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| CUSTOMER CONNECTIONS CAPEX FORECAST |
| BASIS OF PREPARATION |
| Asset Strategy & Planning Branch |
| March 2018 |

CONTENTS

[1. BACKGROUND 1](#_Toc509562108)

[2. CUSTOMER CONNECTIONS CAPEX VS AUGEX 2](#_Toc509562110)

[3. BASIS OF PREPARATION 4](#_Toc509562111)

[3.1 "Base-step-trend" approach for Customer Connection Capex Forecasts 4](#_Toc509562112)

[3.2 Assumptions and Data Sources 5](#_Toc509562113)

[3.3 Methodology 7](#_Toc509562114)

[4. FORECAST 8](#_Toc509562115)

[4.1 Expenditure and Contributions 8](#_Toc509562116)

[4.2 Efficiency of the Forecast Capex 8](#_Toc509562117)

[Attachment 11](#_Toc509562118)

# BACKGROUND

Endeavour Energy services some of the fastest growing communities in NSW. The NSW Government’s priority growth areas within our service area are projected to accommodate 950,000 new residents over the next 30 years as part of the largest coordinated release of Greenfield land for residential, commercial and industrial development in the State’s history. The North West and South West Priority Growth Areas of Sydney are expected to accommodate 500,000 new residents over 30 years.

This projected growth combined with supporting infrastructure projects such as the WestConnex motorway, South West and North West rail links and the associated greenfield and redevelopment growth of the region will continue to require the extension and augmentation of substantial parts of Endeavour Energy’s distribution network. This will be required to connect new customers in new areas, support the urbanisation of previously semi-rural areas, the new economic activity of these developing areas, and ensure that we continue to meet customer’s requirements for network-connected energy services.

Recognising this growth, a primary corporate objective is to ensure that electricity infrastructure is developed in line with the whole-of-government approach to coordinated infrastructure planning for rezoning of new release areas, and this to ensure development in new precincts can proceed in accordance with the demand for housing and related community developments. In particular there is forecast ongoing substantial growth in new connections as new residential precincts are developed. This includes the development of new commercial centres, development of “employment lands” and the provision of supporting social infrastructure all of which adds to growth impacts and demand on network infrastructure.

In NSW, the Electricity Supply Act requires that customers fund their own connections to a licenced distribution service provider’s network, with the connection works themselves being contestable. This requires a clear definition of a customer connection asset as opposed to a shared network service asset. Consequently, the cost borne by customers in establishing new housing in Greenfield areas can be adversely impacted by this definition, particularly if it is not reflective of actual network usage trends.

Endeavour Energy has recently reviewed its approach to funding the installation of electricity supply connection infrastructure for new housing developments. In doing so we have identified the need to remove inequities, complexities and inconsistencies associated with the funding and development of the high-voltage underground reticulation in rapidly developing residential areas, and to remove ambiguities associated with the categorisation of shared network assets and the costs of funding their provision. These changes in our approach are reflected in our current forecasts of customer connection‑driven capital expenditure.

The purpose of this report is to describe the basis of preparation of customer connection capex forecasts, and how the Endeavour Energy-funded connections capex and forecasts of reimbursements for shared-assets components (installed by developers) are developed.

In particular, this report outlines the impact that our revised policy approach has on our future forecasts, with these being developed on a “base-step-trend” basis. It shows how the basis of preparation of our forecasts is founded on external forecasts for customer connection numbers, and empirically derived relationships between customer number growth and capex requirements.

# CUSTOMER CONNECTIONS CAPEX VS AUGEX

The environment in which Endeavour Energy operates, like that of all DNSPs, is rapidly changing. We no longer only provide electricity supply, but rather we provide electricity supply connectivity services, of which there are several layers.

Our current approach to funding the assets required to provide these services is best described as “beneficiaries pays”. This approach is consistent with that adopted by other DNSP’s in NSW and in other jurisdictions across Australia. This approach ensures that:

* dedicated or customer specific assets are fully funded by the relevant customer/developer, such as single-ended user large connections such as mines or Data Centres; and
* assets that provide current and/or future customers with supply, improved network connectivity services or supply resilience are funded across our customer base like all other common standard control service assets. This is typically the case for new residential or commercial connections in developing Greenfield areas.

The connection of new customers to our network has an immediate, local impact on the infrastructure required to meet the energy supply needs of those customers, and a potentially longer-term impact on the upstream infrastructure required to integrate and support the lower level connection arrangements.

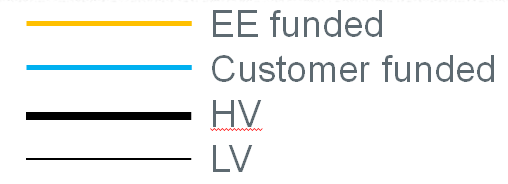
Given the level of new connection activity in our franchise area, the majority of our customer connections capex is driven by the customer connection activity and goes to providing the shared infrastructure required to create the electricity network connectivity services that customers require. Examples of this are local distribution feeders and distribution substations.

Other components of our growth-driven capex, known as augmentation capital expenditure or Augex, are to provide the higher order shared network required to integrate and supply the lower levels of the network. Examples of this are investments in major substations, subtransmission lines and related assets.

Our growth-related capital investment projections capture and segregate these investment programs into categories that reflect their respective drivers. This allows us to discriminate in our capital expenditure forecasts between upstream shared works that are not funded directly by customers from those that are directly funded or contributed to by customers (and/or developers). In some cases, the investment categories are funded by a combination of the two approaches, as is typically the case with distribution network infrastructure required to service greenfield development areas.

The categories of our growth-related customer‑driven capex outlined in our investment plans that will be funded by a combination of Endeavour Energy investment and customer contribution are shown diagrammatically in Figure 1, and outlined in Table 1 below.

Figure Schematic representation of current funding arrangements.



ZS: Zone Substation

DS: Distribution Substation

Table 1 . Shared‑funding Customer connection-related Investment Categories

|  |  |  |  |
| --- | --- | --- | --- |
| SAMP Category | Endeavour Energy Funded Component | Customer/Developer  Capital Contribution Component | Approximate Proportion of Total Connection Capex  (EE funded plus Capital Contributions) |
| UR – Underground Residential | * High Voltage (HV) Reticulation * Distribution Substations | * Low Voltage (LV) Reticulation * Easements | 50% |
| IC – Industrial and Commercial | * Upstream Headworks * High Voltage Reticulation for subdivisions | * Low Voltage Reticulation * HV extension for spot loads | 25% |
| AR – Asset Relocation | * Distribution ducts for future use * Betterment component (where we require the existing assets to be improved) * EE funded components are only 7% of total relocation Capex. | * Relocation of any existing assets due to road widening or a desire to underground/relocate lines * On average the proponent funds on average 93% of relocation costs | 21% |
| NU – Non Urban | * Distribution Transformer * Upstream Headworks for the shared network | * Low Voltage network * HV extensions | 3% |
| DU – Duct installation | * Installation of Future transmission ducts at the same time as major road upgrades | N/A | 1% |

This Basis of Preparation explains the methodology used to develop the Customer Connection driven capex projections for the forthcoming regulatory control period, on the basis of the drivers and principles outlined above. It does not cover the Augex requirements for the higher-levels of the network, which are determined through risk-based probabilistic assessments of the demand-capacity balance of the shared interconnected network.

# BASIS OF PREPARATION

## "Base-step-trend" approach for Customer Connection Capex Forecasts

The funding of shared assets associated with, or driven by new customer connections is the responsibility of Endeavour Energy (the DNSP). However, only a proportion of the customer connection-related infrastructure investment is linearly related to the volume of customer connection activity, This is due to the diverse range of new connections, from large scale industrial to broad-acre greenfield residential developments, the latter of which being the subject of this report. As such, in order to determine a prudent and efficient level of funding by Endeavour Energy for the shared network components of customer driven works (driven in particular by large-scale residential development), we have based our future projections on empirical evidence of recent funding activity as well as the assessed impacts of our revised funding model.

To do this, Endeavour Energy has adopted a forecasting approach for this capex category similar to that used to develop forecasts for opex, i.e. the “base-step-trend” approach. In general, customer driven (connections) capex and capital contributions are driven by:

* Number of new connections/homes;
* New Load from Industrial/Commercial Development; and
* Asset Relocations from new and widened roads, rail infrastructure, and developers wanting to relocate overhead lines to improve land-release lot yields.

The impact of the first driver is able to be reliably predicted using available industry data. However, the impact of the latter two drivers is unable to be reliably forecast except where known developments are in the pipeline. As such Endeavour Energy’s approach to developing customer-driven capex forecasts using the “Base-Step-Trend” for new connections (dwellings) driven forecasts, but uses known or expected developments for the remaining two drivers.

This is appropriate given the base level of new connection activity that Endeavour Energy will continue to experience in the forthcoming regulatory control period, the ubiquitous nature of customer connection works for broad-acre Greenfield developments, and the established relationships between activity levels and actual capex costs.

Given this, Endeavour Energy has developed the FY2020-FY2024 forecast for customer connection driven capex, based on the following:

* The base level of capex is that forecast to be required by end of FY2018, correlated to the forecast number of customers connections expected in that year;
* The step change factored into the forecasts is that arising from the change in customer connections contributions policy interpretation implemented in August 2017 using the outcomes of a detailed analysis undertaken; and
* The trend data used is the forecast numbers of new residential customer connections is developed within Endeavour Energy based on economic activity data obtained from the National Institute of Economic and Industry Research (NIEIR). These forecasts are then correlated and aligned with other external data sources such as Housing Industry Association and NSW Department of Planning data.

It should be noted, however, that some customer-funded capital works are for major customers rather than residential developments. In such cases a single “customer” may make a significant capital contribution for a connection asset, as is the recent case of a new data centre established in western Sydney. Such developments and their associated capital contributions can skew the trend data unless pre-model adjustments are made.

Endeavour Energy has estimated that approximately 50% of the value of capital contributions is driven by major customer connection works as opposed to Greenfield residential developments, thereby funding discrete, dedicated major assets as opposed to the shared distribution network. A corresponding adjustment is made to the trended capital contribution data in order to account for this.

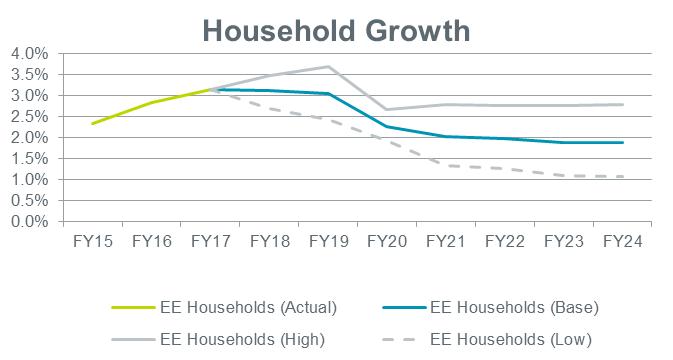
## Assumptions and Data Sources

As a general principle, Endeavour Energy relies on high-integrity external data sources in order to develop its forecast for customer numbers, and recent historical cost data and unit rates for the development of capex projections linked to customer numbers. Further, as a general principle, we adopt median projections which are considered neither to be “bullish” nor pessimistic.

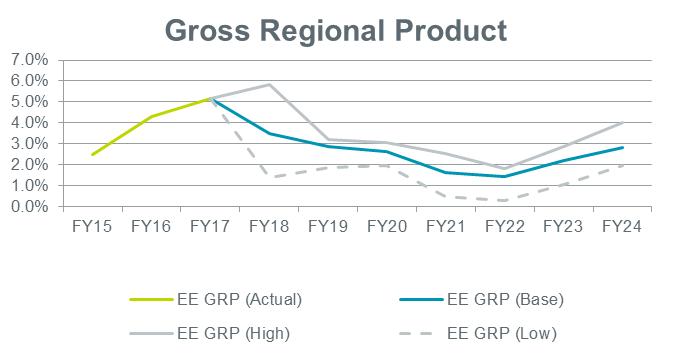
Based on available external data, new dwelling growth forecasts for the Endeavour Energy region are developed for the period FY20 to FY24, with Gross Regional Product (GRP) data primarily used to forecast commercial and industrial customer growth.

The macroeconomic forecasts for Household Growth and (GRP) underpinning these assessments is provided by NIEIR, as shown in Figure 2 and Figure 3 below. NIEIR has provided Endeavour Energy with high, medium and low scenario forecasts, and we have selected the medium scenarios as the basis of projecting capex requirements for new customer connections.

Figure



Figure



The medium forecast scenario that we have used has been benchmarked against independent data sources such as HIA and Department of Planning as noted previously, and as shown in Figure 4 below.

The results show that the medium case forecast is validated by these independent sources, and that this provides a reasonable basis on which our capex projections can be determined. It should be noted in particular that our forecasts fall below the current NSW Department of Planning projections towards the end of the forthcoming regulatory control period.

Figure Customer Number Forecasts (000’s)

As can be seen from the figure above, we expect to see a significant increase in customer connection numbers, over the forthcoming regulatory control period. This is summarised in Figure 5 below.

Figure . 2020 – 2024 Regulatory Control Period Customer Connection Forecast

Further, based on an analysis of historical data we have determined that approximately 50% of capital contributions are directly related to new customer connection numbers. This accounts for the fact that not all new connections will require new shared-services infrastructure, and to cater for commercial and industrial customer developments enmeshed within residential developments. Asset relocations and industrial/commercial gifted assets have no direct relationship with overall customer numbers, as one large High Voltage Customer could gift as substantial proportion of the total contributed asset value, but remains only one customer.

## Methodology

Based on the above assumptions, and the “base-step-trend” approach, the following methodology has been used to develop or customer connection capex forecasts:

* Revised estimates of the base-level of Endeavour Energy funding (reflecting the revised funding model currently being used) have been developed based on analysis of historical contributions data. This has been used to determine an expected forward-looking base contribution estimate.
* We have chosen the median forecast customer numbers as derived from the independent sources as noted above. These are used as the basis for pro-rating the proportion of the residential subdivision component of the connections capex forecast for which Endeavour Energy contributes.
* Estimates of the forward funding contribution by Endeavour Energy for the shared components are determined by applying the trend in the forecast customers numbers to 50% of the total connections capex estimates (as noted above), the base level of which having being derived in accordance with the current funding model applied to historical investment activity levels. This calculation adjusts the historical level of capital contributions to that which now includes the additional component now shifted to being funded by Endeavour Energy.
* Forecasts for other capex (commercial, industrial, relocations, duct provisions in new civil infrastructure) are based on the current base level, carried forward through the 2020- 2024 RCP.

# FORECAST

## Expenditure and Contributions

On the basis of the above inputs, assumptions and methodology, the results of forecast customer connections capex by category is given in Table 2 below, with the quantities expressed in real $FY19.

Table 2. Forecast Customer Connection Capex

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Capex  ($FY19, millions) | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 |
| AR (Asset Relocation) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| IC (Industrial & Commercial) | 13.8 | 13.3 | 13.3 | 13.3 | 13.5 |
| NU (Non-Urban) | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| UR (URD) | 44.0 | 42.1 | 42.0 | 42.2 | 43.0 |
| DU (Duct Installation) | 2.2 | 2.2 | 2.3 | 2.3 | 2.4 |
| Total Connections | 63.5 | 61.1 | 61.0 | 61.3 | 62.4 |

Further, on the basis of this forecast, the forecast for the total amount of capital contributions for Standard Control Service activities is given in Table 3.

Table 3. Total Standard Control Service Contributed Asset Capex

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | Total RCP |
| Total Net SCS  capital contributions  ($FY19, millions) | 112 | 105 | 105 | 105 | 108 | 535 |