



Draft decision
Directlink transmission determination
2015-16 to 2019-20
Attachment 6: Capital expenditure

November 2014

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Note

This attachment forms part of the AER's draft decision on Directlink's revenue proposal 2015–20. It should be read with other parts of the draft decision.

The draft decision includes the following documents:

Overview

Attachment 1 – maximum allowed revenue

Attachment 2 – regulatory asset base

Attachment 3 – rate of return

Attachment 4 – value of imputation credits

Attachment 5 – regulatory depreciation

Attachment 6 – capital expenditure

Attachment 7 – operating expenditure

Attachment 8 – corporate income tax

Attachment 9 – efficiency benefit sharing scheme

Attachment 10 – capital expenditure sharing scheme

Attachment 11 – service target performance incentive scheme

Attachment 12 – pricing methodology and negotiated services

Attachment 13 – pass through events

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Shortened forms

Shortened form	Extended form
AARR	aggregate annual revenue requirement
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ASRR	aggregate service revenue requirement
augex	augmentation expenditure
capex	capital expenditure
CCP	Consumer Challenge Panel
CESS	capital expenditure sharing scheme
CPI	consumer price index
DRP	debt risk premium
EBSS	efficiency benefit sharing scheme
ERP	equity risk premium
MAR	maximum allowed revenue
MRP	market risk premium
NEL	national electricity law
NEM	national electricity market
NEO	national electricity objective
NER	national electricity rules
NSP	network service provider
NTSC	negotiated transmission service criteria

Shortened form	Extended form
opex	operating expenditure
PPI	partial performance indicators
PTRM	post-tax revenue model
RAB	regulatory asset base
RBA	Reserve Bank of Australia
repx	replacement expenditure
RFM	roll forward model
RIN	regulatory information notice
RPP	revenue pricing principles
SLCAPM	Sharpe-Lintner capital asset pricing model
STPIS	service target performance incentive scheme
TNSP	transmission network service provider
TUoS	transmission use of system
WACC	weighted average cost of capital

6 Capital expenditure

The National Electricity Rules (NER) require Directlink to include a forecast of total capital expenditure (capex) in its revenue proposal for the 2015–20 period.¹ The return on and of capex are components of the building block revenue requirement.²

We must accept Directlink's proposed total forecast capex if we are satisfied that it reasonably reflects the capex criteria.³ If we are not satisfied of this, we must not accept it and must determine an alternative estimate that we are satisfied with.⁴ In so doing, we must have regard to the capex factors and take into account the revenue and pricing principles.⁵

We generally categorise capex as either network or non-network capex. Network capex includes:

- growth driven capex, including for augmentation and new connections
- non-load driven capex, including replacement and refurbishment capex.

Non-network capex covers expenditure in areas other than the network and includes business information technology (IT) and buildings/facilities.

This attachment sets out our draft decision on Directlink's proposed total forecast capex.

6.1 Draft decision

Our draft decision is to not accept Directlink's proposed total forecast capex of \$35.19 million (\$ real 2014-15) for the 2015-20 regulatory control period because we are not satisfied that it reasonably reflects the capex criteria. In reaching this conclusion, we have taken into account the revenue and pricing principles. Our estimate of the total forecast capex that reasonably reflects the capex criteria is \$25.63 million, a reduction of 27 per cent. Table 6-1 outlines our draft decision.

Table 6-1 Our draft decision on Directlink's total forecast capex (\$ million \$2014–15)

	2015–16	2016–17	2017–18	2018–19	2019–20	Total
Directlink's proposal	5.86	5.41	4.03	5.10	14.80	35.20
AER draft decision	4.16	2.68	2.26	3.28	13.25	25.63
Difference	-1.70	-2.73	-1.77	-1.82	-1.55	-9.57
Percentage difference	29.0	50.4	43.9	35.7	10.5	27.2

Source: Directlink, Regulatory Proposal, p. 55; AER analysis

Note: Numbers may not total due to rounding.

A summary of our reasons and findings that we present in this Attachment are set out in Table 6-2. It is important to recognise that our decision is about Directlink's total forecast capex for the 2015–2020

¹ NER, cl. 6A.6.7(a).

² NER, cl. 6A.5.4(a).

³ NER, cl. 6A.6.7(c) and 6A.14.1(2)(i).

⁴ NER, cl. 6A.6.7(d) and 6A.14.1(2)(ii).

⁵ NER, cl. 6A.6.7(e); NEL, s. 16(2)(a)(i).

period. We are not approving a particular category of capex or a particular project, but rather an overall amount. However, as part of our assessment, we necessarily review the categories of expenditure and some particular projects in order to test whether Directlink's proposed total forecast capex reasonably reflects the capex criteria. This is explained further in our assessment approach at 6.3.

Table 6-2 Summary of AER reasons and findings

Issue	Reasons and findings
Forecasting methodology, key assumptions and past capex performance	<p>Directlink's capex forecast is based on maintaining the maximum capability of the link with a high degree of reliability whilst ensuring that all regulatory, statutory and legislative requirements are met. Directlink has submitted business cases for each project that supports its capex program. We consider that the majority of Directlink's proposed capex program is prudent and is justified with respect to its reliability and compliance requirements.</p> <p>Directlink's capex business cases provide details in respect of the need for each project, evaluation of alternatives, estimated cost and scope, timing and justification. We consider this approach acceptable given the smaller scale of Directlink's assets and nature of its network operations. For these reasons we have not applied standardised benchmarking analysis or predictive modelling in assessing Directlink's capex forecasts. We have undertaken detailed reviews of Directlink's asset management practices and specific projects.</p> <p>Directlink's proposed forecast capex is 128 per cent (\$19.8 million) higher than the previous 10 year 2005-14 regulatory period. This represents an average annual increase four and a half times greater than the 2005-2014 period. We consider that much of Directlink's proposed capex program reflects the stochastic nature of its capex requirements rather than that of a mature "steady state" system with recurrent capital expenditure programs. We also consider that Directlink is facing a number of "end-of-life" projects which have been included in its historical capex.</p>
Forecast capex	<p>We have not accepted Directlink's proposed forecast capex of \$35.2 million (\$2014–15). On the basis of the information before us, this amount is overstated and exceeds the amount required to achieve the capex objectives.</p> <p>We have made adjustments to the value of \$7.29 million for projects we considered prudent but did not consider the proposed costs to be efficient. These projects included the fire suppression project, the cable replacement program, the spare cable joints program, building corrosion roof repair and zero sequence reactor repair.</p> <p>We considered proposed expenditure related to a number of proposed capex projects is not prudent or efficient. The value of these projects was \$0.7 million and included cable relocation and emergency lighting. We also considered that Directlink's proposal had not identified for what it requires an amount of \$1.57 million and has not provided any supporting documentation to justify its claim for this amount.</p> <p>Our estimate of Directlink's required capex of \$25.63 million has been informed in part by the anticipated impact of Directlink's proposed capex program on reliability and the need to ensure availability of the link at maximum capacity. We also considered the operating risks arising from the impact of the Mullumbimby converter station fire in August 2012.</p>
Impact of reliability improvement	<p>On the basis of significantly increased capex and anticipated increased reliability as a consequence of the impact of the Mullumbimby converter station fire, Directlink's STPIS targets have been recalibrated with stricter performance targets. Details of the recalibrated STPIS targets are discussed in attachment 11.</p>
Real cost escalation	<p>Directlink did not propose labour and materials escalators, instead advising that they would accept our decision on real cost escalators. We consider that real materials cost escalation</p>

Issue	Reasons and findings
	<p>should not be applied in determining a service provider's required capital expenditure. Directlink did not include an amount for the real cost escalation of labour in its capex forecast. For the other NSPs we have forecast the labour price change based on an average of the electricity, gas and water sectors from Deloitte and Independent Economics. To allow us to make this adjustment, we expect Directlink to provide further information in its revised revenue proposal (i.e. labour costs as a proportion of total forecast capex).</p>

Source: AER analysis

Our substitute estimate includes \$25.63 million of Directlink's proposed capex program.

We do however, consider that the proposed cost of a number of projects were not efficient. We have made adjustments to proposed expenditure as follows:

- a reduction of \$2.5 million to its Fire Suppression Project to reflect a lower expert consultancy estimate of the project
- a reduction of \$2.13 million to its Cable Repairs Program based on our assessment of Directlink's cable strategy and improved cable fault rate
- a reduction of \$1.46 million to its Sourcing Program for Cable Joint Kits based on an expected reduced cable fault rate
- a reduction of \$0.99 million for its Zero Sequence Reactor Repair because a suitable reactor could be sourced for about a third of the cost of the proposed Original Equipment Manufacturer (OEM) reactor.

We consider the following proposed expenditure not to be prudent or efficient. We have not included this in our substitute estimate of Directlink's total forecast capex for the 2015-20 period:

- a \$0.37 million capex provision for the relocation of its DC cables in the event they need to be relocated due to development in proximity to any of the cables over the 2015-20 period
- \$0.34 million to bring the existing converter stations emergency lighting and exit signs up to the requirements of the current building code and relevant Australian standards, and
- removal of \$1.57 million in expenditure because Directlink has not identified why the expenditure is required and has not provided any supporting documentation to justify its claim for this amount.

6.2 Directlink's proposal

Directlink proposed forecast capex of \$35.2 million (\$ real June 2015) for the 2015-20 period.⁶ The proposed capex is \$19.8 million (or 128 per cent) higher than the actual/estimated capex over the previous 10 year 2005-15 regulatory period. On an annual basis, Directlink's proposed forecast capex for the 2015-20 period of \$7.04 million is on average 356 per cent or four and a half times greater than the actual/estimated capex of \$1.54 million for the previous 2005-15 regulatory period.⁷ Directlink stated that the majority of its capex projects are stochastic in nature rather than that of a mature

⁶ Directlink, *Revenue proposal*, p. 55.

⁷ Directlink, *Revenue proposal, Regulatory Information Notice, 2.2 Capex*.

"steady state" system with recurrent capital expenditure programs. It also submitted that it was facing a number of "end-of-life" projects which would not have been included in its historical capex.⁸

In support of its capex claim, Directlink provided business cases and supporting information for each of the capex projects listed in Table 6-3.

Table 6-3 Directlink proposed capex projects (\$m real, 2014-15)

Project	Directlink proposed capex
Control system upgrade	13.07
Fire suppression	7.19
Cable repairs	2.84
Phase reactor cooling revisions (Gotland solution)	2.28
Sourcing program - Cable joints	1.94
Sourcing program - IGBTs	1.87
Control system upgrade	1.51
Optic fibre cables and connectors	0.80
Cooling tower sound enclosure remediation	0.51
Security fence upgrade	0.39
Cable relocation	0.37
Emergency lighting	0.34
Roof repair of converter buildings	0.26
Building safety upgrade	0.18
Converter buildings ventilation sound dampers corrosion repair	0.05
Safety hand rails - Bungalora	0.02
TOTAL	33.62¹

1 Excludes \$1.57 million of proposed capex Directlink did not provide supporting documentation in its proposal.
Source: Directlink, May 2014, 'Revenue Proposal, Attachment 8.1, Capital expenditure business cases', p.1.

Directlink stated that the demand for its service will remain equal to its maximum capability during the 2015-20 period and that its proposed capital expenditure is therefore not growth related. Directlink stated that its capex is directed at maintaining the maximum capability of the link with a high degree of reliability, whilst ensuring that all regulatory, statutory and legislative requirements are met. Directlink identified reliability (\$23.7 million), refurbishment (\$10.5) and compliance (\$0.9 million) as drivers of its proposed capex program.⁹ Directlink has identified two projects which make up more than half of its proposed capex - converter station control system upgrade (\$13.1 million) and converter station fire suppression (\$7.2 million). The next highest value project proposed by Directlink was the phase reactor cooling revision project with a forecast capex of \$2.3 million.

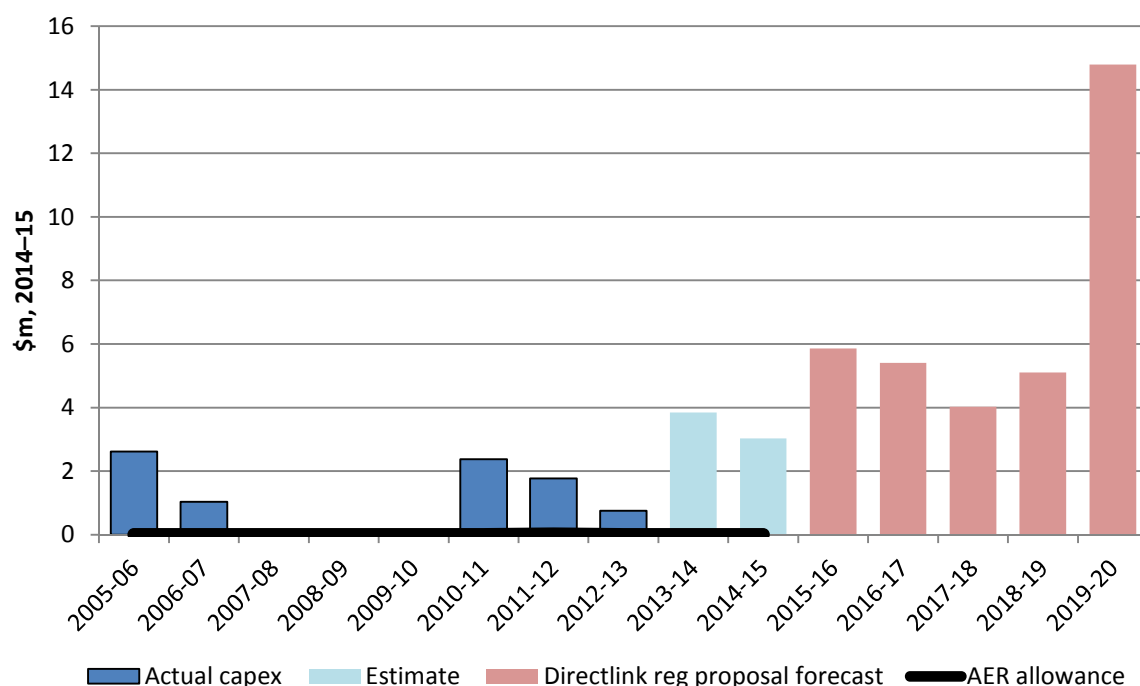
⁸ Directlink, *Revenue proposal*, p. 44.

⁹ Directlink, *Revenue proposal*, pp. 44-45.

Directlink elected not to engage an economic consultant to advise on forecast levels of inflation and real labour and materials cost escalation. Instead it indicated that it was prepared to accept whatever outcome the AER determined for these in its decisions for other NSW transmission and distribution businesses.¹⁰ Given our draft decisions for each of those NSPs, Directlink's forecast capital expenditure reflects a zero real cost escalation for labour and materials costs.

Figure 6-1 shows the increase between Directlink's proposed capex (2015-20) and its historic capex (2005-15). The principle increase in Directlink's proposed capex is attributed by Directlink to increases in expenditure to reliability to ensure availability of the link at maximum capability. Directlink stated that its forecasts for the capital projects in the refurbishment (or "stay-in-business"¹¹) and compliance categories reflect the impact of the Mullumbimby converter station fire in August 2012 to the Asset Management Plan approved by Directlink's Board in November 2013.¹²

Figure 6-1 Directlink—actual and proposed capex (\$ million 2014-15)



6.3 Assessment approach

This section outlines our approach to capex assessments. It sets out the relevant legislative and rule requirements, outlines our assessment techniques, and explains how we build an alternative estimate of total forecast capex against which we compare that proposed by the service provider.

We will accept Directlink's proposed total forecast capex if we are satisfied that it reasonably reflects the capex criteria.¹³ If we are not satisfied, we replace it with our estimate of a total forecast capex that we are satisfied reasonably reflects the capex criteria.¹⁴ The capex criteria are:

- (1) the efficient costs of achieving the capital expenditure objectives

¹⁰ Directlink, *Revenue proposal*, p. 19.

¹¹ Directlink, *Revenue proposal*, p. 48.

¹² Directlink, *Revenue proposal*, p. 47.

¹³ NER, cl. 6A.6.7(c).

¹⁴ NER, cl. 6A.6.7(d) and 6A.14.1(2)(ii).

- (2) the costs that a prudent operator would require to achieve the capital expenditure objectives
- (3) a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objectives.

The Australian Energy Market Commission (AEMC) noted that '[t]hese criteria broadly reflect the NEO [National Electricity Objective]'.¹⁵ The capital expenditure objectives (capex objectives) referred to in the capex criteria, are to:¹⁶

- (1) meet or manage the expected demand for prescribed transmission services over the period
- (2) comply with all regulatory obligations or requirements associated with the provision of prescribed transmission services
- (3) to the extent that there are no such obligations or requirements, maintain service quality, reliability and security of supply of prescribed transmission services and maintain the reliability and security of the transmission system
- (4) maintain the safety of the transmission system through the supply of prescribed transmission services.

Importantly, our assessment is about the total forecast capex and not about particular categories or projects in the capex forecast. The Australian Energy Market Commission (AEMC) has expressed our role in these terms:¹⁷

It should be noted here that what the AER approves in this context is expenditure allowances, not projects.

In deciding whether we are satisfied if Directlink's proposed total forecast capex reasonably reflects the capex criteria, we have regard to the capex factors.

The capex factors are:¹⁸

- (1) the AER's most recent annual benchmarking report and benchmarking capex that would be incurred by an efficient TNSP over the relevant regulatory control period
- (2) the actual and expected capex of the TNSP during the preceding regulatory control periods
- (3) the extent to which the capex forecast includes expenditure to address the concerns of electricity consumers as identified by the TNSP in the course of its engagement with electricity consumers
- (4) the relative prices of operating and capital inputs
- (5) the substitution possibilities between operating and capital expenditure
- (6) whether the capex forecast is consistent with any incentive scheme or schemes that apply to the TNSP

¹⁵ AEMC Final Rule Determination: National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, 29 November 2012, p. 113 (AEMC Economic Regulation Final Rule Determination).

¹⁶ NER, cl. 6A.6.7(a).

¹⁷ AEMC Economic Regulation Final Rule Determination, p. vii.

¹⁸ NER, cl. 6A.6.7(e).

- (7) the extent to which the capex forecast is referable to arrangements with a person other than the TNSP that, in the opinion of the AER, do not reflect arm's length terms
- (8) whether the capex forecast includes an amount relating to a project that should more appropriately be included as a contingent project
- (9) the most recent National Transmission Network Development Plan (NTNDP) and any submissions made by AEMO on the forecast of the TNSP's required capex
- (10) the extent to which the TNSP has considered, and made provision for, efficient and prudent non-network alternatives.
- (11) any relevant project assessment conclusions report under clause 5.6.6 of the NER.

In addition, the AER may notify the TNSP in writing, prior to the submission of its revised revenue proposal, of any other factor it considers relevant.¹⁹

In taking these factors into account, the AEMC has noted that:²⁰

...this does not mean that every factor will be relevant to every aspect of every regulatory determination the AER makes. The AER may decide that certain factors are not relevant in certain cases once it has considered them.

For transparency and ease of reference, we have included a summary of how we have had regard to each of the capex factors in our assessment at the end of this attachment.

More broadly, we also note that in exercising our discretion, we take into account the revenue and pricing principles which are set out in the National Electricity Law.²¹

The Expenditure Forecast Assessment Guideline

The rule changes the AEMC made in November 2012 require us to make and publish an Expenditure Forecast Assessment Guideline for Electricity Transmission (released in November 2013). The Guideline sets out the AER's proposed general approach to assessing capex (and opex) forecasts. The rule changes also require us to set out our approach to assessing capex in the relevant framework and approach paper. For Directlink, our framework and approach paper (published in January 2014) stated that we would apply the guideline, including the assessment techniques outlined in it. We may depart from our Guideline approach and if we do so, need to explain why. In this determination we have not departed from the approach set out in our Guideline, other than we have not assessed Directlink's capex by specific reference to capex drivers, and we have used a more limited number of techniques than we would typically use. Our reasons for our approach are set out below.

Building an alternative estimate of total forecast capex

Our starting point is the service provider's proposal.²² We then considered the service provider's performance in the previous regulatory control period to inform our alternative estimate. We also

¹⁹ NER, cl. 6A.6.7(e)(14).

²⁰ AEMC Economic Regulation Final Rule Determination, p. 115.

²¹ NEL, ss. 7A and 16(2).

²² AER Expenditure Forecast Electricity Transmission Guideline, p. 9; see also AEMC Economic Regulation Final Rule Determination, pp. 111 and 112.

reviewed the proposed forecast methodology and the service provider's reliance on key assumptions that underlie its forecast.

We then applied our specific assessment techniques, outlined below, to develop and estimate and assess the economic justifications that the service provider put forward. The specific techniques that we have used in this draft decision include:

- trend analysis—forecasting future expenditure based on historical information,
- review of asset management practices and a technical review of each of the capex projects

Importantly, our review of particular projects and programs is not conducted for the purpose of determining at a detailed level what projects or programs of work the service provider should or should not undertake. For Directlink, this is key part of our assessment but as the AEMC notes, the AER does not approve projects. Once we approve total revenue, which will be determined by reference to the AER's analysis of the proposed capex, the service provider will have to prioritise its capex program given the prevailing circumstances at the time (such as demand and economic conditions that impact during the regulatory period). Most likely, some projects or programs of work that were not anticipated will be required. Equally likely, some of the projects or programs of work that the service provider has proposed for the regulatory control period will not be required. We consider that acting prudently and efficiently, the service provider will consider the changing environment throughout the regulatory period and make sound decisions taking into account their individual circumstances.

As explained in our Guidelines:

We typically would not infer the findings of an assessment technique in isolation from other techniques.²³ For Directlink, however, we have relied primarily on our technical review of its proposed projects and programs. This is because for Directlink, we consider that this is the most robust technique given the nature and small scale of its operations, and its previous regulatory allowance.²⁴

We also need to take into account the various interrelationships between the total forecast capex and other components of a service provider's transmission determination. We identify these interrelationships in section 6.4.3 below.

Underlying our approach are two general assumptions:

- Capex criteria relating to a prudent operator and efficient costs are complementary such that prudent and efficient expenditure reflects the lowest long-term cost to consumers for the most appropriate investment or activity required to achieve the expenditure objectives.²⁵
- Past expenditure was sufficient for Directlink to manage and operate its network in that previous period, in a manner that achieved the capex objectives.²⁶ though for Directlink we have taken into account where relevant the operating risks arising from the impact of the Mullumbimby converter station fire in August 2012.

After applying the above approach, we arrive at our estimate of the total capex forecast.

²³ AER Expenditure Forecast Electricity Transmission Guideline, p.12

²⁴ AER Expenditure Forecast Electricity Transmission Guideline, p.15

²⁵ AER Expenditure Forecast Electricity Transmission Guideline, pp. 8-9.

²⁶ AER Expenditure Forecast Electricity Transmission Guideline, p. 9.

Comparing the service provider's proposal with our estimate

Having established our estimate of the total forecast capex, we can test the service provider's proposed total forecast capex. This includes comparing our alternative estimate of forecast total capex with the service provider's forecast total. The service provider's forecast methodology and its key assumptions may explain any differences between our alternative estimate and its proposal.

As the AEMC foreshadowed, we may need to exercise our judgement in determining whether any 'margin of difference' is reasonable.²⁷

The AER could be expected to approach the assessment of a NSP's expenditure (capex or opex) forecast by determining its own forecast of expenditure based on the material before it. Presumably this will never match exactly the amount proposed by the NSP. However there will be a certain margin of difference between the AER's forecast and that of the NSP within which the AER could say that the NSP's forecast is reasonable. What the margin is in a particular case, and therefore what the AER will accept as reasonable, is a matter for the AER exercising its regulatory judgment.

Where we approve a service provider's proposed total forecast capex or where we substitute our estimate of total forecast capex, it is important to recognise that the service provider is not precluded from undertaking unexpected capex works, if the need arises, and despite the fact that such works did not form part of our assessment in this determination. As noted above, we anticipate that a service provider will prioritise their capex program of works. Where an unexpected event leads to an overspend of the capex amount approved in this determination as part of total revenue, a service provider will only be required to bear 30 per cent of this cost if the expenditure is found to be prudent and efficient. Further, for significant unexpected capex, the pass-through provisions provide a means for a service provider to pass on such expenses to customers where appropriate. For these reasons, in the event that the approved total revenue underestimates the total capex required, we do not consider that this should lead to undue safety or reliability issues. Conversely, if we overestimate the amount of capex required, the stronger incentives put in place by the AEMC in 2012 should lead to a business spending only what is efficient, with the benefits of the underspend being shared between businesses and consumers.

6.4 Reasons for draft decision

We are not satisfied that Directlink's total forecast capex reasonably reflects the capex criteria. We compared Directlink's proposed total capex forecast to our alternative capex forecast constructed using certain techniques as outlined above. For the reasons set out below, we consider that our substitute estimate reasonably reflects the capex criteria.

6.4.1 Past capex performance

We consider there is limited benefit in reviewing Directlink's capex performance with other NSPs or on a trend basis over the previous period, as there are no equivalent electricity network assets to provide meaningful comparisons given the nature and small scale of Directlink's operations and that there was no allowance for capital expenditure approved for Directlink for the 2006-15 regulatory control period.²⁸

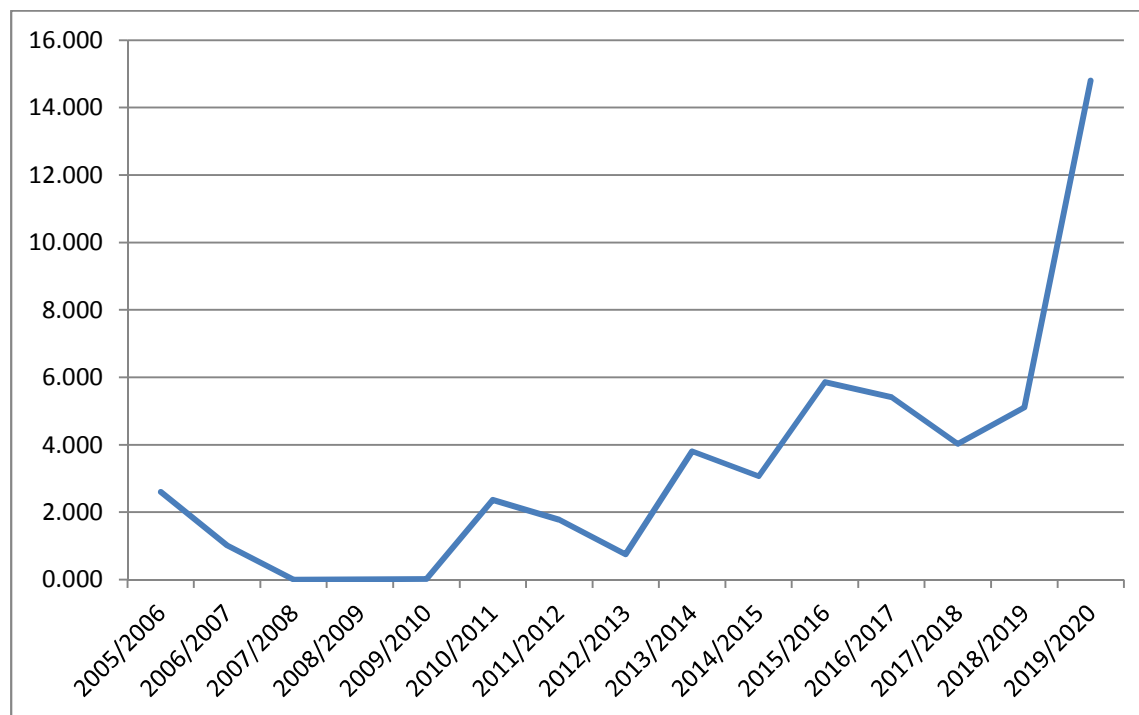
One of the capex factors that we are required to have regard to in determining an electricity network provider's capex allowance is the electricity network provider's actual and expected capex in previous

²⁷ AEMC Economic Regulation Final Rule Determination, p. 112.

²⁸ AER, *Directlink Joint Venturers' Application for Conversion and Revenue Cap Decision*, 3 March 2006, p. v.

regulatory control periods.²⁹ Directlink's capex proposal in this context suggests that the proposal appears relatively high when compared with the historic trend (see Figure 6-2).

Figure 6-2 Directlink capital expenditure (\$ real June 2015)



Source: Directlink, *Revenue proposal, Regulatory Information Notice, Template 2.2 Capex*.

For the period up to 2014/15, Figure 6-2 shows actual/estimated historic capex (rather than forecasts and allowances). Directlink submitted that the proposed capex program reflects that a number of its assets are nearing the end of their useful life as well as the requirement to maintain the maximum capability of the link with a high degree of reliability, whilst ensuring that all regulatory, statutory and legislative requirements are met. We reviewed this justification in the course of assessing the capex program proposed by Directlink's capex forecasts as discussed in section 6.4.2.

6.4.2 Assessment of proposed capital expenditure

Based on our review of Directlink's asset management practices and a technical review of each of the capex projects proposed by Directlink, we consider that total forecast capex of \$25.63 million (\$ real June 2015) for Directlink in the 2015-20 period reasonably reflects the capex criteria. This is a reduction of \$9.56 million or 27 per cent on Directlink's capex forecast of \$35.19 million. Total forecast capex of \$25.63 million provides Directlink with a reasonable opportunity to recover at least the efficient costs it incurs in providing direct control network services.³⁰

Our alternative estimate of the total forecast capex required is based on the same list of projects Directlink used to develop its proposal, but reflects the following adjustments to Directlink's proposed capex:

- A reduction of \$2.5 million to the proposed Fire Suppression Project in line with a lower expert consultancy estimate of the project.

²⁹ Consistent with cl. 6A.6.7(e)(5) of the NER.

³⁰ NEL, s. 7A(2).

The Directlink facility incorporates fire detection systems but currently has no fire suppression system. In August 2012 a fire at Mullumbimby converter station destroyed Directlink's system 1 converter and the associated converter building. Directlink claims that the August 2012 fire demonstrated that a fire suppression system would have been beneficial as it would limit equipment damage, avoid the total loss of a converter station and the consequent extended shutdown, as well as limit third party damage. Directlink also claims that the installation of a fire suppression system will comply with the recommendations of insurance advisors and energy industry advisors. It is estimated that the project to install the proposed fire suppression will take approximately three years at an estimated cost of \$7.2 million. Directlink propose to commence the installation project in mid-2016 with a planned completion date in late 2019.³¹

While the extent of combustible materials (e.g. insulating oil) and the availability of ignition sources within the converter stations is unclear, it is clear from the reports relating to the 2012 fire that the converter equipment has the potential for significant fire events. However, with the removal of the fiberglass 'igloos' from the reactors under the proposed phase reactor cooling revision project, a key potential source of fire risk will be removed from the converter buildings. Consequently, the fire risk associated with the converter buildings is likely to be significantly reduced and this will have plant performance implications as well as insurance implications for the facility (the latter is considered in the opex chapter of this decision). We do, however, acknowledge that there remains an inherent, but reduced, fire risk with the converter buildings.

We are of the view that a prudent electricity service provider would seek the most efficient solution. Directlink received an estimate for a solution with an estimated cost some \$2.5 million (or 55 per cent) less than its proposal.³² Directlink provided no information to show that this estimate did not address the identified need for a suitable fire suppression system. We have therefore included an amount of \$4.69 million in our substitute estimate of total capex.

- A reduction of \$2.13 million to the proposed Cable Repairs Program based on our assessment of Directlink's cable strategy and improved cable fault rate.

The DC cables associated with the Directlink facility exhibit a high failure rate associated with water ingress at cable joints. This cable fault trend showed a considerable worsening over the period from 2002 to 2010. Directlink has advised that in 2011-12 the facility's availability was 78.25 per cent and there were 12 cable faults that accounted for 50.96 per cent of the facility's unavailability which is a contribution to availability of 2.77 per cent for cable fault avoided.³³

To address the cable performance Directlink has developed a strategy of replacing significant lengths of cable adjacent to the fault. We understand that this strategy has been applied for approximately the past three years³⁴ and has shown a considerable improvement in cable failure rates over this time. The proposed expenditure of \$2.84 million provides for cable and associated jointing materials to support this strategy through the maintenance of suitable spares and an expansion of the replacement program.³⁵

We consider Directlink's cable repair strategy of replacing significant lengths of cable adjacent to the cable fault to be a prudent response to the worsening historical cable failure rates, given the

³¹ Directlink, *Regulatory Proposal, Attachment 8.1, Capital expenditure business cases, Fire Suppression Project*, May 2014.

³² Directlink, *Response to Capex 01 - information request*, 22 August 2014.

³³ Availability = 1 – unavailability. Note that each cable fault requires all three cables to be removed from service requiring that cable unavailability is multiplied by three to obtain the total impact.

³⁴ This trend can be seen in Directlink's raw cable fault rates as well as in the fault rates corrected for availability.

³⁵ Directlink, *Regulatory Proposal, Attachment 8.1, Capital expenditure business cases, Cable repairs*, May 2014.

improvements that are progressively being made in reduced cable outages. However, we consider the proposed cost is not based on a realistic estimate as the basis of the estimate assumes the continuation of 12 faults each year with no improvement. We consider that an average cable failure rate of three per annum can be expected to reflect the full impact of Directlink's cable repair strategy. We do not accept Directlink's estimate of a continuation of 12 cable faults per annum with no improvement. We have therefore included an amount of \$0.71 million in our alternative estimate.

- A reduction of \$1.46 million to the related Sourcing Program for Cable Joint Kits based on an expected reduced cable fault rate.

Directlink is proposing \$1.94 million of capex to maintain an adequate inventory of cable jointing materials and support the cable repair expenditure discussed above.³⁶

Whilst we consider Directlink's proposal to maintain an adequate inventory of cable jointing materials to support cable repair to be prudent, we do not consider the proposed expenditure to be efficient because we expect an improvement in the rate of cable faults as discussed above. We have therefore included an amount of \$0.48 million in our alternative estimate.

- A reduction of \$0.99 million for its proposed Zero Sequence Reactor Repair as a suitable reactor could be sourced for about a third of the cost of the proposed OEM reactor.

Directlink is proposing to refurbish its spare zero sequence reactor, which has been found to have corrosion damage in the core laminations. Its forecast cost of this work is \$1.5 million. We understand the reactor was originally purchased in 1999 as a spare and has been held in a wooden crate at various storage facilities since its purchase. APA acquired this spare in 2007 when it purchased the Directlink facility.³⁷

Zero sequence reactors are an integral part of the facility and are not easy to acquire and have long lead times. We therefore consider it prudent to ensure that a working spare reactor is available as this may impact on the availability performance of the Directlink facility. However, we do not accept Directlink's claim that experimenting with alternative suppliers to the OEM incurs increased technical risk in addition to jeopardising the original design performance and ongoing OEM support of Directlink's system.³⁸

We consider that a suitable reactor could be competitively sourced with minimal risk as there are various suppliers that could manufacture a similar device to the original electrical specification. Whilst we recognise the unique nature of the proposed work, it is our view that it is likely that a suitable reactor could be competitively sourced for around one third of the proposed cost³⁹. We have therefore included an amount of \$0.52 million in our alternative estimate.

- Removal of \$0.37 million for cable relocation.

³⁶ Directlink, *Regulatory Proposal, Attachment 8.1, Capital expenditure business cases, Sourcing Program for Cable Joint Kits*, May 2014.

³⁷ Directlink, *Regulatory Proposal, Attachment 8.1, Capital expenditure business cases, Zero Sequence Reactor Repair*, May 2014.

³⁸ Directlink, *Regulatory Proposal, Attachment 8.1, Capital expenditure business cases, Zero Sequence Reactor Repair*, May 2014.

³⁹ Zero sequence reactor costs can vary considerably depending on the details of the required specification. Typical costing has been used as details of the details of Directlink's zero sequence reactor's specification are unclear.

Directlink is proposing a \$0.37 million capex provision for the relocation of its DC cables in the event they need to be relocated due to development in proximity to any of the cables over the 2015-20 period.⁴⁰

We consider that there is no demonstrated need for Directlink's proposed relocation of its DC cables. It is our view that the proposed cable relocation capex is essentially a provision for an event that may not occur. We note that no cable relocations have been required historically by Directlink.⁴¹ Moreover, it is generally accepted industry practice that the proponent of any relocation (e.g. land developer) should fund all costs associated with the requested relocation. Consequently, we consider this capex is not prudent or efficient and have not included expenditure for cable relocation in our alternative estimate.

- Removal of \$0.34 million for emergency lighting

Directlink has identified that the existing converter stations have limited emergency lighting and exit signs and is proposing capex of \$0.34m to bring the facility up to the requirements of the current building code and relevant Australian standards.⁴²

We are aware that Directlink's facility was designed and built to the relevant requirements of the Building Code of Australia and Australian Standards at the time of its construction. There is no requirement in the NER, the Building Code of Australia or in the relevant Australian Standards that requires the retrospective application of these requirements or standards to existing facilities. Consequently we consider that the need for this expenditure has not been demonstrated and have not included expenditure for this emergency lighting project in our alternative estimate.

- A reduction of \$0.21 million for addressing roofing corrosion.

Directlink has stated that high rainfall and salt in the atmosphere due to the facility's proximity to the coast has caused corrosion to the converter station roofing materials which we are aware is mostly confined to the vicinity of the roof fixings. Directlink is proposing to undertake an annual restoration of the roofing material which it claims involves removing the corrosion, applying rust inhibitor and a paint coating, reinforcing with fiberglass and then coating with polyurethane. The total cost of this work is forecast at \$0.26m.⁴³

We consider that although Directlink's proposal to arrest the corrosion and remediate the corroding roofing materials is prudent, no evidence has been provided to support its claim that it is necessary to undertake work annually. Further, it is our view that the proposed action to arrest the corrosion and remediate the corroding roofing materials should provide protection for a considerable period of time and certainly in excess of one year. The efficiency of this expenditure has not been demonstrated as an annual cost and we have made an adjustment of \$0.21 million to remove the annual repair cost over the subsequent four years of the 2015-2020 period. We have therefore included an amount of \$0.05 million in our alternative estimate.

- Removal of \$1.57 million in expenditure to correct for an unexplained discrepancy between the amounts proposed in specified projects by Directlink and its total proposed capex.

⁴⁰ Directlink, *Regulatory Proposal, Attachment 8.1, Capital expenditure business cases, Cable Relocation*, May 2014.

⁴¹ Directlink, *Response to Capex 01 - information request*, 22 August 2014.

⁴² Directlink, *Regulatory Proposal, Attachment 8.1, Capital expenditure business cases, Emergency Lighting Project*, May 2014.

⁴³ Directlink, *Regulatory Proposal, Attachment 8.1, Capital expenditure business cases, Roof Repair of Converter Buildings*, May 2014.

In determining our substitute estimate, we have included the expenditure proposed by Directlink for the following projects:⁴⁴

- Directlink's proposed upgrade to its industrial computers control system for \$13.07 million. We recognise the unique nature of the Directlink facility and critical importance of the control system to the effective operation of this facility as well as the significant technical reliance that is placed on the control system OEM due to the relatively bespoke and proprietary nature of the system. Moreover, the performance of the control system has been problematic with it being implicated in 30 plant performance incidents, or approximately 20 per cent of all interruptions, since 2007. We accept that systems for the control room are at the end of their serviceable life. We consider the proposed expenditure of \$13.07 million is necessary to maintain the link at maximum capacity with a higher degree of reliability and for Directlink to meet its regulatory obligations.
- The proposed phase reactor cooling revisions to address performance issues with the fibreglass 'igloos' at a cost of \$2.28 million. This work is required to address the facility performance issues as well as reduce the risk of further failures or fire events. We consider that the program to maintain a holding of spare insulated-gate bipolar transistors (IGBT) to meet the ongoing replacement needs of Directlink's converters is prudent as it is required to maintain and improve the facilities performance as well as contribute to reduced repair costs. We are also of the view that the proposed expenditure is efficient given the proprietary and bespoke nature of the IGBT's.
- Directlink's proposed \$1.87 million to maintain a holding of spare IGBT's to meet the ongoing replacement needs of Directlink's converters. We consider that the proposed program is prudent as it is required to maintain and improve the facilities performance as well as contribute to reduced repair costs. We are also of the view that the proposed expenditure is efficient given the proprietary and bespoke nature of the IGBT's. Also, given that many of the IGBT failures events are related to the performance of optic fibre cables, their proprietary and bespoke nature and their critical role in the operation of the Directlink facility, we consider that the proposed cost of \$0.80 million for the replacement program for optic fibre cable and optic fibre connectors is prudent and efficient.
- Directlink's proposal to replace and remediate corroded sound enclosure panels associated with the cooling towers, at a total forecast cost of \$0.51 million. Directlink stated that the sound enclosures were installed in 2001 and local heavy rainfall as well as salt in the atmosphere due to the facilities proximity to the coast has caused corrosion to the sound enclosure panels along with potential design issues (e.g. clearance of water from the panels, material gauge and galvanising treatment). Although we are concerned that corrosion damage has occurred in a relatively short time after installation, we recognise that the sound enclosure is required for compliance with noise regulations and accept that corrosion warranting intervention has occurred. We consider that the replacement of the corroded panels and remediation with inhibitors and paint of the remaining panels is prudent and accept that it is a reasonably efficient approach.
- Directlink's proposed upgrade of the existing security fencing at its Mullumbimby facility to improve security and site emergency egress, at a total forecast cost of \$0.39 million. The relatively isolated location of the facility and the number of large towns in the area has resulted in frequent incidents of trespassing, theft and vandalism. Similar fencing at the Bungalora facility has been found to halt illegal entry at that site. Given the nature of the facility we consider that the proposed expenditure is prudent. We are also of the view that the proposed expenditure is reasonably efficient given the security requirements and type of fencing proposed.

⁴⁴ Directlink, *Regulatory Proposal, Attachment 8.1, Capital expenditure business cases*, May 2014.

Our alternative estimate includes Directlink's estimate of expenditure proposed by Directlink for three minor capex projects: for building safety upgrade at the Mullumbimby and Bungalora sites (\$0.18 million), converter buildings ventilation sound dampers corrosion repair (\$0.05 million), and the installation of safety hand rails at Bungalora (\$0.02 million). We consider this expenditure is prudent and efficient.

6.4.3 Interrelationships

Directlink's network service is subject to a Service Target Performance Incentive Scheme (STPIS). On the basis of significantly increased capex and anticipated increased reliability as a consequence of the impact of the Mullumbimby converter station fire, Directlink's STPIS performance targets will require recalibration.⁴⁵ The anticipated improvement in reliability has resulted in stricter performance targets. Details of the recalibrated STPIS targets are discussed in attachment 11 of this decision.

Having regard to the substitution possibilities between opex and capex⁴⁶ we expect the anticipated increased reliability of Directlink's performance during the 2015-20 regulatory control period will also impact on Directlink's operating risk. We consider that Directlink's operating risk will return to its pre-Mullumbimby converter station fire levels based on the increased allowances for capex (and opex) and as such, should be reflected in Directlink's insurance premiums. The impact on Directlink's insurance premiums is discussed in attachment 7 of this decision.

6.4.4 Real price escalators

As noted in section 6.2, Directlink did not propose labour and materials escalators. Instead, Directlink advised that they would accept our decision on these matters. We consider that real materials cost escalation should not be applied in determining a service provider's required capital expenditure. Consideration of the capex factors. We expect Directlink to provide further information in its revised revenue proposal (i.e. the proportion of labour of the total capex forecast) to allow an adjustment to total forecast capex to be made for expected real labour cost escalation over the 2015-120 regulatory control period.

In deciding whether or not we are satisfied Directlink's forecast reasonably reflects the capex criteria, we have had regard to the following capex factors when applying our assessment techniques to the total proposed capex forecast. Table 6-4 summarises how we have taken into account the capex factors.

Table 6-4 AER consideration of the capex factors

Capex factor	AER consideration
The actual and expected capex of Directlink during any preceding regulatory control periods	We have had regard to Directlink's actual and expected capex during the 2006–2015 regulatory control periods in assessing its proposed total forecast capex and in determining our substitute estimate for the 2015–2020 period. We consider that much of Directlink's proposed capex program reflects the stochastic nature of its capex requirements rather than that of a mature "steady state" system with recurrent capital expenditure programs. We also consider that Directlink is facing a number of "end-of-life" projects which have been included in its historical capex.

⁴⁵ NER, cl. 6A.6.7(8).
⁴⁶ NER, cl. 6A.6.7(e)(7).

Capex factor	AER consideration
The most recent annual benchmarking report and benchmarking capex that would be incurred by an efficient TNSP over the relevant regulatory control period	We consider there is limited benefit in reviewing Directlink's capex performance with other NSPs or on a trend basis over the previous period, as there are no equivalent electricity network assets to provide meaningful comparisons given the nature and small scale of Directlink's operations and due to the minimal capital expenditure incurred by Directlink for the 2006-15 regulatory control period.
The extent to which the capex forecast includes expenditure to address concerns of electricity consumers as identified by Directlink in the course of its engagement with electricity consumers	We have had regard to the extent to which Directlink's proposed total forecast capex includes expenditure to address consumer concerns that have been identified by Directlink. On the information available to us, Directlink has not identified any expenditure to address concerns by consumers.
The relative prices of operating and capital inputs	Directlink did not propose material real cost escalators. We consider that real material cost escalation should not be applied in determining Directlink's required capital expenditure.
The substitution possibilities between operating and capital expenditure	We have had regard to the substitution possibilities between opex and capex. We have considered whether there are more efficient and prudent trade-offs in investing more or less in capital in place of ongoing operations. We consider that Directlink's operating risk will decline to its pre-Mullumbimby converter station fire levels based on the increased allowances for capex (and opex) and as such, should be reflected in Directlink's insurance premiums.
Whether the capex forecast is consistent with any incentive scheme or schemes that apply to Directlink.	We have had regard to whether Directlink's proposed total forecast capex is consistent with the STPIS. See our discussion about the interrelationships between Directlink's total forecast capex and the application of the STPIS above and in attachment 11.
The extent to which the capex forecast is referable to arrangements with a person other than the TNSP that do not reflect arm's length terms	We have had regard to whether any part of Directlink's proposed total forecast capex or our substitute estimate is referable to arrangements with a person other than Directlink that do not reflect arm's length terms. We did not identify any parts of Directlink's proposed total forecast capex or our substitute estimate that is referable in this way.
Whether the capex forecast includes an amount relating to a project that should more appropriately be included as a contingent project	We have had regard to whether any amount of Directlink's proposed total forecast capex or our substitute estimate relates to a project that should more appropriately be included as a contingent project. We did not identify any such amounts.
The extent to which Directlink has considered and made provision for efficient and prudent non-network alternatives	We have had regard to the extent to which Directlink made provision for efficient and prudent non-network alternatives as part of our assessment of the capex associated with the non-network capex driver.
Any relevant final project assessment report (as defined in clause 5.10.2 of the NER) published under clause 5.17.4(o), (p) or (s)	There are no final project assessment reports relevant to Directlink for us to have regard to.
Any other factor the AER considers relevant and which the AER has notified Directlink in writing, prior to the submission of its revised regulatory proposal under is	We did not identify any other capex factor that we consider relevant.

Capex factor	AER consideration
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a capex factor

Source: AER analysis

6.4.5 Conclusion

For the foregoing reasons, we do not accept the total forecast capex of \$35.19 million that Directlink proposed in its revenue proposal for the 2015–20 regulatory control period. This is because we are not satisfied that a total forecast capex of \$35.19 million reasonably reflects the capex criteria. In reaching this conclusion, we have taken into account the revenue and pricing principles.⁴⁷

Our alternative estimate of the required capex has been influenced in part by Directlink's proposal, namely the anticipated impact on reliability and the need to ensure availability of Directlink's link at maximum capability. Our alternative estimate also takes into account the operating risks arising from the impact of the Mullumbimby converter station fire in August 2012.

Our substitute estimate of the total forecast capex that Directlink requires over the 2015–20 regulatory control period is based on our alternative estimate. We are satisfied that this amount of \$25.63 million (\$2014-15) reasonably reflects the capex criteria. This should provide Directlink with a reasonable opportunity to recover at least its efficient costs. Table 6-5 shows the adjustments we have made to Directlink's proposed capex.

Table 6-5 Draft decision: capex adjustment (\$m real, 2014-15)

Project	Directlink proposed capex	AER adjustment	Draft Decision
Control system upgrade	13.07	-	13.07
Fire suppression	7.19	-2.50	4.69
Cable repairs	2.84	-2.13	0.71
Phase reactor cooling revisions (Gotland solution)	2.28	-	2.28
Sourcing program - Cable joints	1.94	-1.46	0.48
Sourcing program - IGBTs	1.87	-	1.87
Zero sequence reactor repair	1.51	-0.99	0.52
Optic fibre cables and connectors	0.80	-	0.80
Cooling tower sound enclosure remediation	0.51	-	0.51
Security fence upgrade	0.39	-	0.39
Cable relocation	0.37	-0.37	-
Emergency lighting	0.34	-0.34	-
Roof repair of converter buildings	0.26	-0.21	0.05
Building safety upgrade	0.18	-	0.18

⁴⁷ NEL, s. 7A.

Project	Directlink proposed capex	AER adjustment	Draft Decision
Converter buildings ventilation sound dampers corrosion repair	0.05	-	0.05
Safety hand rails - Bungalora	0.02	-	0.02
Other	1.57	-1.57	0.00
TOTAL	35.19	9.56	25.63

Source: Directlink, May 2014, 'Revenue Proposal, Attachment 8.1, Capital expenditure business cases', p.1 and Directlink, Regulatory proposal, p. 55.