Better Regulation

Draft Expenditure Forecast Assessment Guideline for Electricity Transmission

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AUSTRALIAN ENERGY REGULATOR

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Amendment record

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1 Nature and authority

1.1 Introduction

This publication sets out the Australian Energy Regulator's Draft Expenditure Forecast Assessment Guideline for electricity transmission.

1.2 Authority

The National Electricity Rules (NER) require the Australian Energy Regulator (AER) to develop and publish Expenditure Forecast Assessment Guidelines.[1] This document is our Draft Expenditure Forecast Assessment Guideline for electricity transmission. The Guideline is not binding on the AER (or anyone else). However, if we make a transmission determination that is not in accordance with the Guideline, our reasons for the transmission determination must include why we departed from the Guideline.[2]

Transmission network service providers (TNSPs) are not required to explain departures from the Guideline. However, they must provide with their regulatory proposals, a document complying with the Guideline or—if we deviate from the Guideline—the F&A paper.[3] The NER allow us to require a TNSP to resubmit its regulatory proposal if it does not comply with the Guideline.[4]

1.3 Role of the Guideline

The Guideline must specify:[5]

- the approach the AER proposes to use to assess the forecasts of operating expenditure (opex) and capital expenditure (capex) that form part of the regulatory proposals TNSPs
- the information the AER requires for the purposes of that assessment.

1.4 Definitions and interpretation

In this Guideline the words and phrases have the meaning given to them in:

- the glossary, or
- if not defined in the glossary, the NER.

1.5 Process for revision

The AER may amend the Guideline from time to time in accordance with the requirements of the NER.[6] We will review and amend the Guideline as we consider appropriate.

1.6 Version history and effective date

A version number and an effective date of issue will identify every version of the Guideline.

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1 NER, clause 6A.2.3(a)(1).
2 NER, clause 6A.2.3(c).
3 NER, clause 6A.10.1(h).
4 NER, clause 6A.11.1.
5 NER, clause 6A.5.6(a).
6 NER, clauses 6A.2.3(e), (f).

2 Overview of the Guideline

This Guideline sets out the AER's approach to assessing and setting transmission expenditure forecasts, and the information we require to do so.

2.1 Introduction

The NER require TNSPs and the AER to engage on a TNSP's expenditure forecasting methodology to ensure that both the AER and the TNSP are aware, in advance, of the information the AER requires to assess the TNSP's proposal. To facilitate this, we must set out the types of assessments we will undertake and the information we will require to do so. This Guideline indicates our likely assessment approach for capex and opex, the techniques we propose to use and the information we will require from TNSPs.

Many of the techniques here and their associated data are common to expenditure assessments under the NER and our annual benchmarking reports. We must consider these benchmarking reports when assessing regulatory proposals.

2.2 Structure of the Guideline

This Guideline sets out:

- our task and general assessment approach under the regulatory framework
- our assessment techniques
- our approach to assessing capex and opex
- the information we require for expenditure assessment.

2.3 Transitional issues

The NER require us to indicate how (if practicable) we will deal with transitional issues if a guideline indicates we may change our regulatory approach in future transmission determinations.[7] While this Guideline indicates we may change our assessment approach in some ways, we do not consider transitional issues arise as a result.

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[7] NER, clause 6A.2.3(d).

3 Assessment approach

This section outlines our task under the regulatory framework and our general assessment approach given these requirements. It then explains the regulatory techniques we intend to use for expenditure assessment. The explanatory statement for this Guideline considers these matters in detail.

3.1 The AER's task

The National Electricity Law (NEL) requires us to perform our economic regulatory functions in a manner that will or is likely to contribute to the achievement of the national electricity objective (NEO).[8] The NEO is:[9]

> …to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—
>
> (a) price, quality, safety, reliability and security of supply of electricity; and
>
> (b) the reliability, safety and security of the national electricity system.

In essence, the NEO places an overarching requirement on the AER to make transmission determinations that will deliver efficient outcomes to the benefit of consumers in the long term. The revenue and pricing principles support the NEO and ensure a framework for efficient network investment exists, irrespective of how the regulatory regime and the industry evolve.[10] We must take the revenue and pricing principles into account whenever we exercise discretion in making those parts of a regulatory determination relating to direct control network services (prescribed transmission services).[11]

The incentive based regulatory framework aims to facilitate the NEO and the revenue and pricing principles by ensuring TNSPs are appropriately incentivised to provide, and are compensated for providing, electricity services efficiently so that consumers receive the level of service they expect at the least cost. It does this by rewarding TNSPs for maintaining service standards while spending less in a regulatory control period than the expenditure allowance that we determine. For this reason, we must consider whether TNSPs are responding to incentives and providing transmission services efficiently.

The NER set out specific requirements to ensure we assess and determine expenditure proposals in accordance with the NEL, and hence give effect to the NEO. When we make a transmission determination, we must decide whether or not we are satisfied that a TNSP's proposed total capex forecast and total opex forecast reasonably reflect the capex criteria and opex criteria (collectively, the expenditure criteria). These criteria are:[12]

(1) the efficient costs of achieving the capex and opex objectives

(2) the costs that a prudent operator would require to achieve the capex and opex objectives

8 NEL, section16(1)(a).
9 NEL, section 7.
10 Second reading speech, National Electricity (South Australia) (New National Electricity Law—Miscellaneous Amendments) Amendment Bill 2007, Parliament of South Australia, Hansard of the House of Assembly, 27 September 2007, p. 965.
11 NEL, section 16(2)(a)(i).
12 NER, clauses 6A.6.6(c), 6A.6.7(c).

(3) a realistic expectation of the demand forecast and cost inputs required to achieve the capex and opex objectives.

When considering whether forecasts reasonably reflect the expenditure criteria, we must have regard to the capex and opex factors (collectively, the expenditure factors).[13]

If satisfied, we must accept the TNSP's forecast.[14] If we are not satisfied, we must not accept the forecast[15] and estimate a total forecast that we are satisfied reasonably reflects the expenditure criteria.[16] That is, we must either amend the TNSP's estimate or substitute it with our own estimate.

3.2 General approach

For both capex and opex proposals, we use the same general approach to either accept a TNSP's proposal, or not accept it and substitute it with an alternative estimate. In doing so, we will examine the TNSP's proposal and other relevant information. We will apply a range of techniques that typically involve comparing the TNSPs' forecasts with estimates that we develop from relevant information sources.

If a TNSP's total capex or opex forecast is (or components of these forecasts are) greater than estimates we develop using our assessment techniques and there is no satisfactory explanation for this difference, we will form the view that the TNSP's estimate does not reasonably reflect the expenditure criteria. In this case, we will amend the TNSP's forecast or substitute our own estimate that reasonably reflects the expenditure criteria.

Our general approach is not significantly different from what we have applied in the past. However, we will use a broader range of assessment techniques and collect consistent data to facilitate our assessment. Consistent with our past approach, we will generally develop an efficient starting point or underlying efficient level of expenditure that we will then adjust for changes in demand forecasts, input costs and other efficient increases or decreases in expenditure. This will allow us to determine a total forecast that we are satisfied reasonably reflects the expenditure criteria.

For recurrent expenditure, we prefer to use revealed (past actual) costs as the starting point for determining efficient forecasts. Where a TNSP has operated under an effective incentive framework, 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.

Consequently we apply various incentive schemes (the efficiency benefit sharing scheme (EBSS), service target performance incentive scheme (STPIS) and, going forward, the capital expenditure sharing scheme (CESS)) to provide TNSPs with a continuous incentive to improve their efficiency in supplying electricity services to the standard demanded by consumers.

While we examine revealed costs in the first instance, we need to test whether TNSPs responded to the incentive framework in place. For this reason, we will assess the efficiency of base year expenditures using our techniques, beginning with economic benchmarking and category analysis, to

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13 NER, clauses 6A.6.6(c), 6A.6.7(c)

14 NER, clauses 6A.6.6(c), 6A.6.7(c), 6A.14.1(2)(i), 6A.14.1(3)(i).

15 NER, clauses 6A.6.6(d), 6A.6.7(d)

16 NER, clauses 6A.14.1(2)(ii), 6A.14.1(3)(ii).

determine if it is appropriate for us to rely on a TNSP's revealed costs. That is, whether the TNSP's past performance was efficient relative to its peers and consistent with historical trends.

We rely on revealed costs for opex to a much greater extent than for capex because we assume that opex is largely recurrent. Past actual expenditure may not be an appropriate starting point for capex given it is largely non-recurrent or 'lumpy', and so past expenditures or work volumes may not be indicative of future volumes (particularly for transmission). For non-recurrent expenditure, we will attempt to normalise for work volumes and examine per unit costs (including through benchmarking across TNSPs) when forming a view on forecast unit costs. Other drivers of capex (such as replacement expenditure and connections works) may be recurrent. For such expenditure, we will attempt to identify trends in revealed volumes and costs as an indicator of forecast requirements.

However, capex is not currently subject to an incentive scheme like the EBSS. This means that although past actual expenditures and volumes may indicate the particular TNSP's likely future expenditure, we cannot presume they are efficient. We are implementing a CESS which may mitigate this issue to some extent in the future. Consequently, and because of the presence of non-recurrent expenditures, our assessment approach is typically more involved for capex than for opex. It may be necessary to review projects and programs to inform our opinion on total forecast capex (especially for transmission).

When considering whether capex and opex forecasts reasonably reflect the expenditure criteria, we apply certain assessment approaches and use a variety of assessment techniques. Some of the approaches are specific to capex or opex. Others are common to capex and opex assessment. For example, for both capex and opex, we will always consider whether:

- forecasts are supported by economic analysis that demonstrate forecasts are prudent and efficient
- related party margins impact on forecast expenditure
- adjustments are required for real price escalation
- adjustments are required for efficient increases or decreases in expenditure (step changes).

Our future approach for both opex and capex will place greater reliance on benchmarking techniques than we have in the past. Sections 4 and 5 provide further detail on our assessment approaches for capex and opex.

3.3 Assessment techniques

When we assess capex and opex forecasts, we may use a number of assessment techniques, often in combination. The extent to which we use each technique will vary depending on the expenditure proposal we are assessing, but in general, we will follow an assessment filtering process. That is, we will apply high level techniques in the first instance and apply more detailed techniques as required. For example, for the first pass assessment, we will likely use high level economic and category level benchmarking to determine relative efficiency and target areas for further review. We will, however, also use benchmarking techniques beyond the first pass assessment.

The first pass assessment will indicate the extent to which we need to investigate a TNSP's proposal further. Typically, we will apply predictive modelling, trend analysis and governance or methodology reviews before delving into detailed techniques such as cost benefit analysis and project or program review. While we intend to move away from detailed techniques such as project review, we are likely to rely on them in some cases, particularly to assess capex for transmission network service providers.

Our assessment techniques may complement each other in terms of the information they provide, so we can use them in combination when forming a view on expenditure proposals. Accordingly, we have a holistic approach to using our assessment techniques. This means we intend to give ourselves the ability to use all of these techniques, and refine them over time. Depending on the assessment technique, we may be able to use it to assess expenditure in different ways—some techniques may be more robust than others, at least initially. We will take this into account in terms of the reliance we placed on them.

Therefore, when considering which techniques are the most appropriate for determining allowances that reasonably reflect the expenditure criteria, we would consider best practice regulatory principles. Equally, when deciding the extent to which we rely on a TNSP's forecasting techniques, we may need to consider these principles. The explanatory statement for this Guideline explains this further. This section explains our assessment techniques, which are:

- benchmarking (economic techniques and category analysis)
- methodology review
- governance and policy review
- predictive modelling
- trend analysis
- cost benefit analysis
- detailed project review (including engineering review).

3.3.1 Benchmarking

We intend to incorporate more benchmarking into our expenditure assessment. Benchmarking compares standardised measurements from alternative sources. We are likely to apply several types of benchmarking.

Economic benchmarking

We have not previously used economic benchmarking techniques to assess expenditure, but now intend to do so. Economic benchmarking applies economic theory to measure the efficiency of a TNSP's use of inputs to produce outputs, having regard to environmental factors. It will enable us to compare the performance of a TNSP with its own past performance or the performance of other TNSPs. We intend to apply a range of economic benchmarking techniques, including:

- multilateral total factor productivity
- data envelopment analysis
- econometric modelling.

Category level benchmarking

We will likely benchmark across TNSPs by expenditure categories on a number of levels including:

- total capex and total opex
- high level categories (drivers) of expenditure (for example customer driven capex or maintenance opex)
- subcategories of expenditure.

We may benchmark further at the following low levels:

- unit costs associated with given works (for example, the direct labour and material cost required to replace a transmission tower)
- unit volumes associated with given works (for example, kilometres of conductor replaced per year).

Aggregated category benchmarking

In addition to detailed category benchmarks we are likely to continue to use aggregated category benchmarks of the type found in recent AER publications. Aggregated category benchmarking captures information such as how much a TNSP spends per kilometre of line length or the amount of energy it delivers. We intend to improve these benchmarks by capturing the effects of scale and density on TNSP expenditures.

3.3.2 Methodology review

We will assess the methodology the TNSP utilises to derive its expenditure forecasts, including assumptions, inputs and models. Similar to the governance framework review, we will assess whether the TNSP's methodology is a reasonable basis for developing expenditure forecasts that reasonably reflect the NER criteria.[17]

We expect TNSPs to justify and explain how their forecasting methodology results in a prudent and efficient forecast, so if a methodology (or aspects of it) do not appear reasonable, we will require further justification from the TNSP. If we are not satisfied with further justification, we will adjust the methodology such that it is a reasonable basis for developing expenditure forecasts that reasonably reflect the NER criteria.[18]

3.3.3 Governance and policy review

We will continue to use governance reviews, usually as a holistic assessment of a TNSP's internal processes compared with industry best practice. We typically review processes including governance, strategic planning, risk management, asset management and prioritisation. A favourable governance review will not of itself satisfy the AER that a TNSP's proposed expenditure reasonably reflects the expenditure criteria. A governance review may, however, indicate a TNSP's likely overall efficiency and areas for further analysis.

3.3.4 Trend analysis

The AER will continue to use trend analysis to forecast future expenditure levels on the basis of historical information. In particular, we will apply this technique for the base-step-trend opex

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[17] NER, clauses 6A.6.6(c) and 6A.6.7(c).
[18] NER, clauses 6A.6.6(c) and 6A.6.7(c).

assessment described in section 5. However, trend analysis is also useful for capex assessment where expenditure categories exhibit relatively consistent levels of expenditure over a time series.

3.3.5 Predictive modelling

The AER will use statistical analysis and econometric modelling to help determine the expected efficient costs over the regulatory control period associated with the demand for transmission services associated with different categories of works.

The two models we developed and intend to use for this purpose are the repex model (condition based modelling to forecast asset replacement activities) and the augex model (asset utilisation modelling to forecast network augmentation requirements).

3.3.6 Cost benefit analysis

The AER may assess whether forecast expenditure is expected to be the lowest cost option relative to other options in net present value terms. This technique indicates (all else being equal) the relative efficiency of the different options. Cost benefit analysis is a technique that we will likely use to analyse projects and expenditure categories, for example:

- expenditure decisions for groups of assets that materially affect forecast expenditure (typically set out in asset management plans and justified via a business case)
- expenditure decisions for individual projects or programs that materially affect forecast expenditure (typically justified via a business case).

However, the relative efficiency principle applies equally to higher level drivers of expenditure (for example replacement capex) or to capex or opex in total.

3.3.7 Detailed project review (including engineering review)

The AER may undertake detailed review (including engineering review) of certain project and program expenditure. Usually, detailed review involves 'drilling down' to specific projects or programs of work when further scrutiny is required. We may target specific areas for assessment, or sample projects or programs at random.

Such detailed reviews will likely focus on specialised technical areas (for example augmentation requirements given demand forecasts and network capacity) and will often be undertaken with the assistance of subject matter experts (for example, engineers that specialise in the area concerned). Typically, the scope and form of detailed project and program reviews will be informed by other techniques described in this section, including category level benchmarking and economic benchmarking.

4 Capital expenditure assessment approach

The AER's general approach to assessing total forecast capex will not be significantly different from our approach in the past. However, we intend to use a broader range of assessment techniques and to collect consistent data to aid us with our assessment. We will likely use top down economic benchmarking techniques to compare a TNSP's performance with that of others. We will consider, for example, whether the TNSP is improving productivity and efficiency relative to its past performance and to other TNSPs. Once we know a TNSP's change in productivity over time, we can drill down into greater detail to examine what is driving the change.

We will also examine the volumes and costs applicable to drivers of capex. This means we will split capex into high level, standardised subcategories that reflect primary drivers of capex. These subcategories will likely be:

- replacement capex
- augmentation capex
- connection and customer driven works capex
- non-network capex.

The sections below detail our likely assessment approach specific to each driver. We may further disaggregate these drivers into standardised lower level subcategories. Disaggregating expenditure into categories is helpful because it allows us to understand how particular categories of expenditure affect the total capex forecast. It is also necessary because some types of capex tend to be less recurrent than others. Some categories might be more demand-dependent, for example, or may require particular consideration of cost inputs.

By considering expenditure at the category level, we can examine the prudence and efficiency of a TNSP's proposed expenditure in these categories. In particular, using standardised categories allows direct comparison with other TNSPs, which helps us to form a view on whether the total forecast capex reasonably reflects the capex criteria.

We will require a range of data to support our assessment of total forecast capex. We expect TNSPs to submit regulatory proposals that include:

- economic analysis demonstrating the forecast expenditure is prudent and efficient. This should include documentation and underlying data sufficient to support the economic analysis
- reasons for costs for given expenditure categories and types of work differing from historical expenditure and/or costs of other TNSPs
- consideration of potential work and efficiency trade-offs between capex and opex.

Section 6 further details the information the AER will require to assess total forecast capex.

4.1 Replacement capex

Replacement capex is typically incurred to address deterioration of assets, including works driven by reliability deterioration or as a result of an assessment of increasing risk. This capex driver is closely related to maintenance opex, so we will expect TNSPs to identify and explain potential work and efficiency trade-offs between these two expenditure categories.

We will likely assess the level of forecast replacement capex by:

- analysing information supporting the TNSP's building block proposal
- benchmarking the TNSP's forecast capex with historical expenditure and/or the expenditure of other TNSPs
- replacement expenditure modelling
- detailed project review.

A key input into the analysis will be the outputs from modelling condition or age based replacement rates of assets. This approach will estimate the efficient volumes and cost of replacement works required during each year of the regulatory control period, and to target more detailed project reviews. Replacement expenditure modelling typically involves consideration of:

- the TNSP's historical and forecast mean standard lives of different asset categories
- the change over time in the distribution of asset lives of different categories of the TNSP's assets.

4.2 Augmentation capex

Augmentation capex is typically triggered by a need to build, upgrade or replace network assets to address changes in demand for transmission services or to maintain quality, reliability and security of supply in accordance with legislated requirements.

We expect to assess augmentation capex broadly in line with past practice. This may involve assessing a TNSP's capital governance framework and augmentation forecasting methodology. We may also conduct detailed reviews of projects and infer the findings from such reviews to other projects. However, we also expect to model the cost per mega volt ampere (MVA) of capacity for different types of augmentation projects. We may then consider these modelled costs when determining the prudent and efficient level of augmentation expenditure.

When we assess augmentation capex, we typically consider a TNSP's demand forecasts, the proposed projects and programs to meet forecast demand and the associated forecast capex.

4.2.1 Demand forecasts

We must form a view about whether a TNSP's demand forecasts are realistic. In doing so, we will likely examine:

- global and spatial peak demand at different probabilities of exceedance (PoE) in megawatt (MW) and MVA including:
    - coincident peak demand
    - non-coincident peak demand
    - power factors
    - coincidence factors
- the relationship between any PoE demand forecasts used as an input into the capex forecasts and 10 per cent and 50 per cent PoE demand forecasts

- the model(s) the TNSP used to derive the demand forecasts, and any inputs into these models such as:
  - economic indicators and forecasts
  - temperature measures and forecasts.

4.2.2 Proposed projects and programs

When considering the proposed projects and programs to meet forecast demand and the associated forecast capex, we will likely have regard to:

- the network constraints that require rectification due to demand forecasts including those related to capacity (MVA) and voltage
- any regulatory investment test undertaken by the TNSP in relation to the proposed works
- the options considered to meet the forecast demand, including non-network alternatives and demand side participation
- the previous methods used by the TNSP or another TNSP to meet demand growth of a similar nature, and the costs associated with these works, bearing in mind that better approaches might have become available.

4.3 Connections and customer driven works capex

Connections and customer driven works capex typically relates to the cost of connecting customers to the network and other customer driven works. We will likely use a combination of techniques to assess forecast connection and customer driven works capex, but focus on benchmarking costs per customer and trend analysis for appropriate classes of work.

4.4 Non-network capex

Non-network capex is for activities not directly associated with the transmission network. We will likely assess non-network capex by disaggregating it into a range of subcategories:

- IT and communications
- vehicles
- plant and equipment
- buildings and property
- other.

We may assess non-network expenditure that is more recurrent separately to less recurrent expenditure. We may also examine total expenditure (capex and opex combined) when assessing non-network capex. As we have done in the past, we will likely assess SCADA and network control expenditure in this category.

5 Operating expenditure assessment approach

The AER's general approach to assessing total forecast opex will not be significantly different from our past approach. However, we intend to use a broader range of assessment techniques and collect consistent data to aid us with our assessment. We prefer a 'base-step-trend' approach to forecasting most opex categories. However, when appropriate, we may forecast some opex categories using other forecasting techniques, such as an efficient benchmark amount.

Using the base-step-trend forecasting approach, we will determine forecast opex in year *t* as:

$$Opex_t = \prod_{i=1}^{t}(1 + rate\ of\ change_i) \times (deemed\ final\ year\ opex - efficiency\ adjustment) \pm step\ changes_t$$

where:

- *b* is the base year
- *rate of change*$_i$ is the annual percentage rate of change in year *i*
- *deemed final year opex* is the deemed actual opex in the final year of the preceding regulatory control period
- *efficiency adjustment* is the difference between efficient opex and base year opex
- *step changes*$_t$ is the determined step changes in year *t.*

Under this forecasting approach the product of the annual rates of change accounts for changes in real prices, output growth and productivity in the forecast regulatory control period. The addition of step changes accounts for any other efficient costs not captured in base opex.

5.1 Base opex

The 'revealed cost' approach is our preferred approach to determining base opex. If actual expenditure in the base year reasonably reflects the opex criteria, we will set base opex equal to actual expenditure for those cost categories forecast using the revealed cost approach. We will use a combination of techniques to assess whether base opex reasonably reflects the opex criteria.

We intend not to rely on the expenditure of a particular base year when we identify material inefficiencies in that expenditure. In this case, we may depart from the revealed cost approach by adjusting the base year or substituting an appropriate base year. When determining whether to adjust or substitute base year expenditure, we will also have regard to whether rewards or penalties accrued under the EBSS will provide for the TNSP and its customers to fairly share efficiency gains or losses.

We will likely apply all of our assessment techniques to identify the presence of material inefficiencies in the chosen base year, and in determining an alternative. Section 6 details the information we will require to assess base opex.

The EBSS assumes no cumulative efficiency gains are made after the base year. This allows the NSP to retain incremental efficiency gains made after the base year for five years, the same as other years. This also requires the same assumption to be made when forecasting opex. For this reason, we will deem final year expenditure to be equal to:

$$Deemed\ final\ year\ opex = F_f - (F_b - A_b)$$

where:

- F_f is the determined opex allowance for the final year of the preceding regulatory control period
- F_b is the determined opex allowance for the base year
- A_b is the amount of actual opex in the base year.

5.2 The rate of change

We will forecast opex for the forecast regulatory control period by applying an annual rate of change for each year of the forecast regulatory control period. We will determine the annual rate of change for year *t* as:

$$Rate\ of\ change_t = output\ growth_t + real\ price\ growth_t - productivity\ growth_t$$

5.2.1 Output growth

Forecast output growth is the forecast annual increase in the output measures used to forecast productivity growth. If the productivity measure includes economies of scale then they should not be removed from output growth.

5.2.2 Real price growth

Forecast real price growth is the forecast annual increase in the real price measures used to forecast productivity growth. If the productivity measure includes labour productivity then real price growth should not be adjusted to remove labour productivity.

5.2.3 Productivity

In assessing forecast productivity, we will likely consider (but may not be limited to):

- forecast output growth
- forecast changes in TNSP specific business conditions
- forecast technological change
- how close the TNSP under consideration is to the efficient frontier in our benchmarking analysis
- historical productivity performance
- any difference between industry average productivity change and the rate of productivity change at the efficient frontier.

5.3 Step changes

Step changes must be made only for changes in outputs not captured by the output growth variable. Step changes should only include the forecast costs of non-discretionary changes in inputs, other than capex/opex trade-offs. The drivers for the step change should be external to the control of the TNSP.

If it is efficient to substitute capex with opex, a step change may be included for these costs (capex/opex trade-offs). Step changes should not double count the cost of increased regulatory burden over time, which forecast productivity growth may already account for.

6 Information requirements

This Guideline must specify our information requirements for expenditure assessment. The regulatory information notice (RIN) issued in advance of a TNSP lodging its regulatory proposal will specify the exact information we require. In general, however, we require all the data that facilitate the application of our assessment approach and our assessment techniques. However, we will not require a TNSP to provide information relating to other TNSPs.

We will require forecast information on an ongoing basis, but will typically request historical information in annual RINs. The following sections indicate (at a high level) our likely information requirements for capex and opex.

6.1 Capex

We will require a range of information from TNSPs to enable our assessment of different categories of expenditure applying different assessment techniques. This information will include:

(1) expenditure split by key capex driver (high level expenditure category), namely:

- (a) replacement
- (b) reinforcement
- (c) connections and customer driven works
- (d) non-network

(2) expenditure split by subcategory under each high level expenditure category

(3) methods of calculating, and calculations of any allowances for real cost escalation.

For assessing expenditure by high level expenditure category or subcategory, we will require information on:

(1) forecast expenditure overall and by key asset category supported by forecasts of volumes and unit costs for key expenditure works categories:

(2) the methodology the TNSP used to develop the expenditure forecasts

(3) economic analysis demonstrating the efficiency and prudency of all material forecast operating and maintenance expenditure, including:

- (a) key decisions contained in asset management plans, or likely to be made as a result of the plans
- (b) demonstration that any material change in expenditure relative to historic expenditure levels is efficient (for example, any step changes)

(4) governance plans relating to capital expenditure and evidence where they have or have not been followed. Where governance plans have not been followed TNSPs should explain why and the expected impact on expenditure as a result.

(5) planning and strategy documentation for key capex categories and activities (including asset management plans)

(6) information explaining why any material difference in benchmark costs for key work categories relevant to other TNSPs is efficient

(7) information demonstrating any material change in expenditure relative to historical expenditure levels is efficient and prudent (for example, any step changes)

(8) information explaining why any material difference in benchmark costs for key works categories relevant to other TNSPs is efficient and prudent.

For assessing replacement capex, we will require the above information, plus specific data for modelling, including:

(1) the total quantum of assets added and disposed of by key asset category

(2) the average value of assets added in each category for each regulatory year

(3) the age distribution of assets by key asset category

(4) the historical number of assets replaced in past years by given key category of asset

(5) the expected mean and standard deviation of asset lives by key asset category

(6) the expected costs associated with replacing assets in each category.

For assessing augmentation capex, we will require the above information, plus specific data for modelling, including:

(1) demand forecasts of the TNSP, the models underpinning these demand forecasts and the following demand forecasting data:

    (a) global and spatial peak demand at different probabilities of exceedance (PoE) in MW and MVA including:

        (i) coincident peak demand

        (ii) non-coincident peak demand

        (iii) power factors

        (iv) coincidence factors

    (b) the relationship between any PoE demand forecasts used as an input into the capex forecasts and the 10 per cent and 50 per cent PoE demand forecasts

    (c) the model or models that the TNSP used to derive the demand forecasts and any inputs into these models.

    (d) a full explanation of the calculation and/or selection of inputs into any models and of any assumptions made.

(2) specific data on augmentation expenditure required as a result of forecast increases in demand including:

(a) issues that the augmentation is required to address, which may include:

(i) capacity constraints

(ii) voltage constraints

(iii) load movement

(iv) security

(v) operational efficiency

(vi) compliance with regulations

(vii) land and easements requirements

(b) historical and forecast information on the various segments of the TNSP's network related to demand, utilisation and augmentation cost. This information may include:

(i) voltage, and primary type of area supplied by the segment (CBD, urban, or rural)

(ii) maximum demand at each network segment (historical and forecast)

(iii) various measures of capacity at each network segment

(iv) current utilisation of assets in the network segment

(v) utilisation thresholds of assets in the network segment

(vi) capacity factors

(vii) capacity unit costs

(c) historical and forecast costs associated with the unit cost of key augmentation inputs, by category of augmentation. This information may include the costs of:

(i) transformers

(ii) switchgear

(iii) safety

(iv) line works including conductors and insulators

(v) civil works.

For assessing connections and customer driven works expenditure, we will require the information on forecast volumes and costs for a number of standardised categories of works.

For assessing non-network expenditure, we will require the information on forecast volumes and costs for a number of standardised categories of works.

For assessment using economic benchmarking techniques, we will require a backcast dataset (from 2004) of:

(1) the costs and quantities of the TNSP's inputs, which incorporate:

   (a) overhead lines

   (b) underground cables

   (c) transformers and other capital

   (d) opex

   (e) regulated asset base parameters including depreciation and return on investment

(2) data on outputs, including:

   (a) entry and exit points

   (b) energy delivered

   (c) peak demand

   (d) system capacity by line length

   (e) network reliability

   (f) revenues

(3) environmental factors such as:

   (a) line length

   (b) terrain factors including bushfire risk, the rural proportion of networks and vegetation encroachment

   (c) customer, energy and peak demand density.

We will also require these data annually on an ongoing basis.

6.2 Opex

For opex, we will require all information that will enable us to conduct a base-step-trend assessment of a TNSP's expenditure. This information will include:

(1) expenditure split by each opex and maintenance activity, namely:

   (a) field maintenance

   (b) operational refurbishment

(c) vegetation management

(d) overheads

(2) expenditure split by driver

(3) identification of all non-recurrent expenditure

(4) identification of and justifications for movement in provisions

(5) identification of and justification for any step changes

(6) methods of calculating and calculations of any allowances for real cost escalation.

For assessing expenditure by activity and for step changes, we will require information on:

(1) forecast expenditure overall and by individual opex categories, supported by forecasts of volumes and unit costs for these categories

(2) the methodology the TNSP used to develop the expenditure forecasts

(3) planning and strategy documentation for key opex categories and activities

(4) economic analysis demonstrating the efficiency and prudency of all material forecast operating and maintenance expenditure, including:

(a) key decisions contained in asset management plans, or likely to be made as a result of the plans

(b) demonstration that any material change in expenditure relative to historic expenditure levels is efficient (for example, any step changes)

(5) information explaining why any material difference in benchmark costs for key work categories relevant to other TNSPs is efficient.

For assessing opex on field maintenance and operational refurbishment, we will require the above information, plus information on:

(1) expenditure on the same asset categories reported for the purposes of replacement capex, separated into field maintenance and operational refurbishment expenditures

(2) supporting data explaining the volume of activities undertaken in the current regulatory control period and intended for the forthcoming regulatory control period for field maintenance and operational refurbishment activities, including:

(a) intervals for regular or planned inspections and maintenance

(b) changes in the number and types of asset being serviced

(c) changes in the actual or identified condition of assets, including age data, failure rates and failure modes

(d) impacts arising from changes to legal obligations

(e) other changes including changed approaches to risk management and condition monitoring.

For assessing vegetation management expenditure, we will require the above information plus information on:

(1) expenditure separated into tree trimming, inspection and audit activities

(2) supporting data explaining the volume of activities undertaken in the current regulatory control period and for the forthcoming regulatory control period, including:

  (a) length (in kilometres) of overhead lines/ conductor

  (b) for each defined 'vegetation management area' of the network

    (i) number and types of tree

    (ii) vegetation growth rates

    (iii) rainfall and other material weather factors

    (iv) clearance cycles

  (c) data on fire starts and outages due to vegetation contact

  (d) impact of new or changing legal obligations

  (e) information on audit outcomes (for example, compliance and non-compliance with standards)

For assessing overheads, we will require the above information, and information on:

(1) expenditure separated into major cost categories:

  (a) network overheads, which typically include:

    (i) asset management support

    (ii) grid planning

    (iii) maintenance support

    (iv) network operations

    (v) network support

    (vi) operations/control room

  (b) corporate overheads, which typically include:

    (i) CEO, Legal and secretariat, HR, Regulatory, Finance

    (ii) corporate support

    (iii) debt raising cost

(iv) equity raising cost

(v) insurance

(vi) property management

(vii) rates and taxes.

(2) supporting data explaining the workload of each of these activities undertaken in the current regulatory control period and intended for the forthcoming regulatory control period, including:

(a) the size and complexity of the business

(b) the number of employees

(c) new or changed legal obligations

(3) supporting data explaining how the reporting of these costs affects information presented for the above categories of direct expenditure, including:

(a) full details of the TNSP's cost allocation policies and practices. We require this information in addition to the TNSP's approved cost allocation method and at a level of detail to enable us to reproduce allocations of all non-directly attributable costs to direct cost categories.

(b) details of the TNSP's capitalisation policies and practices. We require this information at a level of detail to enable us to reproduce amounts capitalised or expensed to direct cost categories.

For assessment using economic benchmarking techniques, we will require a backcast dataset (from 2004) of:

(1) the costs and quantities of the TNSP's inputs, which incorporate:

(a) overhead lines

(b) underground cables

(c) transformers and other capital

(d) opex

(e) regulated asset base parameters including depreciation and return on investment

(2) data on outputs, including:

(a) entry and exit points

(b) energy delivered

(c) peak demand

(d) system capacity by line length

(e) loss of supply events

(f) unplanned outage duration

(g) revenues

(3) environmental factors such as:

(a) network characteristics including line length and variability of dispatch

(b) terrain factors including bushfire risk, the rural proportion of networks and vegetation encroachment

(c) weather factors including extreme heat, extreme cold and extreme wind days

We will also require these data annually on an ongoing basis.

Glossary

This Guideline uses the following terms.

Term	Definition
AER	Australian Energy Regulator
CAM	Cost Allocation Method
CBD	Central Business District
EBSS	Efficiency Benefit Sharing Scheme
Guideline	Draft Expenditure Forecast Assessment Guideline for electricity distribution
IT	Information Technology
MVA	Mega volt ampere
MW	Megawatt
NEL	National Electricity Law
NEO	National Electricity Objective
NER	National Electricity Rules
NSP	Network Service Provider
PoE	Probability of Exceedance
RIN	Regulatory Information Notice
SCADA	Supervisory Control and Data Acquisition
TNSP	Transmission Network Service Provider