Directlink Joint Venture

Proposed
Forecasting Methodology

For the regulatory period
July 2015 to June 2020

November 2013
Directlink Forecasting Methodology November 2013.docx

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Purpose

The purpose of this document is to define Directlink's proposed methodology for forecasting capital and operating costs for the 2015-20 regulatory period, as required under Rule 6A.10.1B of the *National Electricity Rules*:

> **6A.10.1B Notification of approach to forecasting expenditure**
>
> (a) A *Transmission Network Service Provider* must inform the *AER* of the methodology it proposes to use to prepare the forecasts of operating expenditure and capital expenditure that form part of its *Revenue Proposal*.
>
> (b) A *Transmission Network Service Provider* must submit the information referred to in paragraph (a):
>
> (1) at least 24 months before the expiry of a *revenue determination* that applies to the *Transmission Network Service Provider*; or
>
> (2) if no *revenue determination* applies to the *Transmission Network Service Provider*, within 3 months after being required to do so by the *AER*.

Italicised terms are defined in the *National Electricity Rules*.

Rule 6A.10.1B(b)(1) would normally require Directlink to file the Forecasting Methodology by 30 June 2013, but Transitional Rule 11.58.4(n) provides for Directlink to file this document 19 months prior to the commencement of the regulatory period, or by November 30, 2013:

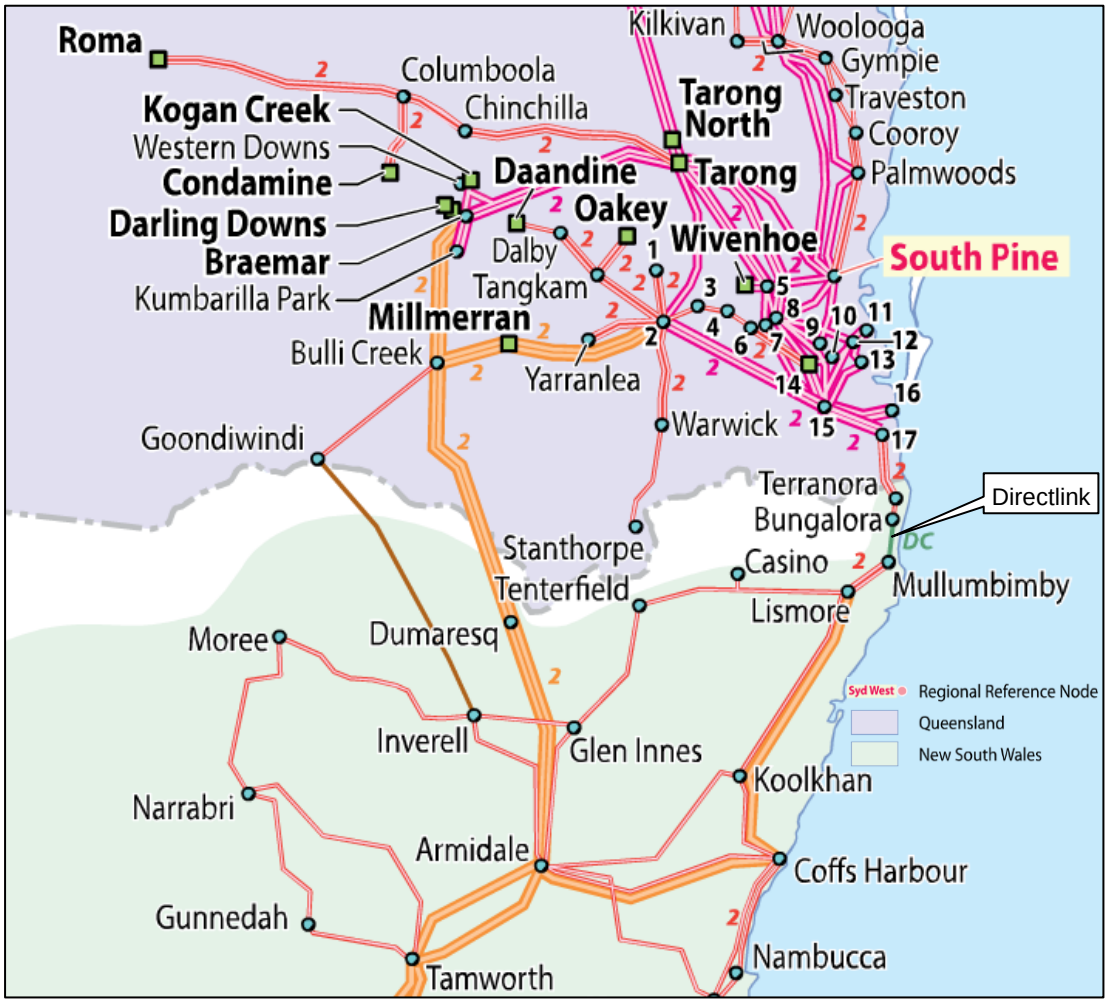
Description	Reference	Transitional treatment
Timing for submission of information about forecasting methodology.	Clause 6A.10.1B(b)(1)	"24 months" is replaced with "19 months".

Background

The Directlink interconnector

The Directlink interconnector is a 59 km, 180 MW High Voltage Direct Current (HVDC) interconnect running between Mullumbimby and Terranora in NSW.

Figure 1 – The Directlink Interconnector



Source: AEMO

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

Directlink has a number of unique features that distinguish them from the more conventional static transmission assets operated by other TNSPs:

- The cables are exposed to direct voltages, which imposes different stresses and potential insulation breakdown mechanisms, than alternating voltage cables.
- The cables have unusual installation approaches; Directlink cables are laid primarily underground, and partly in above-ground galvanised steel troughing (GST).

The convertor stations use what was, at the time of their installation, cutting edge HVDC Light technology.

The primary equipment at the convertor stations comprise:

- 132 kV power transformers;
- AC/DC convertor valve banks;
- harmonic filtering and power factor correction equipment; and
- busbars and switches.

Directlink has been in service for approximately 13 years. The expected service life of the primary convertor station equipment is 40 years. While the DC cables have a potential service life in excess of 40 years, their useful life will be limited to that of the convertor stations.

This primary equipment is supported by a number of ancillary systems, all of which are essential for the secure operation of the link:

- power system protection equipment;
- computerised control systems and communications;
- air conditioning systems (necessary for the control system equipment to function);
- power transformer oil circulation pumps and cooling fans;
- convertor valve water purification and cooling equipment;
- convertor hall air filtering and ventilation; and
- fire protection systems.

It is important to note that the service life of these ancillary systems is much shorter than that of the primary equipment. Various components of the ancillary systems (eg. motor contactors and bearings, fluid control valves) require major maintenance or replacement at intervals ranging from 5 to 10 years.

Regulatory history

Directlink first came into operation on 25 July 2000 as an unregulated *Market Network Service Provider*, earning revenue from the National Electricity Market by providing a market network service between the NSW and Queensland power grids. In March 2006, Directlink converted to a regulated interconnector (i.e. a "prescribed service" under Rule 2.5.2(c)) following application for conversion to the Australian Energy Regulator (“AER”) and an AER determination allowing conversion of Directlink to a regulated interconnector.

The AER's decision established the Regulated Asset Base, and the revenue cap for the ten-year regulatory control period ending on 30 June 2015. Directlink collects its revenues from TransGrid, acting in the role of Coordinating TNSP under the National Electricity Rules.

Directlink's role in the National Electricity Market

As a result of the conversion to a regulated interconnector, Directlink is registered with the Australian Energy Market Operator as a Transmission Network Service Provider.

The link is dispatched by AEMO, in a similar manner to a generator, to control flows between the NSW and Queensland regions of the National Electricity Market (NEM) and thereby minimise the costs of generation in the NEM.

The implications of this arrangement, for forecasting methodology purposes, is that Directlink provides the asset to be available to AEMO for dispatch as required. Directlink is not required to derive its allowed revenue over load or demand served and therefore does not establish tariffs for the provisions of its service. Accordingly, there is no need for Directlink to forecast load or peak demand as would be the case for other regulated TNSPs.

This Forecasting Methodology therefore focuses on the approaches expected to be used to forecast capital and operating expenditure only.

Forecasting Methodology approach

Revealed cost methodology

The AER's *Draft Expenditure Forecast Assessment Guideline for Electricity Transmission* proposes using the AER's preferred base-step-trend revealed cost methodology, using past actual costs as the starting point for determining efficient forecasts.

The AER's reasoning for adopting this methodology is that, where a TNSP has operated under an effective incentive framework,[1] actual past expenditure should be a good indicator of the efficient expenditure the TNSP requires in the future. The *ex ante* incentive regime provides an incentive to reduce expenditure because TNSPs can retain a portion of cost savings (i.e. by spending less than the AER's allowance) made during the regulatory control period.

The revealed cost methodology is then augmented by an analysis of adjustments are required for efficient increases or decreases in expenditure (step and scope changes).

The *draft Guideline* notes that the AER must undertake analysis to ascertain whether it is appropriate to rely on the revealed costs as the starting point for its assessment.

Directlink is concerned that the revealed cost methodology may be difficult to apply in its case:

- Directlink has recently undergone material change in its operating framework, moving from an outsource operating model to an insource model;
- Directlink has experienced a number material asset events which have impacted the availability of the link and have consequential impacts on reported operating costs.

These are discussed below.

Operating framework

In the first years of operation, the Directlink interconnector was operated under a comprehensive outsourcing arrangement.

From 01 July 2012, this arrangement expired. Directlink then moved from the previous comprehensive maintenance resourcing strategy to a model comprised of outsourcing some specialised functions and insourcing the general maintenance functions.

FY 2012/13 was the first year of this new in-sourced operating arrangement and it took some time for the processes and resource requirements to "bed down".

Mullumbimby converter station fire

In August 2012, pole 1 of the Mullumbimby converter station experienced a catastrophic failure and fire, destroying that pole of the converter station and taking that circuit completely out of service. The cause of the fire was indeterminate.

[1] Directlink does not have an Efficiency Benefit Sharing Scheme (EBSS) in place.

While reconstruction processes are in train, the converter station and circuit are not expected to return to fully operational status until mid-2015.

As a result of the converter station being off line since August 2012, the FY2012/13 through FY2014/15 actual operating costs will not reflect the normal operations and maintenance associated with one of the three circuits.

Circuits 2 and 3 disconnection

Following a routine inspection of converter stations 2 and 3 in August 2013, similar conditions were found as those that may have contributed to the pole 1 fire. As a precautionary measure, Directlink took the remaining two circuits offline while repair options were investigated.

Corrective work is under way and these two circuits are expected to return to service in late 2013 to serve the summer peak. Further work is anticipated that will bring these two circuits temporarily offline again in the first half of 2014, as a permanent solution is implemented.

From August to December 2013 then, all three circuits were offline. The observed operations and maintenance costs associated with the Directlink interconnector will therefore be understated for the periods during which the circuits were offline.

Cable faults

It should be noted that the events described above pertain to the converter stations at the end of each circuit. Experience indicates that there are also cable faults which need to be addressed in the normal course of operations. However, with the converter stations offline, cable faults do not have an opportunity to manifest themselves. To the extent that cable faults have been caused by water ingress, it would be reasonable to expect that water would continue to enter the cable; however any faults caused by ongoing water ingress will not be detectable until the cable is re-energised. Opex costs during the periods when one or more converter stations are offline will therefore be understated by the costs of investigation and correction of cable faults.

Defining the base year

These events make it particularly difficult to define a base year that would be representative of normal, ongoing operation of the Directlink interconnector:

- For any base year including a period prior to June 2012, the observed costs will reflect the costs associated with the outsourced operation model rather than the in-house operating model in place today;
- For any base year including or after the second half of calendar 2012, the Mullumbimby converter station fire impacts the reported operating costs because one circuit would be completely offline during that period;
- For any base year including the second half of calendar 2013, operating expenditure will be impacted by all three circuits being offline for much of that half-year.
- In any of these periods, operating costs will also be understated by the absence of routine cable fault expenditure, as discussed above.

In summary, a base year towards the end of the current regulatory period will not present a reasonable picture of the sustainable costs of operating the Directlink interconnector over the forecast regulatory period.

Directlink has assessed the reasonableness of a number of calendar and financial year periods towards the end of the current regulatory period, and has found them all to be unrepresentative of ongoing sustainable operating costs.

Bottom-up cost build

Given the unrepresentative nature of the reported costs in the available base years, it will be necessary to use an additional approach to estimate the sustainable costs of operating the Directlink interconnector over the forecast regulatory period.

Directlink will be conducting a comprehensive review of the interconnector operations to assist in its forecasting of future opex, and proposes to use this information to conduct a bottom-up cost build to augment and validate the historical cost information.

This bottom-up cost build will identify the technical and business processes required to operate the Directlink interconnector in accordance with Good Electricity Industry Practice and the resources necessary to undertake those processes. These resources will then be costed using the best available estimates of relevant materials costs and labour rates appropriate to the required skill and experience levels.

Forecasting Methodology

1. Load and demand

Owing to the nature of the interconnector and its dispatch by AEMO, Directlink does not collect its revenue over forecast load and demand. Moreover, load and demand do not impact on Directlink's capital expenditure program.

Directlink therefore will not prepare a load and demand forecast.

2. Capital expenditure

Consistent with the nature of the asset, Directlink expects that there will be a small number of discrete capital expenditure items. These items are expected to be of a "stay in business" nature.

Forecast costs for these projects will be individually estimated, based on the best estimates of relevant materials costs and labour rates based on recent experience.

Directlink is not anticipating any expansion related capital expenditure during the forecast regulatory period.

3. Operating expenditure

Directlink will apply a base year methodology as a starting point for forecasting future operating costs. The base year will be adjusted for the scope of operations, considering the offline periods of the Directlink interconnector.

Directlink will undertake a bottom-up cost analysis, reflecting the technical and business process activities that are to be undertaken to operate the interconnector in accordance with Good Electricity Industry Practice.

Directlink will use both these processes to inform its proposal on sustainable forecast operating costs.

4. Real cost escalation

Directlink anticipates that it will escalate materials and labour costs in line with real cost increases.