Combined Proposal 2024-2029

Attachment 6
Capital expenditure

Outline: This attachment to TasNetworks' Combined Proposal sets out forecast capital expenditure for TasNetworks' transmission and distribution networks in the regulatory control period commencing on 1 July 2024 and ending on 30 June 2029.

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Note

This attachment forms part of TasNetworks' Combined Proposal for the 2024-2029 regulatory control period and should be read in conjunction with the other parts of the proposal. TasNetworks' Combined Proposal is made up of the documents and attachments listed below, as well as the supporting documents that are listed in Attachment 23.

Document	Description
	Combined Proposal overview
Attachment 1	Customer and stakeholder engagement summary
Attachment 2	Annual revenue requirement
Attachment 3	Regulatory asset base
Attachment 4	Rate of return
Attachment 5	Regulatory depreciation
Attachment 6	**Capital expenditure**
Attachment 7	Contingent projects
Attachment 8	Operating expenditure
Attachment 9	Corporate income tax
Attachment 10	Efficiency benefit sharing scheme
Attachment 11	Capital expenditure sharing scheme
Attachment 12	Service target performance incentive scheme
Attachment 13	Demand management incentives and allowance
Attachment 14	Customer service incentive scheme
Attachment 15	Classification of services
Attachment 16	Control mechanisms
Attachment 17	Pass through events
Attachment 18	Alternative control services
Attachment 19	Negotiated services framework and criteria
Attachment 20	Distribution connection pricing policy
Attachment 21	Tariff structure statement
Attachment 22	Tariff structure explanatory statement
Attachment 23	List of supporting documents
Attachment 24	Glossary

Figures and tables in this attachment may not add due to rounding.

Contents

6 Capital expenditure

6.1 Introduction

TasNetworks' capital expenditure (**capex**) forecasts cover the proposed capital investments for the provision of transmission prescribed services and distribution standard control services for the 2024-2029 regulatory control period.

This attachment outlines:

- the regulatory obligations relating to the capex forecast
- the current operating environment, including opportunities and challenges for TasNetworks in the forthcoming regulatory control period, and how this has influenced its capex forecast
- insights arising from TasNetworks' customer and stakeholder engagement process and the ways in which TasNetworks' has incorporated this feedback into its capex forecasts
- TasNetworks' performance under the Australian Energy Regulator's (**AER's**) cost benchmarking measures
- an overview of the process used by TasNetworks in developing its capex forecast
- TasNetworks' forecast transmission and distribution capex for the 2024-2029 regulatory control period
- an overview of TasNetworks' performance, highlighting specific categories where material changes in investment are proposed, and the drivers for these changes
- our delivery strategy for the capex forecast.

6.2 Capex proposal

TasNetworks has developed its transmission and distribution capex forecasts for the 2024-2029 regulatory control period with three key considerations in mind:

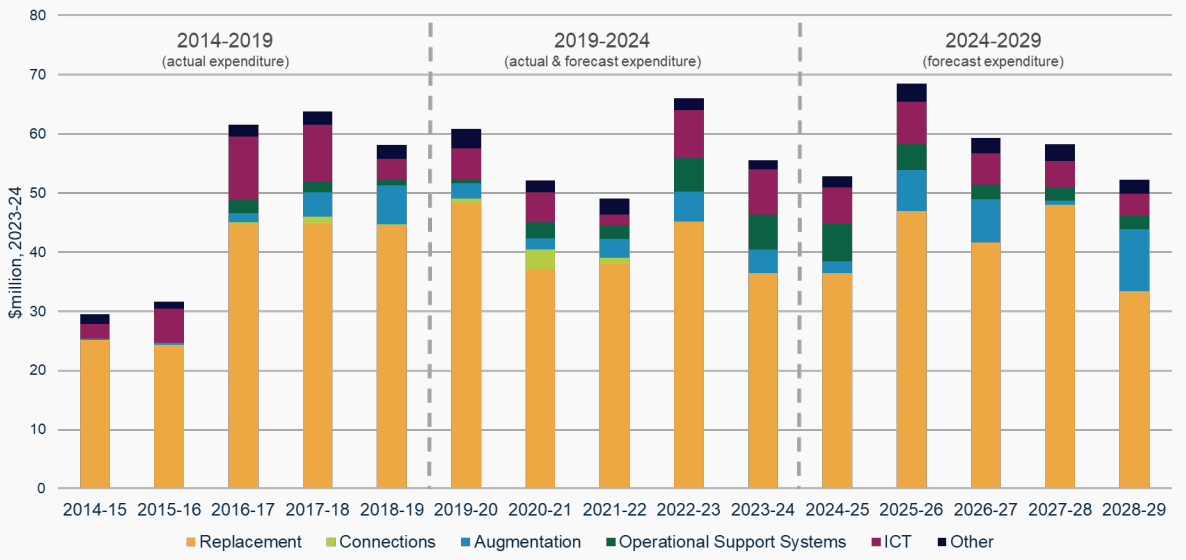
- Minimising upward pressure on customer pricing by keeping the level of forecast capex as low as sustainably possible – delivering affordability for our customers
- Maintaining reliability for customers – delivering services that our customers value
- Managing safety and risks associated with our operations – keeping our people and our customers safe.

Our capex forecasts reflect our efforts to continue delivering safe, clean, reliable and affordable electricity services to our customers while embracing the technological transition re-shaping our industry. They focus on improving community reliability and network resilience, supporting the renewable energy transition and the integration of consumer energy resources (**CER**), as well as managing an ageing asset fleet and addressing risks such as cyber security.

We have optimised our capex forecasts to reflect customer preferences and maximise customer value at the lowest sustainable levels of investment, resulting in transmission and distribution capex forecasts lower than those for the 2019-2024 regulatory control period. Figure 1 and Figure 2 outline our historical and proposed transmission capex and Figure 3 and Figure 4 outline our proposed historical and proposed distribution capex.

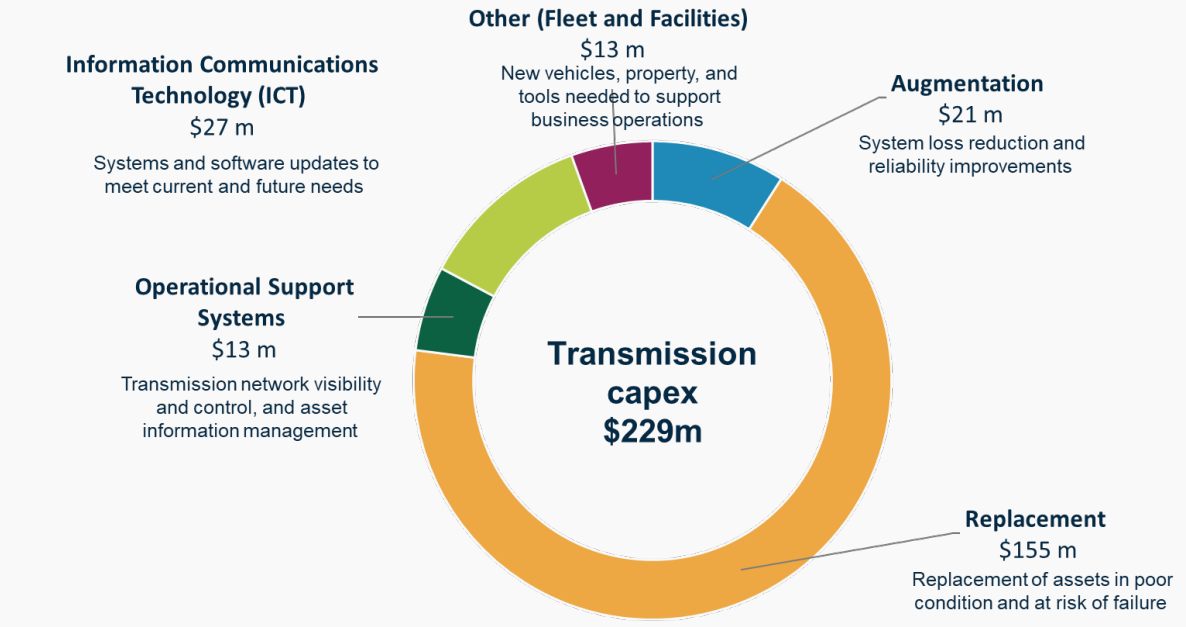
In addition to our base forecasts, seven contingent projects have been identified for our transmission network relating to possible major augmentations in the 2024-2029 regulatory control period. An additional two contingent projects have been included that relate to rule changes and an actionable project in the Australian Energy Market Operator's (**AEMO's**) Integrated System Plan (**ISP**). Attachment 7 Contingent Projects covers these projects in more detail.

Figure 1. Transmission capex - historic and forecast ($million, 2023-24)



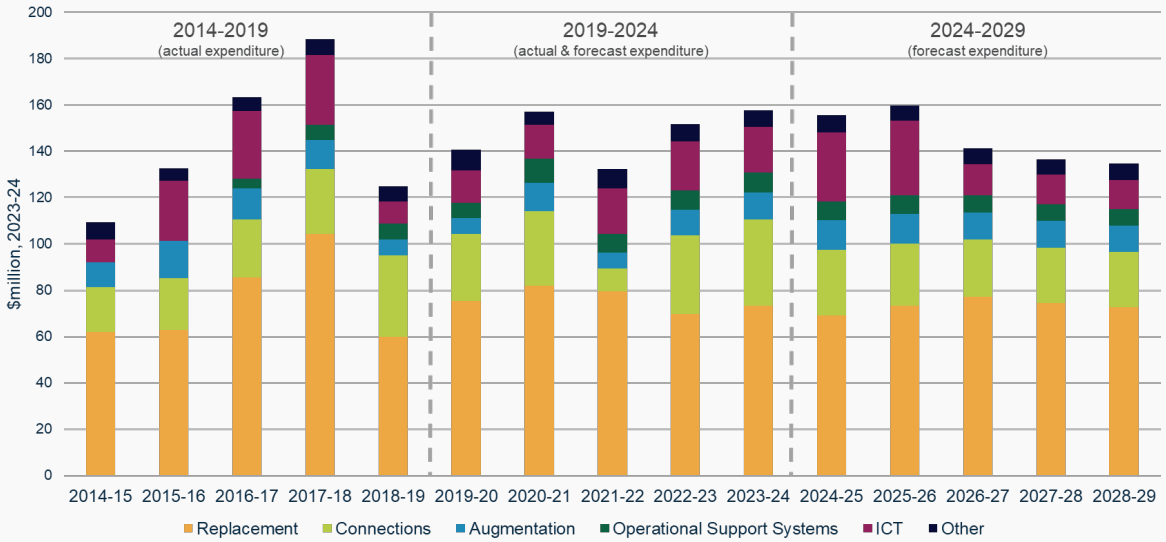
Note: Inclusive of capitalised overheads

Figure 2. Forecast 2024-2029 transmission network capital expenditure by category ($million, 2023-24)



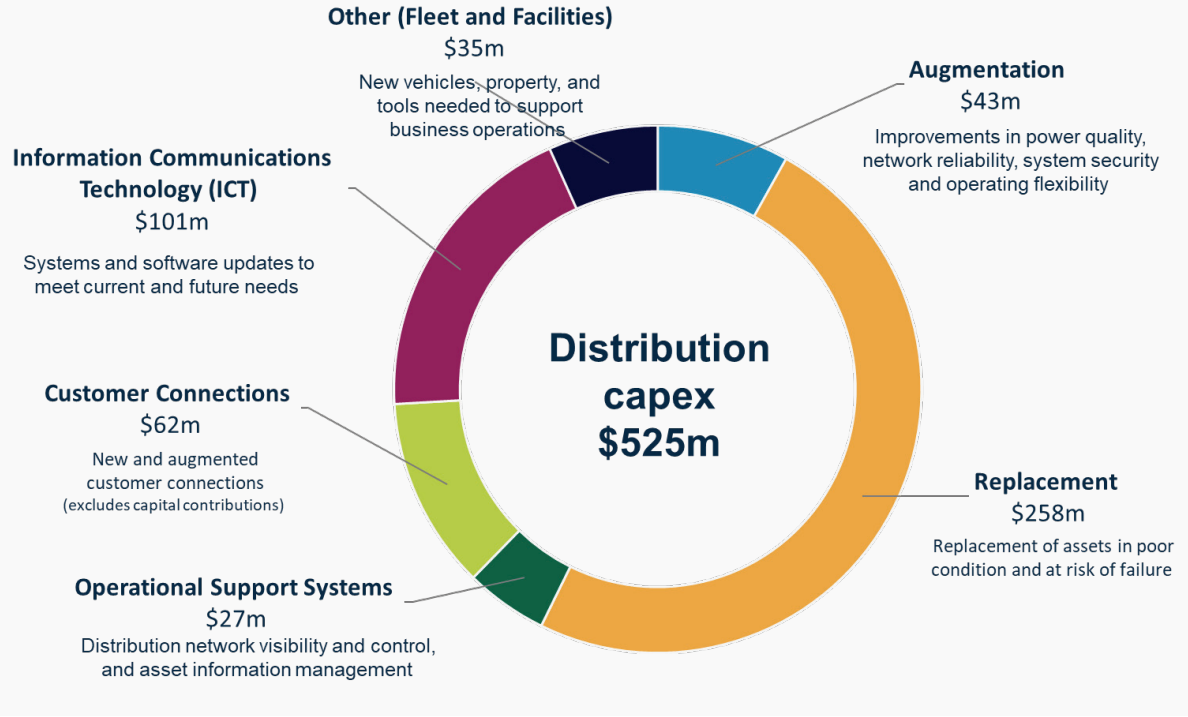
Note: Exclusive of capitalised overheads

Figure 3. Distribution capex - historic and forecast ($million, 2023-24)



Note: Inclusive of capitalised overheads and customer capital contributions

Figure 4. Forecast 2024-2029 distribution network capex by category ($million, 2023-24)



6.3 Rule requirements

For the 2024-2029 regulatory control period, the National Electricity Rules (**NER**)[1] require TasNetworks to prepare a total forecast of the capex that is needed to achieve the following capex objectives:

- meet or manage expected demand over the period
- comply with all applicable regulatory obligations or requirements
- maintain the quality, reliability and security of supply
- maintain the reliability and security of the transmission and distribution systems.

In assessing TasNetworks' Combined Proposal, the AER will have regard for several considerations including, but not limited to:

- the most recent annual benchmarking reports that have been published by the AER and the benchmark capital expenditure that would be incurred by an efficient network service provider (**NSP**) over the 2024-2029 regulatory control period
- the actual and expected capex of TasNetworks during any preceding regulatory control periods
- the extent to which the capex forecast includes expenditure to address the concerns of electricity end users identified through TasNetworks' engagement with customers and stakeholders during the preparation of this Combined Proposal
- the substitution possibilities between operational expenditure (**opex**) and capex
- whether the capex forecast is consistent with any incentive scheme or schemes that apply to TasNetworks
- AEMO's most recent ISP and any submissions made by AEMO, in accordance with the NER, on TasNetworks' forecast of required capex (transmission only)
- the extent to which TasNetworks has considered, and made provision for, efficient and prudent non-network options.

The capex forecasts presented here, and in supporting documentation, satisfy the requirements of the NER and provide the necessary information required by the AER to make its determination.

1 National Electricity Rules: Clauses 6.5.7 and 6A.6.7

6.4 Capex forecast drivers

6.4.1 Affordability

TasNetworks' capex forecasts for the 2024-2029 regulatory control period have been developed in challenging circumstances where inflation and cost of living pressures are weighing heavily on many Tasmanians. Balancing the need for investment in Tasmania's renewable energy future and the affordability of electricity for customers today is more complex and important than ever before.

To maintain affordability for our customers, we have constrained our capex to prudent and efficient levels, resulting in forecasts that are below the AER's approved allowances for the 2019-2024 regulatory control period. We achieved this through applying a top-down and bottom-up approach to developing our capex forecasts, ensuring they do not exceed the level of investment in the 2019-2024 regulatory control period, while also managing future reliability and risk and the preferences and priorities of our customers.

6.4.2 Maintaining safe, reliable and secure services

One of TasNetworks' key objectives is to ensure safe, reliable and secure services for our customers by maintaining and replacing our network infrastructure and investing in the network to support growth in consumption and demand. A measure of the reliability of our service is network service performance, and TasNetworks has adopted the following network service performance objective as noted in our Annual Planning Report:

"Network service performance will be maintained at current overall network service levels, while service to poor-performing reliability areas will be improved to meet regulatory requirements."

TasNetworks continually measures and monitors reliability at various levels of granularity, including state-wide, community, feeder/transmission line, and for individual assets. This analysis proactively identifies communities or assets that are trending towards unacceptable reliability levels as candidates for targeted investment – typically asset refurbishment or replacement - to reverse the trend and maintain acceptable reliability levels.

Ageing and potentially unreliable assets are managed as part of our overall asset management strategy. The focus of this strategy is to ensure that the replacement of assets is determined on the basis of condition and risk, rather than a reliance on age profile information. In developing strategies in relation to potentially unreliable assets we take a holistic approach to asset renewals, augmentations and decommissioning across the transmission and distribution networks. We also ensure that our asset management plans align with our development plans, driving the most efficient outcomes that balance cost, risk and performance.

Section 6.6 provides more information regarding the current reliability performance of our transmission and distribution networks.

6.4.3 Climate change

Electricity networks in Australia are particularly exposed to the effects of the changing climate, including increasingly frequent extreme climate-related phenomena such as storms, floods, heatwaves and bushfires, as well as more gradual but nonetheless significant underlying changes in the weather.

To ensure that climate impacts and network resilience are adequately considered in our strategic decision-making, TasNetworks has:

- identified priority impacts with potential to affect our transmission, distribution, and telecommunications networks; and
- assessed the risks associated with these impacts and determined the following key strategies to mitigate the risks:
  - installing non-burnable poles at selected high value pole locations in Tasmania's high bushfire loss consequence area (**HBLCA**)
  - installing fire-resistant wrap for selected poles in the HBLCA, and other high criticality/high fire danger locations outside the HBLCA
  - updating the HBLCA map to align with the harmonised Phoenix model developed by the ENA
  - encouraging legislative changes that allow vegetation management cost savings through installation of covered conductor on the network
  - increasing installation of lightning arrestors on overhead network transformers on the distribution network
  - updating our overhead distribution line design and construction manual to include the latest AS/NZS7000 design compliance requirements
  - increasing monitoring, analysis and modelling of extreme weather events such as bushfires and floods, through investment in digital technologies.

6.4.4 Demand forecast

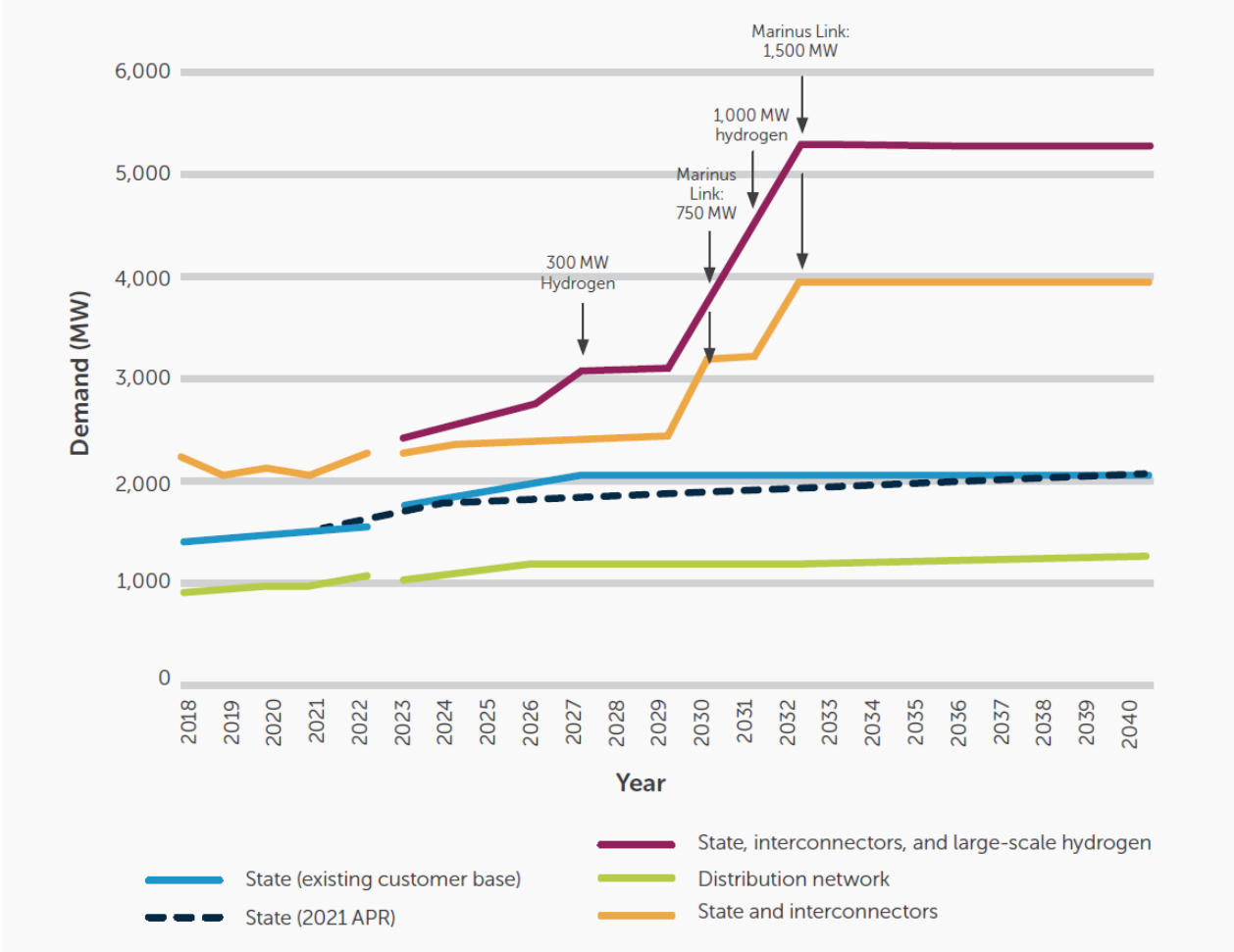
TasNetworks takes into consideration the AEMO state level forecast when producing its connection point and feeder level forecasts. As AEMO no longer publishes connection point forecasts for Tasmania, TasNetworks has made changes to the demand forecast production cycle. As a consequence, the demand forecast impacts seen at a state level are considered and analysed at a local level as part of the annual planning cycle.

Figure 5 presents the maximum demand forecast for Tasmania to 2042, including new loads on the transmission network that may emerge in the next 30 years. In the State (existing customer base) forecast, maximum demand is forecast to increase by approximately 0.9 per cent annually to exceed 2,000 MW by 2027. This is due to projected residential consumption and electric vehicle (**EV**) uptake. TasNetworks has forecasted modest investment in network augmentation in preparation for this scenario.

In the State and interconnectors forecast, the maximum demand on the transmission network is forecast to double over the next decade. In the State, interconnectors, and large-scale hydrogen forecast, maximum demand is forecast to exceed 5,000 MW by 2032 — more than twice the maximum demand on the existing network.

In Tasmania, rooftop solar photovoltaic (**PV**) output does not materially reduce the maximum electricity demand. This is because maximum demand occurs in either early morning or late afternoon/early evening during the winter months, when solar PV output is minimal.

Figure 5. Maximum demand forecast



6.4.5 Consumer energy resources

The push for clean energy, electrification and data accessibility is driving community-led change within our distribution system. New technologies are becoming an important enabler of efficient and sustainable distribution integration and customer services. As the costs of energy technologies decline, more customers are adopting CER technologies that interact with the distribution network, such as solar PV, battery storage and EVs. These technologies enable customers to participate in the energy market in different and greater ways, including by generating energy and storing or exporting it to the distribution network for use by other customers.

The distribution network was not designed for bi-directional power flows, a high penetration of CER or active energy management by consumers. As CER uptake continues to grow, understanding and managing power flows and voltage regulation becomes more challenging. Sections of the network can become overloaded and congested, resulting in consumers being unable to connect new CER or use their existing CER to full capacity. Uptake of EVs also may result in increased overall consumption and maximum demand on the network, and an increase in network complexity due to vehicle charging and related driver behaviour.

In Tasmania, the use of solar PV and household batteries is forecast to continue to grow, while the uptake of EVs is forecast to accelerate towards the end of this decade. Current modelling suggests that there will be insufficient uptake to cause widespread and material network constraints in the 2024-2029 regulatory control period for TasNetworks or our customers. Therefore, TasNetworks proposes a steady and modest level of investment to enable ongoing connection of CER and improved visibility of the low voltage network.

6.4.6 Cyber security

TasNetworks is facing an increasing ICT investment requirement because of growing risks to its cyber security. The most significant factor driving this change is the recent critical infrastructure reform under the (Commonwealth) *Security of Critical Infrastructure Act 2018*, which looks to uplift the security and resilience of critical infrastructure owned by electricity networks and other entities across Australia. The purpose of the reform is to address the growing global cyber threat, and the increased risk of cyber-attacks on Australian networks.

TasNetworks applies AEMO's recommended Australian Energy Sector Cyber Security Framework and we are uplifting our capability to align with the target state specified for NSPs (Security Profile 3). We will continue to implement initiatives to increase our vigilance, reduce the risk of cyber-attack and ensure the ongoing availability and reliability of our networks. The proposed level of investment in this area will ensure the ongoing resilience of our networks.

6.4.7 Distribution customer connections

In the current regulatory control period, TasNetworks has seen materially higher distribution customer connections compared to forecast levels. There have been several different factors behind this increase. TasNetworks has improved its forecasting approach for the 2024-2029 regulatory control period to align the forecast closer to our historic experience and, therefore, provide a more accurate forecast of connection volumes for the 2024-2029 regulatory control period.

6.5 Customer and stakeholder engagement

TasNetworks undertook a comprehensive customer and stakeholder engagement program over a period of 18 months when developing this Combined Proposal for the 2024-2029 regulatory control period. We sought a diverse range of customer and stakeholder views so that we could consider their preferences when developing our capex forecasts.

In implementing our customer and stakeholder engagement program, we engaged with more than 500 persons – presenting them with key components of our capex forecast. Our engagement approach varied in its breadth (the scope of engagement with customers and stakeholders) and depth (the level of detail at which we engaged). We engaged more broadly with our individual customers, and more deeply with our advisory groups (such as the Reset Advisory Committee and Customer Council) and transmission customers than ever before.

We received considerable feedback regarding customers' priorities and TasNetworks' targets for capital investment. The following themes reflect the position of most customers and stakeholders:

- **Affordable for all –** Keeping our capex forecasts as low as sustainably possible
- **Reliable now –** Seek ways to improve service performance for poor-performing communities
- **Resilient for the future –** Without losing sight of the need for affordability, make the necessary investments that will improve the resilience of our electrical networks in the long term.

The influence of these themes on our capex forecasts is presented in Table 1. More information on key themes can be found in Attachment 1 Customer and stakeholder engagement summary, including information for specific capex topics.

Table 1. Capex engagement themes and outcomes.

Key theme	What we've heard	How we're responding
Affordable for all	• Beyond all other considerations, affordability is the most important factor regarding electricity services for our customers and stakeholders. • TasNetworks should invest steadily and strategically in a proactive manner that sets Tasmania up for the long term.	• We have used both a top-down and bottom-up approach to develop our capex forecasts, ensuring they do not exceed the level of investment in the current regulatory control period, while also managing future reliability and risk. • We have ensured that our investment evaluation process considers all requirements required by the AER in its *Industry practice application note – Asset replacement planning*, including the consideration of numerous investment options to address customer needs, with subsequent NPV analysis being used to select the option representing the lowest whole-of-life cost. • We have optimised our capex programs at the portfolio level, ensuring we achieve the right mix of investments that manage risk and reliability outcomes at the lowest whole-of-life cost.
Reliable now	• Maintaining current levels of reliability is the expected minimum. • The reliability of poor-performing communities should be improved more quickly. The timeframes proposed in our early capex forecasts were too long. TasNetworks might not be quick enough to keep pace with population growth in some regional areas, and the new technologies being implemented by these customers such as solar PV, EVs, and batteries. • There were concerns that the cost of the reliability improvement activities proposed for Zeehan and the broader West Coast region may not be commensurate with the population that would benefit from this investment, and that other cheaper alternatives had not been sufficiently considered.	• Instead of waiting until the 2024-2029 regulatory control period, we have brought forward some community reliability investments into the 2019-2024 regulatory control period. • We have increased the number of communities targeted for reliability improvement in the 2024-2029 regulatory control period, from four up to ten, with no change in overall capex investment, through a rebalancing of the capex program. • We have reviewed the proposed solution for Zeehan within the context of broader regional reliability, identifying a multi-stage approach to improve reliability as early as possible and at lowest cost while also leaving opportunity for alternative non-network solutions to be identified.

Key theme	What we've heard	How we're responding
Resilient for the future	• Customers are concerned about climate change and the ability of electricity networks to maintain reliability within that changing environment, and they feel that action is needed now. • Customers valued the benefits of improved reliability and resilience, but noted the cost for some of the more wide-ranging options presented by TasNetworks were challenging to affordability. The consensus was that additional investment, compared to our initial capex program, was needed. • In developing its capex program, it is important that TasNetworks demonstrated how its investments will improve resilience and reliability, and withstand climate change over the long term.	• We have rebalanced our capex forecast to increase funding for network resilience by approximately $10 million, for activities such as installing composite poles, covered conductor and aerial bundled cable in bushfire risk areas. • We have increased our capex forecast to include additional investment of approximately $3 million ($6.3 million total) in CER compared with the 2019-2024 regulatory control period. • We have reviewed our initiatives and forecasts and can confirm that our broad portfolio of investments will continue to improve transmission and distribution resilience in the long term.

6.6 Our reliability performance

Reliability can be influenced in a variety of ways at many points in TasNetworks' business processes. The most cost-effective way TasNetworks achieves its long-term reliability objectives is by designing the right levels of reliability into its distribution and transmission networks when constructing new assets or replacing existing assets.

6.6.1 Transmission reliability

Two key measures used to assess TasNetworks' transmission network reliability are:

- Loss of Supply (**LOS**) events – reflecting the frequency and impact of fault and forced transmission outages resulting in a loss of downstream customer load
- Fault circuit outage rate – showing the percentage of transmission circuits that experience a fault outage each year, regardless of whether there was a loss of downstream load.

As shown in Figure 6 and Figure 7, very few fault and forced outage events on the transmission network result in loss of supply events for customers. This performance has been holding steady over time.

Figure 6. Transmission LOS events > 1.0 system minute

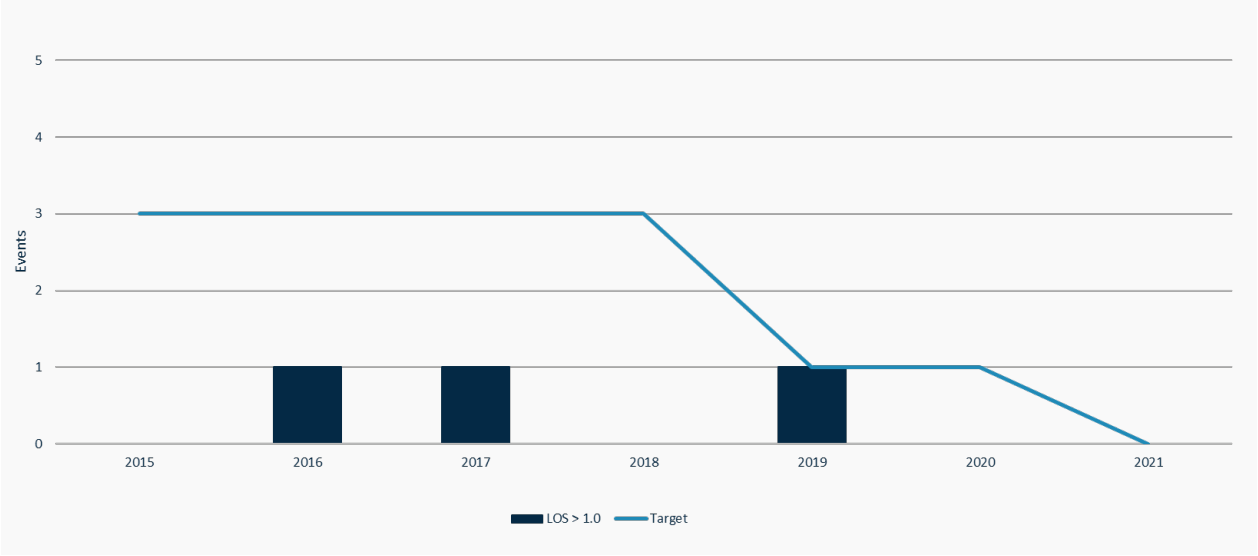
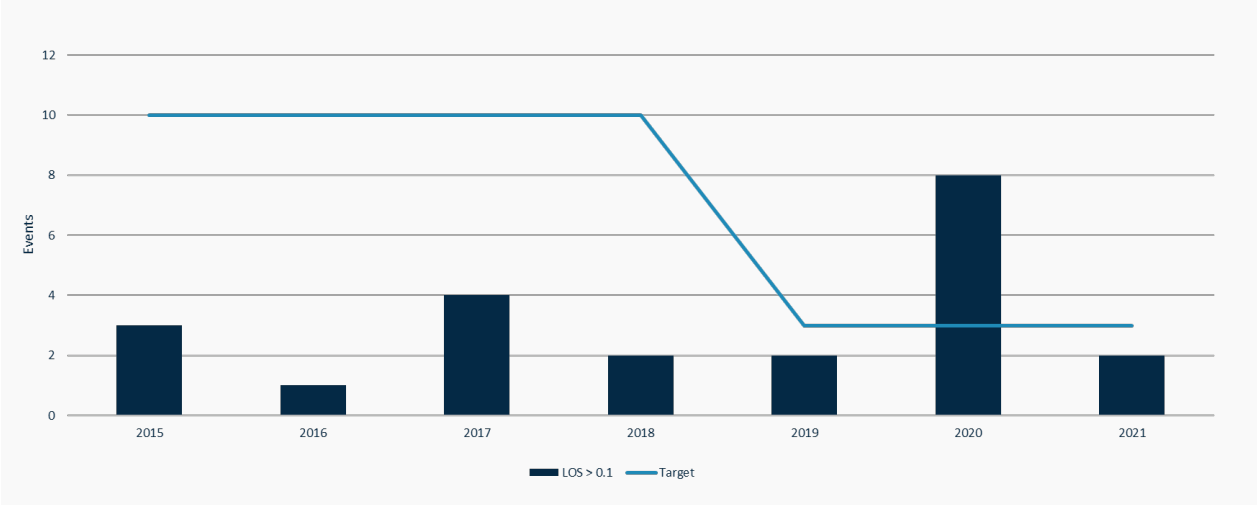


Figure 7. Transmission LOS events > 0.1 system minute



Similarly, as shown in Figure 8 and Figure 9, the underlying fault circuit outage rate for transmission lines has been holding steady while the fault circuit outage rate for transformer circuits has improved in recent years.

Figure 8. Transmission line fault circuit outage rate

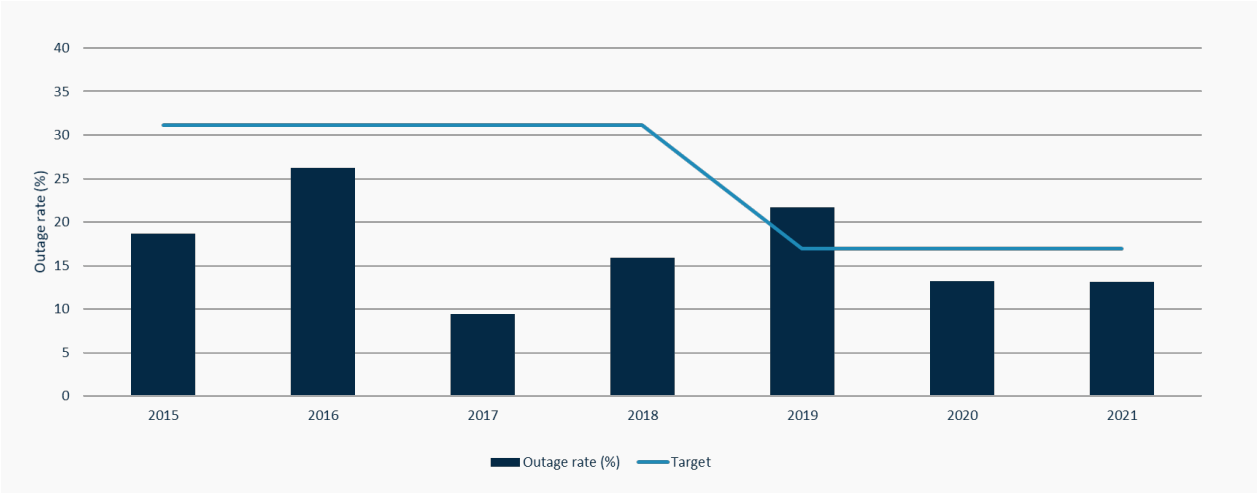
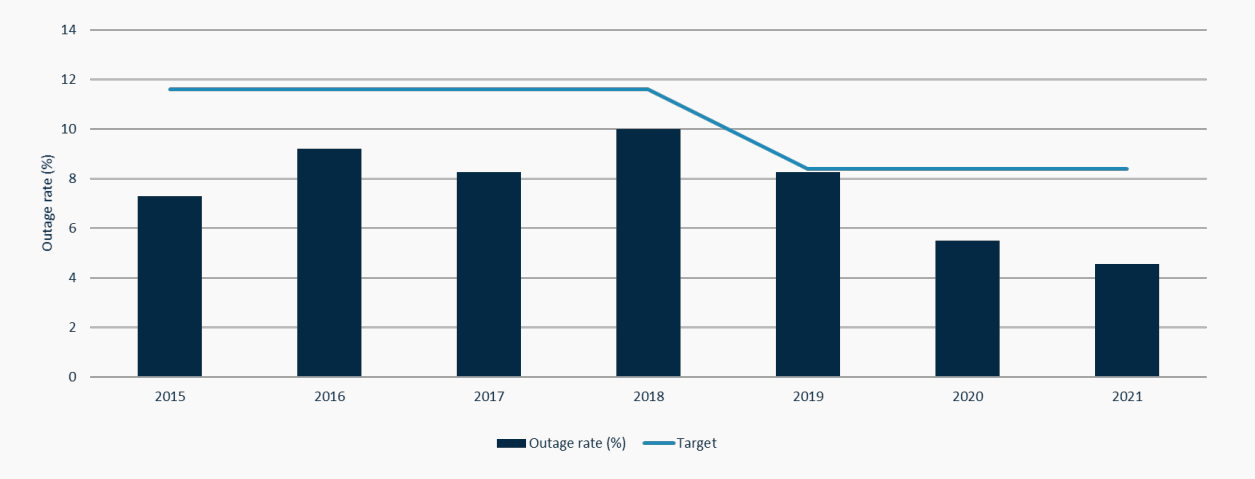


Figure 9. Transformer fault circuit outage rate



These performance outcomes are reflective of TasNetworks' current and previous capital investments to refurbish, replace and augment transmission network assets, reducing the frequency of unplanned outages that have the potential to impact on downstream customers. The outcomes also reflect effective operational responses to restore supply to customers as quickly as possible following any unplanned outages.

TasNetworks, therefore, does not propose specific capital investments in the 2024-2029 regulatory control period to improve transmission network reliability.

6.6.2 Distribution reliability

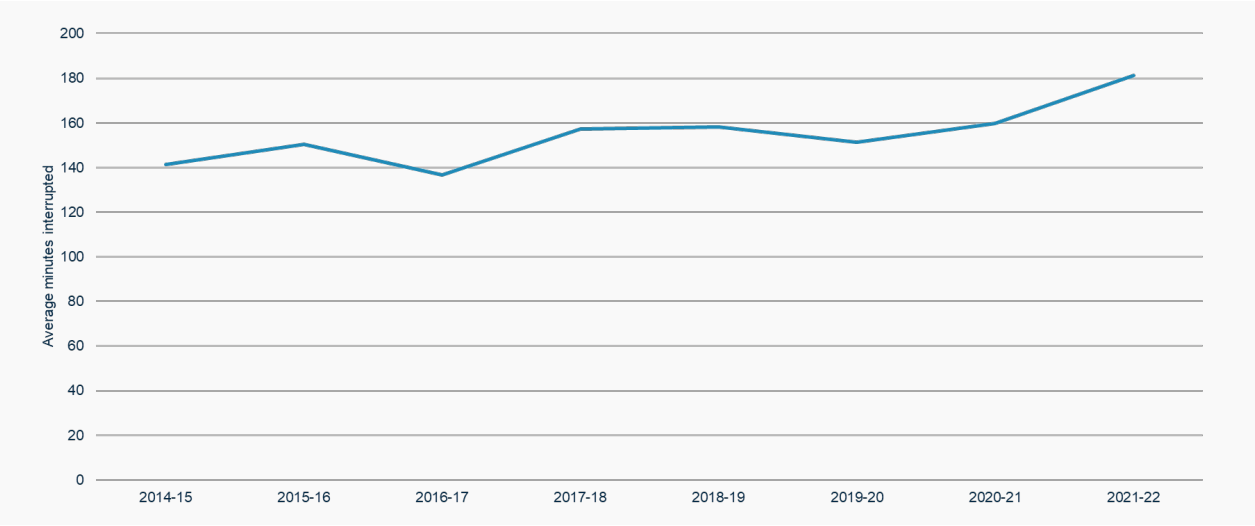
Two key measures used by the AER to assess TasNetworks' distribution network reliability, are:

- System average interruption duration index (**SAIDI**) – the average minutes per year that a customer will experience an unplanned LOS
- System average interruption frequency index (**SAIFI**) – the average number of unplanned LOS events a customer will experience per year.

Figure 10 and Figure 11 present historical overall SAIDI[2] and SAIFI[3] for the distribution network on an annual basis. Figure 11 shows on average the frequency of unplanned outages has been relatively stable in recent years. However, Figure 10 shows that the average minutes off supply per customer is starting to show a trend of deterioration.

By itself, the performance presented here is not sufficiently poor to justify significant Statewide capital investment for the improvement of reliability. However, and as discussed below, in conjunction with other more granular measures, targeted capital investment is needed.

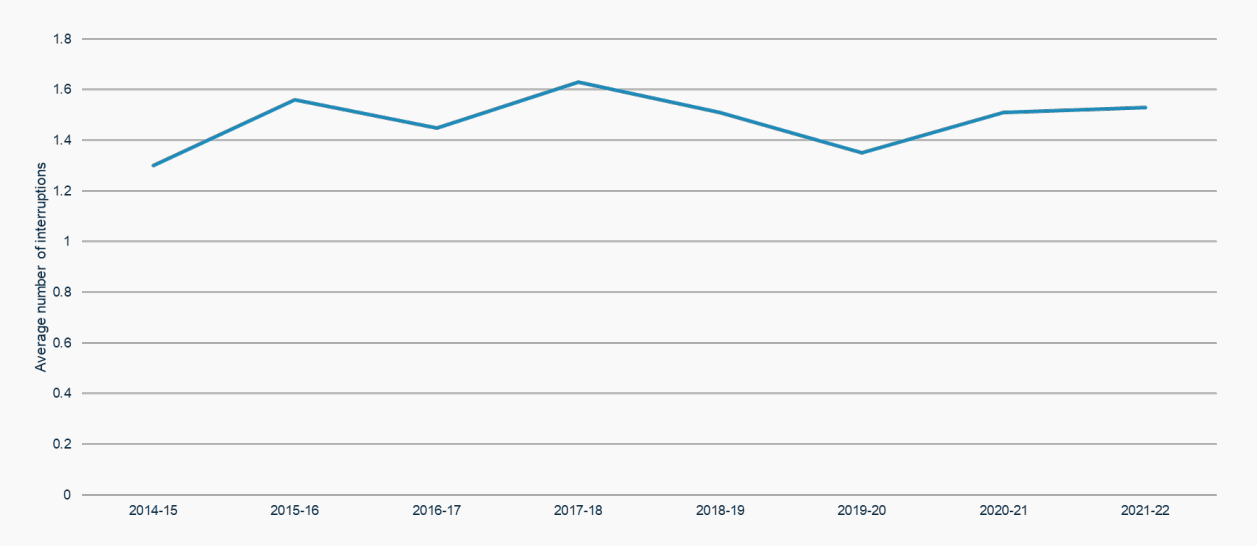
Figure 10. Distribution network system SAIDI



2 SAIDI data presented here excludes SAIDI due to Major Event Days and does not include 'excluded' unplanned outages, as defined by the STPIS

3 SAIFI data presented here excludes SAIFI due to Major Event Days and does not include 'excluded' unplanned outages, as defined by the STPIS

Figure 11. Distribution network system SAIFI

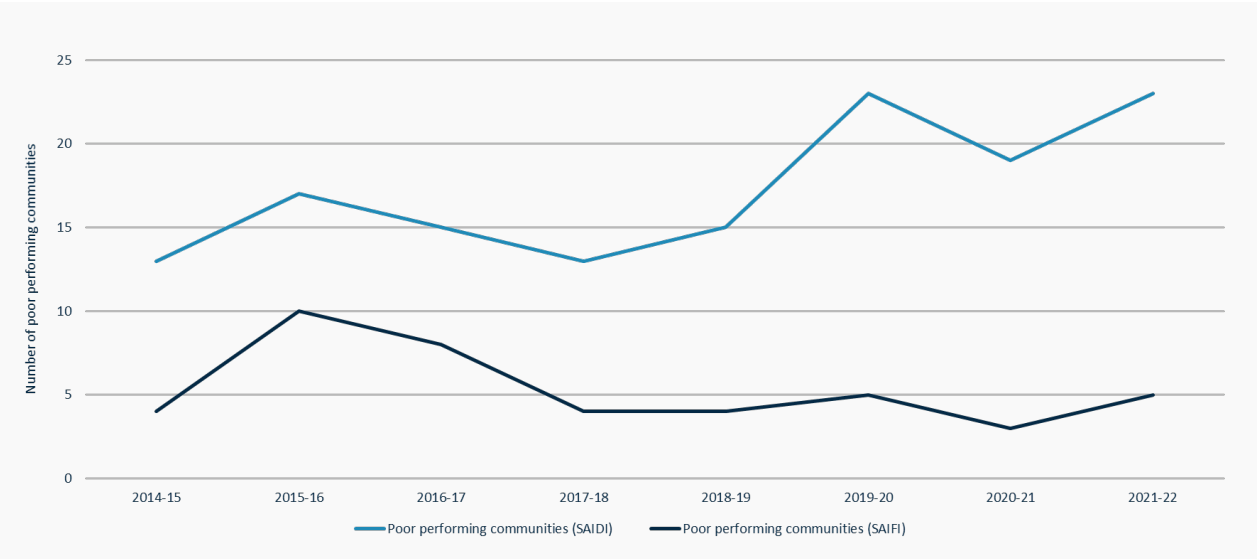


In addition to these two measures, the Tasmanian Electricity Code defines prescribed levels of reliability at a community level (of which there are 101 across Tasmania),[4] requiring TasNetworks to make reasonable endeavours to ensure that the average annual duration and frequency of interruptions in each community category does not exceed the relevant limit. The purpose of community level reliability is to provide reliability equity for customers living in regions with similar energy usage irrespective of their geographical location. For these reasons, TasNetworks also uses the following measures to assess distribution network reliability:

- Number of annual non-compliant communities (outage duration)
- Number of annual non-compliant communities (outage frequency).

Figure 12 presents the annual number of poor performing reliability communities, in terms of annual outage duration and annual outage frequency.

Figure 12. Distribution network annual poor performing communities



4 Office of the Tasmanian Economic Regulator, Distribution Network Performance Standards

TasNetworks' investments in asset and reliability management since 2014 have resulted in sustained annual improvements in terms of outage frequency (SAIFI) at the community level. However, in the last three years we have observed an increase in the number of communities experiencing poor performance in terms of outage duration (SAIDI).

TasNetworks' analysis found that while most communities only experience occasional poor performance, there are a small number of communities experiencing repeated poor reliability performance. There are many options available to TasNetworks to improve community reliability, from minor process improvements with minimal additional operational expenditure, to large-scale asset augmentation and significant capital investment.

Each poor performing community is subjected to an intensive review of underlying causes to identify remedial actions and the most cost-effective ways of bringing community reliability back within acceptable bounds. These communities are outlined in Table 2.

Table 2. Poor performing communities due to SAIDI

Area	Target	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Far North East Rural	720	560	793	650	416	520	902	916	910
Highlands	720	325	2342	459	1554	1390	1377	368	1285
North West	720	797	307	638	880	1032	776	1044	1551
Rosebery	240	177	158	32	167	283	514	272	219
Strahan	240	791	221	228	543	1059	359	690	607
Tamar South	240	164	153	284	207	528	256	229	301
Turners Beach	240	676	279	181	283	437	326	444	612
West Coast	720	565	746	625	923	1385	916	886	774
Zeehan	600	1280	28	304	983	1227	1956	1193	2022

This analysis identified that capital investment is required to achieve the desired reliability improvements. However, with customer affordability a critical consideration, TasNetworks initially constrained its reliability improvement investments to four of the communities identified as poor performing.

TasNetworks tested the importance of reliability and our proposed reliability investments with end use customers as part of of its engagement program. TasNetworks received strong and consistent feedback from communities around Tasmania highlighting reliability as a priority and showing a willingness to pay to improve reliability in more poor performing areas in a shorter timeframe. TasNetworks subsequently rebalanced its distribution capex investment program to align more closely with customer preferences, allocating additional funds to address the reliability of all poor performing communities without increasing the overall capex forecast.

6.7 Our benchmarked productivity

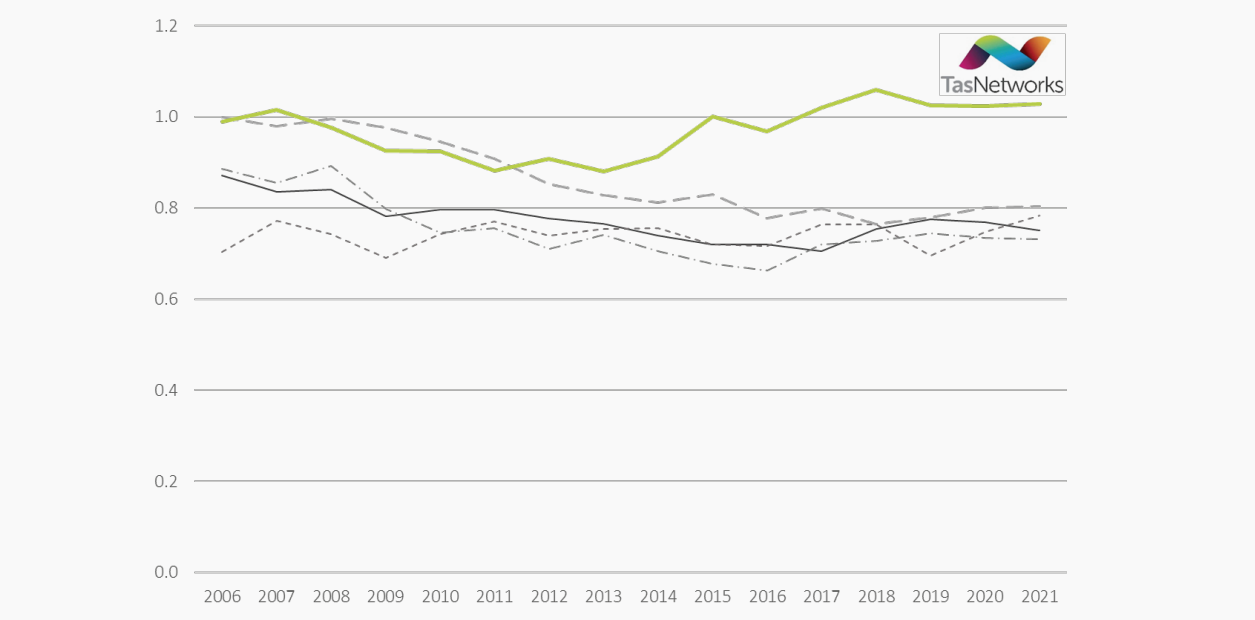
The AER uses industry benchmarking to measure and assess the efficiency and productivity of TasNetworks' transmission and distribution networks. Although the AER does not use results of benchmarking deterministically to set network revenue allowances, the results are used to identify elements of revenue and regulatory proposals where greater scrutiny may be required.

The AER's benchmarking models assess each network operated by TasNetworks independently. TasNetworks contends that it is a productive and efficient provider of transmission and distribution network services. TasNetworks' level of efficiency reflects the business' operating environment factors and the benefits of being the operator of two networks.

6.7.1 Transmission productivity

Figure 13 illustrates that, for the AER's Multilateral Total Factor Productivity (**MTFP**) benchmarking metric, TasNetworks is the most productive transmission network in the NEM. As noted by the AER's benchmarking consultants, TasNetworks' productivity *increased noticeably in 2014 and 2015 with the introduction of restructuring and reform initiatives*[5] and has remained high since.

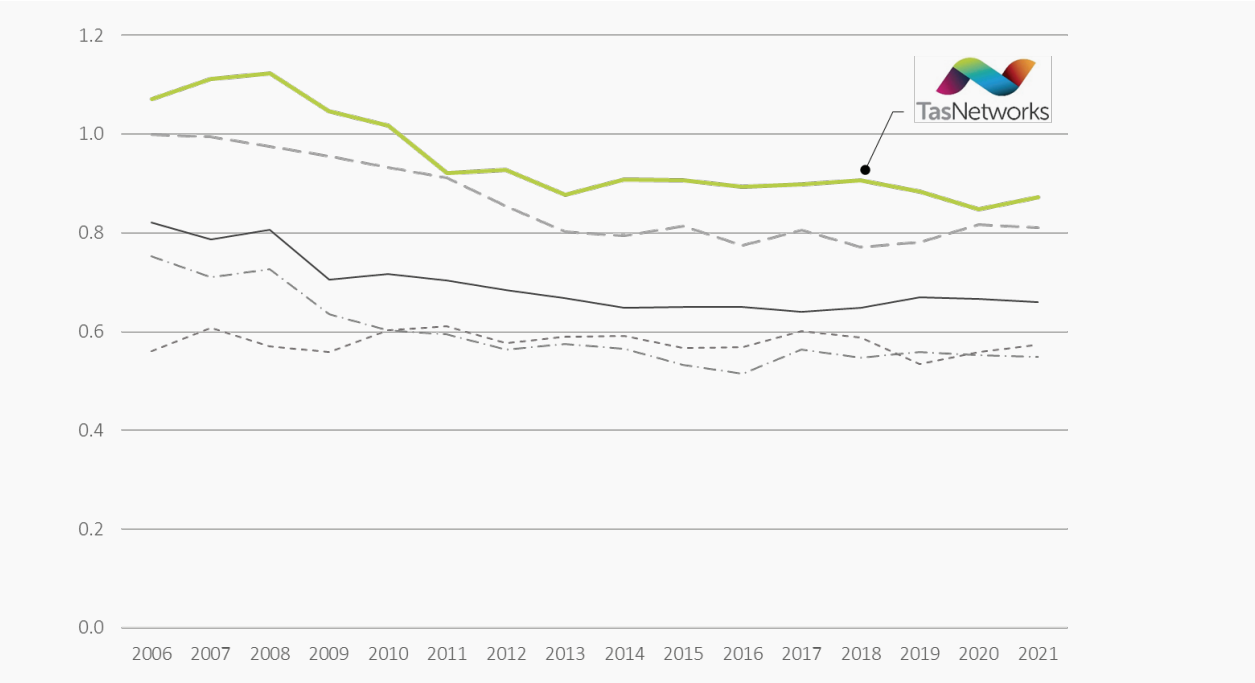
Figure 13. TNSP multilateral total factor productivity indexes, 2006–2021



Source: *Annual Benchmarking Report - Electricity transmission network service providers*, AER, November 2022

The AER's capital productivity performance indicator (**capital MPFP**) also places TasNetworks first of the five TNSPs in the NEM (see Figure 14).

Figure 14. TNSP multilateral capital partial factor productivity indexes, 2006–2021



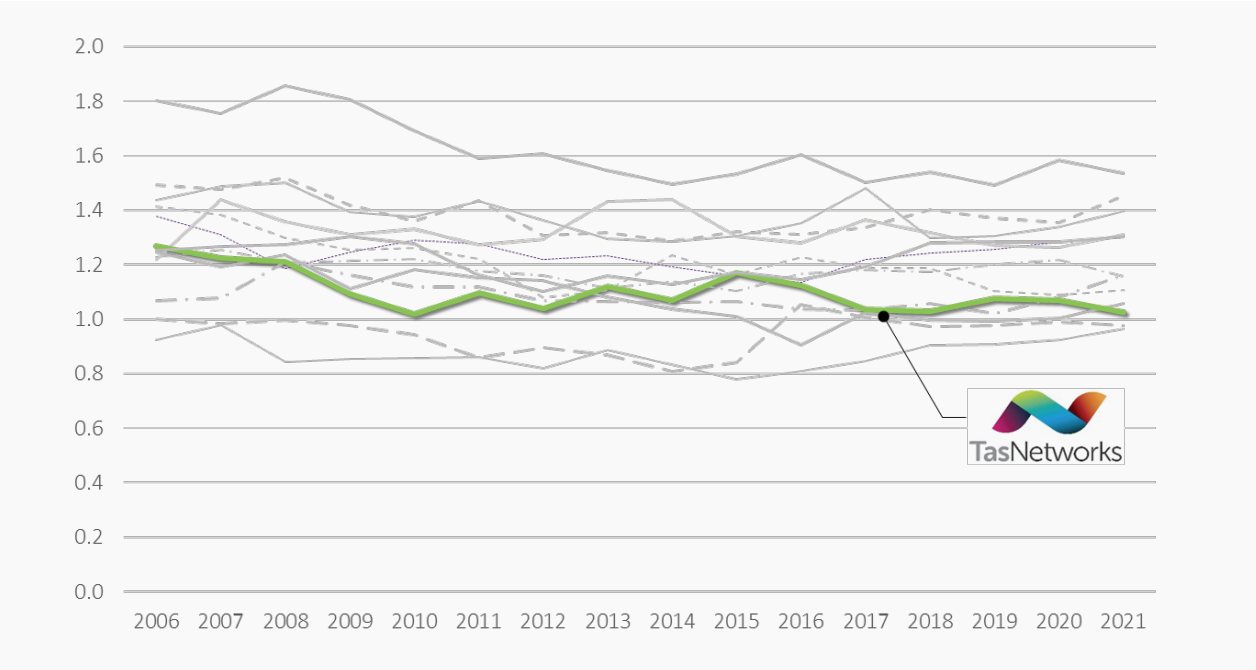
Source: AER, *Annual Benchmarking Report - Electricity transmission network service providers*, November 2022

5 Quantonomics Economics, *Economic Benchmarking Results for the Australian Energy Regulator's 2022 TNSP Annual Benchmarking Report*, Page 22, 3 November 2022

6.7.2 Distribution productivity

Figure 15 shows that the AER's MTFP benchmarking places TasNetworks at the lower end of Australian distribution networks. The AER's capital partial factor productivity performance indicator for distribution networks also places TasNetworks as having the lowest productivity in 2021 of the 13 DNSPs compared.

Figure 15. DNSP multilateral total factor productivity indexes, 2006–2021



Source: AER, *Annual Benchmarking Report - Electricity distribution network service providers,* November 2022

The AER has acknowledged that TasNetworks is something of an outlier in terms of system structure, as the transmission network boundary with the distribution network is by far the most 'downstream'. The benchmarking models used by the AER also do not represent TasNetworks' system structure well, favouring networks which utilise power lines rated at 33kV and above. TasNetworks operates a distribution network almost totally comprised of lines with a capacity of less than 33kV.

The effect of TasNetworks' network structure on its performance in the AER's MTFP benchmarking of distribution networks is considerable, and has prompted the AER's benchmarking consultants to recommend caution in interpreting TasNetworks' MTFP score. Analysis by TasNetworks has shown that were TasNetworks' distribution network structured similarly to other networks TasNetworks would be rated significantly higher in MTFP terms. The current specification of the MTFP model prevents TasNetworks obtaining an MTFP score that would place it among the leading DNSPs.

6.8 Capex forecasting

6.8.1 Methodology

TasNetworks' **2024-2029 Expenditure Forecasting Methodology** (**EFM**) outlines TasNetworks' capex forecasting methodology. Figure 16 presents the key steps in the process by which capex needs are identified, addressed and closed out.

Figure 16. Investment governance process

The development of a capex forecast for the purpose of a revenue determination requires NSPs to focus on the first two steps in this process, those being 'Needs analysis' and 'Investment evaluation'.

The 'Needs analysis' step comprises the recognition and response by TasNetworks to factors such as:

- customer connections and future demand
- historical performance, and forecast security, resilience, and reliability needs of customers
- challenges arising from the changing risk profile of ageing assets
- changing environmental conditions
- safety, security, digital, and environmental compliance obligations.

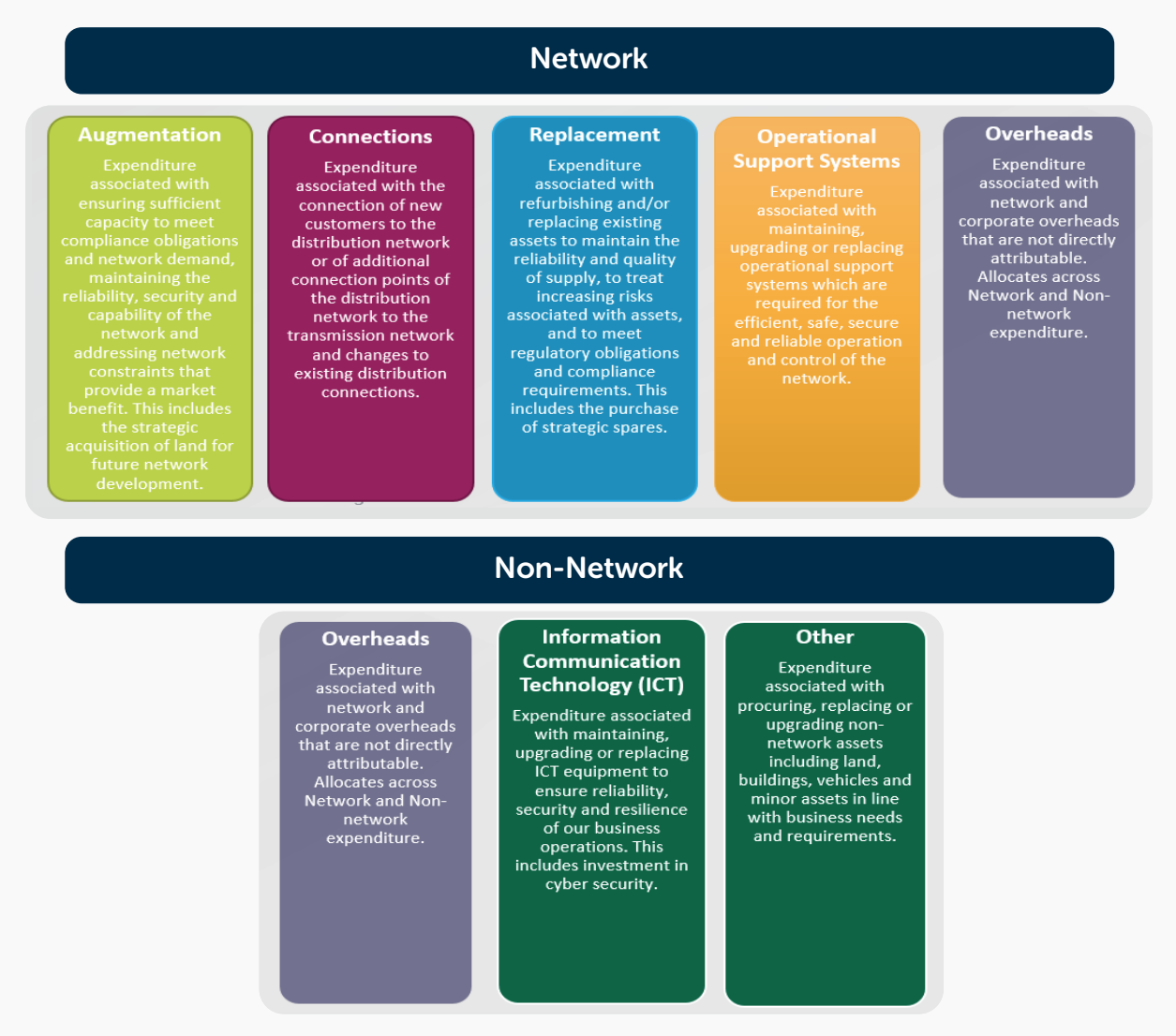
The 'Investment evaluation' step incorporates sub-processes that ensure TasNetworks meets the requirements of the AER's *Industry practice application note – Asset replacement planning*, while also managing long term risk outcomes at the lowest whole-of-life cost, without compromising on customer service performance outcomes. These include:

- options identification – demonstrating the broad range of options considered by TasNetworks that could meet the identified need(s)
- economic analysis (initiative level) – understanding the whole-of-life capital and operating costs needed to implement each option, balanced against the resulting risk cost mitigation outcomes
- economic analysis (portfolio level) – stepping away from the highly granular initiative level, and iteratively assessing combinations of options across categories of investment, asset fleets, and network sites, to identify more optimal risk, cost and service performance outcomes at the portfolio level than could be achieved when only examining individual investments
- preferred option selection – providing robust and quantitative reasoning for the selection of the preferred option, showing how it, and the broader portfolio of investments within which it resides, affordably achieves customer needs
- top down testing – comparing TasNetworks' total capex forecasts and capex category level forecasts against the actual spend over the current regulatory control period to ensure variations in expenditure between regulatory control periods are justified
- deliverability assessment – with consideration for TasNetworks' delivery strategy and resource mix, understanding the deliverability of the preferred options and making micro-adjustments to the forecast to increase efficiency in terms of both timing and resourcing.

6.8.2 Categories

TasNetworks applies a consistent forecasting framework for all transmission and distribution network capex, utilising well accepted categories of expenditure that align with the regulatory framework. Figure 17 shows how TasNetworks categorises capex, with these forecasting categories used consistently here, and throughout TasNetworks' Combined Proposal wherever capex is presented.

Figure 17. Capital expenditure forecasting categories



For most of TasNetworks' forecast capex program, costs can be attributed directly to either the transmission or distribution network. However, to realise the opportunities for efficiency that arise from TasNetworks' dual role as a TNSP and DNSP there are many support services where capex investments will benefit both the transmission and distribution networks, such as the upgrade of ICT assets (like server hardware) or the upgrade of vehicle fleet capabilities for emergency response.

The costs associated with these shared business services are defined as 'shared' and are allocated between the transmission and distribution networks based on the nature of the investment and expected use of the shared service by each network.

6.8.3 Assumptions

Our capex forecasts are underpinned by the key assumptions set out in Table 3.

Table 3. Capex key assumptions

The capex initiatives, including the investment evaluation summaries, project and program scopes and estimating practices, are soundly based and align with our strategic direction
We will have the resources and capability to deliver the programs forecast for the forthcoming regulatory control period
Our forecasts of escalation rates are reasonable and based on independent expert advice
Our cost of consequence values are aligned with TasNetworks risk management framework
There will be no changes to the ownership of private electricity network assets in Tasmania

As indicated in Table 3, a key assumption of TasNetworks' capex forecast is that 'there will be no changes to the ownership of private electricity network assets in Tasmania'. This assumption has recently been called into question. In November 2022, the Tasmanian parliament passed the *Electricity Safety Act 2022* which clarifies the boundary between TasNetworks owned 'electricity infrastructure' and privately owned 'electrical installations'. Section 32(2) of the Act states that *"The owner of an electrical installation must ensure that the operation, maintenance, repair and replacement of any electrical installation beyond the point of supply is such as to ensure the safe use of electricity."*

In addition, the management of private electricity infrastructure has been complicated by a decision in Western Australia (**WA**) known as the "Parkerville case". The case involved a failed private pole (which had a network owned service wire attached to it) which collapsed and started a fire, causing extensive damage to adjoining properties. The WA Court of Appeal (since upheld by the High Court) found Western Power 50 per cent liable in negligence by connecting its infrastructure to a defective private pole. The court held that a reasonable operator would have established a system for periodic inspection of the relevant poles, and either repair any defective poles themselves or require the customer to do so. The High Court found this is an on-going obligation and should be assessed based on the specific situation and the application of relevant local legislation.

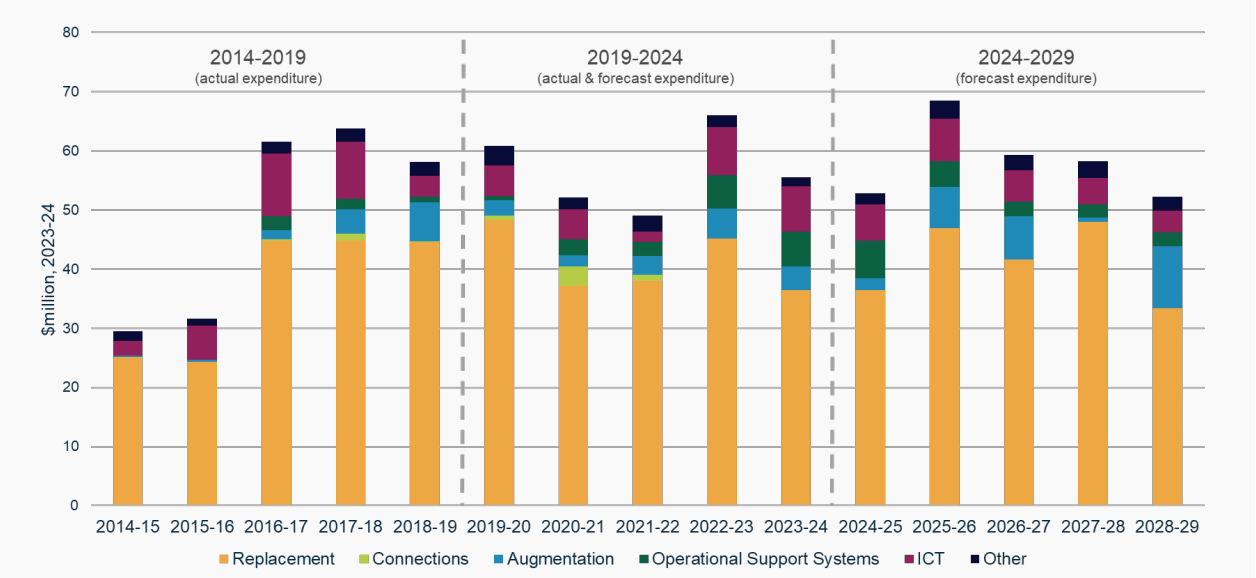
These recent changes to the legislative framework have required TasNetworks to reconsider its management of risk associated with providing network services to private assets. TasNetworks is considering several options on how to reduce its risk exposure, which may affect our future capex program.

6.9 Transmission capex forecast

The following sections outline our transmission capex forecasts, explaining the rationale behind any material step-changes, and compare our forecasts against historical levels of investment to assist the assessment of the prudency of TasNetworks' capex forecasts.

Figure 18 shows TasNetworks' transmission capex since 2014-15, including forecast capex for the remaining two years of the 2019-2024 regulatory control period and the 2024-2029 regulatory control period.

Figure 18. Transmission capex - historic and forecast ($million, 2023-24)

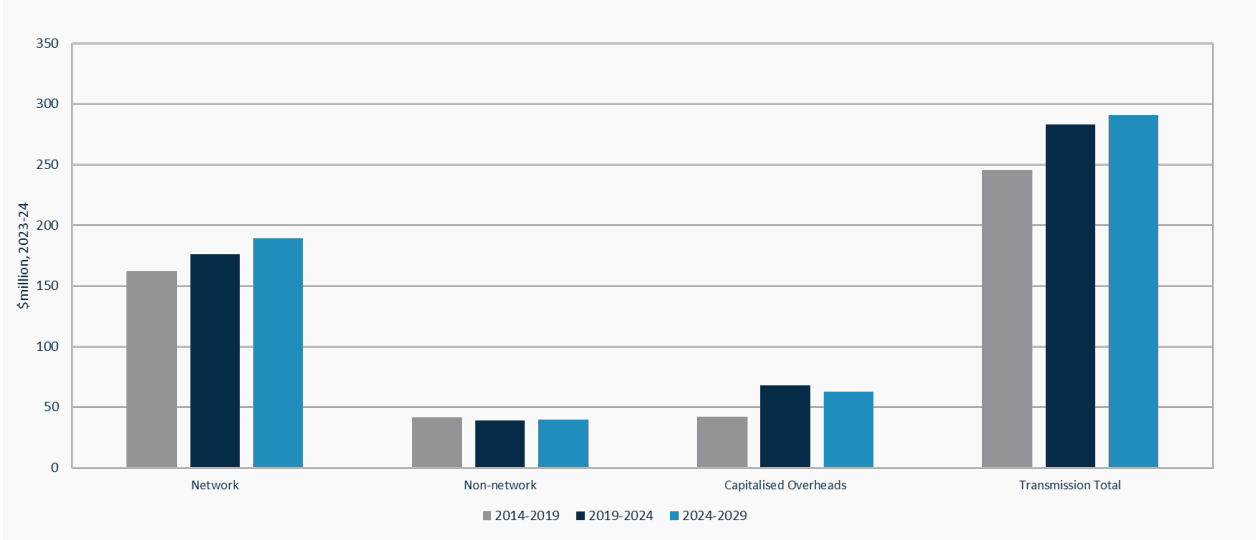


Note: Inclusive of capitalised overheads

Figure 19 presents TasNetworks' historical and future transmission capex showing:

- TasNetworks' total capex for the 2014-2019 regulatory control period
- TasNetworks' capex for the 2019-2024 regulatory control period, comprising three years of actual incurred capex and two years of forecast capex
- TasNetworks' total forecast capex for the 2024-2029 regulatory control period.

Figure 19. Historical and forecast transmission capex by category ($million, 2023-24)

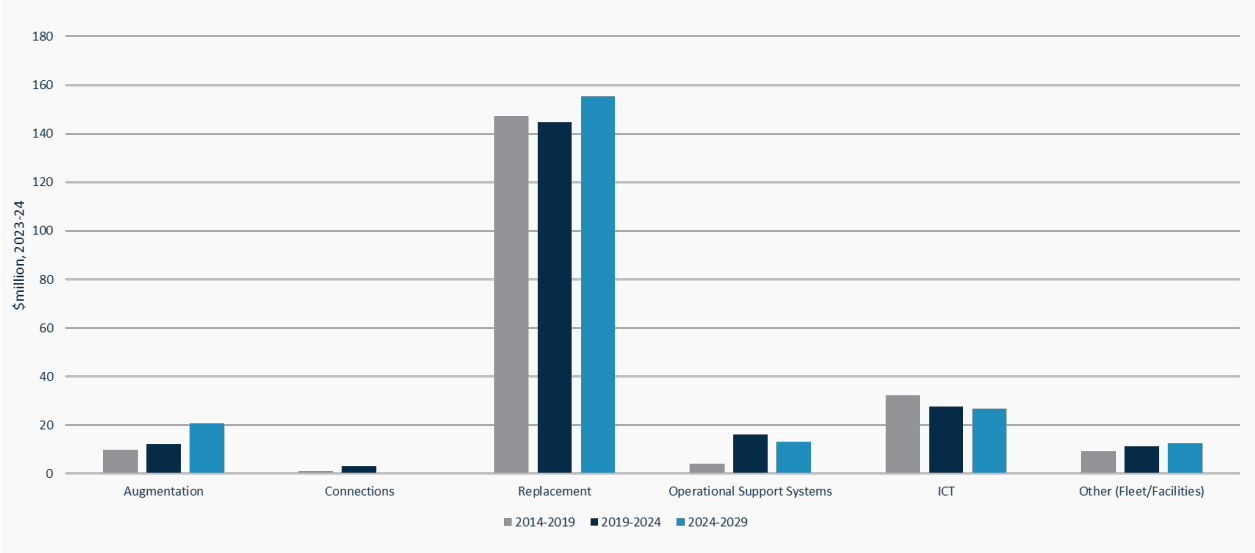


TasNetworks' total transmission capex forecast for the 2024-2029 regulatory control period is $290 million. This forecast is $4 million less than the allowance the AER determined for the 2019-2024 regulatory control period.

Network expenditure remains the largest component of our total transmission capex forecast, and is forecast to increase by $13m. The increase reflects the emergence of new network augmentation drivers and the deteriorating condition of assets in some categories where the risk of asset failure warrants increased investment in asset replacements.

Figure 20 shows how our transmission capex forecast is anticipated to change between regulatory control periods at the capex sub-category level. Analysis and commentary regarding material changes in capex is provided in the next sections.

Figure 20. Historical and forecast transmission capex by sub-category ($million, 2023-24)



6.9.1 Transmission connections

TasNetworks receives many connection enquiries from customers wanting to learn about the connections process, and the potential cost of connecting to the transmission network. Historically, many such enquiries do not proceed further.

To provide certainty in its revenue submission, TasNetworks includes a forecast comprising the capital investment needed for connection enquiries that have progressed to a formal connection application. TasNetworks has not received any connection applications from customers that would require investment on the shared transmission network in the 2024-2029 regulatory control period.

6.9.2 Transmission augmentation

TasNetworks forecasts the need for $21 million of capex to augment the transmission network, representing a $9 million increase compared to our forecast expenditure for the current regulatory control period. Consistent with our focus on affordability for customers and the delivery of services that our customers value, we have only proposed transmission augmentation investments that provide clear and material customer and market benefits.

Table 4 outlines our augmentation capex forecast for the 2024-2029 regulatory control period, comprising two transmission substation augmentation projects and several strategic land acquisitions to support development needs beyond 2029.

In addition, there are several high value capital projects classified as 'contingent' in the 2024-2029 regulatory control period which, if they were to proceed, would result in higher augmentation capex than forecast (see Attachment 7 Contingent projects for more information).

Table 4. Proposed transmission augmentation initiatives, 2024-2029 regulatory control period

Transmission Augmentation Investment	Capex ($m, $2023-24)	Problem / Opportunity	Proposed Solution
Loss Reduction in the Upper Derwent 110kV Network	10.9	Inefficiency in the 110kV Upper Derwent transmission network, is increasing costs for market participants and customers.	Conversion of the Upper Derwent transmission network from 110kV to 220kV, thereby reducing losses and maximising market benefits to participants and customers.
West Coast Reliability Improvement	7.1	Poor reliability is being experienced by customers in Zeehan, on Tasmania's west coast. We are also forecasting an increase in mining loads.	Construction of a new 22kV injection point for the network supplying Zeehan and the West Coast of Tasmania, thereby improving the long-term electrical security and reliability of the region.
Strategic Land Acquisitions	2.7	Land and easements are required for the construction or augmentation of transmission lines and substations. Delayed acquisition increases cost, timing and other project risks.	Acquisition of land and easements, where it can be demonstrated that overall projects costs and the risks of delay during implementation are reduced by early acquisition.

6.9.3 Transmission asset replacements

TasNetworks forecasts the need for $155 million of capex for transmission network asset replacements in the 2024-2029 regulatory control period, representing a $10 million increase in investment compared to forecast investment in the 2019-2024 regulatory control period.

Table 5 provides a breakdown of forecast expenditure by transmission asset categories for the 2024-2029 regulatory control period, including drivers underpinning material changes in the capex forecast.

Table 5. Proposed transmission asset replacement expenditure by asset class, 2024-2029 regulatory control period

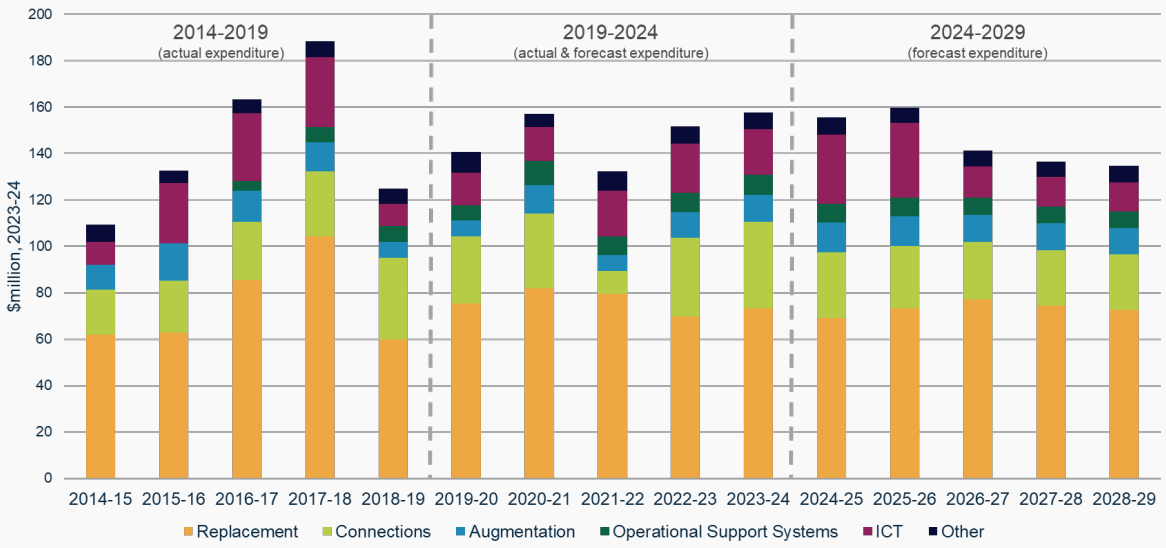
Transmission Asset Replacement Category	Total Capex ($m, $2023-24)	Drivers of change
Transformers	28.4	Increased investment needed due to deteriorating asset condition and risk of asset failure, and minimal investments in the current period.
Transmission line support structures and foundations	17.2	Asset audits have found that weather resistant steel (**WRS**) structures and assemblies are failing prematurely, with increased investment needed to mitigate this risk at critical locations.
Extra high voltage (EHV) switchgear	16.1	Increased investment needed due to deteriorating asset condition and risk of asset failure, and due to non-compliance with arc-flash standard requirements.
SCADA	15.7	In line with current investments.
EHV disconnectors and earth switches	13.9	Increased investment needed due to deteriorating asset condition and risk of asset failure, and minimal investments in the current period.
Telecommunications	11.9	Targeted multiplexor replacements in the current period reduce the need for investments in 2024-2029. Implementation of an improved asset spares management strategy that will make greater use of refurbished assets as spares in the future, significantly reducing the need for investment in new spares.
Transmission line conductor assemblies	10.7	Targeted replacement of galvanised iron (**GI**) conductors in the current period has been effective in mitigating risk, reducing the need for capital investment in 2024-2029.
Transmission line insulators	8.6	In line with current investments.
EHV circuit breakers	7.8	Targeted asset replacements made in the current period across many categories have been effective in mitigating risk, significantly reducing the need for capital investment in 2024-2029.
Transmission lines tracks and clearances	6.9	Increased investment for remediation of transmission spans identified as not meeting minimum clearance-to-ground standards.
Protection and control	5.9	Significant capex reduction resulting from the implementation of an optimised spares management strategy and a more targeted, risk focused approach to asset replacements.
Substation site – infrastructure and fire risk management	4.1	Targeted asset replacements made in the current period across many categories have been effective in mitigating risk, significantly reducing the need for capital investment in 2024-2029.
EHV current and voltage transformers	3.6	Increased investment needed due to deteriorating asset condition and risk of asset failure, and minimal investments in the current period.
Substation asset refurbishment	1.7	In line with current investments.
EHV cables	1.4	Increased investment due to deteriorating asset condition and risk of asset failure identified during dissolved gas analysis tests in the current period.
Substations AC systems	0.7	In line with current investments.
Transmission line rating monitoring	0.3	In line with current investments.
Substations spares management	0.1	In line with current investments.

6.10 Distribution capex forecast

The following sections outline our distribution capex forecasts, explaining the rationale behind any material step-changes, and comparing our forecasts against historical levels of investment to assist in the assessment of TasNetworks' capex forecasts.

Figure 21 shows how TasNetworks' capex has changed over time, including forecast capex for the remaining two years of the 2019-2024 regulatory control period and the 2024-2029 regulatory control period.

Figure 21. Historical and forecast distribution capex ($million, 2023-24)

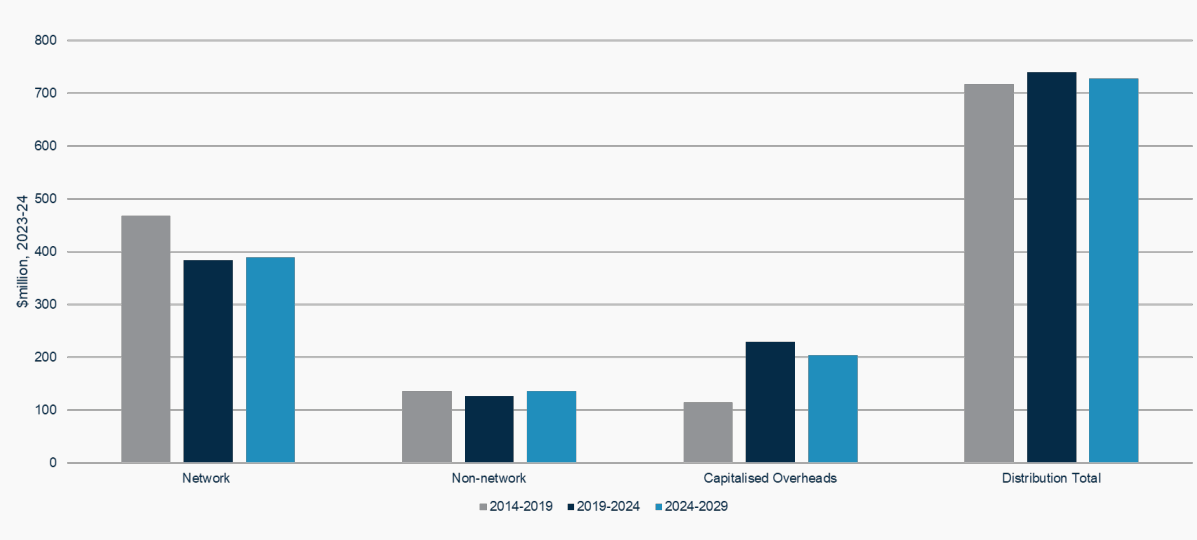


Note: Inclusive of capitalised overheads and customer capital contributions

Figure 22 presents TasNetworks' historical and future distribution capex showing:

- TasNetworks' total capex for the 2014-2019 regulatory control period
- TasNetworks' capex for the 2019-2024 regulatory control period, comprising three years of actual incurred capex and two years of forecast capex
- TasNetworks' total forecast capex for the 2024-2029 regulatory control period.

Figure 22. Historical and forecast distribution capex by category ($million, 2023-24)



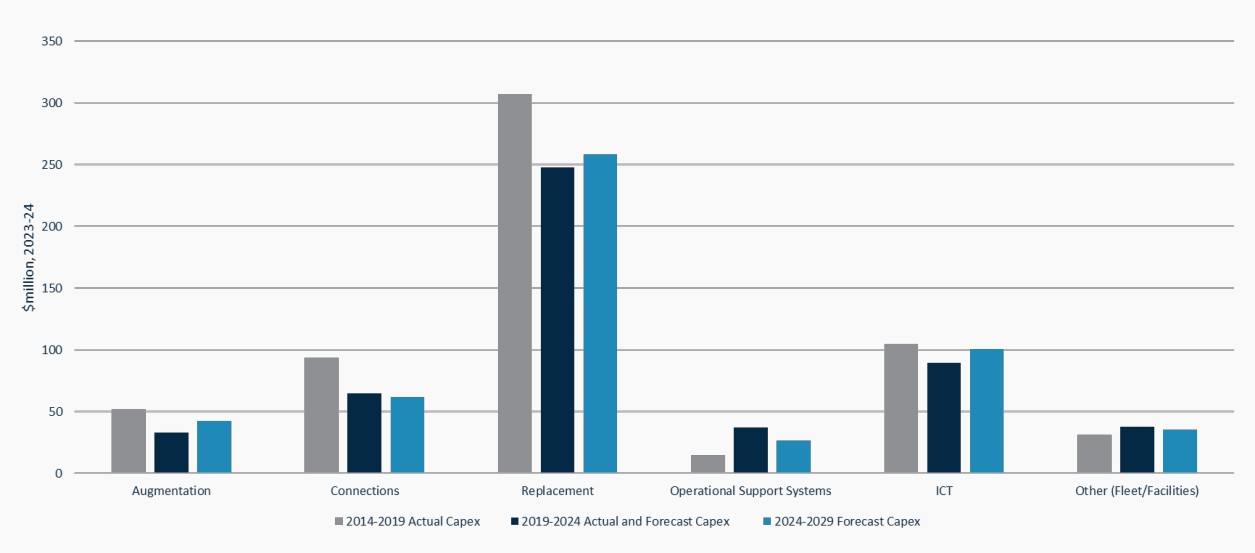
Supporting affordability for our customers, TasNetworks' total distribution capex forecast for the 2024-2029 regulatory control period is $729 million. This forecast is $11 million less than our expected distribution capex over the 2019-2024 regulatory control period. Further, the 2024-2029 forecast is $65 million less than TasNetworks' allowance for the 2019-2024 regulatory control period.

Network expenditure continues to be the largest component of our total distribution capex forecast, increasing by $5 million compared with network investments in the current period. This increase reflects the emergence of new network augmentation drivers, and a number of asset categories where condition deterioration and the risk of asset failure are sufficient to warrant an increase in investment for asset replacements.

We also propose an increase of $11 million in non-network ICT capex compared with similar investments in the current period. This increase is reflective of a number of critical systems approaching end of life and requiring replacement, and the need to uplift the cyber security and resilience of our critical infrastructure.

Figure 23 shows how our distribution network capex is anticipated to change between regulatory control periods, at the capex sub-category level. Analysis and commentary regarding material changes in capex is provided in the sections below.

Figure 23. Historical and forecast distribution capex by sub-category ($million, 2023-24)



6.10.1 Distribution augmentation

TasNetworks forecasts the need for $43 million of capex for distribution network augmentation in the 2024-2029 regulatory control period. This is a $9 million increase in investment compared with our forecast augmentation investments in the 2019-2024 regulatory control period.

The identified investments are outlined in Table 6.

Table 6. Proposed distribution augmentation initiatives, 2024-2029 regulatory control period

Distribution Augmentation Investment	Capex ($m, $2023-24)	Problem / Opportunity	Proposed Solution	Drivers of change
High and low voltage network reinforcement and upgrades due to capacity issues	15.6	Thermal overload, including fault levels, of high voltage conductors and cables imposing operational limitations during normal or contingency events.	Reinforcement or establishment of high voltage conductors and cables to manage thermal loading and fault levels and improve the transfer capability and operational flexibility on the high voltage network.	Improvements in the methodology and data used by TasNetworks to forecast network growth will reduce the level of investment for these assets. Increased customer connections, and the resulting capex needed to facilitate those connections, will also result in a corresponding reduction in the need for augmentation investment.
Future Distribution System Vision and CER enablement	9.7	Increased penetration, use and sophistication of CER is leading to increased bi-directional energy flows on the low voltage network and increased expectations from customers regarding the grid.	Improve visibility and control of the low voltage network, undertake trials to enable CER such as dynamic operating envelopes, network tariffs and community batteries.	Increased investment for the development and implementation of customer trials for community grid batteries, remote power systems, and building capability within the network to cater for increasing solar rooftop connections and EVs. Development of network asset models to leverage advanced meter data.
Distribution transformer upgrades due to supply quality issues	3.7	Poor quality of supply beyond legislated limits impacting customers on the high voltage and low voltage networks where the issue is identified at the transformer.	Replacement and upgrade of distribution transformers to address supply quality complaints from customers.	While solar PV and EV connections are forecast to continue to rise, actual demand in the current period has not reflected the forecasts used by TasNetworks in making its previous revenue submission, and this downward adjustment in investment for transformer voltage regulation is reflected in TasNetworks' forecast for the 2024-2029 regulatory control period.
High voltage network reinforcement and upgrades to address reliability issues	3.7	Poor reliability of supply, measured through the frequency and duration of outages, impacting customers.	Targeted reliability improvement initiatives to address poor performing sections of the distribution network.	Increased funding for reliability improvement for poor-performing communities.

Distribution Augmentation Investment	Capex ($m, $2023-24)	Problem / Opportunity	Proposed Solution	Drivers of change
Zone substation and sub-transmission circuit reinforcement and upgrades due to capacity issues	3.3	Thermal overload associated with zone substation transformers and sub-transmission circuits during normal or contingency events.	Upgrade and installation of new zone substation transformers (not required for the 2024-2029 regulatory control period) and relocation and renewal of sub-transmission circuits.	Reduced investment, due to improvements in the methodology and data used by TasNetworks to forecast network growth. Increased customer connections, and the resulting capex needed to facilitate those connections, will also result in a corresponding reduction in the need for augmentation investment.
High and low voltage network reinforcement and upgrades to address supply quality issues	3.0	Poor quality of supply beyond legislated limits impacting customers on the high voltage and low voltage networks.	Reinforcement and upgrade of the high voltage and low voltage networks to address supply quality complaints from customers.	Growth in solar PV and EV charging connections on the distribution network will drive an increase in capital requirement for improving power quality. Power quality investigations also reveal a need for increased investment in low voltage voltage feeder phase balancing.
Distribution transformer upgrades due to capacity issues	2.0	Capacity constraints on pole and ground mounted distribution transformers caused by excessive thermal loading and/or voltage and power quality issues associated with thermal loading.	Prioritised installation or augmentation of distribution substations to manage thermal loading constraints within the low voltage planning standards prior to failure.	In line with current investments.
Strategic Land Acquisitions	1.5	Land and easements are required for the construction or augmentation of the distribution network, in particular zone substations. Delayed acquisition increases cost, timing and other project risks.	Acquisition of land and easements, where it can be demonstrated that overall projects costs and the risks of delay during implementation are reduced by early acquisition.	In line with current investments.

6.10.2 Distribution customer connections

TasNetworks forecasts the need for $62 million of capex for customer connections in the 2024-2029 regulatory control period. This is $3 million less than our forecast expenditure for customer connections in the 2019-2024 regulatory control period.

TasNetworks has previously utilised several external economic forecasts to develop its distribution customer connections forecasts, including:

- new dwelling construction forecast information from the Housing Industry of Australia
- population growth data from the Department of Treasury and Finance
- unemployment rate data from the Department of Treasury and Finance
- Tasmanian Gross State Product from the Department of Treasury and Finance.

Current levels of investment for customer connections exceed the forecasts developed for TasNetworks' Combined Proposal for the 2019-2024 regulatory control period. Learning from this experience, TasNetworks has improved its forecasting approach by including additional new dwelling forecasts from the Master Builders Association and the Australian Construction Industry Forum. This information has been found to align more closely with TasNetworks' historic experience and is expected to provide a more accurate forecast of connection volumes for the 2024-2029 regulatory control period.

6.10.3 Distribution asset replacement

TasNetworks forecasts the need for $258 million of capex for distribution network asset replacements in the 2024-2029 regulatory control period. This is $10 million more expenditure than forecast for the 2019-2024 regulatory control period.

Table 7 provides a breakdown of forecast expenditure by distribution asset categories for the 2024-2029 regulatory control period, including asset-specific drivers underpinning material changes in the capex forecast.

TasNetworks also has undertaken an investment optimisation process for its 2024-2029 network program of work, using its asset health-based risk management tool to quantify, compare, and ultimately manage risks across the portfolio.

Table 7. Proposed distribution asset replacement expenditure by asset class, 2024-2029 regulatory control period

Distribution Asset Replacement Category	Total Capex ($m, $2023-24)	Drivers of Change
Poles and structures	103.7	Asset condition data, together with the age profile of TasNetworks' fleet of distribution wood poles, shows that failure rates are forecast to increase, and a corresponding increase in capex is needed. TasNetworks is also pursuing an improved asset management strategy, where wood poles are replaced with fibre-reinforced concrete poles that will provide improved bushfire resilience and service performance at a lower whole-of-life cost – both key priorities communicated to TasNetworks by its customers as part of the stakeholder consultation process.
High voltage conductors	41.3	Alternative technologies, including overhead covered conductor, are proposed for implementation at a lower cost per km compared to high voltage aerial bundled conductor (**ABC**) and undergrounding. This will enable funding to be reprioritised to other asset categories to achieve better cost, risk and service performance outcomes.
Ground mounted substations	16.6	TasNetworks' portfolio optimisation process has identified that there are other asset categories where capex investment will achieve better cost, risk and service performance outcomes. TasNetworks will continue to monitor the condition of the assets and failure rate to ascertain whether future investment practices need to adjust to ensure risk is managed within TasNetworks' risk appetite.

Distribution Asset Replacement Category	Total Capex ($m, $2023-24)	Drivers of Change
Service connection assets	15.6	Recent audits have identified an increase in the number of low voltage services and service fuses requiring replacement. Forecast increases are offset by removal of CablePI costs and a move to condition based replacement using advanced meter data to monitor for loss of neutral and other failing assets.
Pole mounted transformers	12.7	Forecast expenditure has been reduced in line with historical volumes.
Bushfire mitigation	8.3	In line with current investments.
Low voltage crossarms	7.9	TasNetworks' analysis shows that changing its asset management strategy for the replacement of low voltage cross-arms from a reactive approach to a pro-active condition-based approach is more cost-effective in the long-term, reducing capex without adversely impacting on risk and/or service performance.
Zone substation transformers	7.0	We propose to reduce capex for this asset category, as TasNetworks' portfolio optimisation process has identified that there are other asset categories where this capex will achieve better cost, risk and service performance outcomes.
Overhead high voltage switchgear	6.6	In line with current investments.
Ground mounted low voltage switchgear	5.5	In line with current investments.
Low voltage cables and connections	5.0	TasNetworks' analysis shows that changing its asset management strategy for CONSAC cables from proactive replacement to replacement on failure is more cost-effective, without adversely impacting on risk and/or service performance.
Ground mounted high voltage switchgear	5.0	We propose to reduce capex for this asset category, as TasNetworks' portfolio optimisation process has identified that there are other asset categories where this capex will achieve better cost, risk and service performance outcomes.
Bird mitigation	4.6	In line with current investments.
High voltage cables and connections	3.9	In line with current investments.
Regulators	3.8	In line with current investments.
Ground mounted transformers	3.2	In line with current investments.
Low voltage conductors	2.4	We propose to reduce capex for this asset category, as TasNetworks' portfolio optimisation process has identified that there are other asset categories where this capex will achieve better cost, risk and service performance outcomes. It is expected that improved spatial and asset data will enable improved prioritisation of works to manage risk more effectively.
SCADA and Network Control	2.6	In line with current investments.
Ground mounted substations site management	1.1	In line with current investments.
Protection and control	0.7	In line with current investments.
Telecommunications	0.4	In line with current investments.
Overhead low voltage switchgear	0.3	In line with current investments.
Oil containment	0.3	In line with current investments.
Submarine cables	0.1	In line with current investments.

6.11 Transmission and distribution capex forecast

The following sections outline our capex forecasts associated with shared business services, that are allocated between the transmission and distribution networks based on the nature of the investment and expected use of the shared service by each network. These include investments in the areas of operational support systems, ICT, fleet and facilities management.

6.11.1 Operational support systems

The Operational Support Systems (**OSS**) category includes investments needed to procure, develop and/or upgrade hardware and software associated with:

- Asset management information systems (**AMIS**) such as the Geographical Information System (**GIS**), health-based risk management (**HBRM**) system, and asset master data
- Network Operating and Control System (**NOCS**) and System Control and Data Acquisition (**SCADA**) systems that are needed for monitoring and controlling the transmission and distribution networks in real time.

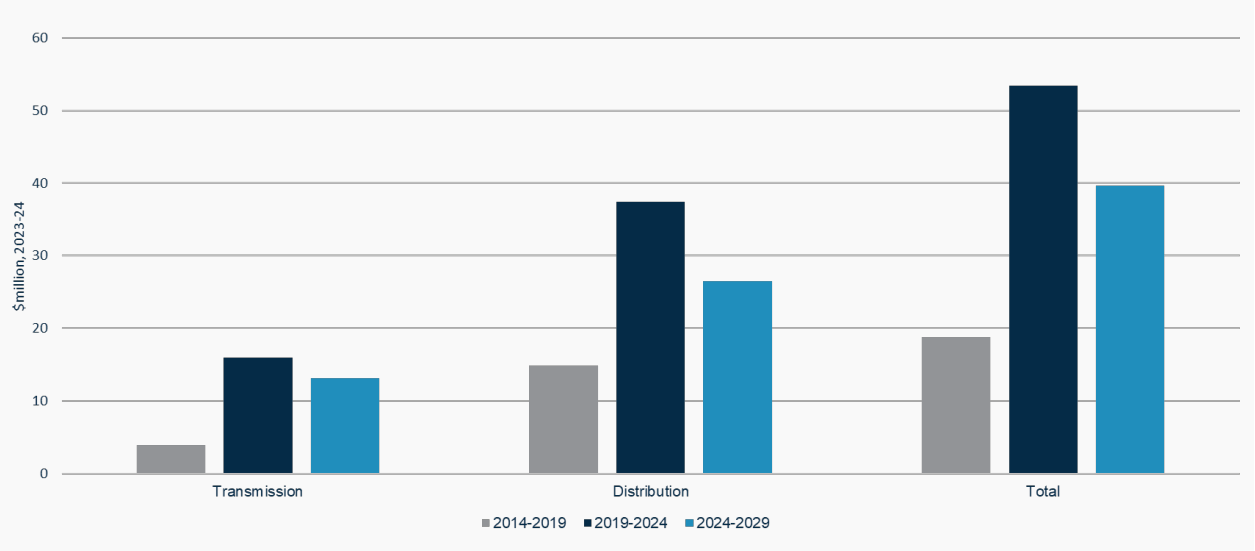
While TasNetworks categorises these investments as 'Network expenditure' (due to these investments strongly supporting the effective management of network assets), the nature of the investments is similar to those needed for ICT, as supported by the AER's definitions provided with annual transmission and distribution RINs.

For this reason, TasNetworks has used the AER's Guidance Note[6] of November 2019, to understand and assess the appropriateness of the mix of 'recurrent' and 'non-recurrent' capex investments required to meet customer and business needs.

Figure 24 presents TasNetworks' historic and forecast OSS expenditure for our transmission and distribution networks. TasNetworks forecasts the need for $40 million of capital investment for operational support systems in the 2024-2029 regulatory control period, comprising:

- $13 million for transmission network operational support systems, representing a $3 million reduction compared to forecast investment in the 2019-2024 regulatory control period
- $27 million for distribution network operational support systems, representing an $11 million reduction compared to forecast investment in the 2019-2024 regulatory control period.

Figure 24. Historical and forecast OSS capex by network ($million, 2023-24)

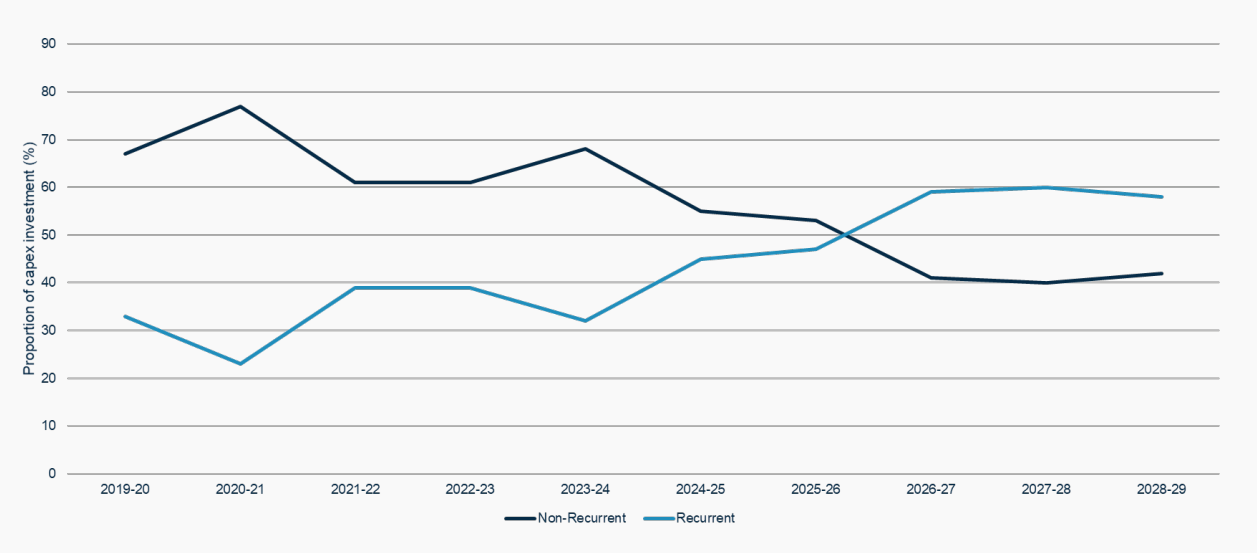


TasNetworks has made, and plans to make, significant non-recurrent investments in the 2019-2024 regulatory control period. By their nature, non-recurrent investments are infrequent and should result in a long term trend toward a greater proportion of recurrent investment (necessary for managing and maintaining the systems resulting from the non-recurrent investments).

6 Guidance note – Non-network ICT capex assessment approach (AER – November 2019)

Figure 25 presents TasNetworks' investments for OSS in terms of the annual proportion (%) identified as being either recurrent or non-recurrent. It shows non-recurrent investments reducing from a peak of 77 per cent early in the current regulatory 2019-2024 period, to around 40 per cent by the end of the 2024-2029 regulatory control period. Conversely, we see recurrent investments increase from 23 per cent up to around 60 per cent.

Figure 25. Recurrent and non-recurrent investment proportionality for operational support systems expenditure



Key non-recurrent investments proposed for the 2024-2029 regulatory control period include:

- AMIS:
  - HBRM system enhancements – acquisition and installation of additional modules for TasNetworks' HBRM system to improve data analytics and investment portfolio optimisation.
- NOCS/SCADA
  - Tasmanian Integrated System Protection Scheme – new control systems to manage transmission system security and maximise system capacity
  - Distribution System Operator (**DSO**) – investment in foundational information technology to support TasNetworks' transition to becoming a DSO
  - Phasor Measurement Unit (**PMU**) analytics – a one off implementation of a system to visualise transmission PMU data streams and automatically detect unusual power system operating conditions
  - Rotational load shedding – static, fixed, transmission load shedding systems (unlike the distribution network which requires annual changes based on feeder configuration and customer categorisation)
  - NOCS phasor measurement capability upgrade – one off upgrade of phasor measurement capability to improve data concentration, historian data storage, and data provision to AEMO
  - NOCS enhancement program – transmission control schemes and changes that are infrequent and that endure for a long period without the need for recurrent investment
  - NOCS infrastructure architecture change – step-change to transmission control systems undertaken for needs which are infrequent in nature, such as cyber security
  - AEMO Engineering Framework – delivery of elements of the new AEMO Engineering Framework and regulatory implementation roadmap necessary to manage new and increasingly dynamic network operating conditions.

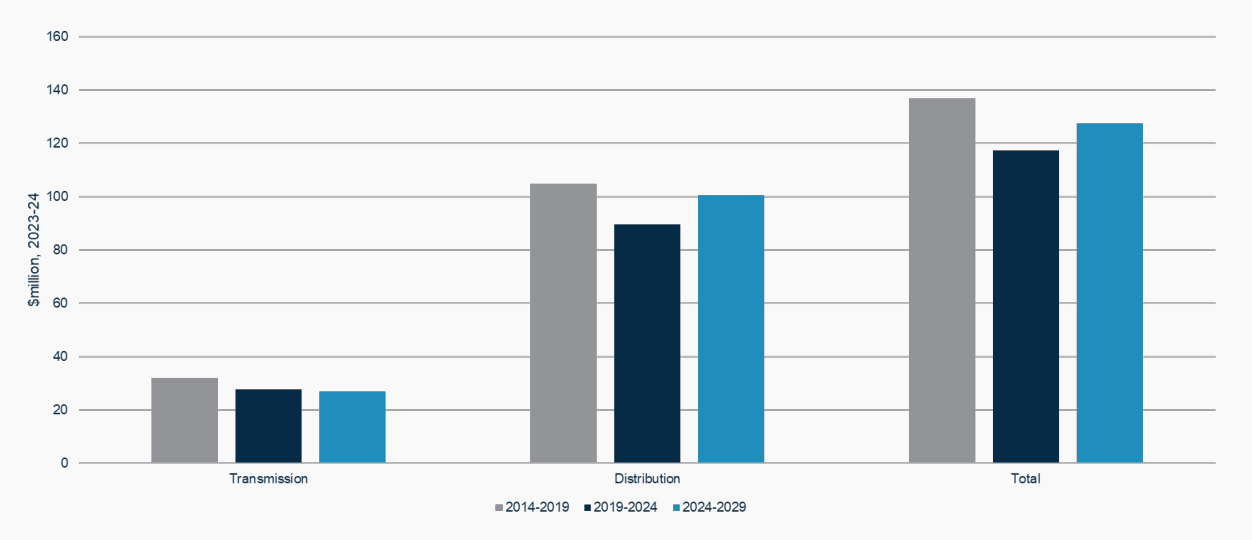
Key recurrent investments that will continue in the 2024-2029 regulatory control period include:

- AMIS:
  - Modelling capability – ongoing uplift in modelling capability for connectivity, forecasting, load and constraint management on the distribution network
  - Master data management – investing in tools and processes to continue to improve the quality of the asset master data and increasing the number of assets covered
  - Drawings management and capability – ongoing improvements to systems and processes
  - Data and analytics – periodic improvements to tools and systems facilitating data collation, interrogation and translation into actionable outputs.
- NOCS/SCADA
  - Advanced distribution management system (**ADMS**) – maintenance and periodic upgrades of software and hardware needed to support activities such as field mobility, visibility and management of network connectivity, and interfaces to CER
  - SCADA – tools and systems needed to maintain effective oversight of our distribution and transmission networks
  - Cyber security – ongoing, periodic improvements needed to cyber security controls to manage ongoing cyber security risks within a changing landscape, particularly considering increased future interconnection of TasNetworks' ADMS
  - Power quality and CER – continuous improvement in ensuring power quality data is being captured and effectively presented to the business, within an increasingly dynamic operating environment and with forecast increases in CER
  - Load management systems – ongoing, periodic upgrades in response to changing electrical networks, required for the rotational load shedding
  - System protection schemes utilising real-time software to calculate and apply transmission asset ratings, necessary for maintaining system capacity, security and reliability
  - Distribution network device lifecycle management, the integration of 'Internet of Things' (**IoT**) devices and associated software systems to support device lifecycle management and historian licensing.

6.11.2 Information communications technology

Figure 26 presents TasNetworks' historic and forecast ICT capex for our transmission and distribution networks.

Figure 26. Historical and forecast ICT capex by network ($million, 2023-24)



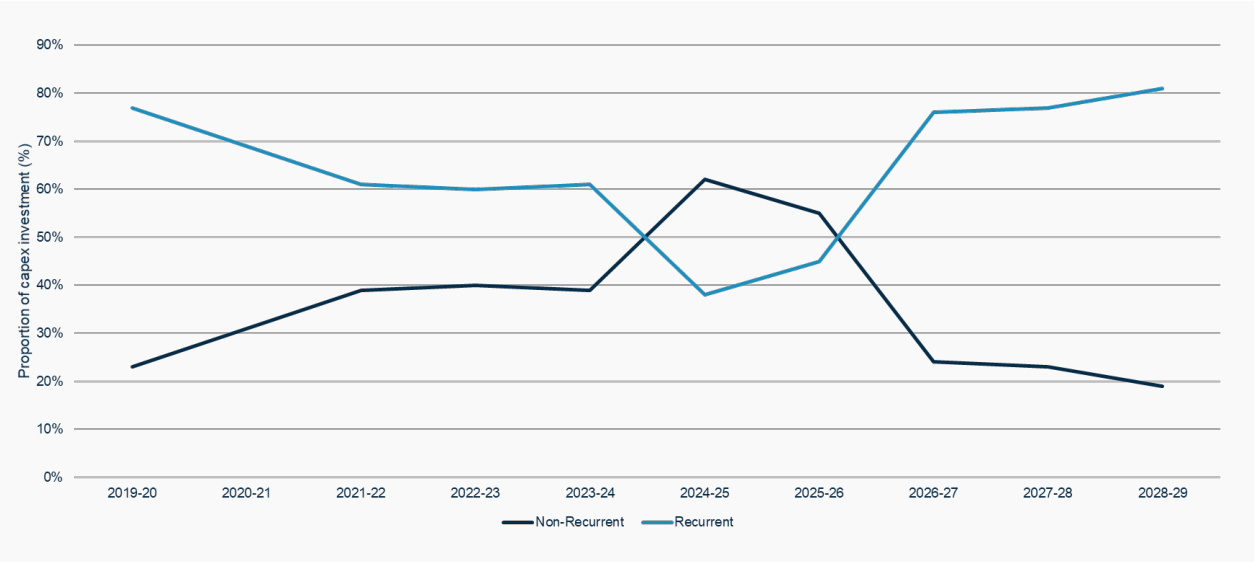
In the 2024-2029 regulatory control period we forecast an overall increase in ICT capex of $10 million.

The most significant drivers behind this increase include:

- Upgrade requirements for three systems comprising TasNetworks' Works Management Tool, as these systems are approaching end-of-life and do not integrate effectively with TasNetworks' enterprise resource planning (**ERP**) tool
- recent critical infrastructure reforms and updates to the (Commonwealth) *Security of Critical Infrastructure Act 2018*, requiring TasNetworks to improve the security and resilience of its critical infrastructure, with a focus on addressing the heightened cyber threat environment globally, and the increased risk of cyber-attacks on Australian networks.

In November 2019 the AER released a Guidance Note[7] explaining its approach to assessing non-network ICT capex forecasts and introducing the concept of 'recurrent' and 'non-recurrent' capex. Figure 27 presents the recurrent and non-recurrent components of TasNetworks' overall ICT capex, showing how they vary over time as a proportion of total capex.

Figure 27. Total ICT capex with recurrent and non-recurrent split



There are a number of non-recurrent investments proposed in the 2024-2029 regulatory control period. The level of investment is to rise in the first two years before reducing considerably in the last three years of the period. This is consistent with the transition to predominantly recurrent expenditure to manage the assets arising from the non-recurrent investments. Some investments comprise both a non-recurrent portion (typically needed for the development or purchase of a new system), and a recurrent portion to facilitate ongoing asset management and minor upgrades.

Key non-recurrent investments proposed for the 2024-2029 regulatory control period include:

- Market Data Management System (**MDMS**) replacement – replacing aging unsupported systems to maintain customer services and compliance
- MDMS upgrades – the non-recurrent component of adapting to regulatory changes, while ensuring we maintain market functions, customer service and compliance
- Works management tool upgrades – replacing and consolidating aging unsupported systems to maintain asset construction and maintenance functions, facilitating provision of good customer service
- Cyber security upgrades – to increase system resilience and to protect TasNetworks' systems and data
- ERP upgrades – the non-recurrent component of a program of upgrades and enhancements to the ERP suite to maintain software currency, optimise efficiency and maintain compliance
- Design and estimation completion – the continuation of investment from the 2019-2024 regulatory control period to replace and consolidate aging unsupported systems to improve efficiency and effectiveness of the design and works initiation processes.

7 Guidance note – Non-network ICT capex assessment approach (AER – November 2019)

Key recurrent investments in the 2024-2029 regulatory control period include:

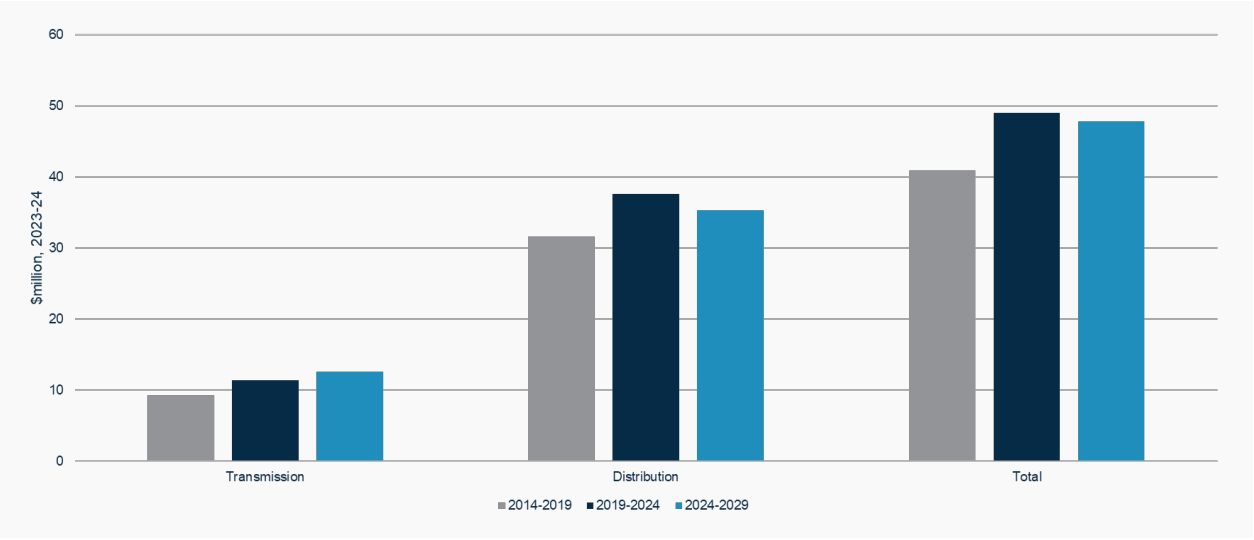
- MDMS maintenance – ensuring we maintain market functions, customer service and compliance
- Business systems maintenance – maintenance and minor upgrades of secondary tier applications that are integral to the successful operations of TasNetworks such as customer systems, collaboration and document management systems, engineering applications, training and licence management etc.
- Data analytics program – maintaining and developing TasNetworks' data warehousing, business intelligence and data analytics capability
- ERP upgrades – the recurrent component of a program of upgrades and enhancements to the ERP suite to maintain software currency, optimise efficiency and maintain compliance
- Digital infrastructure and end user computing – maintenance and replacements of digital infrastructure and hardware that are integral to the successful operations of TasNetworks such as network hardware and software, data storage and back up, desktop and laptop computers, mobile phones and supporting peripherals etc.

6.11.3 Other non-network capex

In line with the AER's standardised capex model, capex investments associated with fleet and facilities assets are reported under the category of 'Other'.

As shown in Figure 28, TasNetworks forecasts a $1 million reduction in capex investment for fleet and facilities in the 2024-2029 regulatory control period compared to the expected outcome for the 2019-2024 regulatory control period.

Figure 28. Historical and forecast non-network other capex by network ($million, $2023-24)



Key investments proposed under this category are presented Table 8.

Table 8. Proposed other non-network initiatives, 2024-2029 regulatory control period

Other Investments	Total Capex ($m, $2023-24)	Investment Need
Fleet replacements	32	Replacement of vehicles and other assets to meet safety and compliance requirements, while also ensuring the business can achieve its operational requirements in the field.
Facility upgrades and developments	16	Optimisation, upgrade, development, and other improvements to depots, offices and other facilities located across Tasmania.

6.12 Delivering our forecast capex program

The amount and composition of TasNetworks' forecast capex work program for the 2024-2029 regulatory control period is similar to that being delivered in the 2019-2024 regulatory control period. TasNetworks, therefore, has the resources and competencies available internally and externally to deliver the proposed works program for the 2024-2029 regulatory control period.

As at December 2022, TasNetworks employs around 1,100 full time equivalent (**FTE**) workers to deliver transmission and distribution services (including alternative control services). This includes field workers, professional and paraprofessional staff (e.g., engineers, technical officers etc.), corporate and support staff.

TasNetworks' strategy is to maintain a base level of in-house resources to deliver our prescribed transmission services and our alternative control and standard control distribution services, with workload peaks and troughs managed through supplementary external suppliers. Strategies are applied to ensure the availability of an optimum mix of skills and resources required to deliver the forecast capex program.

The internal field workforce required to operate, maintain and support the transmission and distribution networks is currently made up of approximately 510 FTEs, comprising Asset Inspectors, Distribution Operators, Dual-Trade Electricians/Lineworkers, Distribution Lineworkers, Live Line Workers, Meter Readers, Electricians, EHV Linesmen, Protection and Control officers, Vegetation Management officers, Project/Site Managers, Designers, Engineers and Schedulers.

TasNetworks also engages contractors to support the delivery of the program of work. Contractors currently provide the equivalent availability of 53 FTEs, which equates to approximately 73,000 hours of labour per annum, to assist with program delivery. The current pool of external service providers has access to crews based in mainland Australia, which can further supplement the external labour pool in Tasmania if required to meet the forecast work program schedule.

6.13 Appendix 1 Asset management framework

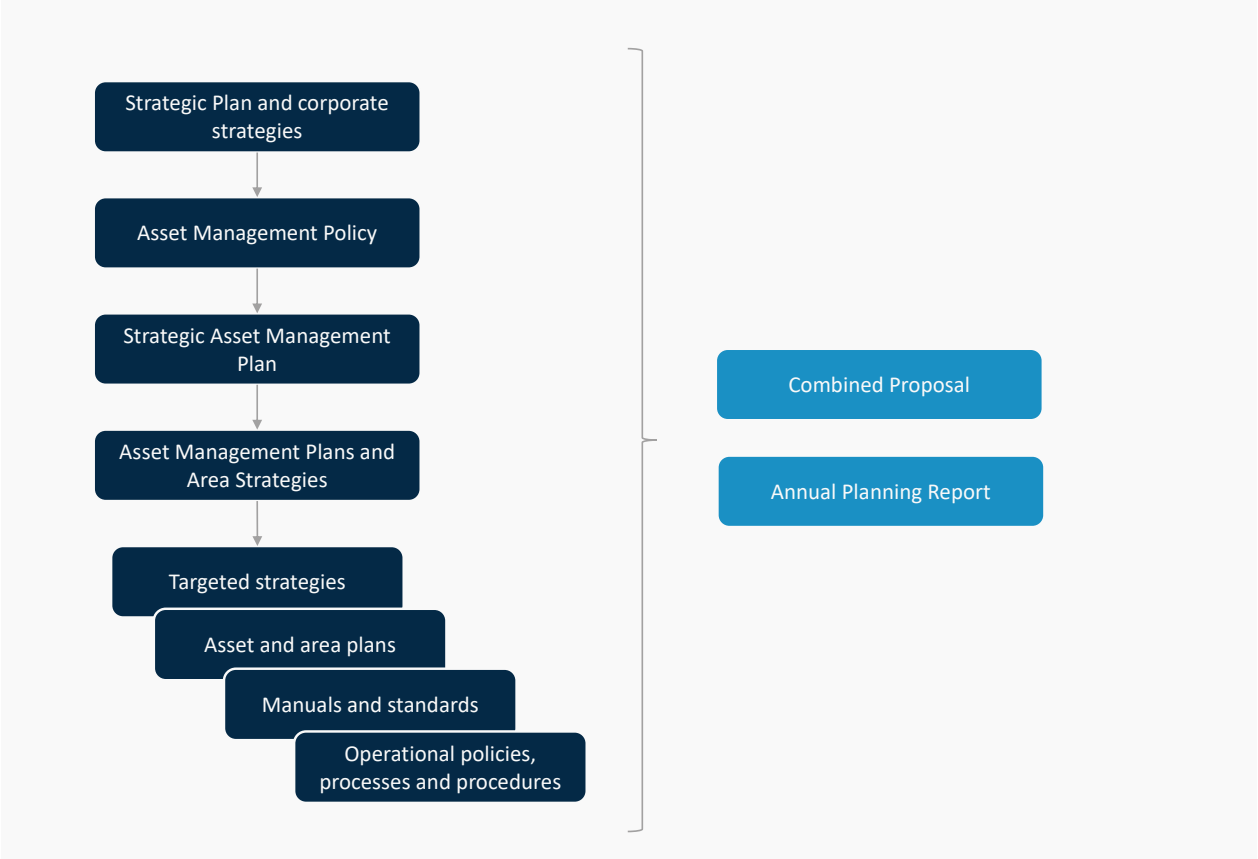
Several of TasNetworks' capex plans and strategies are related and collectively form part of the asset management framework used to manage existing transmission and distribution network assets and plan for new. This includes the preparation of the capex forecasts for our two networks for the 2024-2029 regulatory control period. We consider transmission and distribution planning as an integrated function and apply our asset management framework to one electricity network.

Key documents forming part of our asset management framework are as follows:

- Strategic Plan and other corporate strategies – these detail our strategic direction, key priorities and sets the overarching direction for TasNetworks
- Asset Management Policy – sets out the principles applied to our asset management activities
- Strategic Asset Management Plan – outlines the operating environment and the challenges faced by TasNetworks in delivering prescribed distribution and standard control distribution services now and into the future
- Asset Management Plan – details the levels of service delivered, the assets required to deliver these levels of service, the risks faced, asset life-cycle strategies, historical and forecast expenditure to deliver the levels of service and/or to address identified risks
- Annual Planning Report – informs stakeholders about the existing and forecast system limitations on our distribution and distribution networks, our network performance and proposed investments for the planning period. Preparation of this document is a regulatory requirement.
- Detailed strategies, plans, manuals, policies, processes and procedures – give detailed guidance for asset maintenance and day-to-day operational activities. These documents are available on request by the AER.

Documents from TasNetworks' asset management framework provided in support of this Combined Proposal are listed in Attachment 23 List of supporting documentation.

Figure 29. Asset management framework



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