# . CASE FOR INVESTMENT: CONNECTIONS CAPEX – 2024-29



September 2022



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Investment Title	NUR NNU RAR Connections Capex
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Pre RIT-D	
Final CFI	
Other	

# Endorsement

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0	16/9/2022	Initial Draft - D Sahay
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### Prepared by:

**Reviewed by:** 

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# • 1. Executive Summary

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- Endeavour Energy operates the third largest electricity distribution network in the National Electricity
   Market (NEM) as measured by customer numbers. We service some of the fastest growing urban regions
- in Australia including Western Sydney which is home to approximately 1 in every 11 Australians.
- In Australia including western Sydney which is nome to approximately 1 in every 11 Australians.
   Forecasts indicate the population of Western Sydney will reach 3 million by 2036, representing half of
   Sydney's population and two-thirds of the population growth in the entire Sydney region.
- Our Growth Servicing Strategy and various Area Plans guide our approach in catering for the growing
- demand for our services across Western Sydney and our network area more broadly. Together, these play
- an important role in ensuring we plan and deliver timely and efficient upfront investment in new electricity infrastructure. With a significant portion of this investment triggered by new connections, this Case for
- Investment (CFI) should be considered in conjunction with the Growth Servicing Strategy and Area Plans
- in the suite of documents outlining our approach to servicing the strong growth of our customer base.
- This CFI provides an overview of the factors underpinning our proposed connections investment for 2024-29, including:
  - the role of our Connections Policy in attributing costs to connection applicants and Endeavour Energy;
    - the underlying need for investment in connection assets;
  - a discussion of the key investment drivers including customer growth forecasts;
    - our expenditure forecast modelling approach; and
    - the options considered and the benefits identified which has guided recommended solution.

### 1.1 Background

On average, Endeavour Energy is expected to connect 23,000 new customers to the network over the next ten years. Facilitating the connection of new customers is a core service we are required to provide. The AER's service classification and our AER approved Connection Policy provides guidance as to what types of connection services and associated works are required to be funded by the connecting customer or Endeavour Energy.

For connection works which customers are required to fund, these can generally be provided on a contestable basis rather than by Endeavour Energy. This is unique to customers in NSW as the Accredited Service Provider (ASP) scheme operates to give customers access to competitive third-party providers who are trained and authorised to perform specific connection-related work on the distribution network.

Developers typically hire and pay for ASPs to design and construct the reticulation works required to connect their developments to the Endeavour Energy network. ASPs will typically carry out all of this work plus any works deemed to be 'shared' infrastructure. Works that are considered 'shared' infrastructure is funded by Endeavour Energy and forms part of Augex Connections Funding that is the subject of this case for investment. Once completed, these customer funded connection assets are 'gifted' to Endeavour Energy to maintain. Importantly, they are not included in our Regulated Asset Base (RAB).

Typically, connecting customers are liable for the cost of works dedicated to their connection, while Endeavour Energy bears the cost of investment on the shared network which may be required to accommodate the connection. This program of investment for connections augmentation expenditure is driven primarily by a need to invest in assets including distribution feeders and substations located upstream from the connection where they are (or will be) used to service other existing or future customers.



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- This investment will typically be reactive in nature as expenditure is predominantly in the form of cost
   reimbursements made to developers or their nominated ASP. Reimbursements represent the portion of
- connection works undertaken by customers or developers on the shared network on behalf of Endeavour
- Energy. Reimbursements are made to developers for discrete projects and can range from less than
   \$100,000 to \$2million. As these projects are driven by customer requirements where the bulk of the
- expenditure is funded by the proponents themselves, reimbursements are dispersed across several
- proponents, are geographically diverse and are for different asset types. Endeavour Energy adopts the
   position that for ongoing programs such as this one, a material change in policy settings that results in an
- increase in capital costs over the regulatory period that meet the Regulatory Investment Test for
- Distribution (RIT-D) threshold should be the subject of a RIT-D. This CFI does not result in a material
- change in capital expenditure. For these reasons, we consider that this program does not meet the
- eligibility for a RIT-D at the present time.
- Our Connection Policy provides further guidance on the circumstances where connection costs may be
   shared and how a customer's contribution to these costs where undertaken or funded by Endeavour
- Energy, and vice versa, is determined. However, we note under Endeavour Energy's current 'causer pays'
   policy, connecting customers pay for most of the connection assets, while Endeavour Energy bears the
- cost of any shared infrastructure, including the cost of upgrading or augmenting the upstream network.
- This case for investment covers only the Endeavour Energy portion of capital costs required in connecting
   new customers to the network. As the requirement to provide customers with electricity is a regulatory
- obligation, this program of investment is deemed to be 'reliability corrective action'.

# **1.2** Recommendation

This CFI indicates capital expenditure of \$133.8M over the 2024-29 regulatory period is required to investment in shared upstream, distribution assets to cater for the connection of almost 120,000 additional new connections forecast over this period.

### Table 1: Connection Capex Forecast 2024-29

\$M; real FY24	FY25	FY26	FY27	FY28	FY29	Total
Connection Capex	27.4	26.1	25.9	26.9	27.5	133.8

We consider this forecast is efficient on the basis of the nominated option represents the highest net economic benefit to customers. Our connection program is considered to be 'reliability corrective action', reflecting our obligation to cater for requests to connect to our network and to provide a minimum technical standard at each connection point which are set out in Schedule 5.1 of the NER. We propose this investment be administered via the four programs of UR (Urban Residential), IC (Industrial Commercial), NU (Non-Urban) and AR (Asset Relocations).



## 2. Background

#### • 2.1 Connections Framework

- Endeavour Energy has a policy for
- funding new customer connections that is consistent with NSW legislation and the
- national regulatory framework. The
- former includes the Electricity Supply Act (1995) and the Accredited Service
- Provider (ASP) Scheme which serve to
- outline the requirements relating to
- customer connection services and the contestability arrangements for the
- provision of these services respectively.



- Adherence to the national regulatory framework relates to obligations set out in the National Electricity
- Rules (NER) which establishes inter-relationships between the AER's Service Classification Guideline, the
- AER's Connection Charge Guideline and our Connections Policy.
- The Service Classification Guideline provides guidance on how the AER will decide which connections services are regulated and how, as well as the nature of that regulation. For NSW DNSPs, classification differs from networks in other jurisdictions due to contestability arrangements for connection services.
  - Connection Charge Guidelines (CCG) and NER (Chapter 5A) establishes the connection charging principles and requirements of DNSPs in developing their connection policies. The NER establishes three types of connection services:
    - <u>Basic Connection Services</u> simple connections where no/minimal network upgrades are required. Typical for single residential premises, small commercial premises and small multi-occupant developments. Also applies to micro-embedded generators.
    - <u>Standard Connection Services</u> non-basic connections which require upgrades to accommodate the load. Customers are required to arrange for and where relevant contribute to the costs involved (capital contribution). Typically relate to large multi-occupant developments, and large commercial and industrial developments as well as rural customers who require augmentation work.
    - <u>Negotiated Connection Services</u> where connection is neither basic or standards or for customers who elect to negotiate the terms and conditions on which the connection service is to be provided. Negotiation process governed by the approved negotiation framework.
  - 3. Connection Policy sets out our application of CCG and NER obligations. These require AER approved before the commencement of each regulatory control period and set out the circumstances in which connection charges are payable and the basis for determining the amount of such charges. Connection charges are typically the sum of relevant Ancillary Network Services (ANS) connection charges, capital contributions and any charges payable under a pioneer scheme.

Our approach to planning and coordinating network investment to cater for the forecast connection and demand driven growth is outlined in our Growth Servicing Strategy. Subordinate to this, our Area Plans provide detailed contextual and technical characteristics of the regions in our network area where forecast growth - and the subsequent need for network investment - is particularly concentrated. Connection growth in these areas is typically driven by land releases and development. For any customer or developer wishing to connect new sites to the distribution network, a request for connection is required. We have an



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- established process for receiving and assessing and categorising connection applications which is outlined below.
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## 2.2 Connections Policy

- The costs of connecting residents within new developments is guided by our Connection Policy which among other things, outlines the circumstances in which connection charges are payable and the basis for determining the amount of such charges. In the context of growth which is predominantly development-
- driven, our Connection Policy plays an important role in attributing the cost of connection works between
- developers and Endeavour Energy.
- Our Connection Policy adheres to the principles outlined in the Section 5A of the NER which allow us, in relation to an application for a standard or negotiated connection, to require customers and developers to
- make a reasonable capital contribution to the cost of works to facilitate their connection. Broadly, the
- policy requires that customer-initiated connection services are funded by the customer where they are
   needed to cater for their connection. These works are generally contestable with connection assets gifted
- to Endeavour Energy once built and we are satisfied that the assets have been built to standard. This
- approach is known colloquially as a 'causer pays approach'.
- Conversely, connection works that will benefit customers other than the newly connecting customer are
   funded by Endeavour Energy. Where the scope of connection works incorporate both the shared network
- and the customer's dedicated premise or development site, works are most commonly delivered through contestable works processes with the portion of works attributed to the shared network funded by Endeavour Energy through a reimbursement scheme.

In NSW, development subdivisions requiring connection services are usually deemed to be 'contestable works'. That is, in the absence of safety concerns or potential adverse impacts to the security of the system, contestable works can be delivered on behalf of developers by accredited service providers (ASPs). The arrangements governing the classes of contestable connection services and ASP accreditation requirements are set out in the ASP Scheme Rules. Contestability arrangements are also reflected in the AER's service classification which describes the form of regulation which applies to each type of connection service available to customers.

#### 2.2.1 Causer Pays vs Beneficiary Pays

As a consequence of connection works being contestable, the concept of 'dedicated assets' vs 'shared assets' is typically used to determine funding responsibility in NSW. In regard to residential developments, dedicated assets are generally considered to include all the high and low voltage cables, substations, lights etc. within the new subdivision.

In accordance with our Connections Policy (and supported Endeavour Energy Company Policy 9.6.11), we only make a cost contribution to developers where there is a reasonable likelihood that assets installed as part of the connections works will be used by customers outside the development in the foreseeable future and as a result forms a shared network. This generally includes upstream assets not directly associated with the connection application which need to be constructed or upgraded. As well as upstream system infrastructure, assets such as the provision of additional ducts to take advantage of road construction works and for use by future customers may fall within this category.

As aforementioned, this approach commonly results in customers and developers funding the majority of infrastructure that will enable the new connection or development. The division of connection costs between new customers and existing customers as guided by the 'causer pays' approach differs to most other DNSPs operating in the NEM where connection services are not contestable and sharing is determined via the application of 'the cost-revenue test', otherwise known as the 'beneficiary pays' approach.



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- This test compares the total cost of connection works with the expected incremental revenue received
   from the customer through the impost of network charges. To the extent revenue is insufficient to offset
- these costs, the customer is required to make a capital contribution. Relative to the 'causer pays'
- approach, the 'beneficiary pays' approach results in a larger portion of connection costs being funded by
- the customer base. As a consequence of this connections investment being included in the RAB, this
- contributes to the network charges payable by existing customers under a beneficiary pays approach.
- At the present time, the proportion of Endeavour Energy funded assets in comparison with the total connections assets sits at approximately 13 percent (of total connections expenditure). This value is a consequence of the reimbursement settings applied to various asset classes.
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- In applying the 'causer pays' principles for any given connections project in practice, total connection costs are divided into two components:
  - a 'K' component which captures the customer funded component of a project; and
  - a 'Q' project which captures the Endeavour Energy funded component of a project.
- For ease of construction, a single ASP typically performs or coordinates the connection works with
   Endeavour Energy reimbursing the customer for the 'Q' portion of the project in accordance with a set
- schedule of prices. Assets that are funded by Endeavour Energy as part of this program are rolled into the
- RAB. Customer funded assets which are 'gifted' to the company do not form part of the RAB and is instead treated as taxable revenue.

## • 2.3 Connections Programs

We manage connections capex expenditure through administering the following four programs:

- Urban Residential UR
- Industrial Commercial IC
- Non-Urban NU
- Asset Relocations AR

Projects to be addressed under the particular program are identified through the customer connection process and individually submitted for approval by the Customer Network Solutions Branch prior to inclusion in the program via the change control process.

### 2.3.1 UR Program

The UR Urban Residential program provides for extensions and augmentation of the electrical network to service new Urban Residential Developments (URD). The scope of the UR program is to fund the capital expenditure associated with customer connection works which are not required to be funded by the UR applicant.

#### 2.3.2 IC Program

The IC Industrial Commercial program provides for extensions and augmentation of the electrical network to service new Industrial Commercial Developments (IC). The scope of the IC program is to fund the capital expenditure associated with customer connection works which are not required to be funded by the IC applicant.

### 2.3.3 NU Program

The NU Non-Urban program provides for extensions and augmentation of the electrical network to service new Non-Urban Developments (NU). The scope of the NU program is to fund the capital expenditure associated with customer connection works which are not required to be funded by the NU applicant.



#### 2.3.4 AR Program

- Asset relocation projects arise out of a need by third parties to relocate Endeavour Energy assets. This
- may be driven by developers' intentions to develop land, or by transport authorities undertaking road works. These works are generally considered to be contestable works unless otherwise determined by
- Endeavour Energy and are therefore funded by the party seeking to relocate assets.
- The Asset Relocations program provides for upgrade and augmentation of the electrical network that will,
- in time, be required to service new developments and connection of new customers. The scope of the AR
   program is to fund works on the shared network that are undertaken whilst assets are being relocated or
- developer funded assets are being established.
- For AR programs, the applicant will fund the cost of relocation of the specific network assets required to be
- relocated. As a general principle, the relocating party is required to fund the relocation on a 'like for like'
   basis. However, the relocation works may also require Endeavour Energy to fund certain components
- such as spare ducts and any asset upgrades or renewal required.
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## • 3. Identified Need

- The identified need for our connections program is to facilitate connection of customers to the distribution network. Investment is considered to be "reliability corrective action" reflecting our obligation to connect
- customers as specified in Division 4 of the Electricity Supply Act (1995) and ensure a specified level of
- service is available to all customers is specified Schedule 5.1 of the NER.
- Although investment made on the basis of being a reliability corrective action does not require a positive net economic benefit, we have applied a market benefits test to this investment. Furthermore, we have tested if the ratio of proposed investment for connection assets between connecting and existing customers reflects the preferences of customers and is consistent with historical trends.

## 4. Forecasts

#### 4.1 Customer growth forecasts

The number of new customers we expect to connect to our network over the 2024-29 regulatory control period is a key driver underpinning our proposed connections investment. Our connections capex forecast seeks to establish a relationship between this expected growth and the associated level of investment across the four connections capex categories discussed in the section above. Consistent with our approach for previous regulatory determinations, we have engaged an independent expert third-party to provide us with an estimate of connection growth. Table 2 below outlines the forecast provided by our consultant the National Institute of Economic and Industry Research (NIEIR).

Year	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Domestic	998,038	1,015,792	1,037,994	1,058,305	1,079,201	1,100,743	1,122,924	1,145,672	1,168,579
Commercial	82,765	83,693	85,710	88,404	90,415	92,600	94,741	97,386	99,655
Industrial	5,966	6,049	6,194	6,387	6,532	6,689	6,843	7,033	7,196
Total	1,086,769	1,105,534	1,129,898	1,153,096	1,176,148	1,200,032	1,224,508	1,250,091	1,275,430

#### **Table 2: Customer Connections Forecast**





## 4.2 Connections Capex Model

Connections capex is notoriously difficult to forecast as it is dependent on customers completing their commitments on the project to allow work on the shared network to proceed. That is, reimbursements made are sensitive to any unexpected decisions by developers to defer or delays works, change the scale of the project or bring forward connection works which can be influenced by both a range of macroeconomic and development-specific factors.

To help us forecast forward connection expenditure, a connections capex model has been created to produce an estimate of investment required to cater for the forecast strong growth in customer connections. Capex projections used in this document have been derived from this model. The main input to the connections capex model is the customer numbers growth presented in Table 2.

In general, the model assumes that total connections expenditure (whether it is funded by Endeavour or the customer) is directly related to the growth in the number of connections per year. Historical connections capex and historical capital contributions has been analysed and a 'per connecting customer' unit rate has been derived from the historical analysis. The model then applies the derived unit rate (adjusted by CPI as appropriate) to the forecast customer growth in order to derive total connections expenditure for future years.

The steps applied by the model in deriving the total connections capex forecast and attributing them to existing and new customers and across a range metrics, assets and connection program categories is outlined in Figure 3 below.

#### Figure 2: Connection Capex Model Logic





- The model also incorporates a 'contributions dial' setting which can change the allocation of connections costs between new customers (i.e. gifted assets) and existing customers (i.e. Endeavour Energy
- connections capex). Although the model has the capability to vary components of our connections
- reimbursement regime, we have fixed the dial to 12.82% to reflect the portion of forecast connection costs
- that Endeavour Energy will fund. This is consistent with recent historical levels and reflects stakeholder
- feedback on this issue. The forecasts produced by the model is displayed in Table 3. The expenditure
   trend relative to historical costs and compared with new customers added and a comparison of the
- trend relative to historical costs and compared with new customers added and a comparison of the average NEM cost share is displayed in Figure 4.

\$M; real FY24	FY25	FY26	FY27	FY28	FY29	Total
Connection Capex	27.4	26.1	25.9	26.9	27.5	133.8
Capital Contributions	186.4	177.5	176.4	182.7	187.3	910.2
Total	213.8	203.6	202.3	209.6	214.8	1,044.0

#### Table 3: Connection Model Expenditure Forecasts 2024-29







## • 4.3 Revenue Test Model

- In order, to test the viability of the 'dial setting' which sets the level of funding that Endeavour Energy
- contributes for connections projects, as discussed above, a second model tests the economic validity of these dial settings. It answers a fundamental question with regards to whether investments made by
- Endeavour are set to an appropriate level, and what the risks of not getting return of capital on these
   assets. Conversely, it also addresses the question of whether connecting customers are paying too much
- in terms of up front contributions and whether they are subsidizing existing customers.
- This model attempts to articulate the differences between the 'causer pays' approach used in NSW and the 'beneficiary pays' method used by other DNSPs in the NEM. This is illustrated in the charts below. It shows that expenditure on connection assets can increase considerably before failing the revenue test.
- This case for investment, however, assumes that the level of Endeavour Energy's contribution remains at
- e approximately 13 per cent of total connections expenditure. Ultimately, this assumption means that there
- is an opportunity for a reduction in supply costs for the remaining customer base at large. This is
- discussed in the context of risk costs below.



Figure 5: Causer Pays approach



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## 5. Risk Cost Benefit

A fundamental regulatory principle that applies to capital investments associated with Endeavour Energy's provision of standard control services is that customer benefits must exceed the cost of providing these services, unless the investment is made for reliability corrective actions. A customer benefits test must therefore be satisfied.

### 5.1 Customer Benefits

In regard to assessing benefits from our proposed investment which accrue to customers, there are two elements to customer benefits that need to be considered. The first element deals with benefits to existing connected customers (or the customer base at large), and the second element deals with the benefits attributable to new customers who will get a connection to the grid.



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#### 5.1.1 Bill Impact for the existing customer base

- The first element can be described as 'bill impact', in other words, what will this capital program do to the average customer's bill.
- In the present 'revenue cap' regulatory regime, the Australian Energy Regulator (AER) sets revenue caps for the company for the regulatory period. In simplistic terms, this means that the company should set its tariffs so that this revenue cap is not exceeded. Revenue caps based on the building block approach are determined from a summation of:
  - Return on capital
  - Return of capital (depreciation)
  - Operating expenditure
    - Revenue adjustments
      - Corporate tax allowance

- Facilitating the connection of additional customers to Endeavour Energy's network presents an
- opportunity, in a revenue cap environment to reduce per customer charges. The addition of customers to
- Endeavour Energy's existing customer base enables a reduction in per customer costs to supply, and
- hence a reduction in tariffs. Effectively, this means overall costs to supply are divided over a larger number
- of customers.

A reduction in the average costs to supply a customer is only achievable if the costs associated with adding incremental customers to the existing customer base does not exceed the benefits attributable to these incremental customers. In other words, for a benefit to the existing customer base, the revenue associated with the incremental connecting customers exceed the costs associated with connecting these customers. To achieve this, and to ensure that the existing customer base is not subsidising incremental connecting customers are borne by the connecting customers.

For this evaluation, at a macro level, customer benefits are expressed as the difference between the revenue that would be earnt from new customers and the increase in revenue allowance expressed as the sum of a WACC percentage on the additional connection capex spend and the depreciation on the additional connection capex spend. The table below describes the annual financial benefits arising from this program of works.

#### **Table 4: Financial Risk Costs**

Financial Risk costs (\$million) – Additional Revenue											
FY23 FY24 FY25 FY26 FY27 FY28 FY29 FY30 FY31 F											
\$25.1	\$38.9	\$56.6	\$72.7	\$88.1	\$103.4	\$118.6	\$134.0	\$148.5	\$162.3		

#### 5.1.2 Reliability Risks

The second element deals with the benefits that unconnected customer stand to derive from this program once the connections are facilitated. This benefit is measured in terms of VCR or value of Customer Reliability. The evaluation of this risk cost assumes that customer connections can continue without any corresponding capital expenditure to ensure that the network can supply this additional demand.

The approach to this category of risk is to multiply the expected annual energy consumption of the connecting customers in this category by the VCR, with the assumption that if we did not connect these customers, the energy not supplied to these customers as a result is unserved energy.

Generic values have been used to evaluate this risk. In greenfield areas where most of the growth in customer numbers is situated, typically any existing network capacity is exhausted very quickly, leading to



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- extremely elevated levels of risk realised very quickly. The table below quantifies the annual reliability risk
   costs arising from connecting new customers as part of this program.
- Table 5: Unserved Energy Risk Costs based on VCR

	Reliability Risk costs (\$billion)											
	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32		
	\$9.1	\$21.4	\$33.7	\$49.7	\$65.0	\$80.1	\$95.8	\$111.9	\$128.7	\$145.4		
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## 5.1.3 Breach of Regulatory Obligations

- NER imposes an obligation to connect customers within the company's franchise area to the distribution
- network. A failure by the company to connect each customer within the connections program to the
- network could be regarded as individual breaches of the Rules.
- Following reform of the AER civil penalty regime in 2021, it can be argued that failure to connect
   customers is essentially a reduction of consumers' fundamental right to access electricity services, results
- in financial harm and economic loss for consumers and in some cases could lead to hardship. Tier 1
- breaches carries a maximum penalty of \$10 million or three times the value of any benefit reasonably
- attributable to the breach.
- It can be argued that the NEM compliance breaches evaluated above will lead to eventual loss of DNSP
- licence if the number of breaches and associated fines get large and frequent. Eventual loss of licence has
- not been factored into the risk calculations as the magnitude of the NEM compliance breach risks is large
   enough to suggest that corrective action will be initiated before loss of licence is contemplated.

Table 6: NER Breach Risk Costs

NER Breach Risk Costs (\$million)											
FY22 FY23 FY24 FY25 FY26 FY27 FY28 FY29 FY30 FY31											
\$10	\$20	\$30	\$40	\$50	\$60	\$70	\$80	\$90	\$100		

### 5.2 Annual Risk Costs

At a program level, capex expenditure over 10 years represents a present value expenditure of \$47.6m and a net present value of \$719b if unserved energy risks are taken into account. The net present value is \$324m if unserved energy is ignored.

Annual risk costs for the first five years of the program are outlined in Table 7. Note that risk costs have been compared against a no intervention base case starting from FY23. This means that revenue derived from connection of new customers accumulates with each passing year.

#### Table 7: Resulting Annual Risk costs

		Resulting Annual Risk Costs (\$m and \$b)									
Year	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	
Ex. Unserved Energy (\$m)	\$35	\$84	\$151	\$233	\$331	\$445	\$573	\$717	\$876	\$1,048	
Unserved Energy (\$b)	\$9.1	\$21.4	\$33.7	\$49.7	\$65.0	\$80.1	\$95.8	\$111.9	\$128.7	\$145.4	



# • 6. Options Considered

## • 6.1 BAU Base Case – No Proactive Intervention and Consequences

- The consequence of not engaging in this program will result in customers not being able to connect, or at
- best, being able to connect and having to endure extremely poor levels of service. This risk is quantified in terms of expected unserved energy (EUSE). The obligation to connect customers is stated in the NER,
- and the risk of non-compliance, together with any ensuing customer litigation is reflected in the compliance
- risk costs in the HoustonKemp model. In addition to this the risk of reputational damage has been
- modelled on the basis of risk costs associated with adverse media publicity, and increased costs of customer re-engagement.
- The mitigation of financial risk costs has been sufficient to justify this investment. However, the other risk costs such as adverse media publicity, loss of customer engagement, fines, penalties and eventual loss of
- licence have also been estimated.

#### 6.1.1 AR Program

- Capital expenditure incurred as part of this program is based on the opportunity to install assets or to
- upgrade assets in conjunction with relocation works being undertaken by third parties, particularly road
- construction works and relocation of assets to make way for greenfield developments. The base case is to do nothing at all, either now or later. The consequences of no proactive intervention in either case is no
- distribution or transmission assets will be installed and eventually new customers will not be able to
- connect and connected customers will experience severe disruptions in service levels.

Although not specifically evaluated in this program level CFI, individual projects within this program typically have the options of install ducts now, or alternatively some time in the future.

Both options have exactly the same impact in terms of addressing the risks of involuntary load shedding. The difference in risk costs arises with the timing of investing in ducts either when there are opportunities available as a result of third party works, and carrying out the works only when required and incurring additional civil, project management, traffic control and restoration costs do to so.

For the option of 'install when needed' Endeavour Energy would:

- Install the new conduits and cables close to the need date;
- When required, carry out the necessary civil works, including opening up road surfaces
- Undertake traffic management along the route being worked on;
- Reinstate surfaces to the required standard on completion of the works
- Project manage the above works.

The consequences of the above would be:

- Significantly more capital expenditure in executing these works.
- Paying for civil, traffic and project management costs that could be avoided with the alternative option;
- Managing public inconvenience, disruptions to customers and perceptions arising from works that could have been avoided.
- Managing public perceptions when opening up newly established roads
- Managing traffic authority expectations in relation to opening up newly established roads
- Potentially having to negotiate, acquire and establish a new longer route and associated easements as a result of failing to secure support from roads authorities to install assets in newly built roads after they have been built.



 The roads contractors control the road construction site until they complete roadworks meaning that if Endeavour does not take the opportunity proactively we may not have access to the road to install conduits in time for feeder commissioning.

## 6.2 Credible Network Option

The National Electricity Objectives (NEO) as stated in the National Electricity Law (NEL) require

- Endeavour Energy to operate the networks in the long-term interests of consumers. The options in this
- section sets out the *credible options* that were considered, together with a counterfactual option: "*no proactive intervention*" to assist the overall comparison. These include all substantially differing
- commercially and technically credible options, including non-network solutions. Credible options (or a
- group of options) are those that meet the following criteria:
- addresses the identified need
  - is (or are) commercially and technically feasible
  - can be implemented in sufficient time to meet the identified need
- Due to the nature of connections related capital expenditure incurred by the business on a day to day
- basis, and the fact that there are number of connections related projects that comprise this program, there is only one feasible option related to this program and that is to proceed with connections capex. The
- connections capex is incurred directly because of new customers connecting to the network and this has been compared with a 'base' case of not connecting any customers at all. Whilst connection of new
- been compared with a 'base' case of not connecting any customers at all. Whilst connection of new customers may be considered (business as usual) it will not occur unless there is consy that is being
- customers may be considered 'business as usual' it will not occur unless there is capex that is being
  requested as part of this CFI, as discussed in the previous section. Capex incurred within this program is
  therefore considered interventional and has been compared to a no-intervention base case to demonstrate
  the financial benefits of this program.

Option	Description	Solution Type	Residual Risk Cost (or savings for Opportunities) Post Investment \$b	Total Proposed Investment Cost, capex/opex	NPV (benefits less costs) \$b	Rank	Assessment Description
	No proactive intervention	Base Case	\$750	\$0	\$-750	2	Non-preferred as will lead to unacceptable risk or higher cost for customers if opportunity not captured
1	Connections Capex Program	Network solution	\$0	\$195	\$750	1	Preferred

#### Table 8: Option Summary Table incl Unserved Energy



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#### • Table 9: Options Summary Table Excl Unserved Energy

Option	Description	Solution Type	Residual Risk Cost (or savings for Opportunities) Post Investment \$m	Total Proposed Investment Cost, capex/opex \$m	NPV (benefits less costs) \$m	Rank	Assessment Description
	No proactive intervention	Base Case	\$-1285	\$0	\$-1285	2	Non-preferred as will lead to unacceptable risk or higher cost for customers if opportunity not captured
1	Connections Capex Program	Network solution	\$0	\$195	\$1090	1	Preferred

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## 6.3 Sensitivity and Scenario Analysis

 Sensitivity tests have been applied to the economic evaluation of the network options and the results are shown below.

#### Table 10: Summary of scenarios investigated

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_	Variable	Scenario 1 - baseline	Scenario 2 – Iow benefits	Scenario 3 – high benefits
•	Capital cost	Estimated land capital costs	25% increase in the estimated land capital costs	25% decrease in the estimated land capital costs
•	Value of customer reliability (VCR)	\$40,000/MWh	\$28,000/MWh 30% lower than baseline	\$52,000/MWh 30% higher than baseline
•	Discount rate	3.26% (WACC)	2.22%	4.33%
	Scenario weighting	50%	25%	25%

The scenarios have been weighted as 50% for Scenario 1 being the most likely with Scenarios 2 and 3

being given a weighting of 25%. The weighted NPV is shown below.

#### Table 11: Weighted net present value of options (including Unserved Energy)

•	Option	Scenario 1 NPV (\$b)	Scenario 2 NPV (\$b)	Scenario 3 NPV (\$b)	Weighted NPV (\$b)	Option ranking	
•	Option 1	751	373	1293	792	1	

Table 12: Weighted net present value of options (excluding Unserved Energy)

Option	Scenario 1 NPV (\$m)	Scenario 2 NPV (\$m)	Scenario 3 NPV (\$m)	Weighted NPV (\$m)	Option ranking
Option 1	1090	794	1202	1044	1

# 7. Detailed description and costs of preferred option

As the connections capex program is a reactive program that meets the upstream augmentation costs of shared network infrastructure that occurs over a wide geographical area and under different circumstances depending on as yet undefined customer connection needs, it is not possible to provide a detailed forecast of components of the program or where the expenditure will occur.

## 8. **Proposed Investment Timing**

The proposed capex for FY23-32 is as follows. This capex will be incurred throughout the year on a reactive basis as individual connections applications are processed and designs certified.

## 9. Recommendation

It is recommended Endeavour Energy incorporate the Connections investments within its investment portfolio plan for 2023-2032 as follows:

	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
\$m	\$21.93	\$21.11	\$27.41	\$26.10	\$25.93	\$26.87	\$27.54	\$27.54	\$27.54	\$27.54

#### Table 13: Connections Capital Investment Program \$FY24



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