



**DRAFT DECISION**

**Directlink**

**Transmission Determination**

**2020 to 2025**

**Attachment 5**

**Capital expenditure**

October 2019

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## Note

This attachment forms part of the AER's draft decision on Directlink's 2020–25 transmission determination. It should be read with all other parts of the draft decision.

The draft decision includes the following attachments:

Overview

Attachment 1 – Maximum allowed revenue

Attachment 2 – Regulatory asset base

Attachment 3 – Rate of return

Attachment 4 – Regulatory depreciation

Attachment 5 – Capital expenditure

Attachment 6 – Operating expenditure

Attachment 7 – Corporate income tax

Attachment 8 – Efficiency benefit sharing scheme

Attachment 9 – Capital expenditure sharing scheme

Attachment 10 – Service target performance incentive scheme

Attachment 11 – Pricing methodology

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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
augex	Augmentation expenditure
capex	capital expenditure
CESS	capital expenditure sharing scheme
CPI	consumer price index
EBSS	efficiency benefit sharing scheme
F&A	framework and approach
MAR	maximum allowed revenue
NEL	national electricity law
NEM	national electricity market
NEO	national electricity objective
NER	national electricity rules
NSP	network service provider
opex	operating expenditure
PTRM	post-tax revenue model
RAB	regulatory asset base
repex	replacement expenditure
RFM	roll forward model
RPP	revenue and pricing principles
STPIS	service target performance incentive scheme
TNSP	transmission network service provider
WACC	weighted average cost of capital

## 5 Capital expenditure

Capital expenditure (capex) refers to the investment made in the transmission network to provide prescribed transmission services. This investment mostly relates to assets with long lives (30-50 years is typical) and these costs are recovered over several regulatory periods.

On an annual basis, the financing and depreciation costs associated with these assets are recovered (return of and on capital) as part of the building blocks that form Directlink's total revenue requirement.<sup>1</sup>

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

Our draft decision is based on our analysis of Directlink's proposal and the information we have received to date from Directlink. We will be informed by Directlink's revised proposal, submissions and further analysis in making our final decision in April 2020.

### 5.1 Draft decision

Directlink has not satisfied us that its total net capex forecast of \$40.5 million (\$2019–20) reasonably reflects the capex criteria set out in the NER.<sup>2</sup> Our substitute estimate of \$30.6 million is 24 per cent below Directlink's forecast. We are satisfied that our substitute estimate reasonably reflects the capex criteria. Table 5-1 outlines our draft decision.

**Table 5-1 Draft decision on Directlink's total forecast transmission capex (\$million 2019–20)**

	2019–20	2020–21	2021–22	2022–23	2023–24	Total
Directlink's proposal	11.5	8.2	7.2	8.5	4.9	40.5
AER draft decision	10.4	6.7	4.8	4.9	3.8	30.6
Difference	-1.1	-1.5	-2.4	-3.6	-1.1	-9.9
Percentage difference (%)	-9.6%	-18.3%	-33.3%	-42.5%	-22.4%	-24.4%

Source: AER analysis.

Note: Numbers may not add up due to rounding.

Table 5-2 summarises our findings and the reasons for our draft decision. Our decision relates to Directlink's total forecast capex for the 2020–2025 regulatory control period. We do not approve a particular category of capex or specific projects, but rather an overall amount. However, as part of our assessment, we necessarily review categories

<sup>1</sup> NER, cl. 6A.5.4(a).

<sup>2</sup> NER, cl. 6A.6.7(c).

of expenditure and particular projects in order to test whether Directlink's proposed total forecast capex reasonably reflects the capex criteria.

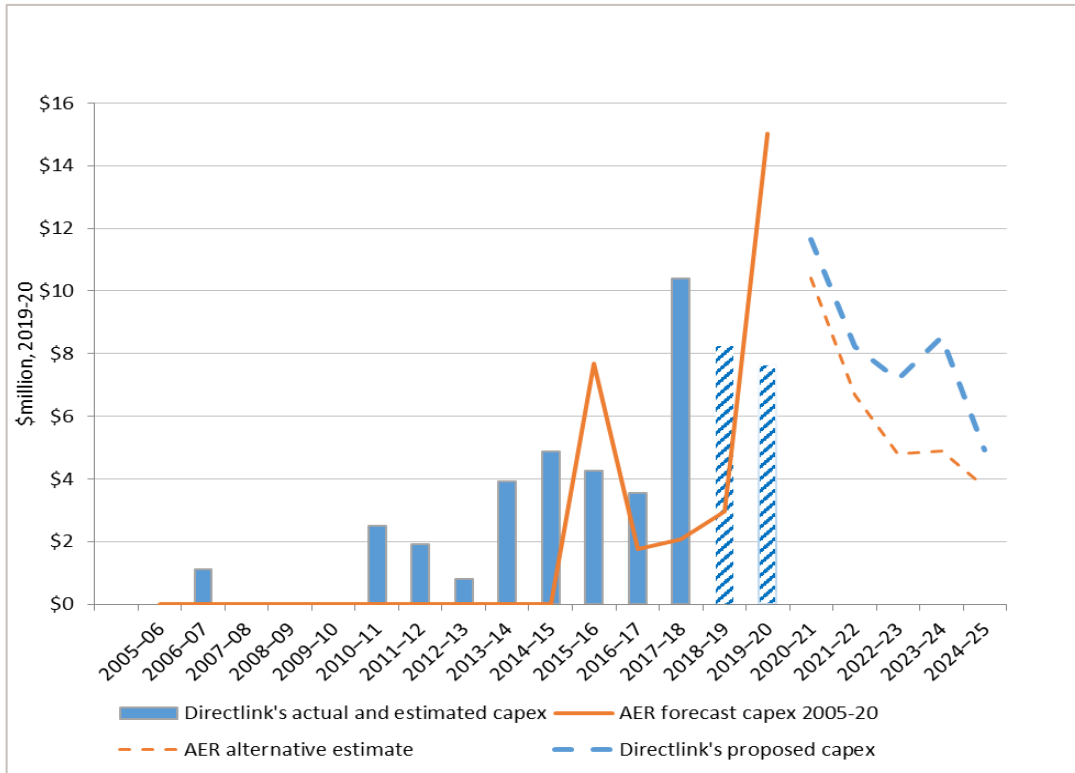
**Table 5-2 Summary of AER reasons and findings**

Issue	Reasons and findings
Total capex forecast	<p>Directlink proposed a total capex forecast of \$40.5 million (\$2019-20) in its proposal. Directlink has not justified that this forecast reasonably reflects the capex criteria.</p> <p>We are satisfied our substitute estimate of \$30.6 million (\$2019-20, including overheads) reasonably reflects the capex criteria. Our substitute estimate is 24 per cent lower than Directlink's initial proposal.</p> <p>The reasons for this decision are summarised in this table and detailed in section 5.2</p>
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 submitted business cases for most projects that support its capex program. We consider that the majority of Directlink's proposed capex program is prudent and is justified with respect to the need to maintain reliability and meet regulatory obligations.</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. We have undertaken detailed reviews of Directlink's asset management practices and specific capex projects.</p> <p>Directlink's proposed forecast capex is 19 per cent (\$6.4 million) higher than the 2015–20 regulatory control period. Much of Directlink's proposed capex program reflects the variable nature of Directlink's capex requirements as a single asset (as opposed to larger TNSPs with more evenly spread recurrent capex on a broader portfolio of assets). A significant part of the forecast (\$17.3 million or 43 per cent) is for replacement of obsolete Insulated Gate Bi-polar Transistors (IGBTs).</p>
Forecast capex	<p>We do not accept Directlink's proposed forecast capex of \$40.5 million (\$2019–20). Based on the information before us, this forecast exceeds the amount required to achieve the capex objectives.</p> <p>We consider Directlink's proposed expenditure for a number of proposed capex projects is not likely to contribute to a forecast of total capex that reasonably reflects the capex criteria. The total value of these projects is \$9.9 million, which includes capex for the following projects:</p> <ul style="list-style-type: none"> <li>• \$4 million to underground part of its cables in response to the proposed Rail Trail construction activity and operation</li> <li>• \$3.1 million to replace the phase reactors with the installation of a Variable Speed Drive on the cooling fans</li> <li>• \$2.1 million to cover part of the future cost of restoration and rectification works at the end of the life of the interconnector; and</li> <li>• \$0.5 million for noise monitoring equipment.</li> </ul> <p>We also consider that \$0.3 million in capex that Directlink had proposed for the stakeholder component of its regulatory reset expenditure is likely to be in the nature of opex rather than capex. Further, during the review process, Directlink updated its proposed capex resulting in a reduction of \$0.1 million from its initial proposal.</p> <p>We consider our alternative estimate of Directlink's required capex in the 2020–25 regulatory control period of \$30.6 million is sufficient to maintain the reliability and availability of Directlink.</p>
Real cost escalation	<p>Directlink did not propose any real cost escalation to capital expenditure beyond adjustments for consumer price inflation. Directlink did not propose any step changes in input costs for capital expenditure.</p>

## 5.2 Directlink's proposal

Directlink proposed total forecast capex of \$40.5 million (\$2019–20) for the 2020–25 regulatory control period.<sup>3</sup> The proposed capex is \$6.4 million (or 19 per cent) higher than the actual/estimated capex over the 2015-20 regulatory control period.<sup>4</sup> Figure 5-1 outlines Directlink's historical capex trend, its proposed forecast for the 2020–25 regulatory control period, and our draft decision.

**Figure 5-1 Directlink's historical vs forecast capex (\$2019–20, million)**



Source: Directlink, *Revenue proposal 2020–25*, 31 January 2019, p. 53; AER analysis.

Directlink submitted that it is a single asset with stochastic capital expenditure requirements rather than a mature "steady state" system with recurrent capital expenditure programs. Directlink considered that because of this it could be expected to have significant year to year variations in capex. Directlink also considered this provides an explanation for any significant variations in its forecast capital expenditure from historical capital expenditure.<sup>5</sup>

In support of its capex forecast, Directlink provided business cases and supporting information for each of the capex projects listed in Table 5-3.

<sup>3</sup> Directlink, *Revenue proposal 2020–25*, 31 January 2019, p. 77.

<sup>4</sup> Directlink, *Revenue proposal 2020–25*, 31 January 2019, p. 77 and AER analysis.

<sup>5</sup> Directlink, *Revenue proposal 2020–25*, 31 January 2019, p. 53.



**Table 5-3 Directlink proposed capex projects (\$million, 2019–20)**

Project	Directlink proposed capex
Obsolete Insulated gate bi-polar transistors	17.3
Cable protection	4.8
Reliability	4.4
Optic fibres	3.8
Corrosion and environmental deterioration	2.9
Land rectification and restoration	2.1
Cable modification	2.1
Stay in business	0.8
Essential spares	0.8
Testing equipment	0.8
Noise monitoring equipment	0.5
Regulatory	0.3
<b>TOTAL</b>	<b>40.5<sup>a</sup></b>

Source: Directlink, *Revenue Proposal 2020–25*, 31 January 2019, pp. 57–77.

(a) Numbers may not add up due to rounding.

Directlink submitted that its forecast expenditure is directed at maintaining the capability and reliability of the network, whilst ensuring that all regulatory, statutory and legislative requirements are met. Directlink has identified the refurbishment or replacement of auxiliary equipment necessary for the continued reliable and secure operation of its link as drivers of its proposed capital expenditure program. Directlink submitted that it did not have any augmentation or expansion expenditure in the 2015–20 regulatory control period and is not forecasting any in the 2020–25 regulatory control period.<sup>6</sup>

Directlink's proposed replacement of obsolete Insulated Gate Bi-polar Transistors (IGBTs) makes up 43 per cent or \$17.3 million of its capex program. The next most material projects proposed by Directlink were cable protection (\$4.8 million), reliability (\$4.4 million) and optic fibres replacement (\$3.8 million).

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<sup>6</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, pp. 54–55.

Directlink did not propose any real cost escalation to capex beyond adjustments for inflation. This is consistent with our recent decisions for NSPs where we have allowed zero real cost escalation for materials costs for forecast capex.<sup>7</sup>

### 5.3 AER's assessment approach

In assessing forecast capital expenditure, we are guided by the National Electricity Objective and underpinning capex criteria and objectives set out in the NER. We must accept a business's capex forecast if we are satisfied that the total forecast for the regulatory control period reasonably reflects the capex criteria.<sup>8</sup>

In determining whether Directlink's proposal reasonably reflects the capex criteria, we use various qualitative and quantitative assessment techniques to assess the different elements of Directlink's proposal. Section 5.4 outlines how we came to our position and the weight we placed on some capex factors relative to others.

More broadly, we must take into account the revenue and pricing principles set out in the NEL. In particular, we take into account whether our overall capex forecast provides Directlink with a reasonable opportunity to recover at least the efficient costs it incurs to:

- provide direct control network services; and
- comply with its regulatory obligations and requirements.<sup>9</sup>

When assessing capex forecasts, we also consider that:

- the efficiency criteria and the prudence criteria in the NER are complementary. Prudent and efficient expenditure reflects the lowest long-term cost to consumers for the most appropriate investment activity required to achieve the expenditure objectives
- past expenditure was sufficient for the business to manage and operate its network in previous periods, in a manner that achieved the capex objectives.

#### 5.3.1 Considerations in applying our assessment techniques

Some of our assessment techniques focus on total capex, while others focus on standardised sub-categories of capex, or individual projects and programs. Importantly, while we may consider certain programs and projects in forming a view on the total capex forecast, we do not determine which programs or projects a business should or should not undertake.

This is consistent with our ex ante incentive based regulatory framework. Our approach is based on approving an overall ex ante revenue requirement that includes

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<sup>7</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 54.

<sup>8</sup> NER, cl. 6A.6.7(c).

<sup>9</sup> NEL, s. 7A(2).

an assessment of what we find to be a prudent and efficient total capex forecast. Once the ex ante allowance is established, businesses are incentivised to provide services at the lowest possible cost because their returns are determined by the actual costs of providing services. If businesses reduce their costs to below the estimate of efficient costs, the savings are shared with consumers in future regulatory periods.

This ex ante incentive-based regulatory framework recognises that the business should have the flexibility to prioritise its capex program given its circumstances over the course of the regulatory control period. The business may need to undertake programs or projects that it did not anticipate during the transmission determination process. The business may also not need to complete some of the programs or projects it proposed during the forecast regulatory control period if circumstances change. We consider a prudent and efficient business would consider the changing environment throughout the regulatory control period and make decisions accordingly.

Therefore, recognising the interplay between the broader incentive framework, and program and project investment considerations, when reviewing a capex forecast we use a combination of bottom-up and top-down assessment techniques. Assessment of the bottom-up build of forecasts including underlying assumptions is an informative way to establish whether the forecast capex at the program or project level is prudent and efficient. Many of the techniques we apply at this level encompass the capex factors that we are required to consider. However, we are also mindful that a narrow focus on only a bottom-up assessment may not itself provide sufficient evidence that the forecast is prudent and efficient. Bottom-up approaches tend to overstate required allowances, as they do not adequately account for interrelationships and synergies between programs, projects or areas of work.

Thus, we also review the prudence and efficiency of aggregate expenditure areas or the total capex forecast. Top-down analysis provides us with assurance that the entire expenditure program is prudent and efficient, and allows us to consider a business's total capex forecast. We use holistic assessment approaches that include a suite of techniques such as trend analysis, benchmarking, predictive modelling and detailed technical reviews. Consistent with our holistic approach, we take into account the various interrelationships between the total capex forecast and other components of a business's transmission determination, such as forecast opex and STPIS interactions.

In the event we are not satisfied a business's proposed capex forecast reasonably reflects the capex criteria, we are required to determine a substitute estimate. We do so by applying our various assessment techniques. We then use our judgement to weight the results of these techniques case-by-case, in light of all the relevant information available to us. Broadly, we give greater weight to techniques that we consider are more robust in the particular circumstances of the assessment.

Importantly, our decision on the total capex forecast does not limit a business's actual spending. We set the forecast at the level where the business has a reasonable opportunity to recover their efficient costs. As noted previously, a business may spend more or less on capex than the total forecast amount specified in our decision in response to unanticipated expenditure needs or changes.

The regulatory framework has a number of mechanisms to deal with these circumstances. Importantly, a business does not bear the full cost where unexpected events lead to an overspend of the approved capex forecast. Rather, the business bears 30 per cent of this cost if the expenditure is subsequently found to be prudent and efficient. Further, the pass through provisions provide a means for a business to pass on significant, unexpected capex to customers, where appropriate.<sup>10</sup>

Similarly, a business may spend less than the capex forecast because it has operated at a more efficient level than expected. In this case, the business will keep on average 30 per cent of this reduction over time, with the remaining benefits shared with its customers.

### **5.3.2 Safety and reliability considerations**

Our position in this draft decision is that our approved capex forecast will provide for a prudent and efficient service provider in Directlink's circumstances to maintain performance at the targets set out in the STPIS. Therefore, it is appropriate to apply the STPIS, as set out in attachment 10. The STPIS provides incentives to businesses to further improve the reliability of supply only where customers are willing to pay for these improvements.

Our analysis in section 5.4 outlines how our assessment techniques factor in network safety and reliability. We consider our substitute estimate will allow Directlink to maintain the safety, service quality and reliability of its network, consistent with its legislative obligations.

### **5.3.3 Interrelationships**

Consistent with our holistic approach, we take into account the various interrelationships between a business's total capex forecast and other components of its transmission determination, such as forecast opex, forecast demand, the Capital Expenditure Sharing Scheme (CESS) and STPIS interactions.<sup>11</sup>

## **5.4 Reasons for draft decision**

We applied the assessment approach set out in section 5.3 to Directlink. Based on our assessment of the information available, we are not satisfied that Directlink's total capex forecast of \$40.5 million (\$2019–20) reasonably reflects the capex criteria. We have included an amount of \$30.6 million (\$2019–20) in our substitute estimate of total capex. We are satisfied that our substitute estimate reasonably reflects the capex criteria. Our reasons are discussed below.

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<sup>10</sup> NER, cl.6A.7.3.

<sup>11</sup> NER, cl. 6A.1.3(1) and 6A.6.5A(d)(1).

### 5.4.1 Past capex performance

We consider there is limited benefit in comparing Directlink's capex performance with other NSPs as there are no equivalent electricity network assets to provide meaningful comparisons given the nature and small scale of Directlink's operations. We also consider that there is limited benefit in reviewing Directlink's capex on a trend basis over a number of previous periods. There was no allowance for capital expenditure approved for Directlink for the 2006–15 regulatory control period.<sup>12</sup>

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 regulatory control periods.<sup>13</sup> Directlink's capex proposal in this context appears relatively high when compared with longer-term average historical levels of capex, but only slightly higher than the current regulatory control period (see Figure 5-1). We also consider that Directlink's historical levels of capex may not be a good guide to future investment requirements due to the variable nature of expenditure for a single asset (as opposed to larger TNSPs with more evenly spread recurrent capex relating to a broader portfolio of assets).<sup>14</sup>

### 5.4.2 Assessment of proposed capital expenditure

Based on our review of Directlink's asset management practices and an economic and technical review of the capex projects proposed by Directlink, we consider that total forecast capex of \$30.6 million (\$2019-20) in the 2020–25 regulatory control period reasonably reflects the capex criteria. This is a reduction of \$9.9 million or 24 per cent on Directlink's capex forecast of \$40.5 million. We consider that a total capex allowance of \$30.6 million provides Directlink with a reasonable opportunity to recover at least the efficient costs it incurs in providing direct control network services.<sup>15</sup>

Our substitute estimate of total forecast capex for the 2020–25 regulatory control period reflects our assessment of the capex projects included in Directlink's revenue proposal. After analysing Directlink's proposal, we formed a view on our substitute estimate of capex that reasonably reflects the capex criteria. Our substitute estimate is based on our assessment of Directlink's forecast capex projects as set out below.

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<sup>12</sup> AER, *Directlink Joint Venturers' Application for Conversion and Revenue Cap Decision*, 3 March 2006, p. v.

<sup>13</sup> Consistent with NER, cl. 6A.6.7(e)(5).

<sup>14</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 53.

<sup>15</sup> NEL, s. 7A(2).

## 5.4.2.1 Projects amended or excluded from our substitute estimate

### Cable protection

Directlink proposed two cable protection projects for the purpose of maintaining reliability, security of supply and safety to the community by limiting the cable's exposure to increased traffic (foot, cycle, and vehicle) caused by organic regional growth as well as protection from construction equipment because of the increasing development expected near the easement.<sup>16</sup>

The two projects are:

1. Cable signage and protection; and
2. Cable protection - partial relocation (underground).

#### *Cable signage and protection*

Directlink proposed capex of \$0.8 million for the cable signage and protection component of its cable protection program. Directlink submitted that on an increasingly regular basis, existing signage to make the public aware of the presence of Directlink's cable to avoid accidental contact has been damaged or removed. Directlink also submitted that the location of its cable is prone to weather events that have also resulted in damage to its signage.<sup>17</sup>

Directlink has identified the Northern Rivers Rail Trail project as likely to impose a significant change of use of its shared corridor and impacts on 14 to 20 kilometres of cable, mostly in the above ground sections of galvanised steel trays.<sup>18</sup> Initial funding for the Rail Trail has been obtained from federal and state governments.<sup>19</sup> Directlink submitted that its cable signage and protection project proposes a base case signage and cable protection measure program suitable for the cable environment as it is today, as well as an additional budget allowance in response to the Rail Trail as a minimal response, pending the outcome of further measures inclusive of partial relocation. Directlink proposed \$0.5 million capex for the 'base case' component of this project and \$0.3 million as a response to the Rail Trail project in those locations where the underground cable is near the proposed Rail Trail. Directlink submitted that these forecast costs reflect quotes from multiple suppliers of procurement items and a labour allocation appropriate to the scale of the project.<sup>20</sup>

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<sup>16</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

<sup>17</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

<sup>18</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

<sup>19</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 61.

<sup>20</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

### ***Cable protection - partial relocation (underground)***

Directlink submitted that Rail Trail construction activity (including personnel and equipment) would be in close proximity with the Directlink interconnector assets. Directlink's three transmission cables run through a galvanised steel tray that runs adjacent to the current railway corridor. Directlink submitted that the construction activity and significant change of use of the corridor into a recreational area represent real changes to the current risk profile of cable interference probability. Directlink also submitted that the galvanised steel tray is designed to enclose the cables and provide some protection from the elements but has limited capacity to withstand accidental or deliberate physical damage.<sup>21</sup>

Directlink acknowledged that the risks associated with the Rail Trail are yet to be assessed on a final design option.<sup>22</sup> Directlink submitted that it has been assessing concept designs for the Rail Trail provided by the Tweed Shire Council and has proposed an investigation into the partial relocation (via undergrounding) of the cable most impacted by the Rail Trail design in the long term, and Rail Trail construction activity in the nearer term.<sup>23</sup>

Directlink submitted that given that risks are envisaged for the scale and type of construction activity near Directlink's high voltage cable, but are yet to be assessed on a final design option, it is essential that Directlink conduct an appropriate scale of risk assessment which will include an As Low As Reasonably Practical (ALARP) risk study.<sup>24</sup> Directlink acknowledged that for the purposes of its ALARP study there is no evidence internationally of death because of deliberate or accidental damage to high voltage cables in a galvanised steel tray less than a metre off the ground. Directlink, however, considered there is a risk as equipment used to construct and maintain the Rail Trail will be in close proximity to the galvanised steel tray.<sup>25</sup>

Directlink submitted that, subject to the results of a detailed ALARP study, it expects that efficiently meeting the standard of ALARP will involve either moving the cable underground in, or close to, its current location, or where that is not feasible, relocating the cable away from the trail to make it once again remote and difficult to physically access for the general public and workers on the Rail Trail.<sup>26</sup>

Directlink's cost estimate of \$4.0 million for cable relocation was based on an initial consideration of the high-level proposals being considered by the Tweed Shire Council. Based on these high-level proposals, Directlink has proposed prioritising one-

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<sup>21</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 62.

<sup>22</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 62.

<sup>23</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

<sup>24</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

<sup>25</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 64.

<sup>26</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 64.



third (4.1 kilometres) of the 12.5 kilometres of cable impacted by the Rail Trail. Directlink's forecast assumes the entire cost for relocation is borne by Directlink.<sup>27</sup>

### ***AER assessment and conclusions***

We consider that Directlink has justified its proposed capex of \$0.8 million for the cable signage and protection component of its cable protection program. It is necessary to have signage to make the public aware of the presence of Directlink's assets to avoid accidental contact. Where signage is inadequate or has been damaged or removed, it is prudent to replace or enhance this signage as necessary in order to maintain safety near Directlink's assets. We also consider that Directlink's proposal to allocate \$0.5 million for the 'base case' component of this project and an additional \$0.3 million as a minimal response to the Rail Trail is likely to be reasonable.

We do not however consider that Directlink has justified the partial relocation component of its cable protection program. We have not included the partial relocation component in our substitute estimate of forecast capex because:

- Directlink has not yet undertaken a detailed study of the change in risk associated with the Rail Trail project, or quantified the benefits of addressing the potential risks relative to the cost of doing so;
- Directlink has assumed that the cable will need to be undergrounded to make it safe during the construction and operation of the Rail Trail, without consideration of other options; and
- Directlink has assumed that it will be required to fund any cable relocation work without contribution from the Tweed Shire Council or any other party.

We consider that any change in the risk of damage to Directlink's cable during construction of the Rail Trail can be addressed using temporary methods such as requiring the construction contractor to adopt practices that would reduce or avoid the risk of damage to, or contact with, the cable. For example, as a condition of access to Directlink's easement, Directlink could negotiate with the landowner that, as a condition of access, the contractor is to provide temporary fencing, additional signage, additional training for site workers or have an observer on site during all construction work in the vicinity of the cable ducts. One, more, or even all of these could be a requirement for the constructing contractor. Ultimately, the construction contractor also has an obligation to provide a safe working environment for its employees.

If risk arising from exposure of the asset to damage or interference during operation of the Rail Trail is material, such that mitigation is reasonably required, then options such as permanent fencing or additional signage could also be considered to address this risk rather than the single option of undergrounding the relevant cable section.

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<sup>27</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.



We also consider that costs related to the relocation of network assets necessitated by a third party construction project would typically be a cost to the project proponent, and should not generally be borne by electricity consumers. In circumstances where the project proponent refuses to pay for necessary measures to protect the asset and maintain safety then there may be a case for the recovery of prudent and efficient costs through Directlink's regulated revenue. However, we are not satisfied that Directlink has made this case. For such a case to be made, Directlink would need to:

1. demonstrate that the change in the risk from asset exposure posed by the Rail Trail (construction or use) represents a material change in risk that necessitates action under the relevant legislation
2. demonstrate that the costs can't be reasonably recovered from the proponent (including through legal claims)
3. demonstrate it has considered all reasonable and practical options to manage the risk including options such as those mentioned above; and
4. demonstrate it has chosen the most efficient option to address the change in risk.

In summary, based on the information available, we consider that:

- the risk has not been shown to be materially altered such that the need for the proposed cable protection (relocation) investment is clear
- recovery of cable protection (relocation) costs, if required, from the Rail Trail proponent has not been reasonably ruled out; and
- other options to mitigate the construction and operation risk of the Rail Trail have not been fully considered.

For these reasons, we consider that Directlink's proposed partial cable relocation component of its cable protection program has not been demonstrated to be prudent and efficient, and would therefore not form part of a total capex forecast that reasonably reflects the capex criteria.

## **Variable Speed Drive for Phase Reactor and Cooling Pumps (part of Directlink's reliability program)**

Directlink submitted that the motors on its phase reactor cooling system currently run only in an on/off mode and that this temperature cycling creates additional wear and tear on the reactors, shortening their operational life. Directlink proposed a project to reposition its phase reactor cooling fans and add variable speed drives (VSD), thereby providing greater flexibility to the temperature control function and consequently reducing wear and tear on the phase reactor and overall operation noise from the convertor station.<sup>28</sup> Directlink estimated a capex cost for this project of \$3.1 million.<sup>29</sup>

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<sup>28</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 67.

<sup>29</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

In its response to our request for supporting cost benefit modelling for the VSD reactors, Directlink stated that as the project will not commence until 2023 its analysis is based on high-level preliminary estimates. Directlink submitted that as new information becomes available from project life testing and modelling, the cost benefit assessment would be refined. As a working assumption, Directlink assumed a 25 per cent life increase in phase reactors with the installation of a VSD on the cooling fans, with a life expectancy of 20 years (based on the VSD at Murraylink) compared to less than 20 years for the constant speed drives at Directlink.<sup>30</sup>

In addition to its quantitative analysis, Directlink noted a number of qualitative benefits to VSDs:<sup>31</sup>

- replacing the current layout of cooling fans which is problematic for safe maintenance of the equipment
- as VSDs are quieter, the need for sound dampers is reduced and subsequently negating the likely replacement of the sound dampening in the 2026 to 2030 regulatory control period; and
- a reduction in noise as two fans in the VSD can operate at a lower speed.

In its response to our request to provide evidence that the VSD investment is needed to maintain reliability, Directlink provided a letter from ABB (the equipment manufacturer) that provided additional information to support the proposed addition of variable speed drives to the Phase Reactor Cooling Fans.<sup>32</sup>

Whilst we acknowledge that a VSD is likely to increase the longevity and performance of its phase reactor, we consider that Directlink has not provided sufficient evidence that its phase reactors require the proposed cooling upgrades in order to meet the capex objectives in respect to quality, reliability, security and safety of supply.

We consider Directlink's proposal to upgrade its cooling system is therefore more likely to be in the nature of augmentation and not replacement. Typically, proposed augmentation capex should be justified based on the net benefit of the investment. We consider that Directlink has not substantiated a positive cost benefit for this investment. Whilst the letter from ABB described a number of benefits of a VSD for the cooling fans, it did not provide support for the economic justification for such an investment. Directlink has acknowledged that as new information becomes available from project life testing and modelling, its cost benefit assessment will be refined.

For these reasons, we are not satisfied that the forecast capex for this project would form part of a total capex forecast that reasonably reflects the capex criteria.

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<sup>30</sup> Directlink, *Response to AER Information Request Capex #003*, 12 April 2019.

<sup>31</sup> Directlink, *Response to AER Information Request Capex #003*, 12 April 2019, p. 6.

<sup>32</sup> Directlink, *Response to AER Information Request Capex #008 - ABB letter on VSDs (Public)*, 26 June 2019.

## Land rectification and restoration

### *Directlink's proposal*

Directlink submitted that its Deed of Licence with the State Rail Authority of NSW, and NSW environmental legislation, will require it to return the easements it uses back to the condition they were in when Directlink commenced construction. Directlink expects its legal restoration obligations will crystallise when the interconnector ceases to provide prescribed services, currently expected in 2041–42 due to the finite technical life of the Directlink assets. Until that time, Directlink has proposed to set aside an annual capex amount to cover the anticipated cost of the future land restoration and rectification works. Directlink proposed capex of \$2.1 million in the 2020–25 regulatory control period as an amount to be set aside for this purpose.<sup>33</sup>

Directlink submitted that its proposal for land rectification and restoration capex in the 2020–25 regulatory control period is consistent with the NER. Directlink submitted that in order to be considered forecast capex, expenditure must be required to meet the capex objectives, including clause 6A.6.7(a)(2) of the NER relating to compliance with all applicable regulatory obligations or requirements. Directlink submitted that the obligations to remediate its easements in its Deed of Licence, and requirements from the NSW Environmental Protection Agency, constitute regulatory obligations. While these obligations would not arise until the interconnector ceases to provide prescribed services (currently expected in 2041–42), Directlink submitted that clause 6A.6.7(a)(2) of the NER is not bound in time to the next regulatory control period.<sup>34</sup> Directlink submitted that this capex amount will be saved, and is therefore an asset. However, Directlink also advised that while this new asset class (restoration and rectification) would be included in its RAB, it would not be depreciated.<sup>35</sup>

Directlink proposed to estimate the efficient cost of meeting the required rectification obligations as they exist today and discount that cost in real terms from 2041–42. That is, Directlink proposed an annual amount of capex intended to make future annual cash flows derived from the PTRM and interest receipts equal to the expected cost of restoration. Directlink's cost estimation methodology:<sup>36</sup>

- assumed a need to remove 25 kilometres of underground cable
- applied a preliminary estimate of cable installation costs of \$304 per metre, plus an uplift of 50 per cent to account for the additional cost of removal and environmental restoration compared with installation
- excluded removal costs for above ground assets and converter stations, and any proceeds from the sale of land or asset disposal.

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<sup>33</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, pp. 69–70.

<sup>34</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 70.

<sup>35</sup> Directlink, *Response to AER Information Request Capex #014*, 5 August 2019.

<sup>36</sup> Directlink, *Response to AER Information Request Capex #015*, 9 August 2019.

Directlink submitted that its approach of setting aside an annual allowance for future costs was a demonstration of prudence and efficiency, as the amount to be set aside each year will be less than the amount that would otherwise be required to be charged to customers in 2041-42. Directlink further submitted that its approach was consistent with the National Electricity Objective as it would charge customers who are benefiting from the presence of Directlink the total cost of Directlink (including decommissioning costs), rather than charging customers who are no longer receiving the prescribed transmission service once Directlink is decommissioned.<sup>37</sup>

### ***AER assessment and conclusion***

We are not satisfied that Directlink's proposed land rectification and restoration capex would form part of an estimate of total capex in the 2020–25 regulatory control period that reasonably reflects the capex criteria.

We acknowledge that Directlink has an obligation under its Deed of Licence with the NSW State Rail Authority to restore its easements, as well as more general obligations under NSW environmental legislation to avoid pollution and land contamination. It is therefore likely that Directlink has regulatory obligations in relation to its easements. The NER requires that Directlink be provided an opportunity to recover its prudent and efficient costs arising from its regulatory obligations.

Further, we agree with the Public Interest Advocacy Centre (PIAC) that annualising the cost of land restoration would prevent the possibility of 'bill shock' to customers at the end-of-life of the asset, and is consistent with the beneficiary pays principle where the full costs of Directlink are recovered from all current and future customers who derive benefit from Directlink.<sup>38</sup>

However, whether it is appropriate that land restoration costs be included as forecast capex in the 2020–25 regulatory control period (and/or in future regulatory control periods) depends on whether the costs meet the capex criteria in clause 6A.6.7(c), having regard to the capex factors in 6A.6.7(e), at the time of assessment. We are not satisfied that the inclusion of forecast capex in relation to future land rectification and restoration costs is justified in the 2020–25 regulatory control period, or that Directlink's proposal is consistent with the current regulatory framework under the NER. We consider there is a need for further consideration, explanation and justification of:

- the basis of estimation of prudent and efficient costs, in accordance with the capex criteria
- the methodology Directlink has proposed to establish and recover the fund for future costs, including how to address forecasting uncertainty and any under or over recovery of actual future costs
- whether the proposed expenditure should reasonably be characterised as capex

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<sup>37</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 70.

<sup>38</sup> Public Interest Advocacy Centre, *Submission to Directlink 2020-25 revenue proposal*, 16 March 2019, p. 8.

- whether capex that is not incurred within a regulatory control period can be included in Directlink's RAB under the current regulatory framework, and
- how and when Directlink would recover these costs if the regulatory asset is not depreciated.

Based on the information available, we are not satisfied that the forecast land restoration and rectification capex reasonably reflects the capex criteria. At present, it is not clear that the proposed land restoration costs are prudent and efficient and reflect a realistic expectation of cost inputs. We consider that the prudence (need and scope) and efficiency (basis of estimation and cost inputs) of the future restoration works is currently uncertain and not well justified. For example, it is not clear that Directlink's proposed cost estimation methodology, based on a high-level estimate of cable installation costs, provides a realistic estimate of cable removal and land rectification costs.

We consider that as the land restoration costs will be incurred after 2042, there is a significant degree of uncertainty as to what will occur, both in the intervening period and at that time. For example, the interconnector may be replaced and the deed of licence varied such that the need to undertake rectification will no longer exist. The need, timing and quantum of the restoration costs that Directlink may incur should become more certain closer to the time the costs are expected to be incurred, and may therefore be able to be included in an expenditure forecast (capex or opex) in future. However, at this time we are not satisfied that Directlink's capex forecast for this project reasonably reflect the capex criteria, and we have therefore excluded these costs from our substitute estimate of Directlink's forecast capex for the 2020–25 regulatory control period.

In its submission, PIAC also raised a number of concerns with Directlink's proposal, and noted that this is an unusual item in a capex forecast and that Directlink had provided limited details of the proposed mechanism for tracking and using the amount set aside. PIAC also expressed concern regarding what would happen if Directlink's life is extended or what would happen with any over or under-spend once the actual costs of land rectification and restoration are revealed.<sup>39</sup> We agree that further consideration and explanation of how the proposed land restoration funds are recovered, accrued, managed and expended over time would be beneficial. It is also not clear how the proposal to recover forecast capex allowances over multiple regulatory control periods in advance of incurring costs aligns with the existing NER cost recovery framework.

For example, we considered whether Directlink's proposed land restoration costs could be included in Directlink's RAB. The NER require that capex must be incurred within a regulatory control period in order to be rolled into the value of a TNSP's RAB.<sup>40</sup> Given the capex proposed by Directlink will be 'saved' in order to provide for the future cost of

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<sup>39</sup> Public Interest Advocacy Centre, *Submission to Directlink 2020–25 Revenue proposal*, 16 March 2019.

<sup>40</sup> NER, cl. S6A.2.1(f)(1)(i).

land restoration works, this is not expenditure that will be 'incurred' in the 2020–25 regulatory control period. It is therefore not clear that any capex amount set aside for future rectification works would be able to be rolled into Directlink's RAB at the conclusion of the 2020–25 regulatory control period as the capex will not have been incurred within the period.

Directlink's forecast allowance for future land restoration and rectification costs may be in the nature of a provision. Provisions are expenditures that have been recorded for anticipated future payments, but not yet paid out (incurred). Our position regarding capitalised provisions, as set out in previous decisions, is that capitalised costs related to provisions can only be included in the RAB when they are incurred (that is, paid out by the business).<sup>41</sup>

In its revenue proposal, Directlink proposed to depreciate its proposed new 'restoration and rectification' asset class over the remaining life of the interconnector. However, in response to an information request, Directlink advised that:<sup>42</sup>

It is inconsistent with the logic of [the] Restoration and Rectification asset to depreciate it. The point is to collect end of life costs from customers (and to reduce the cost to them by using compounding interest), charging them an additional amount in the form of regulatory depreciation to recover the cost of an asset which in itself is being established to recover a cost is counter intuitive.

Further, the asset itself will not be depreciable for taxation purposes.

Directlink proposes that the regulatory and tax life of the restoration and rectification asset should be set to N/A like that for land.

This approach does not appear to be consistent with Directlink's stated intention to recover the future restoration costs from customers over the remaining life of the interconnector, and ensure that customers who benefit from Directlink face the full total cost of Directlink, including decommissioning costs. If the restoration and rectification asset is not depreciated, then Directlink will recover a return on capital for these costs, but no return of capital (depreciation allowance). This is appropriate for assets such as land, which can be sold at the end of its useful life, but this is not the case for the restoration and rectification costs as these do not create an enduring asset. It is therefore not clear how and when Directlink would recover its restoration and rectification costs from customers if the asset were not depreciated.

We acknowledge that there may be some benefit to consumers in Directlink's proposal in terms of 'smoothing' future land restoration costs over a longer period, notwithstanding that this is not an approach that is readily accommodated under the current regulatory framework. However, there are also significant risks associated with

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<sup>41</sup> For example, AER, Draft Decision, *Ausgrid Distribution determination 2019–24 - Attachment 2 - Regulatory asset base*, November 2018, p. 20; AER, *Final Decision, ElectraNet Transmission determination 2013–14 to 2017–18*, April 2013, p. 14.

<sup>42</sup> Directlink, *Response to AER Information Request #014 - Updated PTRM and bill impact*, 5 August 2019, p. 1.



recovering costs that are to be incurred at least 22 years, or more than four regulatory control periods, into the future.

In summary, we consider that Directlink's requirement to rectify and restore the land it uses is likely to be a regulatory obligation as contemplated by the NER. Recovery of these costs, in accordance with the revenue and pricing principles, will be possible if we are satisfied that these costs reasonably reflect the prudent and efficient costs of achieving the capex (or opex) objectives. Based on the information available, we are not satisfied that this is the case. It is also not clear how any forecast capex allowed in relation to future costs can be included in Directlink's RAB in accordance with the NER, and therefore how Directlink intends to recover these costs from customers. For these reasons, we have not included Directlink's proposed land rectification and restoration capex in our substitute estimate of total capex for the 2020–25 regulatory control period that we are satisfied reasonably reflects the capex criteria.

## Noise monitoring equipment

Directlink submitted that there have been multiple complaints about noise levels at the Bungalora and Mullumbimby convertor stations, with a notable recent increase at Mullumbimby, and that the region is forecast for increased growth and development.<sup>43</sup>

In June 2018, Directlink engaged a consultant to monitor noise at the Mullumbimby converter station following a complaint from a neighbouring residential property. Directlink submitted that the conclusion of the monitoring analysis was that whilst it was likely (but not definitive) that Directlink was compliant at the time of the complaint, there were variables in the monitoring that would warrant further investigation.<sup>44</sup> Directlink proposed to install noise monitoring equipment and engage external noise experts. Directlink submitted that this equipment would have the benefit of providing data for analysis to identify sources of unacceptable noise, if they exist, or to enable Directlink to respond to concerns about noise levels demonstrating it is not the source of noise.<sup>45</sup>

The Mullumbimby Substation Noise Assessment Report prepared by Directlink's consultants, Wood Group, stated that:<sup>46</sup>

- the monitoring was not able to positively identify the source of the noise that is the subject of the complaint<sup>47</sup>
- extraneous bird, wind and traffic noise was present during the assessment period. Extraneous traffic noise contributes significantly to overall levels. Noise level sits at

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<sup>43</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 76.

<sup>44</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

<sup>45</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 76.

<sup>46</sup> Directlink, *Response to AER Information Request #003 - Wood Group Report (public)*, 11 July 2018.

<sup>47</sup> Directlink, *Response to AER Information Request #003 - Wood Group Report (public)*, 11 July 2018, p. 12.

approximately 30 dBA when there is no extraneous noise influence and was below 30 dBA for the majority of the assessment period.<sup>48 49</sup>

We acknowledge that Directlink's converter stations are a source of some noise and that Directlink must comply with the relevant legislation. However, based on the Wood Group Report, we consider that the operation of the Mullumbimby converter station does not breach the noise limits of the relevant NSW environmental legislation.<sup>50</sup> We consider that complaints are not of themselves justification for remediation action unless the noise level is outside of statutory limits.

It is normal industry practice to design converter stations to be within statutory noise limits and hence the plant should inherently comply unless something has altered. It is usual industry practice to engage a consultant to measure and report on noise limits if there are complaints and there is reason to believe that those complaints have substance. We consider it is not usual practice to permanently install equipment to continuously monitor noise. Monitoring equipment is typically provided by the consultant, installed in suitable locations on a temporary basis while measurements are taken, and a report prepared showing the findings, stating the comparison to statutory noise requirements and making recommendations (if needed) to address any breach of the statutory requirements. This is the approach Directlink took in engaging Wood Group. The Wood Group report found no compliance issues that require Directlink to take any specific action. We consider that the installation of permanent noise monitoring equipment at the site does not align with good industry practice.

On this basis, we are not satisfied that Directlink's proposed noise monitoring equipment capex would form part of a total capex forecast that reasonably reflects the capex criteria.

## Regulatory

Directlink proposed to capitalise expenditure associated with the regulatory reset process in the 2020–25 regulatory control period. Directlink described this expenditure as necessary for the purposes of putting together a regulatory submission that is compliant with the requirements of the NER. Directlink submitted that these costs were for the use of external consultants and experts associated with establishing the stakeholder engagement over the next transmission determination period. The costs were based on estimates provided by Newgate Research. Directlink submitted that the estimates also include costs associated with external engineer expertise used to prepare the submission documents and justifications.<sup>51</sup>

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<sup>48</sup> Directlink, *Response to AER Information Request #003 - Wood Group Report (public)*, 11 July 2018, Table 4-1, p. 7.

<sup>49</sup> Directlink, *Response to AER Information Request #003 - Wood Group Report (public)*, 11 July 2018, Appendix B.

<sup>50</sup> New South Wales Environment Protection Agency, *Noise Policy for Industry, Table 2.2: Amenity noise levels*, October 2017.

<sup>51</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 76.



We consider costs associated with Directlink's regulatory reset to have the characteristics of operating expenditure. Our assessment of Directlink's proposed regulatory costs are presented in Attachment 6 of this draft decision.

#### **5.4.2.2 Projects included in our substitute estimate of total forecast capex**

In determining our substitute capex estimate, we have included the expenditure proposed by Directlink for the following projects. We are satisfied that the capex associated with these projects would form part of an estimate of total capex that reasonably reflects the capex criteria.

### **Replacement of obsolete Insulated Gate Bi-polar Transistors (IGBTs)**

We accept Directlink's proposed replacement of obsolete Insulated Gate Bi-polar Transistors (IGBTs). This project makes up 43 per cent or \$17.3 million of Directlink's capex program for the 2020–25 regulatory control period. We are satisfied that Directlink has demonstrated the need for this investment, in order to maintain the ongoing reliable operation of Directlink.

IGBT's are the basic building block of Directlink's voltage source controlled HVDC converter stations. Directlink has 5,328 IGBTs in service, with five of the six converter stations utilising ABB Generation One IGBTs rather than the newer Generation Three IGBTs. Generation Three IGBTs were installed in the Mullumbimby System 1 converter station that was reconstructed in 2015 following a fire in 2012.<sup>52</sup>

In October 2018, ABB advised that due to the cessation of the manufacture and supply of crucial items it was unable to continue support for Generation One IGBTs, and in particular would no longer be producing new Generation One IGBTs. Directlink submitted that ABB has only 88 currently available Generation One IGBTs that Directlink has now purchased to extend the life of the existing equipment. Directlink's expected failure rate of Generation One IGBTs is 45 to 50 per year.<sup>53</sup>

Directlink has considered various options to address the obsolescence of Generation One IGBTs to address the risk of a sufficient number of IGBTs failures reducing the operating capacity of the network.<sup>54</sup> Directlink's preferred option is to enter into a long-term capex replacement contract with the equipment manufacturer, ABB. Under this option, the responsibility for the technical risk of operating and replacing all IGBTs, associated valve control units, and the control and protection system would be assumed by ABB. This contract would also cover spares management and maintaining cyber security for these assets.<sup>55</sup>

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<sup>52</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 57.

<sup>53</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-3 - ABB-letter re Generation One IGBTs (Public)*, 9 October 2019.

<sup>54</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 58.

<sup>55</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019, p. 3.

We met with Directlink and sought further information to assist us better understand Directlink's proposed replacement of obsolete IGBTs project.<sup>56</sup> We sought further information on a number of issues, including:

- clarification of the values and mechanics of the IGBTs worksheet in Directlink's capex model; and
- details of the scope of work for each alternative option considered.

Based on Directlink's proposal, and the additional clarifications and information request responses received, we consider Directlink's proposed capex for its replacement of obsolete IGBTs program is likely to reasonably reflect the capex criteria.<sup>57</sup> We recognise that the obsolescence and lack of available spares of ABB Generation One IGBTs means that investment is required in order to maintain the reliability and supply of prescribed services.

We consider that Directlink's net present value (NPV) options analysis supports the preferred option of a long-term capex replacement contract with ABB. The proposed arrangement, whereby ABB manages the ongoing operation of Generation One IGBTs, and where no longer available, upgrade to Generation Three IGBTs, transfers a significant amount of ongoing obsolescence and technical risk to ABB. We are satisfied that Directlink's NPV analysis suggests this approach is likely to be the most efficient option to address this need. While we consider the need for investment to address the risk of IGBT asset obsolescence is clear, we note this project remains subject to a future RIT-T process. We encourage Directlink to continue its ongoing stakeholder engagement around this project through that process.

## Cable protection

As discussed in section 5.4.2.1 above, we consider that Directlink has justified its proposed capex of \$0.8 million for the cable signage and protection component of its cable protection program.

## Reliability

Directlink submitted that it currently experiences reliability issues, such that its full 180MW capacity is available approximately 70 per cent of the time. In order to avoid further deterioration of its availability, Directlink proposed reliability maintenance projects to ensure key components and equipment that contribute to reliability are in optimum working order and utilise advanced technologies and products relevant to high-voltage direct current assets.<sup>58</sup> We discuss these projects briefly in turn below.

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<sup>56</sup> AER, *Information Request #008 - Proposed capex*, 29 May 2019.

<sup>57</sup> Directlink, *Response to AER Information Request #003*, 12 April 2019 and *Response to AER Information Request #008 - Proposed capex*, 26 June 2019.

<sup>58</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 65.

## **Cyber security**

Directlink submitted that since its commissioning in 2000, information technology (IT) and security has evolved and its capabilities increased, imposing obligations on Directlink to ensure the consequential associated risks are identified and mitigated. Directlink identified that any disruption or breach to its IT infrastructure has the potential of serious consequences for the market and end customers as it has multiple interfaces with third parties (including the Essential Energy Connection Agreement) where information is both dispatched and received on a daily basis. Directlink submitted that this data often includes market sensitive information and requires protection.<sup>59</sup>

Directlink proposed to tender for a suitably qualified contractor to ensure value for money as well taking into consideration recommendations from a past APA Internal Audit on Cyber Security.<sup>60</sup>

To assist in assessing Directlink's proposed cyber security capex of \$0.5 million, we sought further details of the specific capex components included in this project. In its response, Directlink provided a detailed table of the capitalised costs included in the proposed cyber security expenditure.<sup>61</sup>

Based on Directlink's proposal and its information request response, we consider Directlink's proposed capex for cyber security is prudent and efficient. We consider that Directlink has justified the need to update its cyber security arrangements. The scope of the proposed cyber security capex appears prudent given the nature of Directlink's assets and operations. We consider Directlink's breakdown of costs into network segregation, vulnerability management and physical security reflect a prudent and efficient allocation of such costs for its proposed cyber security.

## **Power supply upgrade**

Directlink submitted that during short interruptions to auxiliary power, its control systems are maintained by Uninterrupted Power Supply (UPS) systems. Long duration auxiliary power outages, however, exhaust the UPS systems, causing significant downtime from the subsequent control system faults. Directlink submitted that significant work is required to restore the control systems after these events and that repeatedly exhausting the UPS systems can damage critical computer equipment causing extended outage times awaiting repair or replacement. Directlink proposed to augment its existing UPS systems with additional equipment, such as additional batteries and diesel generators that will have longer backup times at a cost of \$0.8 million.<sup>62</sup>

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<sup>59</sup> Directlink, *Revenue Proposal 2020-25*, 31 January 2019, p. 66.

<sup>60</sup> Directlink, *Revenue Proposal 2020-25*, 31 January 2019, p. 66.

<sup>61</sup> Directlink, *Response to AER Information Request Capex #008*, 26 June 2019.

<sup>62</sup> Directlink, *Revenue Proposal 2020-25*, 31 January 2019, pp. 66-67.

We sought additional information from Directlink to justify the need to replace its UPS units, the options considered and reasons for selecting the proposed option.<sup>63</sup>

In response to our information request, Directlink submitted that the life expectancy of its UPS units is about five years and that they therefore require replacement during the 2020–25 regulatory control period. Directlink stated that the necessary benefit to justify its proposed expenditure is two hours of additional operation of Directlink over the life of the UPS. Directlink provided details of the unplanned loss of electricity supply to auxiliary systems back to 22 October 2015. Directlink advised that there is no avenue for Essential Energy to prioritise reconnection of Directlink in the event of a power outage.<sup>64</sup>

We acknowledge that the UPS is not designed to give Directlink the capability to outlast an interruption but rather to provide Directlink the opportunity to shut down key systems, in particular the Control and Protection System, in an orderly manner. We also acknowledge that severe weather can make it difficult for APA to send a technician to the site in a safe and timely manner. Based on its submission and responses to our information requests, we consider that Directlink has demonstrated that its investment in augmenting its UPS system is justified, as the proposed investment benefits are likely to exceed the proposed investment costs.

## Optic fibres

Directlink has identified deterioration in the performance of IGBT optic fibres that has affected the availability of Directlink. Following recent testing of the optic fibres, Directlink intends to significantly increase its replacement program for valve optic fibres. Directlink submitted that recent testing of four converter buildings identified 943 optic fibres requiring replacement. Directlink proposed capex of \$3.8 million for this project.<sup>65</sup>

Directlink evaluated the following three alternatives for the optic fibre replacement/upgrade works<sup>66</sup>:

- continuing the current pace of replacement at a cost of \$0.4 million per year
- an accelerated program of replacing optic fibres in Systems 2 and 3 as a single project
- no action.

Directlink justified its selection of replacing optic fibres in Systems 2 and 3 as a matter of urgency in order to maintain critical spares for its assets and to ensure.<sup>67</sup>

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<sup>63</sup> AER, *Information Request Capex #008*, 29 May 2019; and Directlink, *Response to AER Information Request Capex #008*, 25 July 2019.

<sup>64</sup> Directlink, *Response to AER Information Request Capex #003*, 12 April 2019.

<sup>65</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, pp. 67–68.

<sup>66</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

<sup>67</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

- the program of replacements is at a sufficient pace to provide support for the IGBTs and stop the rapid degradation currently contingent on the heating mechanism
- timely response to any future faults with the IGBTs allowing effective repair and minimised outages; and
- good industry practice by maintaining stock of critical components for the long-term sustainability and availability of the plant.

In response to our request, Directlink also provided a more detailed breakdown of its cost estimate for the optic fibre replacement capex program.<sup>68</sup>

Based on the information available, we consider Directlink's response to the increased failure rate of optic fibre cables to be prudent and efficient. Directlink has demonstrated that its optic fibres are deteriorating at a rate that justifies the level of investment proposed.<sup>69</sup>

## Corrosion and environmental deterioration

Directlink submitted that corrosion and environmental issues are a recurring challenge at both the Bangalore and Mullumbimby substations. Directlink identified a number of projects that need to be undertaken to prevent corrosion as well as to repair or replace equipment because of deterioration due to corrosion, rotting or environmental damage. These projects included:<sup>70</sup>

- annual spraying for corrosion
- barn door replacement
- barn roof repair
- barn sound damp vent inlet replacement
- circuit breaker pole repair and refurbishment; and
- Capacity Voltage Transformer (CVT) replacement.

Directlink forecast capex of \$2.9 million for these projects.<sup>71</sup>

We consider that, given the location of Directlink's substations, they are likely to be exposed to corrosion and other environmental issues. On this basis, and based on Directlink's response to our information request seeking additional details of the proposed corrosion related projects, we consider that there is a need for some ongoing investment by Directlink to address corrosion in accordance with the capex

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<sup>68</sup> Directlink, *Response to AER Information Request Capex #003*, 12 April 2019.

<sup>69</sup> In its response to AER Information Request #008 on 26 June 2019, Directlink identified a potential support cost ABB included in its current agreement for the fibre optic replacement work that will be unnecessary and should be removed from the project estimate. We accepted the revised cost for the proposed optic fibres project of \$3.75 million.

<sup>70</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 69.

<sup>71</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 69.

objectives.<sup>72</sup> Given the relatively minor amount of capex for these projects, we consider that it is prudent to address the corrosion issues and that the proposed capex is likely to be efficient and proportionate to the scale of Directlink's facilities.

## Cable modification

In 2018, Directlink commissioned Amplitude Consultants to conduct a cable fault analysis. Amplitude Consultants identified that a significant number of cable faults appeared to be occurring at, or near, cable transitions between below and above ground. While the cable analysis remained ongoing, an early recommendation was to replace cable transitions to remove an identified mechanical stress.<sup>73</sup>

Directlink's forecast capex for this project of \$2.1 million included a budget for ongoing technical analysis and investigation. Directlink submitted that until the technical analysis and investigation was completed in 2019, the exact nature of the cable modification project cannot be finalised. Directlink's forecast capex for this project included an estimate of the cost of this subsequent work, with a final cost to be determined prior to submission of the revised proposal in December 2019. Directlink submitted that this project is critical to its ability to be a reliable network provider.<sup>74</sup>

We consider that the component of this project to conduct further investigations into the cable failure mode and to trial rectification is reasonable. However, we consider the Amplitude Consulting report inconclusive in regards to establishing a clear cause of the cable failures. We consider Amplitude Consulting has investigated the more obvious causes but has not analysed the electro-dynamic and electro-static implications for the cable transitioning from a metal enclosure to a non-metal enclosure. Nonetheless, whilst we consider there is some uncertainty as to whether Directlink has yet established the cause of its cable failures, we accept that it would be prudent for Directlink to be provided with sufficient funds to support a cable modification program. We will reassess the cable modification program in our final decision, when Directlink has further refined the scope and cost of the program.

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<sup>72</sup> Directlink, *Response to AER Information Request Capex #008*, 25 July 2019.

<sup>73</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 71.

<sup>74</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 72.

## Stay in business

Directlink proposed a number of discrete stay in business projects that include tools and equipment specifically for HVDC operations and maintenance, as well as minor projects beneficial to business operations. Directlink forecast stay in business capex of \$0.8 million for the 2020–25 regulatory control period.<sup>75</sup>

Based on the information available, we consider this forecast capex is likely to be prudent and efficient. This is a reduction from the \$1.6 million (\$2014–15) allowed for Directlink's stay in business capex for the 2015–20 regulatory control period.<sup>76</sup>

## Essential spares

Directlink submitted that due to the failure rates associated with IGBTs and capacitors, a stock of these items is held in storage to be available when either of these items fails so it does not result in significant outages for any of Directlink's systems. Directlink's forecast for replacement Generation Three IGBTs and replacement capacitors are based on historical failure rates. Essential spares capex is forecast to be \$0.8 million.<sup>77</sup>

We consider this forecast capex for essential spares is likely to be prudent and efficient. This is a reduction from the \$1.9 million (\$2014–15) allowed for Directlink's IGBT spares program for the 2015–20 regulatory control period.<sup>78</sup>

## Testing equipment

Directlink submitted that testing equipment projects seek to ensure systems and equipment are in a condition capable of meeting operational requirements. Directlink identified three specific projects to replace equipment that has reached the end of its life or new equipment to increase its testing capabilities:<sup>79</sup>

- Thumper Unit (including trailer) (\$0.3 million)
- IGBT tester (\$0.07 million)
- Power Quality metering (\$0.3 million).

Directlink described its Thumper unit as equipment designed to test the insulation on its cables. Directlink submitted that the Hi-pot tester component of its Thumper unit is approaching the end of its life and needs to be replaced. Directlink also submitted that

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<sup>75</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 72.

<sup>76</sup> AER, *Final Decision, Directlink transmission determination 2015–16 to 2019–20, Attachment 6 - Capital expenditure*, April 2015, p. 15.

<sup>77</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 73.

<sup>78</sup> AER, *Draft Decision, Directlink transmission determination 2015–16 to 2019–20, Attachment 6 - Capital expenditure*, November 2014, p. 20.

<sup>79</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 74.



the trailer that carries the tester has significant levels of corrosion due to age and exposure and will be replaced at the same time as the tester.<sup>80</sup>

Directlink submitted that due to the nature of its Thumper unit, a refurbishment by replacing the unit in parts would have significant costs. Directlink considers that having performed more than 170 cable fault tests at the end of 2018 it cannot be refurbished.<sup>81</sup>

Based on the condition of the Hi-pot tester and trailer as described by Directlink, and the ongoing need for cable testing, we consider Directlink's proposal to replace its Thumper unit to be reasonable.

In response to our information request regarding the impact of Directlink's proposed ABB capex replacement contract, Directlink stated that its proposed purchase of an IGBT tester would be unnecessary.<sup>82</sup> The proposed capex for the IGBT tester has been removed from Directlink's proposed capex.

Directlink proposed to invest in power quality metering equipment and software in order to provide transparency of quality performance and ensure power quality in accordance with its connection agreements and the NER.<sup>83</sup>

In response to our information request seeking more details on its proposed power quality metering program, Directlink submitted that power quality is currently monitored on an ad-hoc basis by engaging third-party logging hardware, software and analysis at recurring costs of an average of \$50,000 for one week's monitoring. Directlink stated that monitoring at a minimum of five-year intervals has been undertaken in the past on the recommendation of a consultant. Directlink submitted that monitoring by a third party could only demonstrate compliance for the period when the data logging is taking place.

Based on the information available, we consider that Directlink's investment of \$0.3 million for power quality metering equipment is likely to be justified as prudent and efficient, as it provides real time continuous monitoring as well as an ongoing saving in costs for third party monitoring.

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<sup>80</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 74.

<sup>81</sup> Directlink, *Revenue Proposal 2020–25 - Attachment 9-1 - Business cases (Public)*, 31 January 2019.

<sup>82</sup> Directlink, *Response to AER Information Request Capex #003*, 12 April 2019, p. 3.

<sup>83</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 75.



## A Ex-post statement of efficiency and prudence

We are required to provide a statement on whether the roll forward of the regulatory asset base from the previous period contributes to the achievement of the capital expenditure incentive objective.<sup>84</sup> The capital expenditure incentive objective is to ensure that where the regulatory asset base is subject to adjustment in accordance with the NER, only expenditure that reasonably reflects the capex criteria is included in any increase in value of the regulatory asset base.<sup>85</sup>

The NER requires that the last two years of the previous regulatory control period (for the purposes of this decision, the 2018–19 and 2019–20 regulatory years) be excluded from the ex post assessment of past capex.<sup>86</sup> Accordingly, our ex post assessment only applies to the 2015–16 to 2017–18 regulatory years.

We may exclude capex from being rolled into the RAB in three circumstances:<sup>87</sup>

1. where the transmission business has spent more than its capex allowance
2. where the transmission business has incurred capex that represents a margin paid by the transmission business, where the margin refers to arrangements that do not reflect arm's length terms; and
3. where the transmission business's capex includes expenditure that should have been classified as opex as part of a transmission business's capitalisation policy.

### A.1 Position

We are satisfied that Directlink's capital expenditure in the 2015–16 to 2017–18 regulatory years should be rolled into the RAB.

### A.2 AER approach

We have conducted our assessment of past capex consistent with the approach set out in our capital expenditure incentive guideline (the Guideline). In our Guideline, we outlined a two-stage process for undertaking an ex post assessment of capital expenditure:<sup>88</sup>

- stage one - initial consideration of actual capex performance
- stage two - detailed assessment of drivers of capex and management and planning tools and practices.

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<sup>84</sup> NER, cl. 6A.14.2(b).

<sup>85</sup> NER, cl. 6A.5A(a).

<sup>86</sup> NER, cll. S6A.2.2A(a) and S6A.2.2A(a1).

<sup>87</sup> NER, cl. S6A.2.2A(b).

<sup>88</sup> AER, *Capital Expenditure Incentive Guideline*, November 2013, pp. 19–22.

The first stage considers whether the transmission business has overspent against its allowance and past capex performance. In accordance with our Guideline, we would only proceed to a more detailed assessment (stage two) if:

- a transmission business had overspent against its allowance
- the overspend was significant; and
- capex in the period of our ex post assessment suggests that levels of capex may not be efficient or do not compare favourably to other transmission businesses.

### A.3 AER assessment

We have reviewed Directlink's capex performance for the 2015–16 to 2017–18 regulatory years. This assessment has considered Directlink's out-turn capex relative to the regulatory allowance given the incentive properties of the regulatory regime for a transmission business to minimise costs.

Directlink incurred total capex above its forecast regulatory allowance in these regulatory years. Therefore, the overspending requirement for an efficiency review of past capex is satisfied.<sup>89</sup> We consider that the 'margin' element of the RAB exclusion adjustment is however not satisfied. We also consider that although the 'capitalisation' element of the RAB exclusion adjustment is likely to be satisfied in regards to Directlink's revenue reset expenditure, we have determined not to reduce Directlink's capital expenditure by this amount in this instance.<sup>90</sup> The expenditure that we consider has been incorrectly capitalised is \$0.27 million (\$nominal) revenue reset expenditure that should have been classified as opex. For the 2020–25 regulatory control period, we assessed Directlink's proposed revenue reset expenditure as opex.

Where we consider that the overspending requirement is satisfied, in accordance with our Guideline we then consider a range of factors to determine whether to move to stage two of the ex post review. These factors are:<sup>91</sup>

- whether the overspend is significant
- what is the transmission business's history of capex
- how the transmission business has performed relative to other businesses.

We have identified that Directlink underspent total net capex in 2015–16 by 43 per cent and overspent net capex by 72 per cent in 2016–17 and by 406 per cent in 2017–18. The cumulative capex overspend across the ex post review period was 59 per cent. We consider that the cumulative overspend for the 2015–16 to 2017–18 ex post review period could be considered significant, despite the underspend in the 2015–16 year.<sup>92</sup>

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<sup>89</sup> NER, cl. S6A.2.2A(c).

<sup>90</sup> NER, cl. S6A.2.2A(f).

<sup>91</sup> AER, *Capital Expenditure Incentive Guideline*, November 2013, p. 14; and AER, *Explanatory statement - Capital Expenditure Incentive Guideline*, November 2013, p. 47.

<sup>92</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 36.

It should be pointed out, however, that the small capex allowances for the 2016–17 and 2017–18 regulatory years of \$1.94 million (\$nominal) and \$1.97 million (\$nominal) respectively compared to other years of the regulatory control period are likely to contribute to considerable variation in comparison to actual capex where project delivery timings change within the regulatory control period.<sup>93</sup>

In order to consider the context for Directlink's capex overspend in the ex post review period, we then considered Directlink's history of capex.

In considering Directlink's history of capex, as we stated in the Explanatory Statement for our Guideline:<sup>94</sup>

In making this assessment we are likely to take into account the differences between timing in regulatory control periods and the ex post review period when we look at a NSP's history of capex during stage one of our ex post review process. In particular, we will have regard to the available information on how a NSP has spent against its regulatory allowance for the regulatory control period.

The ex post review period does not align with the regulatory control period over which a capex forecast allowance is provided, in this case the 2015–20 regulatory control period. Directlink's actual net capex against the forecast regulatory allowance for this period, including the three years of the ex post review period, is shown in Table 5-4 below.

**Table 5-4 Directlink's actual net capex versus capex allowance – 2015–20 regulatory control period (\$million, nominal)**

Category	2015–16	2016–17	2017–18	2018–19	2019–20	Total
Total net capex allowance	6.92	1.94	1.97	3.09	15.10	29.02
Total net actual capex <sup>1</sup>	3.95	3.34	9.97	7.85 (estimate)	6.86 (estimate)	31.96
Capex overspend / (underspend)	(2.97)	1.4	8.0	4.76	(8.24)	2.94

<sup>1</sup> Source: Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 35.

Our analysis of Directlink's capex history during the current regulatory control period shows that although Directlink overspent its forecast net capex allowance in the 2016–17, 2017–18 and 2018–19 years (with 2016–17 and 2017–18 corresponding to the ex post review period for this decision), it underspent its total forecast net capex allowance in 2015–16 and estimates an underspend in 2019–20. The estimated net

<sup>93</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 35.

<sup>94</sup> AER, *Explanatory Statement - Capital Expenditure Incentive Guideline*, November 2013, p. 54.

capex overspend was \$2.9 million (\$nominal) (10 per cent) for the 2015–20 regulatory control period.

### A.3.1 Reasons for differences between AER's allowance and Directlink's actual capex

In its regulatory proposal, Directlink provided an explanation for the divergence between our allowance and its actual capex for projects where the divergence was considered to be material (defined as projects where the difference between the forecast and the actuals is greater than 15 per cent and where that difference is greater than five per cent of the total difference between our forecast and actual expenditure).<sup>95 96</sup> Table 5-5 summarises our analysis of the projects that Directlink identified where its actual capex and our capex allowance was materially different.

**Table 5-5 Projects with a material divergence between the AER's capex allowance and Directlink's actual capex (\$million, nominal) – 2015–20 regulatory control period**

Project	AER allowance	Actual capex (estimate)	Difference	AER analysis
Phase reactor cooling	\$2.46	\$3.62	\$1.16	Directlink reported that the AER allowance for this project in the last year of the previous regulatory control period (2014–15) was \$2.19 million whereas its actual capex was \$1.05 million. For the 2015–20 regulatory control period, Directlink reported that its actual capex was \$3.62 million and that the AER allowance was \$2.46 million. Therefore, whilst there was a difference of \$1.16 million during the 2015–20 regulatory control period, the overall capex was in line with the AER allowance for the phase reactor cooling project.
Landslip	\$0	\$0.35	\$0.35	Directlink submitted that as a result of Cyclone Debbie in 2018, there was heavy rainfall in the area where Directlink's cables are located leading to landslips and damage to the cables. Directlink responded by realigning the galvanised steel tray and reinstating fallen posts. Another repair project was planned for Mooball in April 2019. <sup>97</sup> We consider Directlink's response to the impact of landslips adjacent to its cables to be prudent and efficient.

<sup>95</sup> Directlink considers this is inside the standard contingency that APA would add to a project for its own business purposes recognising the level of accuracy of the forecast undertaken for the Asset Management Plan. Directlink therefore considers this a good proxy for an amount where it is meaningful to explain divergences between forecast and actuals.

<sup>96</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 37.

<sup>97</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 39.

Optic fibres	\$0.84	\$1.19	\$0.35	Directlink forecast replacement of 459 optic fibre cables during the 2015–20 regulatory control period based on historical failure levels. However, based on testing, Directlink reported that the sub-optimal performance of the optic fibres was having an impact on IGBTs and replaced the optic fibres upon failing testing. <sup>98</sup> We consider Directlink's response to an increased failure rate of optic fibre cables to be prudent and efficient.
Cable modification	\$0	\$0.34	\$0.34	Directlink responded to an increasing frequency of cable faults by engaging an engineering consultant in 2018 at a cost of \$0.15 million to investigate the cable fault trends and identify changes that can be made to reduce the number of faults occurring at various and multiple locations. Directlink submitted that preliminary results of the investigation have identified that more information is required about faults occurring at cable transitions and that a mechanical stress on the cable at the transition is of concern and analysis is continuing. <sup>99</sup> We consider that Directlink's approach of engaging a consultant to report on and monitor the condition of its cables is prudent as it may prevent substantially greater costs being incurred should a cable fail.
Essential spares	\$2.06	\$2.37	\$0.31	Directlink submitted that although the unit price for capacitors and IGBTs increased only slightly during the 2015–20 regulatory control period, the essential spares capex was higher than forecast due to increased volumes. <sup>100</sup> We consider that an increase of \$0.31 million or 15 per cent of forecast essential spares capex due to changes in volumes from forecast and slight increases in unit prices to be reasonable. We consider a relatively small overspend in forecast essential spares capex is likely to reflect a change in operational circumstances in response to an increased need for capacitors and IGBTs.
Transmission determination review	\$0	\$0.27	\$0.27	Directlink submitted that it capitalised revenue reset expenditure during the 2015–20 regulatory control period. Directlink engaged Newgate Research to provide advice on stakeholder engagement processes. <sup>101</sup> Directlink did not propose this amount in its revenue proposal nor did we include it in our capex allowance for the 2015–20 regulatory control period. Whilst we consider the nature and amount of Directlink's reset expenditure for the 2015–20 regulatory control period to be reasonable, we consider this type of expenditure has the character of opex rather than capex. For the 2020–25 regulatory control period, we have assessed Directlink's proposed regulatory reset capex of \$0.3 million (\$2019–20) as opex.

Source: AER analysis.

<sup>98</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, p. 40.

<sup>99</sup> Directlink, *Revenue Proposal 2020–25*, 31 January 2019, pp. 40–41.

<sup>100</sup> Directlink, *Revenue Proposal 2020–25*, January 2019, p. 40.

<sup>101</sup> Directlink, *Revenue Proposal 2020–25*, January 2019, p. 42.

Based on our analysis, we consider that Directlink's total actual capex for the 2015–20 regulatory control period, which includes the entirety of the ex post review period, is likely to reasonably reflect the capex criteria. We are therefore satisfied that including this actual capex in the RAB is likely to contribute towards achieving the capital expenditure incentive objective.<sup>102</sup>

This is because our approach to forecasting capex is to forecast the total amount of efficient capex required over the regulatory control period. Typically, a transmission business is then best placed to decide the projects and programs it needs to carry out. This means, from time to time, a transmission business may choose to defer expenditure that we initially considered prudent and efficient when forming our forecast of total capex for the regulatory control period. We consider it is important to provide incentives to efficiently defer capex (or bring forward other efficient capex) as circumstances change during the regulatory control period.

We also note that, in assessing the prudence and efficiency of Directlink's capex in the ex post review period, we may only take into account information and analysis that Directlink could reasonably be expected to have considered or undertaken at the time that it undertook the relevant capex.<sup>103</sup> We have therefore not taken into account the information and analysis relied upon in other areas of this draft decision for this ex post efficiency and prudence review.

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<sup>102</sup> NER, cl. 6A.14.2(b).

<sup>103</sup> NER, cl. S6.2.2A(h)(2).