Directlink Joint Venture

Revised
Revenue Proposal

Effective
July 2015 to June 2020

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Glossary

Abbreviation	Meaning
AARR	Aggregate Annual Revenue Requirement
ABS	Australian Bureau of Statistics
AC	Alternating Current
ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AMP	Asset Management Plan
AWOTE	Average Weekly Ordinary Time Earnings
CGS	Commonwealth Government Securities
DC	Direct Current
DNSP	Distribution Network Provider
DRP	Debt Risk Premium
EBSS	Efficiency Benefit Sharing Scheme
EGWWS	Electricity, Gas, Water and Waste Services
EII	Energy Infrastructure Investments
GST	Galvanised Steel Troughing
HVDC	High Voltage Direct Current
IGBT	Insulated-Gate Bipolar Transistors
km	Kilometre
kV	Kilovolt
LPI	Labour Price Index
MAR	Maximum Allowed Revenue
NEM	National Electricity Market
NER	National Electricity Rules
NPV	Net Present Value
OEM	Original Equipment Manufacturer
OHS	Occupational Health and Safety
Proposal	Directlink Revenue Proposal
PTRM	AER Post Tax Revenue Model
RAB	Regulatory Asset Base
RBA	Reserve Bank of Australia

RIT	Regulatory Investment Test
RFM	(Asset Base) Roll Forward Model
Rules	National Electricity Rules
STPIS	Service Target Performance Incentive Scheme
TNSP	Transmission Network Service Provider
WACC	Weighted Average Cost of Capital

Executive Summary

This revised Revenue Proposal for the Directlink transmission interconnector (Directlink) is submitted by Energy Infrastructure Investments Pty Limited on behalf of the Directlink Joint Venture. It is lodged in accordance with section 6A.12.3(a) of the National Electricity Rules:[1]

6A.12.3 Submission of revised proposal, framework or pricing methodology

(a) In addition to making such other written submissions as it considers appropriate, the *Transmission Network Service Provider* may, not more than 30 *business days* after the publication of the draft decision, submit to the *AER*:

(1) a revised Revenue Proposal;

(2) a revised proposed negotiating framework; or

(3) a revised proposed pricing methodology.

Directlink is a privately funded electricity transmission asset operated by the Directlink Joint Venture. It connects the NSW and Queensland regions of the National Electricity Market (NEM), transferring power between Mullumbimby and Terranora, both in NSW. Directlink's current rated capacity is 180 Megawatts (MW).

Directlink comprises six AC/DC converter stations (three at each end) and the six cables (three pairs) that link them, making up three circuits of 60 MW each. It is made up of both primary equipment (the major components operating at high voltage) and secondary equipment (necessary for the operation of the primary equipment).

Originally constructed as an unregulated *Market Network Service Provider*, Directlink became a regulated Transmission Network Service Provider in 2006. The AER's decision established the Regulated Asset Base (RAB), and the revenue cap for the ten-year regulatory control period ending on 30 June 2015.

This revenue proposal commences the review process for the AER to establish a new Maximum Allowed Revenue for the next regulatory period commencing 01 July 2015 and ending 30 June 2020.

The revenue proposal outlines the capital expenditure undertaken in the previous ten-year period and established the Regulatory Asset Base as at 30 June 2015:

[1] The reference to 30 *business days* arises through application of transitional Rule 11.58.4(n).

Table ES.1 – Opening RAB as at 1 July 2015

F/Y ending June ($m)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015F
Opening RAB	116.68	119.15	119.70	121.50	121.09	121.11	123.74	123.67	123.72	127.14
Capex	2.09	0.85	-	0.01	0.02	2.19	1.69	0.73	3.67	4.63
Depreciation	-3.11	-3.20	-3.28	-3.42	-3.50	-3.60	-3.72	-3.78	-3.87	-3.99
Indexation	3.48	2.90	5.08	3.00	3.50	4.04	1.96	3.09	3.62	3.18
Closing RAB	119.15	119.70	121.50	121.09	121.11	123.74	123.67	123.72	127.14	**130.95**

Directlink forecasts a number of capital expenditure projects over the upcoming regulatory period, focused primarily on maintaining the operation of the link and improving its reliability.

Table ES.2 – Forecast capital expenditure 2015-20

F/Y ending June ($000 2104 real)	2016	2017	2018	2019	2020	Total
Converter stations	9,792	2,034	1,873	2,653	13,660	9,792
Cables	1,674	1,674	1,674	1,674	1,674	1,674
Easements						
Total	**11,466**	**3,708**	**3,547**	**4,327**	**15,334**	**11,466**

No augmentation capital expenditure is proposed, and no contingent projects are proposed.

This proposal then adopts the AER's December 2013 Rate of return Guideline as it relates to cost of capital matters to develop the proposed Weighted Average Cost of Capital to apply to the 2015-20 forecast regulatory period. Adopting the same parameters for the risk free rate and debt risk premium as the AER found in the recent transitional decisions for TransGrid and Transfield, Directlink proposes a WACC of 8.06%.

Directlink proposes to align the remaining useful life of the cable and converter stations, and depreciate them over their remaining life of 26 years. Combined with indexation of the capital base at a forecast CPI of 2.5% yields the following regulatory depreciation allowance:

Table ES.3 – Forecast depreciation 2015-20

F/Y ending June ($000)	2016	2017	2018	2019	2020
Forecast straight line depreciation	-5,011	-5,619	-5,922	-6,229	-6,583
Forecast indexation	3,339	3,610	3,662	3,706	3,769
Forecast regulatory depreciation	1,672	2,010	2,260	2,523	2,814

Together, the capital expenditure and regulatory depreciation allow us to forecast the value of the Regulatory Asset Base to the end of the proposed regulatory period.

Table ES.4 – Opening RAB as at 1 July 2020

F/Y ending June ($000)	2016	2017	2018	2019	2020
Opening RAB	130,955	141,552	143,611	145,343	147,814
Capex	12,269	4,069	3,991	4,993	18,147
Depreciation	-5,011	-5,619	-5,922	-6,229	-6,583
Indexation	3,339	3,610	3,662	3,706	3,769
Closing RAB	141,552	143,611	145,343	147,814	163,146

In light of a 2012 converter station fire, Directlink has undertaken a comprehensive review of its operations and an extensive bottom-up review of its efficient operating costs. These studies support forecast operating expenditures as follows:

Table ES.5 – Forecast operating expenditure 2015-20

F/Y ending June (000 2014)	2016	2017	2018	2019	2020
Operating and maintenance costs	2,896	2,196	2,272	2,220	2,249
Management fees and expenses	459	459	459	459	459
Insurance	799	761	776	792	729
Tax on property and capital	9	9	9	9	9
Accounting/audit fees	10	10	10	10	10
Other	1	1	1	1	1
Sub total[2]	**4,175**	**3,437**	**3,527**	**3,492**	**3,458**
Debt raising costs[3]	73	77	76	75	75
Total Forecast opex	**4,248**	**3,514**	**3,603**	**3,567**	**3,533**

An allowance for tax has been calculated using the AER's post-tax revenue model. The outputs from that model derive the Maximum Allowed Revenue as shown below:

Table ES.6 – Summary of unsmoothed revenue requirement

FY ending	2016	2017	2018	2019	2020
Return on capital	8,077	8,731	8,858	8,965	9,117
Return of capital	1,672	2,010	2,260	2,523	2,814
Total operating expenditure	4,465	3,787	3,983	4,043	4,106
Tax allowance	537	594	640	688	740
Unsmoothed revenue requirement	14,751	15,122	15,741	16,219	16,777

Directlink proposes to smooth this price path over the regulatory period as follows:

Table ES.7 – Smoothed revenue requirement and X factor

FY ending	2016	2017	2018	2019	2020
Unsmoothed revenue requirement	14,751	15,122	15,741	16,219	16,777
Smoothed revenue requirement	14,927	15,307	15,698	16,098	16,509
X factor (CPI-X)	-2.80%	0.00%	0.00%	0.00%	0.00%

[2] These opex costs have been indexed for one year's inflation for input to the PTRM.

[3] As debt raising costs are calculated by the PTRM, no margin is included.

Directlink submits that acceptance of this proposal will promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—

(a) price, quality, safety, reliability and security of supply of electricity; and

(b) the reliability, safety and security of the national electricity system.

Directlink looks forward to working with the AER over the upcoming months to finalise this process.

1 Introduction

1.1 Purpose of this document

This revised Revenue Proposal provides details of Directlink's revenue requirements for prescribed transmission services for its second regulatory control period. This period is proposed to span 5 years, from 1 July 2015 to 30 June 2020.

This Revenue Proposal has been developed in accordance with Chapter 6A of the *National Electricity Rules* (Rules).[4]

This Revenue Proposal is submitted on behalf of the Directlink Joint Venture by:

- Directlink (No 1) Pty Ltd (ACN 085 123 468);
- Directlink (No 2) Pty Ltd (ACN 095 439 222); and
- Directlink (No 3) Pty Ltd (ACN 095 449 817);

all of Level 19, 580 George Street, Sydney NSW 2000.

1.2 Structure of this document

The following Sections of this Revenue Proposal are structured as follows:

- Chapter 2 addresses matters raised in the AER's draft decision regarding the calculation of the regulated asset base for the forthcoming regulatory period, using the AER's Roll Forward Model (RFM).
- Chapter 3 addresses matters raised in the AER's draft decision regarding Directlink's capital financing costs;
- Chapter 4 addresses matters raised in the AER's draft decision regarding the derivation of Directlink's proposed tax allowance.
- Chapter 5 addresses matters raised in the AER's draft decision regarding the capital expenditure forecast.
- Chapter 6 addresses matters raised in the AER's draft decision regarding the operating expenditure forecast.
- Chapter 7 addresses matters raised in the AER's draft decision regarding the depreciation allowance.
- Chapter 8 presents the revenue needs for the 2015-20 regulatory control period, calculated using the AER's Post-Tax Revenue Model.
- Chapter 9 addresses matters raised in the AER's draft decision regarding the incentive mechanisms to apply to Directlink over the 2015-20 regulatory period.

[4] Australian Energy Market Commission, *National Electricity Rules* Version 60.

2 Regulatory asset base

2.1 Introduction

This Chapter explains how Directlink has determined the proposed opening Regulatory Asset Base (RAB) for the new regulatory control period.

S6A.1.3(5) requires Directlink to provide a completed asset Roll Forward Model (RFM) to accompany its Proposal. The RFM forms Attachment 2.1 to this Proposal.

2.2 AER amendments to May 2014 revenue proposal

AER updated the Directlink RFM to align the forecast inflation and allowed WACC from the 2006 PTRM. This had a minor effect on the closing RAB from 129.76m as proposed to 129.64m in the AER draft decision. Directlink accepts this correction and has reflected it in the RFM lodged with this revised revenue proposal.

The opening RAB has been updated to reflect updated forecast capital expenditure to the end of the current regulatory period, as discussed below.

2.3 Update to actual and forecast historical capital expenditure

In the original revenue proposal, Directlink reported historical capital expenditure, including estimated and forecast capital expenditure for the years ended June 2014 and June 2015 as follows:

Table 2.1 – May 2014 forecast of capital expenditure

F/Y ending June ($m)	2006	2007	2008	2009	2010	2011	2012	2013	2014E	2015F
Capex	2.11	0.85	0	0.01	0.02	2.21	1.71	0.74	3.86	3.17

As complete fiscal year 2014 information has now become available, and as the estimate of fiscal 2015 capital expenditure has firmed, Directlink now reports capital expenditure for the previous regulatory period as follows:

Table 2.2 – Updated forecast of capital expenditure

F/Y ending June ($m)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015F
Capex	2.01	0.82	-	0.01	0.02	2.11	1.64	0.70	3.53	4.46

2.4 Regulatory Asset Base as at 1 July 2015

The outcome of applying the AER's roll forward methodology and RFM is an opening RAB for Directlink of $129.76 million, for the 2015-20 regulatory control period. This calculation is set out in Table 2.3.

Table 2.3 – Opening RAB as at 1 July 2015

F/Y ending June ($m)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015F
Opening RAB	116.68	119.15	119.70	121.50	121.09	121.11	123.74	123.67	123.72	127.14
Capex	2.09	0.85	-	0.01	0.02	2.19	1.69	0.73	3.67	4.63
Depreciation	-3.11	-3.20	-3.28	-3.42	-3.50	-3.60	-3.72	-3.78	-3.87	-3.99
Indexation	3.48	2.90	5.08	3.00	3.50	4.04	1.96	3.09	3.62	3.18
Closing RAB	119.15	119.70	121.50	121.09	121.11	123.74	123.67	123.72	127.14	**130.95**

3 Cost of capital

This chapter outlines Directlink's calculation of the proposed return on equity, return on debt and allowed rate of return, for each regulatory year of the regulatory control period, in accordance with clause 6A.6.2.

As Directlink proposed to adopt the cost of capital components of the AER's rate of return guideline, the differences between the WACC proposed by Directlink and that included in the AER's draft decision stem largely from market-observable factors.

3.1 Introduction

For the proposed return on equity, return on debt and allowed rate of return, Directlink does not propose to depart from the AER's *Rate of Return Guideline*.

However, Directlink does propose to depart from the AER's *Rate of Return Guideline* in the calculation of the tax allowance, as discussed more fully in chapter 4.

3.2 Proposed Rate of Return

The proposed rate of return applied for the purpose of this submission is calculated using a Weighted Average Cost of Capital approach, and applying the Sharpe-Lintner Capital Asset Pricing Model for the purposes of calculating the required return on equity, in accordance with the AER's *Rate of Return Guideline,* in which*:*

- Risk free rate is to be based on the annualised yield on 10-year Commonwealth Government bonds, for an agreed or specified period; [5]
- Equity beta: 0.7[6]
- Market risk premium: 6.5%[7]
- Gearing: 60%[8]
- Credit rating: BBB+[9]

Directlink has adopted these parameter values for the purposes of this Proposal.

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5 AER *Rate of Return Guideline* p15.

6 AER *Rate of Return Guideline* p15.

7 AER *Better Regulation - Explanatory Statement - Rate of Return Guideline*, December 2013, p93.

8 AER *Rate of Return Guideline* s4.3.2.

9 AER *Rate of Return Guideline* s6.3.3.

3.2.1 Nominal risk free rate

For the purposes of this revised proposal, Directlink proposes to use a placeholder risk free rate of 2.90 per cent, the average yield on Commonwealth government bonds of 10 years maturity observed in the last 10 business days of December 2014, sourced from the Reserve Bank of Australia website.

Directlink and the AER have agreed the period to be used by the AER to calculate the nominal risk free rate for the purposes of calculating the return on equity to apply to the 2015-20 regulatory period. Consistent with the draft decision, this information will not be disclosed prior to the release of Directlink's Final Determination.

3.2.2 Return on debt

Directlink does not propose to depart of the *Rate of Return Guideline* for the purposes of calculating the cost of debt. Importantly, the Guideline provides for direct observation of the cost of debt rather than separate observation of the risk free rate and estimation of a debt risk premium.

Directlink accepts the draft decision's proposed approach to average the yields published by Bloomberg and the Reserve Bank of Australia in determining the cost of debt.

Directlink has not undertaken a market observation of the cost of debt for the purposes of this revised proposal, acknowledging that the final decision will reflect market observations over the agreed averaging period. For the purposes of this revised proposal, Directlink has calculated a placeholder return on debt by adding the risk free rate above to an estimate of the debt risk premium. The draft decision back-calculated a Debt Risk Premium of 2.38 per cent, based on the difference between the observed cost of debt and the observed risk free rate.

For the purposes of this revised revenue proposal, Directlink has applied a placeholder nominal Pre-tax Cost of Debt of 5.28 per cent, calculated by applying the draft decision Debt Risk Premium of 2.38 percent to the risk free rate above.

Directlink acknowledges that the cost of debt will be updated over the agreed averaging period closer to the date of the AER's Final Determination.

The draft decision proposed not to accept some of Directlink's proposed averaging periods for observing the risk free rate and the cost of debt over the regulatory period. Directlink has proposed a revised set of observation periods in confidential Attachment 3.1.

The transitional approach to estimating the cost of debt

The AER's *Rate of Return Guideline* proposes long and complex transitional arrangements to move from the current "on-the-day" approach to the envisioned

trailing average approach.[10] Under this approach, the AER proposes to assess the allowed cost of debt initially using the "on the day" approach, gradually eroding the weight applied to that measure each year over a ten-year transition to the trailing average approach.

Directlink notes that the Reserve Bank of Australia (RBA) has now published a reliable data series of ten-year bond yields going back ten years. This was not available at the time the AER issued its Rate of Return Guideline. Directlink notes that the AER proposes to include the RBA data in calculating the allowed cost of debt.

As discussed more fully in Attachment 6.1 to Directlink's May 2014 revenue proposal, the RBA data set would allow the AER to move immediately to the trailing average approach to calculating the cost of debt.

Directlink remains concerned that the long transitional approach adds additional and needless complexity to the regulatory regime, and indeed may not satisfy the Allowed Rate of Return Objective and the Revenue and Pricing Principles.

Directlink maintains that, considering independent and reliable data is currently available to allow an immediate transition to the trailing average approach, it is incumbent on the AER to implement this approach immediately and dispense with the transitional process.

3.3 Forecast inflation

For the purposes of calculating the allowed rate of return for this submission, Directlink has accepted the draft decision forecast inflation rate of 2.55%.

3.4 WACC calculation: summary

For the purposes of this submission, a summary of the relevant parameters for calculation of the rate of return is included in Table 3.1.

[10] AER, *Better Regulation Rate of Return Guideline* December 2013 s6.3.2.

Table 3.1 – Proposed WACC parameters

Nominal Risk Free Rate	Rf	2.90%
Real Risk Free Rate	Rrf	0.34 %
Inflation Rate	f	2.55%
Cost of Debt Margin	DRP	2.38 %
Nominal Pre-tax Cost of Debt	Rd	5.28 %
Real Pre-tax Cost of Debt	Rrd	2.66 %
Market Risk Premium	MRP	6.50%
Corporate Tax Rate	T	30.00%
Proportion of Equity Funding	E/V	40.00%
Proportion of Debt Funding	D/V	60.00%
Equity Beta	βe	0.70
Post-tax Nominal Return on Equity (pre-imp)		7.50 %[11]
Post-tax Real Return on Equity (pre-imp)		4.83 %
Nominal Vanilla WACC		**6.17 %**
Real Vanilla WACC		3.53 %

Consistent with clause 4.3.3 of the AER *Rate of Return Guideline*, Directlink proposes that the overall rate of return should be updated annually in line with annual adjustments to the cost of debt. However, Directlink proposes that the expected return on equity should not be updated for the duration of the regulatory control period.

[11] Rounded to one decimal place as per the AER Guideline

4 Tax

The draft decision accepted two key elements of the Directlink May 2014 revenue proposal, being the value of the opening Tax Asset Base (p8-10), and a proposal to align the remaining tax asset lives of the converter stations, cable and capital expenditure (p8-11). The draft decision also notes that the statutory tax rate is set externally by government.

The Tax Asset Base has been updated in the Roll Forward Model to reflect the actual capital expenditure to 30 June 2014, and forecast for the year to 30 June 2015.

The only remaining point of difference is the value of tax imputation credits, Gamma. Where Directlink had proposed a value of 0.25 for Gamma, the draft decision proposed a value of 0.4. This is discussed further below.

Once the value for Gamma is settled, Directlink acknowledges that the final value for the regulatory tax allowance will be impacted by the final decision on the other inputs to the PTRM, notably the cost of debt and the capex and opex allowances.

4.1 Value of imputation credits

Directlink's submission on the value of imputation credits, and a supporting expert consultant report, are included as Attachment 4.1 and Attachment 4.2 respectively.

This submission and accompanying expert analysis continues to support a value for Gamma of 0.25, which has been incorporated in the accompanying revised proposal PTRM.

4.2 Summary

Directlink has used the AER's PTRM to calculate the net taxation allowance, summarised in Table 4.1.

Table 4.1 – Tax allowance 2015-20

F/Y ending June (000)	2016	2017	2018	2019	2020
Tax allowance	537	594	640	688	740

5 Forecast capital expenditure

The draft decision proposed amendments to a number of Directlink's forecast capital expenditure projects, where the reason for the proposed amendments fit into a number of broad categories:

- Projects which were found to be prudent, but for which the draft decision required further information in confirmation of the proposed cost (fire suppression, Gotland solution, zero sequence phase reactor repairs);
- Projects found to be prudent and for which the costs were found to be reasonable, but for which the draft decision required further information in support of the project scope (cable replacement program, cable joint sourcing program, roof repair program);
- Capital expenditure for which further information was required ("Other")

5.1 Projects subject to cost confirmation

5.1.1 Fire suppression system

The draft decision acknowledged that installation of a fire suppression system would be consistent with the actions of a prudent operator.

In the May 2014 revenue proposal, Directlink referenced two consultancy reports which estimated the cost of installing a fire suppression system for the Directlink interconnector converter stations. These were indicative estimates, and the Directlink forecast was based on the midpoint of these estimates.

The draft decision concluded that a prudent electricity service provider would seek the most efficient solution (page 6-17) and accepted the prudence of the project, albeit at a cost consistent with the lower of the two estimates.

Since the May 2014 revenue proposal was lodged, Directlink has conducted a rigorous tender process to seek out the most competitive market price for this project. The tender and other costing documents will be provided to the AER for review.

The final cost of the fire suppression system is:

F/Y ending June ($000)	*2015F*	2016	2017	2018	2019	2020
Fire suppression system	*1,430*[12]	4,597	602			

[12] Included in historical capital expenditure.

Project timing update

At its meeting of 26 November 2014, the EII Board decided to advance the timing of the fire suppression project relative to that advised in the May 2014 revenue proposal. The project is now scheduled to commence in 2015 and be completed in 2016, as shown in the Directlink Asset Management Plan.

5.1.2 Ventilation redesign ("Gotland solution")

The draft decision accepted the ventilation redesign project and the costs proposed for it.

At the time of lodging the May 2014 revenue proposal, negotiations on the final cost of this project were still under way. These negotiations have been completed and the final cost, as shown in the Directlink Asset Management Plan, is $6,907 for both the System 1 pilot project (included in historical capital expenditure) and the rollout of the solution to the remaining four converter stations.

The final forecast costs associated with the two phases of the Gotland solution ventilation redesign are as follows:

F/Y ending June ($000)	*2015F*	2016	2017	2018	2019	2020
Directlink cooling system upgrade – "Gotland" solution	*2,462*[13]	4,445				

Detailed project costings and quote information will be provided to the AER for review.

5.1.3 Zero sequence reactor repair

The Directlink May 2014 revenue proposal included a project to engage the Directlink Original Equipment manufacturer, ABB, to build a replacement Zero Sequence Phase Reactor. The draft decision acknowledged the critical nature of this component and accepted the prudence of maintaining a spare Zero Sequence Phase Reactor. However the draft decision did not accept Directlink's proposed costs for the OEM manufacture, allowing approximately one third of the forecast cost (p6-18).

The key point of debate appears to be whether it is prudent and efficient for Directlink to source the spare from the original manufacturer, or whether it is prudent to rely on an aftermarket supplier.

Directlink's experience with the reconstruction of the Mullumbimby converter station indicates that there are significant risks associated with sourcing key components

[13] Included in historical capital expenditure.

from manufacturers other than the OEM. Directlink understands that ABB manufactured a small excess amount of cable remaining from the phase reactors required for the Mullumbimby rebuild, and can deploy this cable for the replacement zero sequence phase reactor. This would ensure the technical compatibility of the cable.

As this unit may well remain in storage for a significant period of time before it is deployed, it will be critical to ensure that the manufacturer remains in business and available to address any problems that may arise in the future. Directlink considers that it would not be prudent to rely on an aftermarket supplier whose availability may be in question in years to come.

Directlink is also concerned with the draft decision's approach to assessing the efficient cost of such a unit. While acknowledging (footnote 39, p6-18) that it does not have the specific requirements of the reactor to hand, and that "reactor costs can vary considerably based on the details of the required specification", the draft decision applied "typical costing" as the basis of its assessment. The draft decision does not provide any reference information to allow Directlink to test the reasonableness of its assessed costs.

The updated business case for the Zero Sequence Phase Reactor includes a quote from ABB in order to substantiate the proposed costs.

5.2 Projects subject to scope confirmation

5.2.1 Scope of cable replacement strategy

Since the Directlink system was commissioned in 2000 there have been 140 cable faults. Historically, cable repairs focused on a short section of the cable surrounding a fault. Particularly where moisture ingress was observed, experience has shown that another fault often occurs nearby (referred to elsewhere as a 'fault cluster').

Advice from ABB suggested that where a second cable fault had occurred in a section of cable that was known to be water-affected (as discovered during a previous cable repair) then a longer section of cable should be replaced to remove the water-affected sections.

Acting on advice from ABB, Directlink has trialled a cable replacement program to replace longer segments of cable during cable repair operations, particularly where there has previously been a fault in the vicinity, or where a longer replacement segment can also replace an aged (original design) cable joint.

To date, this program appears to be delivering positive outcomes.

Given the apparent success of this long cable replacement approach in respect of reactive cable replacements (along with the limited success of other approaches trialled such as silicone injections), Directlink has concluded that the only prudent

strategy remaining is a targeted program of replacing the water-affected sections of cable. This was reflected in the cable sourcing business case lodged in May 2014.

While the above experience is related to reactive cable replacement, Directlink believes that a prudent service provider would also undertake a proactive or planned cable replacement program to address known trouble spots. For example, there are a number of "second" cable repairs that Directlink had undertaken prior to receiving the ABB advice, and prior to trialling the "long cable replacement" program.

Directlink sought the advice of PSC, experts in HVDC systems, regarding the prudence and reasonableness of expanding the reactive cable replacement trial system to a proactive cable replacement program. PSC reviewed the cable fault history and the advice from ABB, and concluded that a targeted program of cable replacements in known trouble spots was a prudent course of action that was likely to result in improved cable reliability over time.

> … it is the authors' opinion that a strategy of careful analysis of past cable faults to identify areas that have and are likely to experience clusters of failures, and the replacement of these cables, is a prudent approach to improve the reliability of the DC cables.

PSC's report is included as Attachment 5.3.

Directlink considers that recent experience and investigations into the frequency of cable faults and their cause, as well as advice received from ABB, suggests that adopting an integrated strategy for managing cable faults and resulting cable replacements would yield improvements in Directlink's reliability over time. This integrated cable replacement strategy involves two interrelated limbs, forming the cable replacement program, as follows:

- an opportunistic strategy to replace longer segments of cable and aged (original design) cable joints when conducting cable repairs in response to cable failures. This limb of the strategy commenced in July 2010 (on System 2) as a trial cable replacement program and was progressively expanded to Systems 1 and 3. As discussed above, this trial program appears to be delivering some promising results. This has given Directlink confidence to embrace the second limb of the strategy in combination with the first.
- a targeted proactive cable replacement strategy, that undertakes planned replacement of cable segments in known or suspected trouble spots, as explained in the cable replacement program business case. Directlink has not undertaken any proactive cable replacements to date.

The May 2014 revenue proposal forecast to undertake 12 cable replacements per year. However on review, it appears that the May 2014 revenue proposal did not clearly articulate the two limbs of the cable replacement strategy.

The dual nature of the cable replacement strategy is important for forecasting purposes. As cable faults are stochastic in nature, their timing and frequency is very difficult to predict. Phacelift has updated its analysis of the expected number of cable faults going forward (see Attachment 5.4) and found that:

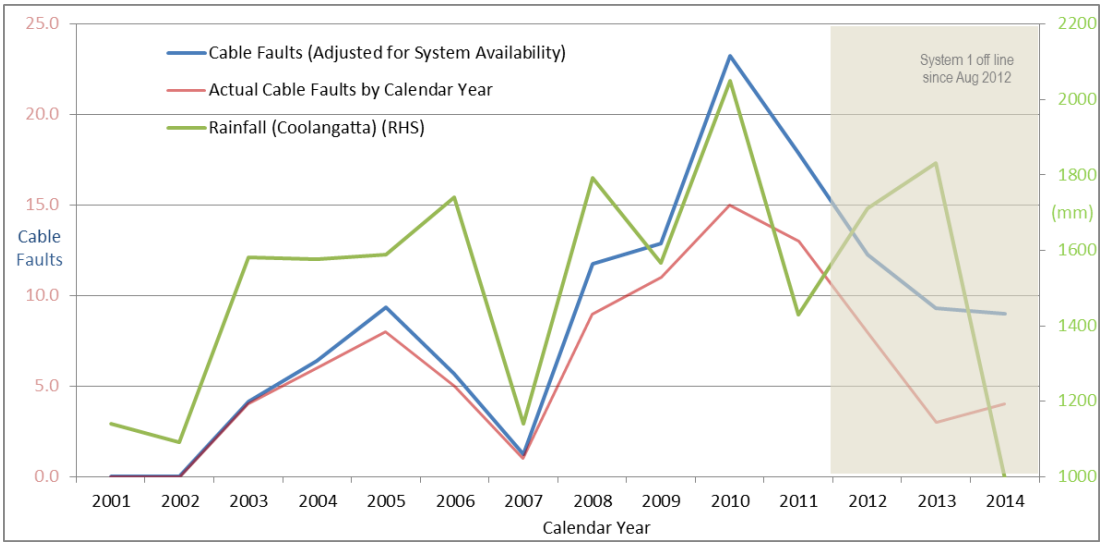
- the replacement of longer sections of cable had stabilised the rate of increase of cable faults for a short time; and
- as the cables are already water-affected, and subject to ongoing stress enhanced electro-chemical degradation, in the absence of a proactive cable replacement strategy, the rate of failure can be expected to return to its historical (increasing frequency) pattern, particularly as System 1 comes back on line;
- in the absence of a proactive cable replacement program, the number of cable faults expected across the three systems is expected to as many as 14 per year out to 2019/20.

Phacelift concluded that the evidence does not support the draft determination assumption that the expected number of cable faults will reduce to three, especially if Directlink is bound by the reactive environment it is currently experiencing. In the absence of skills and resources to plan and execute a proactive cable replacement program, Directlink will be forced to remain in a reactive cable repair mode.

The expectation that cable faults will reduce to three per year is also not supported by recent analysis of rainfall evidence.

Directlink had indicated in the May 2014 revenue proposal that there appeared to be some correlation between rainfall and cable faults, based on an observed reduction in cable faults in years of low rainfall (2007 in particular). However, with the addition of 2014 rainfall data, this relationship appears to be less compelling. 2014 was a particularly low rainfall year (994.2mm), yet the number of cable faults did not decrease as much as may have been expected. That is, even in a year where rainfall patterns would suggest a low range number of cable faults, Directlink still experienced more than three faults in that year.

Figure 5.1 – Rainfall and cable faults (updated)



Directlink notes the advice of ABB that all cable faults reviewed in its 2011 study had been caused by moisture incursion into the cables.[14] This is a problem that is expected to lead to more, rather than less cable faults in the future in the absence of a comprehensive cable replacement strategy.

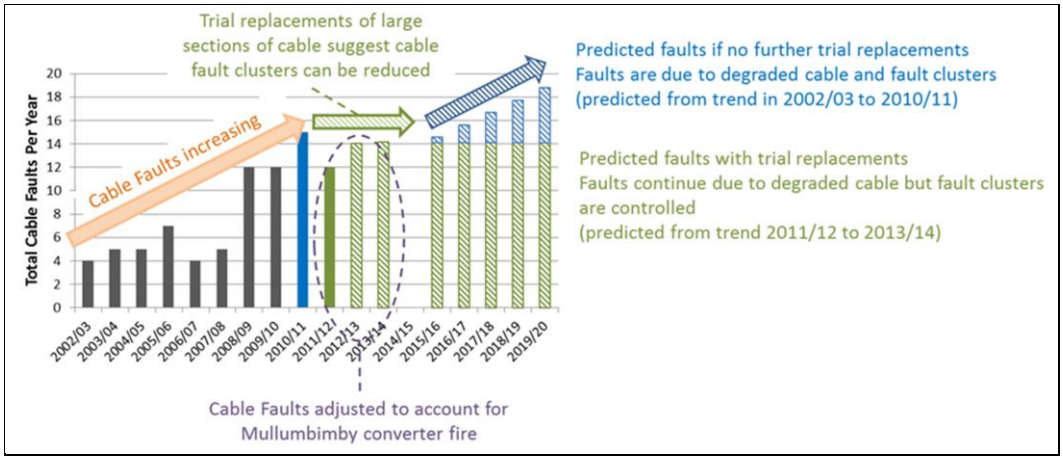
Phacelift's forecast indicates that if the trial cable replacement program was to continue at its current level of action (ie only in response to cable faults), Directlink could expect to experience as many as 14 cable faults in total per year (once System 1 was returned to service).

Directlink's strategy is to undertake 12 cable replacement operations per year; made up of a combination of reactive and targeted, proactive replacements.

By focusing on a cable replacement strategy involving a mix of reactive and planned cable replacements, the debate over the number of cable faults expected to be experienced over the regulatory period falls away. The number of proactive cable replacements undertaken will be related to the number of reactive cable replacements undertaken in response to cable faults, such that the forecast target number of cable replacements totals 12 per year.

However it would be reasonable for the AER to question why 12 is a reasonable number of cable replacements to undertake per year, and there are a number of factors that support this level of activity:

- Phacelift has updated its fault analysis (see Attachment 5.4), indicating that this is approximately the number of cable replacements that must be undertaken to stabilise the historically observed increase in cable fault frequency:



- The Phacelift bottom-up cost study found that the frequency of cable faults was forcing Directlink into a reactive maintenance environment, which resulted in a lack of sufficient resources to undertake the research and analysis to adopt a planned cable replacement strategy. Operating reactively, there was no quality time available to develop a comprehensive strategy which would deliver

[14] Referenced in PSC, *Directlink - Opinion Paper on Directlink DC Cable Replacement Strategy*, Attachment 5.3.

improvement in the reliability of the cables. The Phacelift study also identified that the planning, coordination and execution of a cable replacement is a labour intensive process. In addition, the analysis and planning for the targeted proactive program is a resource intensive process requiring the specialist skills of an experienced reliability engineer to guide and influence the planning of proactive cuts of the cable. The staffing levels proposed by the Phacelift bottom-up cost study are the minimum number of additional people required to plan, coordinate and execute 12 cable replacements (reactive or proactive) per year. This conclusion was determined from a comprehensive process mapping exercise which reflected on the nature of the work to be performed and the impact of the current reactive maintenance environment.

- The HVDC cable manufacture is an intensive, long lead time process, and requires a minimum order size of 3000 metres. The experience to date suggests that an average of 250 metres of cable would be replaced in each operation. 12 cable replacements per year, at an average length of 250 metres, would require one "order" of cable to be undertaken each year.
- Any operational asset requires routine maintenance, and the Directlink cables are no exception. With over 350 km of cable in service (59 km x 6 cables), the cable replacement program represents less than 1% cable replacement per year.[15]
- Directlink submits that 12 cable replacements per year is an appropriate scope of work to improve the reliability of the Directlink cables over time; it is manageable within the obligation to provide transmission services, and with the additional resources proposed.

A proactive program also has a positive impact on system coordination. A proactive replacement can be scheduled and coordinated with the other TNSPs as a planned outage. In contrast, cable fault repairs require forced outages for repair at unpredictable times, making it impossible to coordinate with other TNSPs' required outages.

Over time, it is anticipated that the blend of failure versus targeted replacements will change, moving from a majority of failure-related replacements to a majority of proactive replacements over the five year period. Directlink will then assess the success of the program and its continued need.

The scope of the cable replacement strategy impacts three areas of costs: the cable sourcing program, the cable joint sourcing program, and the cable replacement planning and execution costs. Each are is discussed below.

[15] A business the size of TransGrid or Powerlink would undertake routine cable section replacements as part of its normal operating and maintenance expenditure. However the Directlink capitalisation policy would require this activity to be capitalised, consistent with prior years. See the discussion under "Classification of costs".

5.2.2 Cable sourcing

As discussed above, the cable replacement program plans to replace 12 segments of cable per year, with an average length of 250 metres per replacement. This equates to 3 km of cable per year, the minimum order size.

The cable replacement program captures the costs of the cable, and identifies the costs associated with cable procurement. These costs are supported by recent quotes and invoices, which will be provided to the AER tor review. The draft decision accepted the forecast costs for cable procurement, but differed in the quantity of cable to be procured.

5.2.3 Cable joint sourcing

The cable replacement program requires 2 cable joints to be deployed per cable replacement. The forecast cost reflects 24 cable joints to be ordered per year; 12 segments of replacement cable with a joint at each end.

As with the cable, the cable joints are a long lead time manufacture item, so it is critical to have them ordered and available for deployment when required.

The forecast costs are supported by invoices for recent cable joint purchases which will be provided to the AER tor review. The draft decision accepted the forecast costs associated with cable joint sourcing, but differed in the number of cable joints to be procured.

5.2.4 Cable replacement planning and execution costs

The business case discussed above reflects the capital costs associated with the segments of replacement cable and the joints used in the installation. However there is a significant amount of planning, coordination and execution costs that are incurred to undertake the project.

A targeted cable replacement program requires the services of an experienced reliability engineer to undertake fault analysis and identify trouble spots for targeting the proactive cable repair program. As identified in the Phacelift bottom-up cost study lodged in May 2014, the current cable fault rates are diverting Directlink's resources from analysis and planning to reactive cable fault repairs. The original Bottom Up Cost Study found that additional staff were required in order to gain improved knowledge to predict where future faults might occur, and then to carefully plan and coordinate outages so that prioritised sections of cable could be proactively replaced in the most efficient manner.

The physical cable replacement process itself is also resource-intensive. As identified in the Phacelift bottom-up cost study, these activities include fault location (for reactive replacements), crew and equipment mobilisation, vegetation management, excavation, jointing, cable testing, and site restoration.

These costs were estimated in the Phacelift bottom-up cost study (Attachment 9.3 to the May 2014 revenue proposal) through an extensive analysis of the various tasks required to be undertaken and the time required to undertake them. The draft decision accepted these execution costs, but took a different view of the number of cable replacements to be undertaken.

The draft decision (on opex) concluded that the three new (half-time) roles proposed by Directlink (Senior Reliability Engineer, Works Practices Specialist and Works Planner) are not required. This conclusion hinged on the draft decision's assessment that Directlink would only undertake three cable replacements per year going forward.

Directlink submits that the need for these additional staff resources is directly related to the workload associated with (reactive and proactive) cable replacement activity. The need for these additional positions, then, hinges on the assessment of the scope of the cable replacement program.

Directlink has clarified the nature of the program to undertake 12 cable replacements per year; a combination of reactive cable replacements in response to cable faults, and proactive cable replacements in known trouble spots to total 12 cable replacements per year.

The Phacelift bottom-up cost study has been clear that management of cable replacements (reactive or proactive) is a labour intensive and time consuming process, and the costing of the three additional staff was to allow the business to operate in accordance with Good Electricity Industry Practice while managing 12 cable replacements per year. Phacelift noted:[16]

> The Bottom Up Cost Study showed the considerable staff effort involved in the repair of each fault (95 hours per fault). While coordinating the repair of faults Directlink staff are forced to defer normal duties. Once the repair was complete they then have to catch up on the work that was deferred.
>
> This reactive environment prevented the existing staff from undertaking the necessary planning to move to a proactive cable replacement program, and was likely to result in a continuation of the current high rate of cable faults. The Bottom Up Cost Study noted that insufficient resources were available in this reactive environment to analyse where cable faults might occur. Unless spare skills were available (a) to analyse likely failure locations, (b) to plan for the cable replacement, and (c) to update documentation to match current conditions, the Company will not be able to show any substantial reduction in average cable faults from that estimated by this analysis.
>
> The Company has recognised this issue by including the need for additional staff in the Cable Replacement Program Business Case.

The PSC report also identifies the need for additional resources for planning, analysis and adequate record management:[17]

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16 Phacelift, *Bottom Up Cost Study – Response to AER draft Determination*, Attachment 5.4.

17 PSC, *Directlink - Opinion Paper on Directlink DC Cable Replacement Strategy*, Attachment 5.3.

> …within each cable route section identified in Table 4, working out which cable (of the six cables) and which 250m section of cable route section length should be replaced requires detailed record keeping, investigation and analysis. With the assignment of the right resources to undertake this analysis, this strategy could seek to ensure that the trouble areas within each cable fault cluster length are replaced as priority.

Should the final decision conclude, in the context of the reliability benefits pursued through the cable replacement program, that it is reasonable to undertake 12 cable replacements per year, then the interrelationships between the capex and opex program would similarly require the final decision to approve these positions to allow the cable replacement program to proceed.

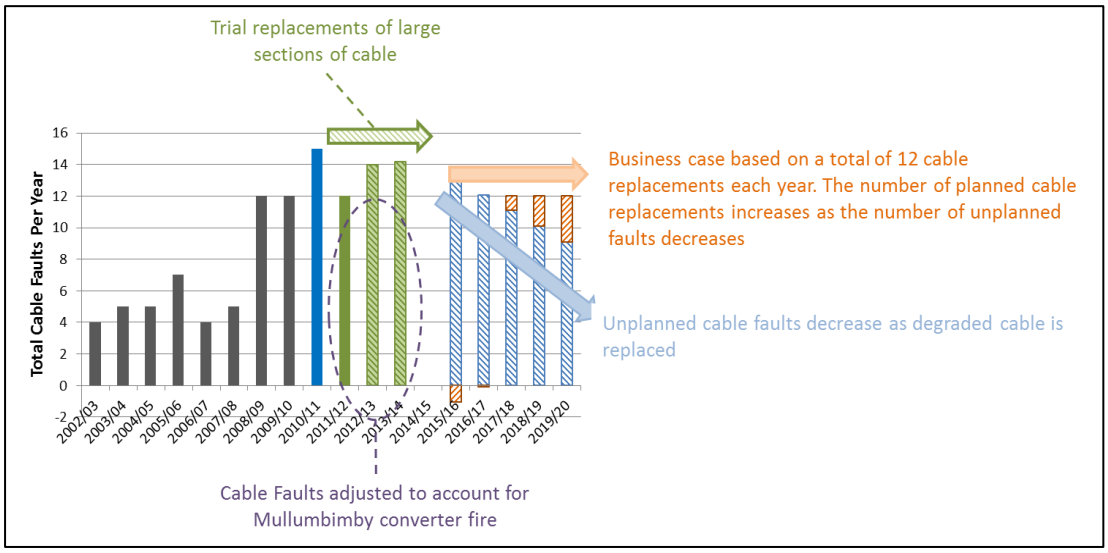
Classification of costs

Directlink erred in classifying these planning and execution costs as opex in the May 2014 revenue proposal. For this line item, the purpose of the Phacelift bottom-up cost study was to develop a reasonable forecast for the cable replacement program execution costs, in addition to the costs of the physical cable and joints discussed above.

These amounts have been removed from the forecast opex in this revised proposal, a instead included in capex as per this discussion.

5.2.5 Summary – cable replacement program

In summary, the cable replacement program is designed to undertake targeted replacements of cable in known trouble spots, in addition to the longer cable lengths replaced in response to faults under the current trial program. As the program continues, it is expected that Directlink will see a lower proportion of reactive cable replacements and a higher proportion of proactive cable replacements:



The total capital expenditure cost of the (reactive and proactive) cable replacement program is the sum of the cost of the cable, the cable joints, and the costs of planning and coordinating the program, as well as installing the replacement cable, as shown below:

Table 5.1 – Total forecast cost of cable replacement program

F/Y ending June ($000 2013/14)		2016	2017	2018	2019	2020
Cable sourcing program		554	554	554	554	554
Cable joint sourcing		388	388	388	388	388
Reliability planning and coordination		345	345	345	345	345
Cable replacement execution costs		387	387	387	387	387
Total		**1,674**	**1,674**	**1,674**	**1,674**	**1,674**

5.2.6 Converter station roof restoration program

The performance of the converter station roof is critical for maintaining the life of key components inside the converter building. The 3 phase reactors and the zero sequence reactor are not designed for outdoor service and must be completely protected from rainfall.

The soundness of the converter station roof is critical to the ongoing service of the interconnector. In 2007, a phase reactor in the system 3 Bungalora converter building shorted circuited, burning a large track from the top of the reactor to the bottom. The most likely cause of this failure is attributed to improperly sealed flashing around the phase reactor exhaust chimney which allowed rain water to enter the reactor. Based on this experience, Directlink submits that it is prudent to undertake measures to prevent water intrusion into the converter buildings.

In the May 2014 revenue proposal, Directlink proposed an annual roof repair program to address corrosion that has been detected in the converter station roofs. The draft decision questioned the scope of this project, concluding that a single year's attention would be sufficient to address the corrosion needs.[18]

Directlink has reassessed the project in light of the draft decision's conclusions, and plans to undertake the work as a single restoration project during the regulatory period.[19] It is important to note that the further restoration work may need to be performed in later regulatory periods, depending on the durability of the chosen solution.

[18] It is not clear how the draft decision reached a conclusion on the scope of the project.

[19] This will necessarily mark a departure from the Asset Management Plan.

Directlink will provide project costing and quotation information for this project, and would be pleased to engage with the AER to further discuss the scope of this project.

Table 5.2 – Forecast cost of roof restoration program

F/Y ending June ($000 2013/14)		2016	2017	2018	2019	2020
Roof restoration program			287			

5.3 Other projects

The draft decision found approximately $1.57 million of capex appeared to be unsupported and therefore proposed to disallow it.

Directlink did not prepare a business case for all expenditure in the capital expenditure program. As with any business, Directlink expects to incur a proportion of capital costs of a minor "stay in business" nature, which were not specified through individual business cases.

Table 8.2 of the May 2014 revenue proposal submission reported $35.19m of proposed capex. Of this amount, $33.229m was included in the discussion in section 8 of the Directlink revenue proposal. A further $0.388m, while not discussed in the text of the revenue proposal submission, was represented by a capital expenditure business case. Together this represents 96% coverage of the total capital expenditure program.

The leaves a balance of $1.576m of capital expenditure that the draft decision considered to be unsupported.

This is made up of a number of routine "Stay in Business" capital expenditure projects which do not warrant individual discussion or business cases, as follows:

Table 5.3 – Stay In Business capital expenditure 2015-20 – May 2014 submission

F/Y ending June ($)	2016	2017	2018	2019	2020	Total
Room Ventilation Fans				38,438		38,438
Reactor Cooling Fans				123,000		123,000
VESDA Scanner				49,200		49,200
Capacitors	18,450	18,450	18,450	18,450	18,450	92,250
Valve Cooling System					15,170	15,170
Valve Cooling System				15,170		15,170
Valve Cooling System					12,300	12,300
Cooling Tower				559,650		559,650
Split system air conditioners				82,000		82,000
Work Station Computers				6,560		6,560
Work Station Computers				41,000		41,000
Motor Control Centres				11,839		11,839
Motor Control Centres				8,118		8,118
Motor Control Centres				20,787		20,787
Control System				65,264		65,264
Dehumidifiers				76,875		76,875
Dehumidifiers				76,875		76,875
Test Equipment				8,200		8,200
Camera Equipment				4,100		4,100
UPS		30,750			30,750	61,500
Storm Water		9,225		9,225		18,450
Contingency Spares	35,875	39,975	33,825	33,825	33,825	177,325
Site lighting improvement	6,150	6,150				12,300
Total	**60,475**	**104,550**	**52,275**	**1,248,575**	**110,495**	**1,576,370**

Table 2.2 of the RIN included spreadsheet references to working documents supporting the totals reported (RIN Template '2.2 Capex'!N38:S41). These references are also included in the PTRM ('Input'!E282:K287).

The revision to the timetable for the fire suppression system (discussed above) has caused some consequential adjustments to the timing of these other projects, as follows:

Table 5.4 – Other "stay in business" capital expenditure 2015-20 – revised revenue proposal

Id	Description ($000 2014)	2016 $000s	2017 $000s	2018 $000s	2019 $000s	2020 $000s
9	Cameras	6	-	-	-	-
16	Contingency spares	100	36	40	34	34
17	Refurbishment works[20]	-	18	58	1,215	18
19	Site lighting improvement	6	6	6	-	-
	Total "Other"	112	60	104	1,249	52

These projects are reflected in the November 2014 Asset Management Plan.

[20] These "refurbishment works" are a summary of projects that largely align to the more detailed listing above.

5.4 Capital expenditure summary

Table 5.5 – Capital expenditure 2015-20 – revised revenue proposal

F/Y ending June ($000 2014)	2016	2017	2018	2019	2020
Converter stations					
Directlink cooling system upgrade – "Gotland" solution	4,445				
Fire suppression	4,597	602			
Zero sequence reactor repair			749	749	
Roof repair program		287			
Industrial computer control system					13,070
Bungalora hand rails			20		
Sourcing program - IGBTs	407	407	407	407	326
Optic fibre cables and connectors	160	160	160	160	160
Cooling tower sound enclosure remediation	40	40	350	41	41
Security fence upgrade		395			
Building safety upgrade	20	72	72	36	-
Converter buildings ventilation sound dampers corrosion repair	11	11	11	11	11
Other stay in business capex	112	60	104	1249	52
Total converter station capex	**9,792**	**2,034**	**1,873**	**2,653**	**13,660**
Cables					
Cable replacement program	1,674	1,674	1,674	1,674	1,674
Total cable capex	**1,674**	**1,674**	**1,674**	**1,674**	**1,674**
Total forecast capex	**11,466**	**3,708**	**3,547**	**4,327**	**15,334**

Where required, updated detail on these projects are provided in the relevant business cases provided in Attachment 5.2.

6 Forecast Operating Expenditure

As discussed in the Directlink May 2014 revenue proposal and accepted in the draft decision, it was not possible to apply a revealed cost methodology to assess the reasonableness of Directlink's forecast operating costs.

The draft decision largely accepted the forecast direct operating costs derived through the bottom-up cost study, with three exceptions:

- The draft decision questioned the scope of the cable replacement program;
- The draft decision did not accept the need for additional engineering and operational staff; and
- The draft decision reduced the forecast of phase reactor maintenance.

The draft decision also reflected some relatively minor consequential changes, such as the removal of forecast inflation, and a consequential impact on pre-start inspection costs.

The draft decision also raised questions on the costs of insurance in light of the Mullumbimby converter station fire, and the allocated cost of the commercial services fee.

These matters are discussed below.

6.1 Direct operating costs

The Phacelift bottom-up cost study has been updated to reflect the draft decision findings, and this revised proposal's response to those findings. The updated report is included as Attachment 5.4, and the related model has been included with the package of materials lodged with the AER. As discussed below, some of the costs previously forecast as opex have been reclassified as capex, and the forecast of some costs has been refined. These modifications are discussed below.

6.1.1 Cable replacement program

As discussed in section 5.2, Directlink erred in the May 2014 revenue proposal by including cable replacement planning and execution costs in the opex forecast. The Directlink capitalisation policy[21] would require these costs to be capitalised, and these costs are discussed in the context of the capex forecast in this revised revenue proposal.

It should be noted however, that the draft decision's adjustment to the scope of this program had consequential impacts on the opex forecast, for example in the forecast of converter station pre-start inspection costs.

[21] The Directlink capitalisation policy is the same as that applicable to Murraylink, which was recently approved by the AER in the Murraylink 2013-18 price review.

The previously forecast cable replacement program opex costs, including the costs associated with the three new half-time staff positions required to undertake the program, have been removed from the opex forecast in this revised revenue proposal.

6.1.2 Phase reactor maintenance costs

Directlink accepts the draft decision conclusion that, once the Gotland solution has been implemented, the work currently undertaken to rehabilitate the phase reactor igloos will no longer be required (p7-20). Directlink acknowledges that this was an error in the previous analysis.

But it would be incorrect (and premature) to assume that the Gotland solution will be maintenance free. In particular, a significant inspection regime will be required to ensure that the Gotland solution is performing as well in Australian conditions as it has in Sweden. The Gotland solution also requires its own maintenance regime, which had not been specified at the time of the bottom-up cost study. This regime will involve management of air filtration systems, thermostatic controls, cleaning and replacement of sail cloth, etc.

This cost has been analysed in detail and a forecast of $553 per year has been included in the revised Phacelift bottom up cost study included as Attachment 5.4.

6.1.3 Operating expenditure forecast

The Phacelift bottom-up cost study has been updated to reflect the removal of these costs, and to update for some other minor amendments:

- Removal of the forecast inflation adjustment;
- Reinstatement of Pre-start inspection costs to reflect the costs associated with 12 cable replacements as discussed in the capex section; and
- Reinstatement of the MOMCSA margin.[22]

As developed in detail in the updated Phacelift report at Attachment 5.4, the total direct operating and maintenance cost forecast is as shown below.

[22] The draft decision had reported the MOMCSA margin as a separate line item.

Table 6.1 –Total direct operating expenditure 2016 to 2020

F/Y ending June (000) $2014 real	2016	2017	2018	2019	2020
Direct operating costs per Phacelift study	2,749	2,049	2,125	2,073	2,102
ABB Service Agreement	147	147	147	147	147
Total operating and maintenance costs	2,896	2,196	2,272	2,220	2,249

6.2 Insurance

The AER did not accept Directlink's proposed forecast of insurance costs, citing five concerns in its draft decision:

- the capex and opex proposed for the asset should return the risk of the asset to pre-fire levels, so the insurance costs should similarly return pre-fire levels (p7-27);
- if the cost of insurance for Directlink is to be calculated on a stand alone basis, then the cost of insurance for all EII assets should be calculated on a stand alone basis (p7-27);
- the insurance costs are based on an internal allocation, not on commercial insurance costs (p7-23);
- the insurance costs have increased significantly from the average of the last 5 years (p7-21);
- the allocation of insurance costs among the EII assets was unreasonable and inconsistent with the AER-approved Cost Allocation Methodology (p7-25).

Each will be discussed in turn. Some clarifying commentary is also provided on the margin applicable to insurance costs.

6.2.1 Returning asset risks to pre-fire levels

On page 7-23, the draft decision assumes that the capital and operating expenditure proposed to be undertaken on the Directlink asset (in particular the ventilation redesign and fire suppression system) will return the risks associated with the asset to pre-fire conditions, which should (according to the draft decision) be immediately reflected in reduced insurance premiums:

> The proposed industrial special risks (ISR) insurance costs and self insurance costs do not appear to reflect the capex and opex proposed by Directlink which is intended to reduces [sic] the risks associated with the Directlink asset to pre-fire levels. This will overstate the insurance premium estimates for these categories of insurance.

And on page 7-29:

> Given this evidence we consider that the insurance costs should be commensurate with the real costs of industrial special risks insurance incurred pre-fire, that is, in 2011-12.

Directlink has two key concerns with this finding:

- first, that it is not clear that it is within the capability of the economic regulator to ascertain whether the technical risks of the asset have been returned to pre-fire levels; and
- second, that the AER has not demonstrated expertise in commercial insurance markets to be able to conclude that, even if the technical risks associated with the asset were to be returned to pre-fire levels, that this would flow directly into a reduction in insurance premiums.

While the AER relied on its internal engineering expertise for the first part of this opinion (that the asset risks could be expected to return to pre-fire levels), it did not reference any expertise relating to insurance markets for the second (so insurance costs should return to pre-fire levels).

Following the August 2012 fire event, investigations were conducted to determine the cause of the fire. The insurer's loss adjustor (Crawfords & Company) appointed Mr. Marty Denham from QEC Global to examine the fire scene and determine the cause of the fire. Mr. Denham's considered opinion was that the fire started in the C Phase reactor of the Pole 1 converter of the Mullumbimby HVDC transmission facility, and was probably caused by a short circuit fault in that reactor. While Mr. Denham identified a number of possible causes of the fault,[23] the cause of the fire was not conclusively determined.

Mr. Denham's conclusions were subsequently relied upon by other experts, including Professor TR Blackburn. No further conclusions on the cause of the fire were drawn. Both these reports have previously been provided to the AER.

Subsequent to the fire, Directlink has initiated various actions aimed at mitigating a recurrence of the fire event. In the absence of a definitive cause of the fire event, this has required Directlink to identify and mitigate *potential* causes. Directlink considers that these mitigating actions do provide some (immeasurable) level of increased confidence that the probability of a recurrence of the August 2012 fire event is lower than it would be, had the mitigating steps not have been taken.

However, while the mitigating actions do give some comfort, they do not give certainty. Directlink has taken reasonable steps to protect the asset, but in the absence of definitive cause, it cannot be certain.

Rather, the capital and operating program is designed to address those matters that have been implicated as possible contributors of the fire (to which end the replacement igloos and ventilation redesign projects are targeted), and to implement

[23] Mr Denham identified two possible causes of the short circuit: invasion by local fauna (snake) into the reactor, or conductive tracks having grown in the inner surface of the upper fibreglass dome over time. There was no indication that this was an exhaustive list of possible causes.

mitigation measures to reduce the impact of a fire should another occur (to which the fire suppression system is targeted).

Directlink has repeatedly noted, consistent with the reports of Mr Denham and Professor Blackburn discussed above, that the cause of the fire was indeterminate.

As the cause of the fire was indeterminate, it is not possible for Directlink (or the AER) to say with any confidence that the proposed capital and operating program will return the fire risks associated with the asset to pre-fire levels.[24]

The second leg of the draft decision finding is an assumption that, given the risk of the asset has been returned to pre-fire levels (addressed above), then insurance premiums should immediately return to pre-fire levels. The draft decision has not referenced any insurance industry expertise in reaching this conclusion.

Importantly, as the cause of the fire is indeterminate (as confirmed by two expert fire investigation reports), Directlink is not able to provide comfort to insurers that the cause of the fire has been addressed.

From an insurance perspective, the risk will be viewed in a very similar way to that described above; all reasonable steps have been taken to minimise the probability of recurrence, however in the absence of definitive cause, there is no certainty.

While the proposed capex and opex program does, to some extent, improve the risk profile that prevailed before the event, the fact that an unexplained fire event resulting in a significant insurance claim has occurred, cannot be removed from consideration by insurers.[25] That adverse claims history significantly influences pricing of insurance going forward,[26] and is further compounded by the absence of definitive cause.

Directlink does not accept the draft decision's assumption that, even if mitigation measures were taken to reduce the risks of the asset to pre-fire levels, insurance costs would immediately fall to pre-fire levels. As reflected in the Marsh update report included at Attachment 6.1, the premium impact of the claim event is expected to dissipate over time, assuming no further events.

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24 A comment on the PSC risk assessment report (Attachment 9.2 to the May 2014 regulatory proposal) may be helpful in this context. The purpose of this analysis was not to ascertain what actions should be undertaken to return the technical risks of the asset to pre-fire conditions. Rather, the analysis identified that Directlink's understanding of the risks of the asset, based on manufacturer's assurances, was understated. The PSC study advised on additional procedures to be undertaken, in light of the revised understanding of the risks associated with the operation of the asset, in order for Directlink to be confident that it was operating the asset in accordance with Good Electricity Industry Practice. Directlink does not accept the draft decision's assessment that the addition of these procedures reduces the risk of the asset to pre-fire levels.

25 As Marsh notes in the update to its report included as Attachment 6.1, "In our opinion, the claims experience of Directlink has had a material impact on the premium rating."

26 By way of analogy, if a person's car is stolen, it is the occurrence of the claim, not the technical risks associated with the replacement car, that drives the inevitable increase in car insurance premiums.

6.2.2 Calculating insurance costs for all assets on a stand alone basis

The draft decision expressed a concern that the calculation of insurance premiums attributable to Directlink had been calculated on a stand alone basis, but that the insurance premiums attributable to the other assets in the EII portfolio had not. The draft decision was concerned that this would result in an over-allocation of insurance costs to Directlink relative to the other assets in the EII portfolio.

To give the AER comfort in this area, it is useful to understand the methodology for calculating the insurance costs to be charged by the operator to EII.

As identified in the draft decision, the MOMCSA provides for the operator to obtain a stand alone insurance quotation every three years (clause 11.11(a)). The stand alone quotation for Directlink reflects the most recent stand alone quotation obtained under the MOMCSA.

The stand alone premium is then discounted to reflect the portfolio benefits associated with insuring the asset as a larger group. The operator then applies the margin under the MOMCSA.

As stand alone insurance quotations are obtained for each of the assets in the EII portfolio over the three year cycle, the cost of insurance charged by the operator to EII will reflect those updated insurance quotations over the cycle. While the total amount of insurance costs charged from APA to EII will change as quotations are updated, the amount attributable to Directlink will not change until its quotation is updated in three years' time.[27]

As discussed below, Directlink's May 2014 revenue proposal had put forward the stand alone insurance cost without adding the MOMCSA margin. In order to address the AER's concerns, Directlink has, in this revised proposal, put forward the insurance costs reflecting the process described above, notably including the portfolio discount and the MOMCSA margin:

Table 6.2 – Revised forecast property insurance costs 2016 to 2020

F/Y ending June ($000)	2016	2017	2018	2019	2020
Stand alone premium per Marsh report	754	717	717	717	663
Portfolio discount	-94	-90	-90	-90	-83
Margin	66	63	63	63	58
Total	**726**	**690**	**690**	**690**	**638**

Directlink will provide information to the AER demonstrating the forward application of this approach across all EII assets.

[27] Directlink takes a risk that future insurance costs will increase relative to the current forecast within the regulatory period.

6.2.3 Commercial basis of insurance costs

The draft decision expresses concern that Directlink's forecast insurance costs were based on an internal allocation of insurance costs rather than on commercial insurance costs. The draft decision appears to reach this conclusion because there is no actual stand alone insurance invoice for Directlink. As EII insures its assets as a portfolio, there is no direct invoice for Directlink insurance written on a stand alone basis.

As trend analysis does not form a reasonable basis of estimating forecast insurance costs (discussed below), Directlink sought, from industry expert Marsh, its opinion on the expected future insurance costs, which was lodged with the May 2014 Regulatory Proposal as Attachment 9.5.

Consistent with the AER's concept of the benchmark efficient firm, the market indication requested was for a stand alone firm, a "pure play" energy network business in Australia, without parental support.

The concerns over the "internal allocation" appear to arise from a series of information requests from the AER staff, to which Directlink made genuine effort to respond. However, as discussed more fully in the context of the Cost Allocation Methodology below, Directlink considers that insurance costs should be directly attributed in accordance with the commercial market estimation.

Margin

Importantly, because this "stand alone" quote does not reflect the economies of scale that arise from being part of a larger portfolio, no margin was applied to insurance costs – the forecast of insurance costs in the RIN were drawn directly from the Marsh expert report. The AER's analysis had incorrectly made an effort to "back out" the assumed margin.

6.2.4 Increase relative to the average of the last 5 years

The draft decision correctly notes that the forecast insurance costs for the Directlink Interconnector are significantly higher than the reported costs over the previous 5 year period. The relevant RIN template indicates:[28]

	Current regulatory period						Forthcoming regulatory period				
	Actual/ estimate ($000s nominal)						Forecast ($000s real)				
	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Insurance	318	353	355	489	658	1,267	1,402	1,370	1,390	1,422	1,394

The AER's concerns in this area appear to result from its application of its revealed cost methodology. The AER explains its underlying assumptions on p7-12 of the draft decision:

[28] It should be noted that self insurance costs are included in the forecast, but are not reported in the historical amounts.

Underlying our approach are two general assumptions:

- the efficiency criterion and the prudence criterion in the NER are complementary, and
- past actual expenditure was sufficient to achieve the expenditure objectives in the past.

We have used this general approach in our past decisions. It is a well-regarded top-down forecasting model for regulatory purposes that have been employed by a number of Australian regulators over the last fifteen years. We refer to it as a 'revealed cost method' in our Guideline (and we have sometimes referred to it as the base-step-trend method in our past regulatory decisions).

On page 7-16, the AER correctly concluded that the application of the revealed cost methodology in Directlink's circumstance was not appropriate:

> We considered whether to apply our usual revealed cost forecasting method to assess Directlink's opex proposal. Given the specific circumstances of Directlink's recent operational history, we considered that assessing the efficiency and prudency of Directlink's proposed expenditure by using a bottom up assessment approach was appropriate.

But the draft decision does not apply this conclusion to its assessment of Directlink's forecast insurance costs; page 7-33 of the draft decision comments that:

> Directlink proposed insurance costs of $6.3 million (real $2014-15, excluding APA Operations 10 per cent margin) over the 2015-16 to 2019-20 regulatory period, an increase of $4.2 million or 200 per cent over the 2009-14 period.

Directlink acknowledges that insurance costs clearly show a sharp increase in the period following the Mullumbimby converter station fire, and prior to the forecast period. The AER's calculation of the increase is based on an average over the previous 5 years, much of which is prior to the Mullumbimby converter station fire. As a result of this major event, it is inappropriate to apply trend analysis to this cost item.

Directlink has attempted make it clear that the Mullumbimby converter station fire (and the resulting significant insurance claim) has caused a major shift in the way insurers view the Directlink asset, and the level of premiums attributable to that asset. In light of this significant event, it is not appropriate to rely on trend analysis to assess the prudence and efficiency of the Directlink forecast insurance costs.

For clarity, it should be noted that the pattern of increased costs for Directlink's insurance as shown in the RIN arises from the translation of the Directlink accounts from calendar to fiscal year reporting, and from the mismatch between the reporting years and the insurance policy years. The increased insurance costs are therefore partly reflected in the 2013/14 fiscal year (being partly reflected in the 2013 calendar year), with the balance reflected in the 2014/15 fiscal year.

In summary, in light of the Mullumbimby converter station fire and its impact on the risks of the Directlink asset in the eyes of insurers, Directlink submits that it is not reasonable for the AER to apply trend analysis as a tool in assessing the reasonableness of Directlink's forecast insurance costs.

6.2.5 Application of Directlink Cost Allocation Methodology

The draft decision (p7-25) expressed concern that the allocation of insurance costs among the EII assets was unreasonable and inconsistent with the AER-approved Cost Allocation Methodology.

The Directlink CAM requires costs to be 1) directly attributable to assets where possible, then 2) allocated among assets using a causal allocator, and then 3) any remaining costs to be allocated on some reasonable basis.

The AER has characterised the Directlink CAM as classifying insurance as a shared cost to be allocated among the EII assets over revenue (p7-26):

> As the insurance cost is not solely related to or directly associated with Directlink, Directlink's proposal to directly apportion a standalone estimate of the insurance cost to Directlink is inconsistent with Directlink's CAM. *Directlink's CAM requires that the EII asset group insurance costs, covered under the MOMSCA, are apportioned according to each Energy Infrastructure Investments asset's contribution to group revenue.* Forecast opex proposed in a revenue proposal must be properly allocated in accordance with Directlink's CAM. On this basis, we consider that Directlink should be allocated its revenue share of the EII group insurance costs and not the amount attributed by gaining an estimate of the stand alone cost of insuring Directlink. [emphasis added]

The AER's assertion on this matter, highlighted above, is not correct.

Appendix C of the CAM provides for specified categories of costs to be allocated among the EII assets on the basis of the proportional contribution to group revenue. Importantly, insurance is not included in this list.

Rather, insurance is specifically identified in the Directlink CAM as a Direct Cost that is to be attributed to the asset (s2.2):

- direct other costs, including insurance, contracted services, taxes, travel costs, utilities expenses, accounting fees and legal fees, and other direct expenses which can be attributed to the asset;

Directlink submits that its original application was in accordance with the AER-approved CAM, and that the draft decision's proposed allocation of costs would be in violation of the CAM.

Directlink acknowledges that, historically, insurance costs were allocated among the various EII assets (regulated and non-regulated) using a combination of asset values and contributions to group revenue. This is consistent with the Application of the CAM as there was, historically, no sound basis on which to directly attribute insurance costs to any particular asset.

However, following the Mullumbimby converter station fire and ensuing increases in Directlink insurance premiums arising from the insurers' risk perceptions and the claims history, a foundation for direct attribution of costs became evident. Directlink was therefore obliged under the AER-approved Cost Allocation Methodology to apply this basis of direct cost attribution to Directlink.

This direct attribution is evident in the historical insurance costs reported in the RIN as shown above. Reported insurance costs are relatively stable from 2009/10 through 2011/12, increasing as the attribution approach flows through the financial statements,[29] finally resting at its directly attributable level in the 2014/15 historical amount and into the forecast period.

Notwithstanding Directlink's view, discussed above, that it is inappropriate to apply trend analysis to assess the reasonableness of the forecast costs to this line item, this level of incurred insurance costs forms the basis of the forecast, consistent with the AER's revealed cost methodology. That is, the directly attributed costs are the revealed costs as reported in the RIN.

6.2.6 Allocation of insurance portfolio costs across EII assets

Directlink has, however, calculated the insurance costs attributable to Directlink by allocating the invoiced amount across the EII assets on the basis of their individual stand alone premiums, as shown below. As this calculation necessarily involves information relating to non-regulated assets, Directlink will provide the detailed calculations to the AER under separate cover.

For clarity, these costs are the insurance costs that have been included in operating expenditure forecast in the PTRM.

Table 6.3 – Forecast property insurance costs allocated across all EII assets

F/Y ending June ($ 2014)	2016	2017	2018	2019	2020
EII portfolio insurance costs allocated to Directlink	593	559	573	587	530
Plus margin	59	56	57	59	53
Total	652	615	630	646	583

[29] While insurance costs are accrued monthly in the EII financial accounts, the Directlink regulatory accounts are developed through a process of translating the EII calendar year financial accounts to a fiscal year equivalent by merging half of two consecutive fiscal year reported accounts. For example, the opex lines of the 2012/13 regulatory accounts are developed by adding half of the opex lines of the calendar 2012 and calendar 2013 accounts, respectively. The effect of the monthly accrual of insurance costs is obscured through this process.

6.2.7 Liability insurance costs

The draft decision expressed concern over the level of liability insurance coverage, indicating that is considered the forecast limit of $650 million to be excessive relative to the current $300 million limit.

While debate may continue over the appropriate amount of liability insurance to be carried for this asset, Directlink has accepted the draft decision's views on this matter and has asked Marsh to advise on the cost of $300 million of liability cover. This is included in the Marsh addendum included as Attachment 6.1.

As with property insurance, invoiced liability insurance costs have been allocated across the EII portfolio assets on the basis of each asset's respective stand alone liability premiums, as estimated by Marsh. As this calculation necessarily involves information relating to non-regulated assets, Directlink will provide the detailed calculations to the AER under separate cover.

Table 6.4 – Forecast liability insurance costs

F/Y ending June ($ 2014)	2016	2017	2018	2019	2020
Liability insurance costs per Marsh report	21	21	20	21	21
Plus margin	2	2	2	2	2
Total	**24**	**23**	**22**	**23**	**24**

6.2.8 Self insurance

The AER's draft decision accepted Directlink's claim for a self-insurance allowance, but disagreed with Directlink's proposed amount.

In light of the draft decision's comments regarding the costs of insurance being sourced by EII as part of a portfolio of assets, it is important to note that self insurance costs, relating to items such as deductible amounts under existing policies, cannot be diversified across assets. There is no risk reduction, associated with self insurance, to be had by insuring a portfolio of assets.

In the expert insurance report lodged as Attachment 9.5 to Directlink's May 2014 revenue proposal, Marsh identified a number of different categories of self insurance exposure. However the draft decision discussed the Working Loss and Major Property Loss category, but did not discuss the other categories.

In the draft decision (p7-30), the draft decision concluded that the proposed capital and operating initiatives would reduce the risk of loss, and this should be reflected in the allowed self insurance estimate. Directlink has accepted the draft decision's views on the probability of loss and has asked Marsh to modify its advice to reflect this acceptance. Marsh advises that only the Major Property Loss category could be

impacted by the design and operational changes,[30] and has modified its assessment of the self insurance costs associated with the Major Property Loss category as shown in the attached addendum to its report, and as shown below.

Directlink has accepted the draft decision's views on the one class of risk potentially impacted by the capital and operations program, and made the relevant changes to the Major Property Loss self insurance cost forecast. The draft decision did not discuss the forecast for the other classes of self insurance costs, but did not include the relevant premiums in its table of approved opex costs. As the draft decision did not reject these costs, Directlink assumes that the failure to include them in the total is an oversight.

The revised forecast of self insurance costs, accepting the draft decision's findings on the risk of loss in the Major Property Loss category, is shown below:

Table 6.5 – Revised forecast self insurance costs 2016 to 2020

F/Y ending June ($)	2016	2017	2018	2019	2020
Working losses	63	63	63	63	63
Major property loss	30	30	30	30	30
Decontamination event	15	15	15	15	15
Catastrophic property loss[31]	15	15	15	15	15
Liability event	1	1	1	1	1
Total	**123**	**123**	**123**	**123**	**123**

6.2.9 Margin applied to insurance

In the May 2014 revenue proposal, Directlink included the forecast cost of insuring the asset on a stand alone basis. The forecast costs for insurance were drawn directly from the Marsh expert report included as Attachment 9.5.

Under this construct, there would be no economies of scale associated with the use of an external operator, and accordingly Directlink did not add a margin to those forecast insurance costs.[32]

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30 The draft decision discusses the reduced risk of loss in terms of working losses and major property losses. It should be noted that Marsh's initial assessment of the probability of major property loss was based on pre-fire experience only, and is not related to the design and operational changes.

31 Note that "Catastrophic Property loss" was incorrectly quoted as $10,000 pa in the May 2014 submission.

As discussed above, the updated forecast of Directlink's insurance costs reflects the benefits of EII insuring a portfolio of assets (that is, that Directlink should benefit from the economies of scale that can be sourced by the external operator), and the MOMCSA margin has been included.

In the case of self insurance, there are no scale economies to be achieved through the use of an external operator, and accordingly no margin has been added to the Marsh forecast of self insurance premiums.

6.2.10 Summary - insurance

In summary, Directlink submits:

- as the cause of the August 2012 Mullumbimby converter station fire is indeterminate, the capital and operating initiatives being undertaken cannot be said to reduce the risk of the asset to pre-fire levels;
- it is not reasonable to assume, even if the capital and operating initiatives being undertaken reduced the risk of the asset to pre-fire levels, that insurance costs would fall immediately to pre-fire levels;
- its forecast of insurance costs is based on a commercial assessment of insurance costs, and not an internal allocation of portfolio insurance costs;
- The process of directly attributing insurance costs to Directlink is consistent with the application of the MOMCSA and does not result in an over-allocation of insurance costs to Directlink;
- considering the impact of the August 2012 Mullumbimby converter station fire, it is inappropriate to apply historical cost trend analysis to assess the reasonableness of Directlink's forecast of insurance costs;
- the AER-approved Cost Allocation Methodology clearly requires direct attribution of insurance costs where possible, rather than application over a revenue-based allocator;
- Directlink accepts the AER's views on the probability frequency of a Major Property Loss event, and has reduced its forecast for this class of self insurance accordingly. As the draft decision did not reject the other classes of self insurance, the forecast for the other classes has been maintained;
- In the May 2014 revenue proposal, a margin had not been added to the stand alone insurance costs. In this revised proposal the MOMCSA margin has been added to the discounted property insurance costs. A margin has not been added to the self insurance component.

The summary of the revised forecast insurance costs is shown below.

[32] The AER's analysis, however, backed out an amount assumed to be the margin included in the insurance forecast.

Table 6.6 – Forecast insurance costs 2016 to 2020

F/Y ending June ($ 2014)	2016	2017	2018	2019	2020
Property	652	615	630	646	583
Liability	24	23	22	23	24
Self Insurance	123	123	123	123	123
Total	**799**	**761**	**776**	**792**	**729**

6.3 Commercial services costs

The draft decision accepted the prudence and efficiency of the commercial services fees charged from APA to EII. However, the draft decisions was concerned with the fairness of the allocation of that fee among the various EII assets.

Directlink agrees with the draft decision that there is a circular calculation required to precisely allocate the commercial services fee across the EII assets, as the amount of the fee is allocated based on revenue contribution, and the Directlink revenue contribution will depend on how much of the fee is allocated to it.

Directlink's approach, in the May 2014 revenue proposal, was to use a rough estimate of the forecast Directlink revenue as the basis of allocation, acknowledging that the amount of the commercial services fee allocated to Directlink would be imprecise.

Directlink accepts that a degree of imprecision is expedient and proposes to apply that methodology in this revised proposal.

[information redacted]

Directlink submits that the process it applied to estimate the proportion of commercial services costs to be allocated to Directlink over the revenue control period, while slightly imprecise, is reasonable. Directlink has updated the forecast of Directlink revenue based on this revised proposal (reflecting in particular the reduction in the cost of capital) for application in the allocation process, adopting an estimated Directlink annual allowed revenue of $15 million per year.

Table 6.7 – Allocation of commercial services costs

	Forecast Revenue ($m)	Proportion %	Allocation of Commercial Services Fee ($000)
Directlink	15,000[33]	15.9%	459
Murraylink	13,505[34]	14.3%	413
Other assets	66,034[35]	69.8%	2,018
Total	94,539	100%	2,889[36]

6.4 Forecast operating expenditure

In summary, the forecast operating expenditure required to maintain the prescribed transmission services by Directlink during the 2015-20 regulatory control period is set out in Table 6.8.

Table 6.8 – Forecast operating expenditure 2015-20

F/Y ending June (000 2014)	2016	2017	2018	2019	2020
Operating and maintenance costs	2,896	2,196	2,272	2,220	2,249
Management fees and expenses	459	459	459	459	459
Insurance	799	761	776	792	729
Tax on property and capital	9	9	9	9	9
Accounting/audit fees	10	10	10	10	10
Other	1	1	1	1	1
Sub total[37]	**4,175**	**3,437**	**3,527**	**3,492**	**3,458**
Debt raising costs[38]	73	77	76	75	75
Total Forecast opex	**4,248**	**3,514**	**3,603**	**3,567**	**3,533**

33 Approximation taken as an average of the allowed revenue per the PTRM over the 5 year regulatory period.

34 Smoothed revenue per Murraylink PTRM.

35 Per AER draft decision.

36 Total assumes 2 years' CPI escalation. Includes margin.

37 These opex costs have been indexed for one year's inflation for input to the PTRM.

38 As debt raising costs are calculated by the PTRM, no margin is included.

7 Depreciation

The draft decision accepted Directlink's proposal to align the useful lives of eh cable and converter stations, and to restrict the useful life of any capital expenditure to the remaining life of those assets.

In light of this agreement, the only differences in the depreciation forecast in this revised revenue proposal, relative to the draft decision, are consequential on amendments to the quantum and timing of the various capital expenditure projects.

7.1 Depreciation forecast

The regulatory depreciation has been calculated using the AER's PTRM.

The forecast regulatory depreciation for Directlink during the 2015-20 regulatory control period is set out in Table 7.1.

Table 7.1 – Forecast depreciation 2015-20

F/Y ending June ($000)	2016	2017	2018	2019	2020
Forecast straight line depreciation	-5,011	-5,619	-5,922	-6,229	-6,583
Forecast indexation	3,339	3,610	3,662	3,706	3,769
Forecast regulatory depreciation	**1,672**	**2,010**	**2,260**	**2,523**	**2,814**

The draft decision approved Directlink's proposal that depreciation (return of capital) for establishing the regulatory asset base as at the commencement of the 2020-2025 regulatory control period be based on forecast capital expenditure.

8 Maximum allowed revenue

Directlink's Revenue Proposal is derived from the post-tax building block approach outlined in Part C of Chapter 6A of the Rules and the AER's PTRM.[39] The completed PTRM forms Attachment 8.1 to this regulatory proposal. This Chapter summarises the building block approach, the components of which are detailed in the preceding Chapters. The MAR and X factor for Directlink are calculated from the PTRM. Future adjustments to the revenue cap are also described.

8.1 Building block approach

The building block formula to be applied in each year of the regulatory period is:

MAR = return on capital + return of capital + opex + tax

= (WACC × RAB) + D + opex + tax

Where:

MAR = Maximum Allowable Revenue.

WACC = post-tax nominal weighted average cost of capital ("vanilla" WACC).

RAB = Regulatory Asset Base.

D = Regulatory Depreciation.

opex = operating expenditure.

tax = income tax allowance.

The MAR is then smoothed with an X factor, in accordance with Rule 6A.6.8.

The Rules allow for revenue increments and decrements arising from the Efficiency Benefit Sharing Scheme (EBSS). As the EBSS does not apply to Directlink in the 2006-15 regulatory period, there is no carry over amount to be included in the operating expenditure building block.

Any increment or decrement associated with the STPIS is not included in this Revenue Proposal, but as a future revenue cap adjustment.

8.2 Building Block components

The building blocks that formed a part of the revenue calculation are set out below.

[39] AER, Final decision, *Amendment - Electricity transmission network service providers Post-tax revenue model*, December 2010.

8.2.1 Regulatory asset base

Chapter 2 described the calculation of the estimated RAB of $129.755 million, as at 1 July 2015.

The capital expenditure forecast in Chapter 5 and was used to roll forward RAB, using the expected regulatory depreciation detailed in Chapter 7. The RAB for the next regulatory control period is set out in Table 8.1.

Table 8.1 – Summary of RAB

F/Y ending June ($000)	2016	2017	2018	2019	2020
Opening RAB	130,955	141,552	143,611	145,343	147,814
Capex	12,269	4,069	3,991	4,993	18,147
Depreciation	-5,011	-5,619	-5,922	-6,229	-6,583
Indexation	3,339	3,610	3,662	3,706	3,769
Closing RAB	**141,552**	**143,611**	**145,343**	**147,814**	**163,146**

8.2.2 Return on capital

The return on capital was calculated by applying the post-tax nominal vanilla WACC to the opening RAB in the respective year.

The post-tax nominal vanilla WACC of 6.17% was established using the methodology detailed in Chapter 3. Directlink has calculated the return on capital in using the PTRM. This calculation is summarised in Table 8.2.

Table 8.2 – Summary of return on capital forecast

FY ending	2016	2017	2018	2019	2020
Return on capital	8,077	8,731	8,858	8,965	9,117

8.2.3 Return of capital

Chapter 7 describes how Directlink has calculated the return of capital provided by depreciation. The AER's PTRM combines both the straight line depreciation and an adjustment for inflation on the opening RAB. A summary of the regulatory depreciation allowance is given in Table 8.3.

Table 8.3 – Summary of regulatory depreciation

FY ending	2016	2017	2018	2019	2020
Depreciation	- 5,011	- 5,619	- 5,922	- 6,229	- 6,583
Indexation	3,339	3,610	3,662	3,706	3,769
Regulatory depreciation	1,672	2,010	2,260	2,523	2,814

8.2.4 Operating expenditure

Chapter 6 of this revenue Proposal details Directlink's requirement for operating expenditure requirements in each year of the next regulatory period. This is summarised in Table 8.4.

Table 8.4 – Summary of forecast operating expenditure

FY ending	2016	2017	2018	2019	2020
Total operating expenditure	4,465	3,787	3,983	4,043	4,106

8.2.5 Tax allowance

The tax allowance associated with the RAB is outlined in Section 4. The forecast tax allowance is summarised in Table 8.5.

Table 8.5 – Summary of tax allowance 2015-20

FY ending	2016	2017	2018	2019	2020
Taxation allowance	537	594	640	688	740

8.3 Maximum Allowed Revenue

The total revenue cap and the MAR for each year of the next regulatory period is provided below. Based on the building blocks outlined in the previous Sections, the total revenue cap and maximum allowable unsmoothed revenue requirement is summarised in Table 8.6.

Table 8.6 – Summary of unsmoothed revenue requirement

FY ending	2016	2017	2018	2019	2020
Return on capital	8,077	8,731	8,858	8,965	9,117
Return of capital	1,672	2,010	2,260	2,523	2,814
Total operating expenditure	4,465	3,787	3,983	4,043	4,106
Tax allowance	537	594	640	688	740
Unsmoothed revenue requirement	14,751	15,122	15,741	16,219	16,777

8.4 X-Factor smoothed revenue

Rule 6A.6.8 requires the Revenue Proposal to include the X factors nominated for each year of the regulatory period and that the X factors comply with the Rules. A net present value (NPV) neutral smoothing process is applied to the building block unsmoothed revenue requirement, while ensuring the expected MAR for the last regulatory year is as close as reasonably possible to the annual building block revenue requirement. The associated X factors are presented in Table 8.7.

Table 8.7 – Smoothed revenue requirement and X factor

FY ending	2016	2017	2018	2019	2020
Unsmoothed revenue requirement	14,751	15,122	15,741	16,219	16,777
Smoothed revenue requirement	14,927	15,307	15,698	16,098	16,509
X factor (CPI-X)	-2.80%	0.00%	0.00%	0.00%	0.00%

8.5 Revenue cap adjustments

In accordance with the Rules,[40] Directlink's revenue cap determination by the AER is in the CPI-X format, and may be subject to adjustment during the next regulatory period for the following reasons:

- ***Adjustment for actual CPI*** – Directlink's revenue cap will be calculated each year using the actual CPI and the application of the AER's transitional approach to incorporating the trailing average cost of debt in the total revenue calculation.

[40] National Electricity Rules, Chapter 6A.5.3.

- ***STPIS*** – Directlink's revenue cap will be adjusted by the impact of the STPIS as discussed in section 9;
- ***Pass through*** – Directlink's revenue cap may be adjusted in the event that an eligible pass through amount is approved by the AER in accordance with Rule 6A.7.3.

9 Incentive mechanisms

9.1 Service Target Performance Incentive Scheme

The draft decision did not accept Directlink's proposed STPIS parameters, proposing parameters that are based on a more aspirational target of 10 circuit outages per year. This is based on an assumption of 2.15 cable faults and 6.5 other outages per year, with a judgemental upward rounding to 10 outages per year.

As discussed extensively in the capex and opex sections of this revised proposal, Directlink submits that the draft decisions significantly understates the scope for cable related outages over the upcoming regulatory period, notwithstanding the allowances for reliability improvement capital expenditure and revised cable replacement strategies.

Directlink notes that the STPIS parameters are internally consistent with the number of cable faults assumed in the capex and opex sections of the draft decision. However Directlink is confident that, based on the information provided with this revised proposal, the final decision will reach a more reasonable conclusion on the forecast number of cable replacements, and will adjust the final STPIS parameters accordingly.