends that ActewAGL takes account of these real installed asset cost escalation forecasts within their forthcoming regulatory expenditure proposal.

Appendices

Appendix A - Material cost escalators

The following table shows the material only cost escalation factors for the ActewAGL standard asset classes.

Table 11 Real annual material cost escalation indices forecast 2018/19 to 2023/24

ActewAGL standard asset class	Forecast					
	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Transmission Overhead	1.001	0.985	1.002	1.004	1.006	1.022
Transmission Underground (Cu)	1.027	1.003	1.004	0.988	0.990	1.029
Distribution Overhead Lines	1.013	0.997	1.010	1.010	1.012	1.029
Distribution Underground Lines (Al)	1.022	0.999	1.005	0.998	1.000	1.032
Zone Substation Switchgear	1.017	1.006	1.012	1.008	1.009	1.024
Zone Substation Transformer	1.015	0.999	1.009	1.005	1.007	1.028
Zone Substation Electronics/Other	1.030	1.024	1.024	1.019	1.020	1.031
Zone Substation Civils	0.995	0.982	0.991	0.987	0.988	1.002
Distribution Substations	1.020	1.010	1.015	1.012	1.013	1.027
Meters	1.030	1.024	1.024	1.019	1.020	1.031
Relays (Protection & Control)	1.030	1.024	1.024	1.019	1.020	1.031
IT & Communication Systems (Networks)	1.022	1.025	1.025	1.025	1.025	1.025
Other Non-System Assets (Corporate)	1.000	1.000	1.000	1.000	1.000	1.000
Other Non-System Assets (Networks)	1.000	1.000	1.000	1.000	1.000	1.000
Motor Vehicles	1.000	1.000	1.000	1.000	1.000	1.000

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