DRAFT DECISION

TasNetworks Distribution Determination 2019 to 2024

Attachment 5 Capital expenditure

September 2018

AUSTRALIAN ENERGY REGULATOR

Inquiries about this publication should be addressed to:

Australian Energy Regulator
GPO Box 520
Melbourne Vic 3001

Tel: 1300 585165

Email: AERInquiry@aer.gov.au

AER reference: 60152

Note

This attachment forms part of the AER's draft decision on TasNetworks' 2019–24 distribution determination. It should be read with all other parts of the draft decision.

The draft decision includes the following attachments:

Overview

Attachment 1 – Annual revenue requirement

Attachment 2 – Regulatory asset base

Attachment 3 – Rate of return

Attachment 4 – Regulatory depreciation

Attachment 5 – Capital expenditure

Attachment 6 – Operating expenditure

Attachment 7 – Corporate income tax

Attachment 8 – Efficiency benefit sharing scheme

Attachment 9 – Capital expenditure sharing scheme

Attachment 10 – Service target performance incentive scheme

Attachment 11 – Demand management incentive scheme

Attachment 12 – Classification of services

Attachment 13 – Control mechanism

Attachment 14 – Pass through events

Attachment 15 – Alternative control services

Attachment 16 – Negotiated services framework and criteria

Attachment 17 – Connection policy

Attachment 18 – Tariff structure statement

Contents

Shortened forms

Shortened form	Extended form
ACS	alternative control services
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
augex	augmentation expenditure
capex	capital expenditure
CCP	Consumer Challenge Panel
CCP 13	Consumer Challenge Panel, sub-panel 13
CESS	capital expenditure sharing scheme
CPI	consumer price index
DRP	debt risk premium
DMIAM	demand management innovation allowance (mechanism)
DMIS	demand management incentive scheme
distributor	distribution network service provider
DUoS	distribution use of system
EBSS	efficiency benefit sharing scheme
ERP	equity risk premium
Expenditure Assessment Guideline	Expenditure Forecast Assessment Guideline for Electricity Distribution
F&A	framework and approach
MRP	market risk premium
NEL	national electricity law
NEM	national electricity market
NEO	national electricity objective
NER	national electricity rules
NSP	network service provider

Shortened form	Extended form
opex	operating expenditure
PPI	partial performance indicators
PTRM	post-tax revenue model
RAB	regulatory asset base
RBA	Reserve Bank of Australia
repex	replacement expenditure
RFM	roll forward model
RIN	regulatory information notice
RPP	revenue and pricing principles
SAIDI	system average interruption duration index
SAIFI	system average interruption frequency index
SCS	standard control services
SLCAPM	Sharpe-Lintner capital asset pricing model
STPIS	service target performance incentive scheme
WACC	weighted average cost of capital

5 Capital expenditure

Capital expenditure (capex) refers to the investment made in the network to provide standard control services. This investment mostly relates to assets with long lives (30-50 years is typical) and these costs are recovered over several regulatory periods.

On an annual basis, the financing and depreciation costs associated with these assets are recovered (return of an on capital) as part of the building blocks that form TasNetworks' total revenue requirement.[1]

This attachment sets out our draft decision on TasNetworks' total distribution capex forecast. Further detailed analysis is provided in the following appendices:

- Appendix A - Assessment techniques
- Appendix B - Assessment of capex drivers
- Appendix C - Engagement and information-gathering process
- Appendix D - Repex modelling approach
- Appendix E - Demand
- Appendix F - Ex-post efficiency and prudency review.

Our draft decision is based on our analysis of the information we have received to date. We will be informed by TasNetworks' revised proposal, submissions and further analysis in arriving at our final decision in April 2019.

5.1 Draft decision

In assessing forecast capital expenditure, we are guided by the National Electricity Objective and underpinning capex criteria and objectives set out in the NER. We must accept a distributor's capex forecast if we are satisfied that the total forecast for the regulatory control period reasonably reflects the capex criteria.

This criteria outlines that a distributor's capex forecast must reasonably reflect the efficient costs of achieving the capex objectives, the costs that a prudent operator would require to achieve the capex objectives, and a realistic expectation of the demand forecast and cost inputs required to achieve the capex objectives.[2]

The capex objectives relate to a distributor's ability to comply with regulatory obligations and maintain the quality, reliability and security of supply of standard control services.[3]

---

1 NER, cl. 6.4.3(a).
2 NER, cl. 6.5.7(c)(1).
3 NER, cl. 6.5.7(a).

Where a distributor is unable to demonstrate that its proposal complies with the capex criteria and objectives, the NER requires us to set out a substitute estimate of total capex that we are satisfied reasonably reflects the capex criteria, taking into account the capex factors.[4]

TasNetworks has not justified that its total net capex forecast of $734.4 million for its distribution network reasonably reflects the capex criteria. Our substitute estimate of $550.9 million is 25 per cent below TasNetworks' forecast. We are satisfied that our substitute estimate reasonably reflects the capex criteria. Table 5.1 outlines our draft decision.

Table 5.1 Draft decision on TasNetworks' total forecast distribution capex ($2018-19, million)

	2019-20	2020-21	2021-22	2022-23	2023-24	Total
TasNetworks' proposal	153.9	149.0	136.2	147.8	147.6	734.4
AER draft decision	117.7	113.8	101.4	110.0	108.0	550.9
Difference	-36.2	-35.1	-34.7	-37.8	-39.6	-183.5
Percentage difference (%)	-23.5%	-23.6%	-25.5%	-25.6%	-26.9%	-25.0%

Source: AER analysis.

Note: The figures above do not include equity raising costs, capital contributions and disposals. For our assessment of equity raising costs, see attachment 3. Numbers may not add up due to rounding.

Table 5.2 summarises our findings and the reasons for our draft decision by 'capex driver' (e.g. augmentation, replacement and connections). This reflects the way we have assessed TasNetworks' total distribution capex forecast.

Our findings on the capex drivers are part of our broader analysis and should not be considered in isolation. We do not approve an amount of forecast expenditure for each individual capex driver. However, we use our findings on the different capex drivers to assess a distributor's proposal as a whole and arrive at a substitute estimate for total capex where necessary.

Our assessment highlighted that we are satisfied that some aspects of TasNetworks' proposal, such as its proposed augmentation and connections expenditure, would form part of a total capex forecast that reasonably reflects the capex criteria. However, we found other capex drivers associated with TasNetworks' proposal, such as replacement and non-network expenditure, are likely to be higher than an efficient level and therefore are not likely to reasonably reflect the capex criteria[5], taking into account the capex factors and the revenue and pricing principles.[6]

---

4 NER, cl. 6.12.1(3)(ii).

5 NER, cll. 6.5.7(c), (d).

6 NEL, ss.7(a), 16(2).

We therefore formed a substitute estimate of total capex. We test this total estimate of capex against the capex criteria (see appendix B for a detailed discussion). We are satisfied that our estimate represents a total capex forecast that as a whole reasonably reflects the capex criteria. As set out in appendix B, we are satisfied our total capex forecast forms part of an overall distribution determination that will or is likely to contribute to the achievement of the National Electricity Objective to the greatest degree.

Table 5.2 Summary of AER reasons and findings

Issue	Reasons and findings
Total capex forecast	TasNetworks proposed a total capex forecast of $734.4 million ($2018-19, including overheads) in its initial proposal. We do not accept TasNetworks' total capex forecast, as it has not justified that its forecast reasonably reflects the capex criteria. We are satisfied our substitute estimate of $550.9 million ($2018-19, including overheads) reasonably reflects the capex criteria. Our substitute estimate is 25 per cent lower than TasNetworks' initial proposal. The reasons for this decision are summarised in this table and detailed in the remainder of this attachment.
Forecasting methodology, key assumptions and past capex performance	We consider TasNetworks' investment governance processes are implemented inconsistently, and key assumptions and forecasting methodology lack sufficient quantification. In addition, the top-down 'optimisation' applied to the capex forecast appears arbitrary. We discuss where we have identified specific areas of concern in section 5.4 and in the appendices to this attachment.
Augmentation capex	We accept TasNetworks' forecast augex of $32.4 million ($2018-19, including overheads). TasNetworks has demonstrated that its forecast augex is prudent and efficient, and would form part of a total capex forecast that reasonably reflects the capex criteria. It is consistent with the drivers of expenditure in this category, including continuing flat or declining maximum demand in the forecast period.
Customer connections capex	We accept TasNetworks' gross forecast customer connections capex of $123.0 million ($2018-19, including overheads). TasNetworks has demonstrated that its forecast customer connections capex is prudent and efficient, and would form part of a total capex forecast that reasonably reflects the capex criteria. We consider that TasNetworks' customer connection forecasting methodology is reasonable and likely to produce a realistic forecast. We anticipate that TasNetworks' revised proposal will include an updated forecast of customer contributions, which will reduce TasNetworks forecast net connections capex.
	We do not accept TasNetworks' repex forecast of $463.0 million ($2018-19, including overheads). We have included an amount of

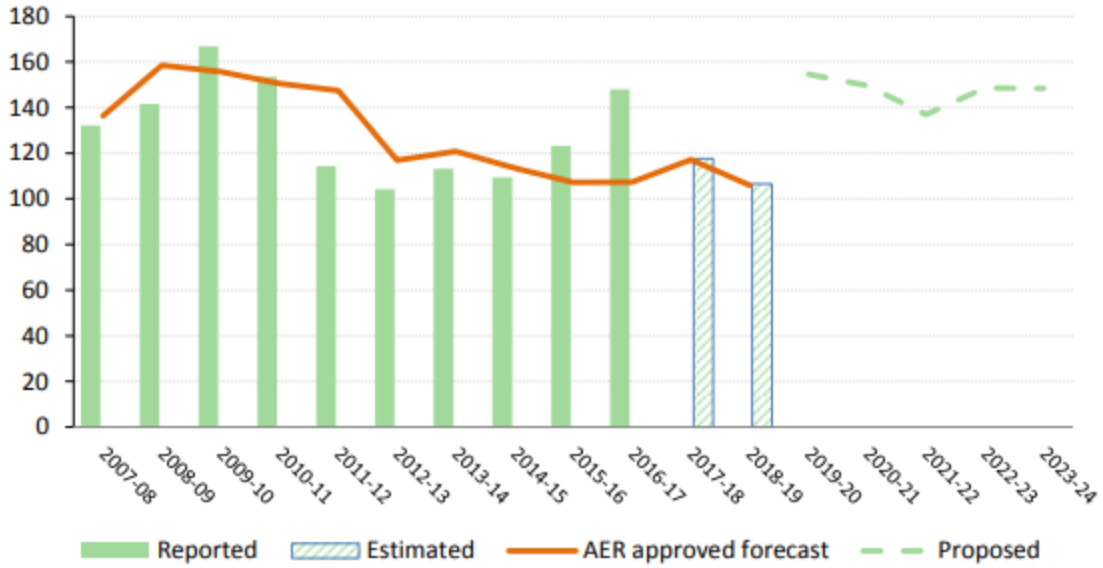
Replacement capex (repex)	$306.4 million ($2018-19, including overheads) in our substitute estimate of total capex. We do not accept that TasNetworks' repex forecast is prudent and efficient, and it would not form part of a total capex forecast that reasonably reflects the required expenditure for this driver. In particular, TasNetworks' modelled repex is significantly greater than our predictive modelling threshold, which compares distributors' asset categories on both unit costs and expected replacement lives. We also conducted a bottom-up review of the proposed repex programs and found that TasNetworks has not adequately justified the repex for its proactive replacement programs.
Non-network capex	We do not accept TasNetworks' non-network capex forecast of $151.6 million ($2018-19, including overheads). We have included an amount of $127.8 million in our substitute estimate of total capex. TasNetworks has not demonstrated that its forecast non-network ICT capex is prudent and efficient, and would form part of a total capex forecast that reasonably reflects the capex criteria. Our draft decision provides for a lower estimate of required capex for major market systems projects.
Capitalised overheads	We have adjusted TasNetworks' forecast of capitalised overheads as a consequence of our adjustments to direct capex in each capex category, and in accordance with TasNetworks approved cost allocation methodology.

5.2 TasNetworks' proposal

For the 2019–24 regulatory control period, TasNetworks proposes total forecast net capex of $734.4 million ($2018-19). TasNetworks' 2019-24 capex forecast is $165.2 million (29 per cent) higher than its actual/expected capex of $569.2 million over the 2014–19 period.[7]

[7] The current regulatory control period for TasNetworks Distribution is 2017–19.

Figure 5.1 TasNetworks' historical vs forecast capex, including 2014–19 allowance ($2018-19)



The key drivers of TasNetworks' capex proposal are:

- Augmentation—$32.4 million
- Connections—$123.0 million
- Replacement—$463.0 million
- Non-network—$151.6 million.

5.3 AER's assessment approach

In determining whether TasNetworks' proposal reasonably reflects the capex criteria, we use various qualitative and quantitative assessment techniques to assess the different elements of TasNetworks' proposal.[8] In Appendix B, we discuss the weight we placed on some capex factors relative to others and how we came to our position.

More broadly, we also take into account the revenue and pricing principles set out in the NEL.[9] In particular, we take into account whether our overall capex forecast provides TasNetworks with a reasonable opportunity to recover at least the efficient costs it incurs in:[10]

- providing direct control network services; and
- complying with its regulatory obligations and requirements.

---

8 NER, cl. 6.5.7(c).
9 NEL, ss. 7A, 16(2).
10 NEL, s. 7A.

When assessing capex forecasts, we also consider that:

- the efficiency criteria and the prudency criteria in the NER are complementary. Prudent and efficient expenditure reflects the lowest long-term cost to consumers for the most appropriate investment or activity required to achieve the expenditure objectives[11]
- past expenditure was sufficient for the distributor to manage and operate its network in previous periods, in a manner that achieved the capex objectives.[12]

5.3.1 Considerations in applying our assessment techniques

Appendix A outlines our assessment approach and appendix B details how we came to our position on TasNetworks' capex forecast. In summary, some of these assessment techniques focus on total capex, while others focus on high-level, standardised sub-categories of capex. Importantly, while we may consider certain programs and projects in forming a view on the total capex forecast, we do not determine which programs or projects a distributor should or should not undertake.

This is consistent with our ex-ante incentive based regulatory framework. Our approach is based on approving an overall ex-ante revenue requirement that includes an assessment of what we find to be a prudent and efficient total capex forecast.[13] Once the ex-ante allowance is established, distributors are incentivised to provide services at the lowest possible cost because their returns are determined by the actual costs of providing services. If distributors reduce their costs to below the estimate of efficient costs, the savings are shared with consumers in future regulatory periods.

This ex-ante incentive-based regulatory framework recognises that the distributor should have the flexibility to prioritise its capex program given its circumstances over the course of the regulatory control period. The distributor may need to undertake programs or projects that it did not anticipate during the distribution determination process. The distributor may also not need to complete some of the programs or projects it proposed during the forecast regulatory control period if circumstances change. We consider a prudent and efficient distributor would consider the changing environment throughout the regulatory control period and make decisions accordingly.

Therefore, recognising the interplay between the broader incentive framework and program and project investment considerations, when reviewing a capex forecast we use a combination of bottom-up and top-down assessment techniques. Assessment of the bottom-up build of forecasts including underlying assumptions is an informative way to establish whether the forecast capex at the program or project level is prudent and efficient. Many of the techniques we apply at this level encompass the capex

---

11 AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, pp. 8–9.

12 AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 9.

13 AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. vii.

factors that we are required to consider. However, we are also mindful that a narrow focus on only a bottom-up assessment may not itself provide sufficient evidence that the forecast is prudent and efficient. Bottom-up approaches tend to overstate required allowances, as they do not adequately account for interrelationships and synergies between programs, projects or areas of work.

Thus, we also review the prudency and efficiency of aggregate expenditure areas or the total capex forecast.[14] Top-down analysis provides us with assurance that the entire expenditure program is prudent and efficient, and allows us to consider a distributor's total capex forecast. We use holistic assessment approaches that include a suite of techniques such as trend analysis, predictive modelling and detailed technical reviews. Consistent with our holistic approach, we take into account the various interrelationships between the total capex forecast and other components of a distributor's distribution determination, such as forecast opex and STPIS interactions.[15]

In the event we are not satisfied a distributor's proposed capex forecast reasonably reflects the capex criteria, we are required to determine a substitute estimate. We do so by applying our various assessment techniques. We then use our judgement to weigh the results of these techniques case-by-case, in light of all the relevant information available to us.

Broadly, we give greater weight to techniques that we consider are more robust in the particular circumstances of the assessment. By relying on several techniques, we ensure we consider a wide variety of information and take a holistic approach to assessing the distributor's capex forecast. Where our techniques involve the use of a consultant, their reports are considered when we form our draft decision position on total forecast capex.

Importantly, our decision on the total capex forecast does not limit a distributor's actual spending. We set the forecast at the level where the distributor has a reasonable opportunity to recover their efficient costs. As noted previously, a distributor may spend more or less on capex than the total forecast amount specified in our decision in response to unanticipated expenditure needs or changes.

The regulatory framework has a number of mechanisms to deal with these circumstances. Importantly, a distributor does not bear the full cost where unexpected events lead to an overspend of the approved capex forecast. Rather, the distributor bears 30 per cent of this cost if the expenditure is subsequently found to be prudent and efficient. Further, the pass through provisions provide a means for a distributor to pass on significant, unexpected capex to customers, where appropriate.[16]

---

[14] For example, see AER, *Draft decision: Ergon Energy determination 2015−16 to 2019−20: Attachment 6 − Capital expenditure*, October 2015, p. 21; AER, *Draft decision: SA Power Networks determination 2015−16 to 2019−20: Attachment 6 − Capital expenditure*, October 2015, pp. 20–21.

[15] NEL, s. 16(1)(c).

[16] NER, cl. 6.6.

Similarly, a distributor may spend less than the capex forecast because it has operated at a more efficient level than expected. In this case, the distributor will keep on average 30 per cent of this reduction over time, with the remaining benefits shared with its customers.

5.3.2 Safety and reliability considerations

Our position in this draft decision is that our approved capex forecast will provide for a prudent and efficient service provider in TasNetworks' circumstances to maintain performance at the targets set out in the STPIS. Therefore, it is appropriate to apply the STPIS, as set out in attachment 10. The STPIS provides incentives to distributors to further improve the reliability of supply only where customers are willing to pay for these improvements.

Our analysis in appendix B outlines how our assessment techniques factor in network safety and reliability. We consider our substitute estimate will allow TasNetworks to maintain the safety, service quality and reliability of its network, consistent with its legislative obligations.

5.3.3 Interrelationships

Consistent with our holistic approach, we take into account the various interrelationships between a distributor's total capex forecast and other components of its distribution determination, such as forecast opex, forecast demand, the Capital Expenditure Sharing Scheme (CESS) and STPIS interactions.

5.4 Reasons for draft decision

We applied the assessment approach set out in section 5.3 and appendix A to TasNetworks. TasNetworks has not demonstrated that its total capex forecast reasonably reflects the capex criteria. We outline how we have applied our assessment techniques and how we came to our position in appendix B. We are therefore required to set out a substitute estimate, which we are satisfied reasonably reflects the capex criteria.

As part of our assessment, we engaged engineering consultants, Arup, to undertake a detailed review of TasNetworks' total capex proposal. Overall, we agree with Arup's conclusion that TasNetworks has governance and risk management processes in place to identify risk, but there is a lack of risk quantification in the underlying cost-benefit analysis supporting its capex forecast.

Based on its review of TasNetworks' governance and risk management documents and processes, Arup concluded that "TasNetworks' risk identification appears to be a prudent approach, but the lack of quantifying risk consequences means that TasNetworks' approach to risk analysis is inadequate in fully understanding the impact

of risks to the network".[17] Appendix B outlines more detailed analysis drawing on Arup's assessment of TasNetworks' capex forecast.

We recognise that our substitute estimate is substantially lower that what TasNetworks has proposed. It has been actively engaging with us in advance of this draft decision and we commend its efforts to understand and begin addressing our areas of concern well before its revised proposal.

Table 5.3 sets out the capex amounts by driver that we included in our substitute estimate of TasNetworks' total capex forecast for the 2019-24 regulatory control period.

Table 5.3 Assessment of required capex by capex driver 2019–24 ($2018-19, million)

Category	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Augmentation	6.9	6.4	6.4	6.5	6.2	32.4
Connections	22.4	24.1	24.6	25.7	26.2	123.0
Replacement	63.2	63.6	58.9	61.9	58.8	306.4
Non-network	32.3	26.9	18.9	24.3	25.4	127.8
Modelling adjustments*	-0.4	-0.4	-0.3	-1.2	-1.3	-3.6
Gross capex	**124.4**	**120.6**	**108.5**	**117.2**	**115.3**	**586.0**
Less capital contributions	6.0	6.0	6.3	6.4	6.5	31.2
Less disposals	0.8	0.8	0.8	0.8	0.8	4.0
Net capex	**117.7**	**113.8**	**101.4**	**110.0**	**108.0**	**550.9**

Source: AER analysis.

Note: Numbers may not add up due to rounding.

*Modelling adjustments relate to 2017-18 CPI and labour cost escalator changes.

The reasons for our alternative capex forecast of $550.9 million are summarised below.

Augmentation

- TasNetworks has justified that its proposed augmentation capex of $32.4 million ($2018-19, including overheads) is efficient and prudent and would form part of a total capex forecast that reasonably reflects the capex criteria.

[17] Arup, *Review of TasNetworks' proposed capital expenditure for the 2019-24 regulatory control period,* August 2018, p. 24.

Connections

- TasNetworks has justified that its proposed connections capex of $123.0 million ($2018-19, including overheads) is efficient and prudent and would form part of a total capex forecast that reasonably reflects the capex criteria.

Replacement

- TasNetworks' proposed repex of $463.0 million ($2018-19, including overheads) does not appear to be a reasonable estimate of the efficient costs required for this capex category. TasNetworks has not justified that this repex forecast would form part of a total capex forecast that reasonably reflects the capex criteria. We have included an amount of $306.4 million ($2018-19, including overheads) in our substitute estimate of total capex.
- TasNetworks' forecast for modelled repex ($327 million, direct costs) lies $117 million above our 'repex model threshold' ($210 million). Our bottom-up and top-down assessment, including Arup's review of TasNetworks' forecast, supports our modelling results and position. In particular, TasNetworks has not sufficiently justified that proposed proactive replacement programs for overhead conductor, service line and underground cables are necessary to mitigate apparent safety risks. We therefore applied the $117 million (direct costs) reduction forecast by the repex model to TasNetworks' total repex forecast.

Non-network

- TasNetworks' proposed non-network capex of $151.6 million ($2018-19, including overheads) does not appear to be a reasonable estimate of the efficient costs required for this capex category. TasNetworks has not justified that this non-network capex forecast would form part of a total capex forecast that reasonably reflects the capex criteria. We have included an amount of $127.8 million ($2018-19, including overheads) in our substitute estimate of total capex.
- Specifically, TasNetworks has not justified that its forecast non-network information and communication technology (ICT) capex is efficient and prudent, and it would form part of a total capex forecast that reasonably reflects the capex criteria. Our alternative estimate of non-network ICT capex in the 2019–24 regulatory control period is $79.4 million ($2018-19, including overheads). Our draft decision provides for a lower estimate of required non-network ICT capex for major market systems projects.

Modelling adjustments

- We updated the 2017-18 CPI input in TasNetworks' capex model from forecast inflation to actual inflation. We also updated the forecast labour cost escalators in the model. These inputs are now consistent with the labour cost escalators in the opex attachment (attachment 6).

A Assessment techniques

This appendix describes the approaches we applied in assessing whether TasNetworks' total capex forecast reasonably reflects the capex criteria. Appendix B sets out in greater detail the extent to which we relied on each of these assessment techniques.

The assessment techniques that we apply in capex are necessarily different from those we apply when assessing opex. This is reflective of differences in the nature of the expenditure that we are assessing. We therefore use some assessment techniques in our capex assessment that are not suitable for assessing opex and vice versa. We outline this in the Expenditure Assessment Guideline (the Guideline).[18]

Below we outline the assessment techniques we used to assess TasNetworks' capex forecast.

A.1 Trend analysis

We consider past trends in actual and forecast capex as this is one of the capex factors under the NER.[19] We also consider trends at the asset category level to inform our view on the prudency and efficiency of a distributor's capex forecast.

Trend analysis involves comparing a distributor's forecast capex and volumes against historical levels. Where forecast capex and volumes are materially different to historical levels, we seek to understand the reasons for these differences. In doing so, we consider the reasons the distributor provides in its initial proposal, as well as any potential changing circumstances.

In considering whether the total capex forecast reasonably reflects the capex criteria, we need to consider whether the forecast will allow the distributor to meet expected demand and comply with relevant regulatory obligations.[20] Demand and regulatory obligations (specifically, service standards) are key capex drivers. More onerous standards or growth in maximum demand will increase capex. Conversely, reduced service obligations or a decline in demand will likely cause a reduction in the amount of capex the distributor requires.

Maximum demand is a key driver of augmentation or demand-driven expenditure. Augmentation (augex) often needs to occur prior to demand growth being realised. Forecast demand, rather than actual demand, is therefore most relevant when a distributor is deciding the augmentation projects it will require in the forecast regulatory control period. However, to the extent that actual demand differs from forecast demand, a distributor should reassess project needs. Growth in a distributor's network

---

18 AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 8.

19 NER, cl. 6.5.7(e)(5).

20 NER, cl. 6.5.7(a)(3).

will also drive connections related capex. For these reasons, it is important to consider how capex trends, particularly for augex and connections, compare with trends in demand and customer numbers.

For service standards, there is generally a lag between when capex is undertaken (or not) and when the service improves (or declines). This is important when considering the expected impact of an increase or decrease in capex on service levels. It is also relevant to consider when service standards have changed and how this has affected the distributor's capex requirements.

We analysed capex trends across a range of levels including at the total capex level and the category level, (e.g. augex, connections and repex). We also compared these with demand trends and any relevant changes in service standards.

A.2 Category analysis

Expenditure category analysis allows us to compare expenditure across distributors, and over time, for various levels of capex. The comparisons we analyse include:

- overall costs within each category of capex;
- unit costs across a range of activities;
- volumes across a range of activities; and
- expected asset lives across a range of repex asset categories.

Using standardised reporting templates, we collect data on augex, repex, connections, non-network capex, overheads and demand forecast for all distributors in the NEM. Using standardised category data allows us to make direct comparisons across distributors. Standardised category data also allows us to identify and scrutinise different operating and environmental factors that affect the amount and cost of works that distributors incur and how these factors may change over time.

A.3 Predictive modelling

Background

Our repex model is a statistical based model that forecasts asset replacement capex (repex) for various asset categories based on their condition (using age as a proxy) and unit costs. We use the repex model to only assess forecast repex that can be modelled. This typically includes high-volume, low-value asset categories and generally represents a significant component of total forecast repex. The repex model is currently only used to forecast modelled repex for electricity distributors.

The repex model forecasts the volume of assets in each category that a distributor would expect to replace over a 20-year period. The model analyses the age of assets already in commission and the time at which, on average, these assets would be expected to be replaced, based on historical replacement practices. We refer to this as the calibrated expected asset replacement life. We derive a total replacement

expenditure forecast by multiplying the forecast replacement volumes for each asset category by an indicative unit cost.

We can use the repex model to advise and inform us where to target a more detailed bottom-up review and define a substitute estimate if necessary. We can also use the model to compare a distributor against other distributors in the NEM.[21] In coming to our position, we also had regard to feedback from distributors on some of the underlying assumptions and modelling techniques.

Scenario analysis

Our repex modelling approach analyses four scenarios that consider both a distributor's historical replacement practices and the replacement practices of other distributors in the NEM. In contrast to previous determinations, the current approach considers intra-industry comparative analysis for unit costs and expected asset replacement lives, rather than analysing inter-company historical performance. The four scenarios analysed are:

1. historical unit costs and calibrated expected replacement lives
2. comparative unit costs and calibrated expected replacement lives
3. historical unit costs and comparative expected replacement lives
4. comparative unit costs and comparative expected replacement lives.

We define comparative unit costs as the minimum of a distributor's historical unit costs, its forecast unit costs and the median unit costs across the NEM. We define comparative replacement lives as the maximum of a distributor's calibrated expected replacement life and the median expected replacement life across the NEM.

The 'cost, lives and combined' scenarios rely on a comparative analysis technique that compares the performance of all distributors in the NEM. The technique analyses the two variable repex model inputs – unit costs and expected replacement lives.

The 'cost scenario' analyses the level of repex a distributor could achieve if their historical unit costs were improved to comparative unit costs. The 'lives scenario' analyses the level of repex a distributor could achieve if their calibrated expected replacement lives were improved to comparative expected replacement lives.

Previous distribution determinations where we have used the repex model have primarily focused on the 'historical scenario'. This scenario forecasts a distributor's expected repex and replacement volumes based on their historical unit costs and asset replacement practices (which are used to derive expected replacement lives).

Our refined comparative analysis repex modelling approach builds on this previous analysis and now introduces the historical performances of other distributors in the NEM into the forecast period. The 'cost, lives and combined' scenarios rely on a

[21] This includes TasNetworks.

comparative analysis technique that compares the performance of all distributors in the NEM. The technique analyses the two variable repex model inputs – unit costs and replacements lives.

Repex model threshold

Our 'repex model threshold' is defined taking these results and other relevant factors into consideration. For the 2019–24 determinations, our proposed approach is to set the repex model threshold equal to the highest result out of the 'cost scenario' and the 'lives scenario'.[22]

This approach considers the inherent interrelationship between the unit cost and expected replacement life of network assets. For example, a distributor may have higher unit costs than other distributors for particular assets, but these assets may in turn have longer expected replacement lives. In contrast, a distributor may have lower unit costs than other distributors for particular assets, but these assets may have shorter expected replacement lives.

Further details about our repex model are outlined in appendix D.

A.4 Assessment of bottom-up and top-down methodologies

In assessing whether TasNetworks' capex forecast is prudent and efficient, we examined the forecasting methodology and underlying assumptions used to derive their forecast. In particular, some of the evidence that we can use to justify the prudency and efficiency of a bottom-up forecast at the program or project level is:

- identifying and quantifying all reasonable options in a cost-benefit analysis, including deferral or 'do nothing' scenarios;
- cost-benefit analysis that incorporates a proper quantified risk assessment, where the most beneficial program or project is selected, or clear and justified reasoning as to why another option was chosen; and
- reasons to support the expenditure timing for the forecast regulatory control period, particularly if the expenditure may have been deferred in previous regulatory control periods.

Our industry practice application note[23], which relates to asset replacement planning, aims to assist network businesses with this bottom-up forecast. At the time of this draft decision, the draft industry practice application note is open for consultation. The final

---

[22] Our modelling approach means the 'historical scenario' will always be higher than the 'cost scenario' and the 'lives scenario', and the 'combined scenario' will always be lower than the 'cost scenario' and the 'lives scenario'.

[23] This Application Note does not replace published guidelines. Rather, it supplements the guidelines by outlining principles and approaches that accord with good asset management and risk management practices. Good asset management and risk management practices are often aligned with international standards of practice, such as ISO 55000 for asset management and ISO 31000 for risk management.

industry practice application note will be published in late November 2018. We therefore encourage TasNetworks to have regard to the final application note and the consultation process in its revised proposal.

In addition to a bottom-up build, a holistic and strategic consideration or assessment of the entire forecast capex portfolio would be evidence that some discipline has been applied at the top-down level. In particular, a top-down assessment would give us confidence that:

- the bottom-up builds have been subject to overall checks against business governance and risk management arrangements;
- synergies between programs or projects have been identified, which may reduce the need for, scope or cost of some programs or projects over the forecast regulatory control period;
- subjectivity from the bottom-up forecasts has been addressed; and
- the timing and prioritisation of capital programs and projects have been determined over both the short and long term, such that delivery strategy has been considered.

A.5 Economic benchmarking

Economic benchmarking is one of the key outputs of our annual benchmarking report.[24] The NER requires us to have regard to the annual benchmarking report, as it is one of the capex factors.[25] Economic benchmarking applies economic theory to measure the efficiency of a distributor's use of inputs to produce outputs, having regard to the operating environment and network characteristics.[26]

Economic benchmarking allows us to compare the performance of a distributor against its own past performance and the performance of other distributors. It also helps to assess whether a distributor's capex forecast represents efficient costs.[27] The AEMC stated:

> Benchmarking is a critical exercise in assessing the efficiency of a distributor.[28]

Several economic benchmarks from the annual benchmarking report are relevant to our capex assessment. These include measures of total cost efficiency and overall capex efficiency. In general, these measures calculate a distributor's efficiency with consideration given to its inputs, outputs and its operating environment.

---

[24] AER, *Annual benchmarking report: Electricity distribution network service providers*, December 2017.

[25] NER, cl. 6.5.7(e)(4).

[26] AER, *Better regulation: Explanatory statement: Expenditure forecasting assessment guidelines*, November 2013, p. 78.

[27] NER, cl. 6.5.7(c).

[28] AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. 25.

We consider each distributor's operating environment in so far as there are factors outside of a distributor's control that affects its ability to convert inputs into outputs.[29] Once we consider these exogenous factors, we expect distributors to operate at similar efficiency levels. One example of an exogenous factor we consider is customer density.

A.6 Other assessment factors

We considered several other factors when assessing TasNetworks' total capex forecast. These factors included:

- safety and reliability statistics (SAIDI and SAIFI);
- internal technical and engineering review;
- external consultant review;
- submissions made by various stakeholders; and
- other information provided by TasNetworks.

[29] AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. 113. Exogenous factors could include geographic factors, customer factors, network factors and jurisdictional factors.

B Assessment of capex drivers

This appendix outlines our detailed analysis of the categories of TasNetworks' capex forecast for the 2019–24 regulatory control period. These categories are augmentation capex (augex), customer connections capex, replacement capex (repex), and non-network capex.

As we discuss in the capex attachment, we are not satisfied that TasNetworks' proposed total capex forecast reasonably reflects the capex criteria. In this appendix, we set out further analysis in support of this view. This further analysis also explains the basis for our substitute estimate of TasNetworks' total capex forecast, which we are satisfied reasonably reflects the capex criteria. In coming to our views and our substitute estimate, we applied the assessment techniques outlined in appendix A.

This appendix sets out our findings and views on each capex category. The structure of this appendix is:

- Section B.1: substitute estimate
- Section B.2: forecast augex
- Section B.3: forecast customer connections capex (including capital contributions)
- Section B.4: forecast repex
- Section B.5: forecast non-network capex.

In each of these sections, we explain why we are satisfied the amount of capex that we have included in our substitute estimate reasonably reflects the capex criteria.

B.1 Substitute estimate

Our substitute estimate of TasNetworks' total capex forecast for the 2019–24 regulatory control period is $550.9 million ($2018-19, including overheads). We analysed TasNetworks' proposal and determined that it had not justified that its forecast reflects the capex criteria. We then set out our substitute estimate of capex, which we are satisfied reasonably reflects the capex criteria, taking into account the capital expenditure factors.[30] We have based our substitute estimate on the assessment techniques explained in section 5.3 and appendix A. Our weighting of each of these techniques is set out under the capex drivers in appendix B.

[30] NER, cl. 6.5.7(e).

B.2 Forecast augex

Augmentation is typically triggered by the need to build or upgrade the network to address changes in demand and network utilisation. However, it can also be triggered by the need to upgrade the network to comply with quality, safety, reliability and security of supply requirements.

B.2.1 TasNetworks' proposal

TasNetworks proposed augex of $32.4 million ($2018-19, including overheads) for the 2019–24 regulatory control period.[31] This is in line with the current regulatory control period (2017–19) and a 24 per cent decrease from actual and estimated augex of $42.7 million for the five year period 2014–19.[32] TasNetworks submitted that its forecast reflects an expected continuation of low demand growth on the distribution system, with some localised agricultural growth in regional areas and commercial development in Hobart's central business district.[33]

B.2.2 Position

TasNetworks has demonstrated that its forecast augex of $32.4 million is efficient and prudent, and would form part of a total capex forecast that reasonably reflects the capex criteria. We have therefore included this amount in our substitute estimate of total forecast capex for the 2019–24 regulatory control period.

B.2.3 Reasons for our position

We have applied several assessment techniques to assess TasNetworks' proposed augex forecast against the capex criteria. In reaching our position, we:

- assessed trends comparing historical actual and forecast augex as well as trends in peak demand and connection point utilisation; and
- reviewed TasNetworks' expenditure forecasting methodology, including a review of key inputs and assumptions and the project documentation supporting TasNetworks' proposal.

We did not receive any stakeholder submissions specifically relating to TasNetworks' forecast augex. We sought further information and clarification from TasNetworks as necessary, and we had regard to advice on TasNetworks' forecast augex from our engineering consultant Arup.

---

31 TasNetworks, *Regulatory Proposal 2019/20-2023/24*, 31 January 2018, p. 114.

32 TasNetworks, *Regulatory Proposal 2019/20-2023/24*, 31 January 2018, p. 114.

33 TasNetworks, *Regulatory Proposal 2019/20-2023/24*, 31 January 2018, p. 115.

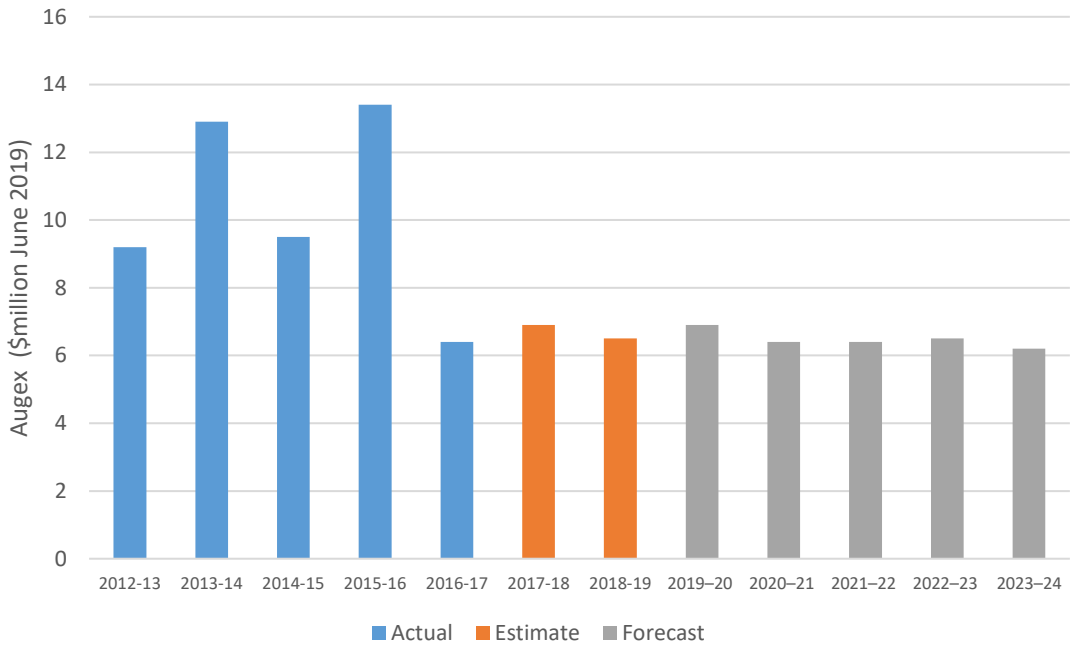
Trend analysis

Trend analysis allows us to draw general observations about how a business is performing. In addition, one capex factor that we must have regard to is the actual and expected capital expenditure during any preceding regulatory control period.[34]

Our use of trend analysis is to gauge how TasNetworks' actual augex compares to forecast augex for the 2019–24 regulatory control period. Where past expenditure was sufficient to achieve the capex objectives, this can be a reasonable indicator of whether an amount of forecast augex is likely to be efficient and prudent, and therefore contributes to a forecast of total capex that reasonably reflects the capex criteria.[35]

Figure B.2.1 shows TasNetworks' actual and estimated augex since 2012-13 and its forecast augex for the 2019–24 regulatory control period. This shows forecast augex in line with the 2017–19 regulatory control period, but significantly lower than the earlier regulatory control period.

Figure B.2.1 TasNetworks historical and forecast distribution augex ($2018–19)



Source: TasNetworks, *Regulatory proposal 2019/20-2023/24*, 31 January 2018, p. 119.

We consider that historical trend analysis supports TasNetworks augex proposal as likely to reflect a prudent and efficient level of capex for this category. Expenditure in

[34] NER, cl. 6.5.7(e)(5).

[35] AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 7–9.

this category is forecast to remain low compared to longer term historical levels of investment.

Forecasting methodology and project review

We have also considered the key drivers of TasNetworks' forecast augex, including key assumptions and inputs, and TasNetworks' justification for the specific projects and programs which make up the forecast augex requirement in the 2019–24 regulatory control period.

Forecast demand and new load connection requests are key drivers of forecast augex requirements.[36] In this regard, as discussed in appendix D, we have accepted TasNetworks' forecasts of maximum demand and new customer connections in the 2019–24 regulatory control period. We are therefore satisfied that TasNetworks' forecast augex is likely to reflect a realistic expectation of the demand forecast.[37] TasNetworks' forecast augex appears consistent with the expected continuation of low demand growth on the distribution system.

The need for compliance with network technical and performance requirements and associated reliability standards is also a driver of forecast augex in the 2019–24 regulatory control period.[38] For example, as part of the HV feeder program, TasNetworks proposed to augment galvanised iron conductor spurs where the connected load on these feeder sections has grown in excess of the conductor capability and is resulting in voltage and power quality issues. TasNetworks' HV network feeders augmentation program accounts for 69 per cent of forecast augex.

We engaged our engineering consultant Arup to assist us in our review of TasNetworks' proposed augex. Arup assessed key programs in TasNetworks' augex for prudency, in particular TasNetworks' HV feeder program.[39]

Arup identified that the HV feeder program involves the development of a number of existing and new HV distribution feeders and associated elements operating at the distribution level. Arup reviewed the two key projects within the HV program: the Hobart CBD 11 kV supply development and the augmentation of HV overhead galvanised iron feeders.[40]

---

36 TasNetworks, *Regulatory Proposal 2019/20-2023/24*, 31 January 2018, p. 117.

37 NER, cl. 6.5.7(c)(1)(iii).

38 TasNetworks, *Regulatory Proposal 2019/20-2023/24*, 31 January 2018, p. 117.

39 Arup, *Final report - Review of TasNetworks. Proposed capital expenditure for the 2019–24 regulatory control period*, 10 August 2018, p. 125.

40 Arup, *Final report - Review of TasNetworks. Proposed capital expenditure for the 2019–24 regulatory control period*, 10 August 2018, pp. 125–128.

Arup concluded that, based on its analysis of the information available, TasNetworks' proposed distribution augex for the 2019–24 regulatory control period appears to be reasonable and consistent with its historical levels of expenditure.[41]

On the basis of our own review of TasNetworks' proposed augex program, and Arup's advice, we are satisfied that the proposed capex associated with the TasNetworks' proposed augex program is efficient and prudent, and would form part of a total capex forecast that reasonably reflects the capex criteria. We have included TasNetworks' forecast of required augex in our estimate of total forecast capex required to achieve the capex objectives.

[41] Arup, *Final report - Review of TasNetworks. Proposed capital expenditure for the 2019–24 regulatory control period*, 10 August 2018, p. 128.

B.3 Forecast customer connections

Connections capex is expenditure incurred to connect new customers to the network and, where necessary, augment the shared network to ensure there is sufficient capacity to meet the new customer demand. The connecting customer will generally provide a capital contribution towards the cost of the new connection assets, which decreases the revenue that is recoverable from all consumers.

B.3.1 TasNetworks' proposal

TasNetworks proposed forecast gross connections capex of $123.0 million ($2018-19, including overheads). This is a reduction of 17 per cent from actual and estimated gross connections capex of $148.9 million for the five year period 2014–19.[42]

TasNetworks also forecast customer contributions of $31.4 million, a reduction of 47 per cent from actual and estimated customer contributions for the five year period 2014–19.[43] This means that, in net terms, TasNetworks' forecast connections capex is relatively stable at $91.6 million compared to actual and estimated capex of $89.6 million for the preceding five years.

B.3.2 Position

TasNetworks has demonstrated that its forecast gross connections capex of $123.0 million is efficient and prudent, and would form part of a total capex forecast that reasonably reflects the capex criteria. We have therefore included this amount in our estimate of total forecast capex for the 2019–24 regulatory control period. We consider that:

- TasNetworks' customer connections capex forecasting methodology appears reasonable and likely to produce a realistic forecast; and
- TasNetworks' forecast is consistent with the underlying expenditure trend and macroeconomic drivers of new connections activities in Tasmania.

TasNetworks is reconsidering its forecast customer contributions for the 2019–24 regulatory control period, with reference to actual data from 2017-18 (the first year of application of its current connection policy). TasNetworks has advised that it is likely to increase its forecast of capital contributions for the 2019–24 regulatory control period in its revised proposal.[44] This would increase the share of connections costs contributed by new customers and therefore reduce TasNetworks' forecast net connections capex for the 2019–24 regulatory control period to be included in the RAB. We will consider TasNetworks' revised forecast of customer contributions in our final decision.

---

42 TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, p. 114.

43 TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, p. 114.

44 TasNetworks, *Response to AER information request #017*, 14 May 2018, p. 8.

B.3.3 Reasons for our position

We have applied several assessment techniques to assess TasNetworks' proposed connections capex and customer contributions forecasts against the capex criteria. In reaching our position, we:

- assessed trends comparing historical actual and forecast customer connections capex and customer contributions
- reviewed TasNetworks' customer connections forecasting methodology, including a review of key inputs, assumptions and relevant documentation supporting TasNetworks' proposal.

We sought further information and clarification from TasNetworks as necessary, and also had regard to stakeholder submissions and advice on TasNetworks' forecast connections capex from our consultant Arup.

Trend analysis

Trend analysis allows us to draw general observations about how a business is performing. In addition, one capex factor that we must have regard to is the actual and expected capital expenditure during any preceding regulatory control period.[45]

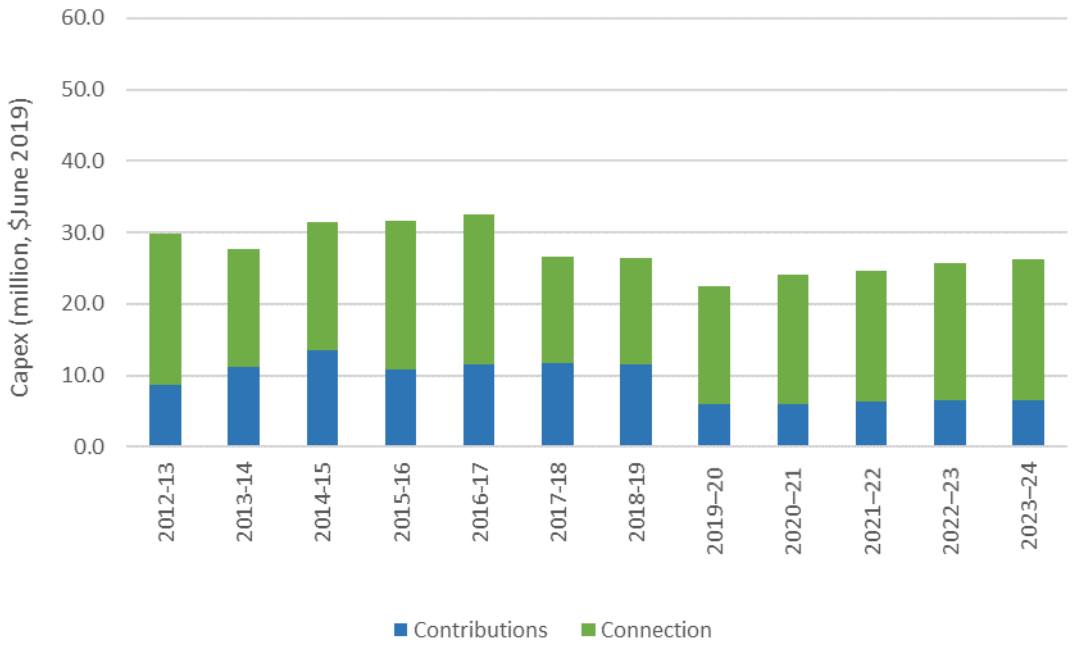
Our use of trend analysis is to gauge how TasNetworks' actual connections capex and customer contributions compares to TasNetworks' forecast for the 2019–24 regulatory control period. Where past expenditure was sufficient to achieve the capex objectives, this can be a reasonable indicator of whether an amount of forecast capex is likely to be efficient and prudent, and therefore contributes to a forecast of total capex that reasonably reflects the capex criteria.[46]

Figure B.3.1 shows TasNetworks' actual and estimated connections capex and customer contributions since 2012-13 and its forecast of connections capex and customer contributions for the 2019–24 regulatory control period. This shows forecast gross connections capex reducing in the first year of the 2019–24 regulatory control period, then growing across the period, but remaining at historically low levels throughout the period.

[45] NER, cl. 6.5.7(e)(5).

[46] AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 7–9.

Figure B.3.1 TasNetworks total distribution connections capex and customer connections 2012-13 to 2023-24 ($2018-19)



Source: TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, p. 116.

We consider that historical trend analysis supports TasNetworks' customer connections capex proposal as likely to reflect a prudent and efficient level of capex for this category. Expenditure in this category is forecast to remain low compared to historical levels of investment.

In regard to forecast customer contributions, the trend analysis shows that TasNetworks has forecast a significant reduction in customer contributions relative to historical levels, including in the current regulatory control period. The forecast reduction in customer contributions (47 per cent) is greater than might be expected as a result of the forecast 17 per cent reduction in connections capex.

Forecasting methodology review

We have also considered the key drivers of TasNetworks' forecast connections capex and customer contributions, including TasNetworks' forecasting methodology, key assumptions and inputs.

TasNetworks' connections capex forecast is derived from of a series of activity based connection type forecasts. TasNetworks forecasts connections capex for residential, residential sub-divisions, commercial and embedded generation customers.

TasNetworks calculated its connections capex forecast by first estimating the volumes of new customer connections for each customer class and then multiplying these volumes by unit rates for each connection type. We have separately assessed

TasNetworks' forecast volumes and unit rates as discussed below. In summary, we have found that:

- TasNetworks' forecast connections volumes appear reasonable and unbiased estimates of likely connection activity
- TasNetworks' average forecast unit rates reasonably reflect a realistic expectation of cost inputs and are likely to represent efficient amounts.

Connection volume forecasts

TasNetworks used an econometric model, which estimates a statistical relationship between the number of new connections and underlying economic drivers, to forecast volumes of new customer connections.[47] The model was developed by the National Institute of Economic and Industry Research (NIEIR). NIEIR found that Tasmania's gross state product (which reflects the state economic performance) is the best predictor of new residential and commercial customer connections.

TasNetworks' forecast appears to be consistent with the following macroeconomic drivers:

- Tasmania's economic growth, which is expected to be 3.5 per cent in 2017-18, well above the long-term trend, followed by 2.25 per cent growth in 2018-19.[48]
- Above trend population growth and high employment levels, which are contributing to a buoyant housing market in Tasmania, with house price growth among the highest in Australia, exceptionally strong demand for rental accommodation and a positive outlook for dwelling construction.[49]

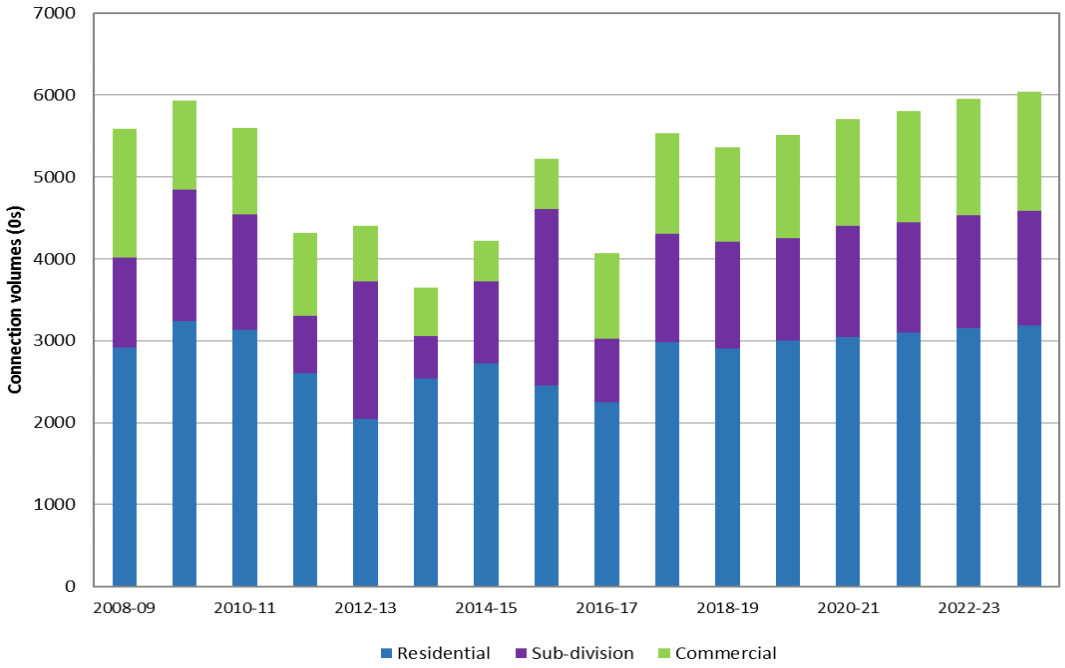
Figure B.3.2 shows TasNetworks' historical and the forecast volumes rates for residential and sub-division connections and commercial connections. This chart shows that TasNetworks' forecast connection volumes are generally slightly above levels experienced in recent years, but consistent with volumes experienced in the period from 2008–11.

47 TasNetworks, *TN022 Customer Connections Forecasts 2015*, 16 September 2015, p. 12.

48 Tasmanian Department of Treasury and Finance, *2018–19 Budget Paper No. 1, Chapter 2 -Tasmanian Economy*, June 2018, p. 23.

49 Tasmanian Department of Treasury and Finance, *2018–19 Budget Paper No. 1, Chapter 2 -Tasmanian Economy*, June 2018, p. 23.

Figure B.3.2 TasNetworks' connections volumes 2008-09 to 2023-24



Source: TasNetworks, *Customer Forecasts Model*, 31 January 2018.

Note: The figures for 2018-19 to 2023-24 are TasNetworks' estimates.

TasNetworks also 'back-cast' its residential connections volumes using NIEIR's statistical model and historical movements in gross state product to check the historical accuracy of its forecasting methodology. The modelled results closely match the historical volumes of connections between 2007–08 and 2013–14 (with an accuracy error of between -4.0 per cent to 1.7 per cent).[50]

We consider this provides evidence that this methodology is capable of producing a realistic and unbiased forecast of residential connections volumes. Arup also concluded that TasNetworks forecasting methodology and proposed capex for connections using gross state product as a reference appears robust.[51]

Given the reliance of the forecasting methodology on forecasts of underlying macroeconomic drivers, we consider that TasNetworks should ensure that its revised proposal reflects the latest available forecasts in this regard.

Unit rates

TasNetworks applied a series of internally derived unit costs to determine its connections capex forecasts. These unit costs are broken down by connection type

---

50 TasNetworks, *TN022 Customer Connections Forecasts 2015*, 16 September 2015, pp. 32–33.

51 Arup, *Final report - Review of TasNetworks. Proposed capital expenditure for the 2019–24 regulatory control period,* 10 August 2018, p. 132.

based on the characteristics of the type of customer served and the capacity of the connection.

TasNetworks derives a unit rate for each connection type based on the cost of undertaking similar recent investments.[52] TasNetworks uses historic unit cost data from 2009 to 2017 to determine an appropriate unit rate.[53]

Based on the information available, we consider that TasNetworks' forecast unit rates are likely to be at or close to an efficient level. TasNetworks' forecast unit rates are on average slightly lower than actual unit rates across the 2012–17 regulatory control period.[54] This provides some assurance that TasNetworks has not overestimated its likely outturn unit rates for connection works, and contributes to the reduction in total connections capex forecast for the 2019–24 regulatory control period.

Customer Contributions

The relationship between gross connections capex and customer contributions is important as it determines from whom and when TasNetworks recovers revenue associated with works required to connect new customers or alter existing connections. For works involving a customer contribution, TasNetworks recovers revenue directly from the customer who initiates the work at the time the work is undertaken.

TasNetworks submitted that its customer contribution forecast is based on its proposed connection policy which provides a continuation of current arrangements.[55]

We received a submission from Consumer Challenge Panel (CCP13) supporting the 'user pays' approach of TasNetworks' connection policy, as it ensured that smaller and more vulnerable customers were not required to subsidise new connections for larger customers.[56]

We compared customer contributions for the 2012–19 period with TasNetworks' forecast for the 2019–24 regulatory control period. As noted above and shown in Figure B.3.1, TasNetworks customer contribution forecast is lower than (almost half the level of) the historical actual contributions received during the previous five year period.

We sought additional information from TasNetworks to explain the significant reduction in forecast customer contributions, given that TasNetworks' connection policy was not materially changing from the current regulatory control period.[57] TasNetworks did not explain why it had forecast the level of customer contributions to reduce from current levels, but stated that it was reconsidering its forecast customer contributions for the

---

52 TasNetworks, *2019–2024 Regulatory Proposal Expenditure Forecasting Methodology*, June 2017, p.15.

53 TasNetworks, *Customer Forecast Model*, 31 January 2018.

54 TasNetworks, *Customer Forecast Model*, 31 January 2018.

55 TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, p. 213.

56 CCP Sub-Panel No. 13, *Advice to the AER, Response to proposals from TasNetworks for a revenue reset for the 2019–24 regulatory period*, 16 May 2018, p. 39.

57 AER, *Information request #017*, 4 May 2018.

2019–24 regulatory control period in light of updated actual data from 2017-18 (the first year of application of its current connection policy). TasNetworks indicated that it expects to increase its forecast capital contributions for the 2019–24 regulatory control period as part of its revised proposal.[58] Therefore, for this draft decision, we have made no adjustment to TasNetworks' forecast customer contributions in the expectation that TasNetworks will submit a revised (higher) forecast in its revised proposal. All else being equal, this would reduce TasNetworks total forecast net capex for the 2019-24 regulatory control period. Should TasNetworks not submit a revised higher forecast, we will reconsider our position in this draft decision in our final decision.

Finally, we note CCP13's suggestion that we consider developing a guideline for all service providers in relation to customer connections, driven by a user pays approach for all connections apart from residential connections.[59] We will consider this suggestion in a broader context, as it goes beyond the scope of this draft decision.

[58] TasNetworks, *Response to AER information request #017*, 14 May 2018, p. 8.

[59] CCP Sub-Panel No. 13, *Advice to the AER, Response to proposals from TasNetworks for a revenue reset for the 2019–24 regulatory period*, 16 May 2018, p. 9.

B.4 Forecast repex

Replacement capital expenditure (repex) must be set at a level that allows a distributor to meet the capex criteria. Replacement can occur for a variety of reasons, including when:

- an asset fails while in service or presents a real risk of imminent failure;
- a condition assessment of the asset determines that it is likely to fail soon (or degrade in performance, such that it does not meet its service requirement) and replacement is the most economic option[60];
- the asset does not meet the relevant jurisdictional safety regulations and can no longer be safely operated on the network; and
- the risk of using the asset exceeds the benefit of continuing to operate it on the network.

The majority of network assets will remain in efficient use for far longer than a single five year regulatory control period (many network assets have economic lives of 50 years or more). As a result, a distributor will only need to replace a portion of its network assets in each regulatory control period. Our assessment of repex seeks to establish the proportion of TasNetworks' assets that will likely require replacement over the 2019–24 regulatory control period and the associated capital expenditure.

B.4.1 TasNetworks' proposal

TasNetworks has proposed forecast repex of $463.0 million ($2018-19, including overheads). In summary, TasNetworks has submitted that this expenditure is driven by two primary objectives:[61]

- satisfying regulatory obligations, including the requirement to maintain the safety of the distribution system; and
- maintaining network reliability in accordance with customers' expectations.

This section interchangeably refers to TasNetworks' repex forecast in both direct costs and total costs inclusive of overheads. This is because TasNetworks' overall repex proposal and submitted capex model both refer to forecast repex in total cost terms. However, TasNetworks' submitted reset RIN refers to forecast repex in direct cost terms.

Therefore, when we refer to specific asset groups, such as poles or overhead conductors, these costs are provided in direct terms rather than total cost terms inclusive of overheads. When we refer to TasNetworks' total repex forecast, the costs

---

[60] A condition assessment may relate to assessment of a single asset or a population of similar assets. High value/low volume assets are more likely to be monitored on an individual basis, while low value/high volume assets are more likely to be considered from an asset category wide perspective.

[61] TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, January 2018, p. 119.

are presented to total cost terms inclusive of overheads. Throughout our assessment, we have specified the relevant dollar terms to aid clarity and understanding.

B.4.2 Position

We do not accept that TasNetworks' proposed repex of $463.0 million ($2018-19, including overheads) would form part of a total capex forecast that reasonably reflects the capex criteria. We have included an amount of $306.4 million ($2018-19, including overheads) in our substitute estimate of total capex. This represents a 34 per cent reduction. In coming to our position, we note:

- TasNetworks' forecast for modelled repex ($327 million, direct costs) lies above our 'repex model threshold' ($210 million, direct costs). Its forecast for the overhead conductor, underground cable, service line and transformer asset groups is significantly higher than our modelled results.
- If a distributor's forecast exceeds our modelling results, we do not necessarily reject the forecast deterministically. We use our modelling results to target a more detailed bottom-up assessment. If the proposed repex is sufficiently justified and shown to be prudent and efficient, we will accept it. If sufficient justification has not been provided, we can use our modelling results to arrive at a substitute estimate.
- For TasNetworks, our modelling results informed a more detailed bottom-up assessment of the overhead conductor, underground cable and service line asset groups. TasNetworks is forecasting a significant increase in both repex and replacement volumes for overhead conductors, service lines and underground cables.
- We were unable to test the effectiveness of TasNetworks' top-down optimisation. We agree with Arup's observation that TasNetworks' top-down 'optimisation' was arbitrary in nature and it was unable to identify specific efficiencies in program delivery.

CCP13 recommended in its submission “that the AER closely examine all aspects of TasNetworks proposed capital spend with particular focus on repex and ICT”.[62]

B.4.3 Reasons for our position

We have applied several assessment techniques to assess TasNetworks' proposed repex forecast against the capex criteria, as well as considering stakeholder submissions. These techniques include:

- trend analysis;
- repex modelling;
- bottom-up and top-down considerations;

---

[62] CCP Sub-Panel No. 13, *Advice to the AER, Response to proposals from TasNetworks for a revenue reset for the 2019–24 regulatory period,* 16 May 2018, p. 5.

- technical and engineering review; and
- network health indicator assessment.

The repex amounts discussed below are direct costs in $2018-19 unless otherwise specified.

Trend analysis

Trend analysis of a distributor's past expenditure allows us to make general observations about how a distributor is performing, as well as to provide a check against our predictive modelling results. This is consistent with the capex factor that requires us to have regard to the actual and expected capital expenditure during any preceding regulatory control period.[63]

For some aspects of our assessment where we have not relied on predictive modelling, we have considered historical levels of expenditure to assess forecast repex. In particular, where past expenditure was sufficient to achieve the capex objectives, this can be a reasonable indicator of whether an amount of forecast repex is prudent and efficient, and whether we would be satisfied this amount forms part of a total capex forecast that reasonably reflects the capex criteria.[64]

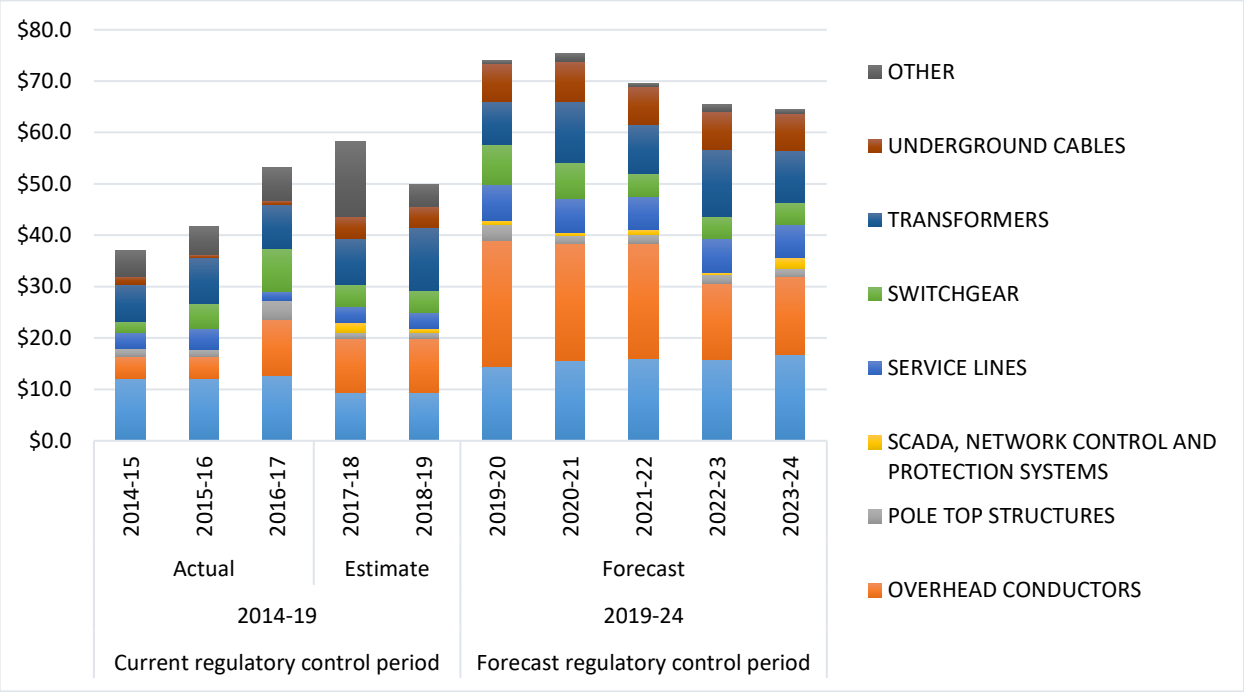
In coming to our position, we had regard to the following trends:

- TasNetworks' proposed repex forecast for the 2019–24 regulatory control period relative to its actual spend in the current regulatory control period (Figure B.4.1); and
- historical vs forecast repex and replacement volume trends at both the asset group and asset category level.

[63] NER, cl. 6.5.7(e)(5).

[64] AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 7–9.

Figure B.4.1 TasNetworks' actual repex vs forecast repex ($2018-19, million, direct costs)



Source: AER analysis.

Figure B.4.1 indicates that TasNetworks has forecast a significant increase in repex in the 2019–24 regulatory control period. Average annual repex is forecast to increase from $48.0 million per annum over the 2014–19 period to $69.8 million in the 2019–24 regulator control period. We assess and consider specific aspects of TasNetworks' repex forecast below under 'repex modelling'.

The Tasmanian Small Business Council noted in its submission that it "would expect to see a relatively stable level of repex (renewal or replacement expenditure) in a mature network business, however that is not the case for TasNetworks, with expenditure varying from around $13 million in 2015-16 to over $50 million in 2021-22".[65]

Repex modelling

We use the repex model to advise and inform us where to target a more detailed bottom-up review and define a substitute estimate if necessary. We also use the model to compare a distributor against other distributors in the NEM.

We recognise that it may be difficult to model some categories of repex. Sometimes the repex model cannot forecast expenditure due to a non-age related reason for the asset replacement (such as a change in jurisdictional safety or environmental

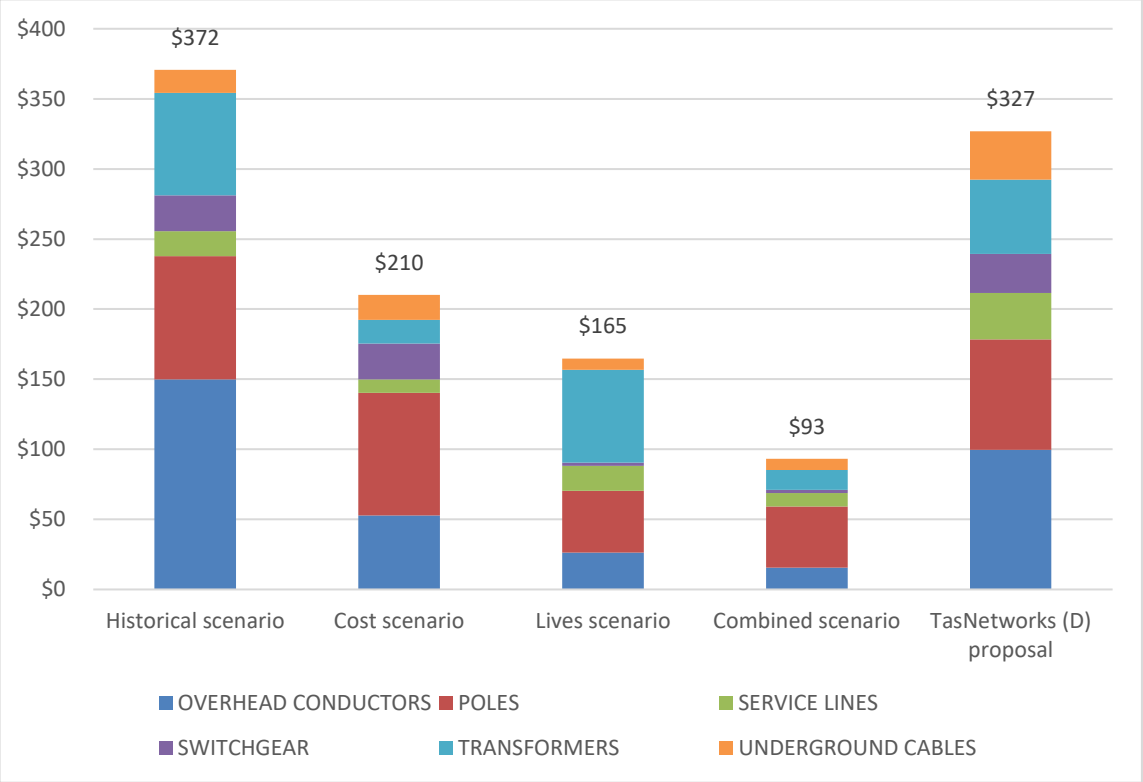
[65] Tasmanian Small Business Council, *TasNetworks transmission revenue and distribution regulatory proposal – 2019-20 to 2023-24,* May 2018, p. 35.

legislation) or there may not be sufficient data on particular repex categories. We rely on other evidence to assess the prudency and efficiency of this unmodelled repex.

TasNetworks engaged GHD Advisory (GHD) to apply the repex model and compare modelled substitute estimates with TasNetworks' repex proposal. GHD's analysis indicated that the likely 'modelled' repex forecast amount should be approximately $35 to $40 million ($2018-19, direct costs) per year for the 2019–24 regulatory control period.[66] As noted above, TasNetworks' repex proposal is an average of $69.8 million ($2018-19, direct costs) per year over this period.

In coming to our position, we assessed $327 million ($2018-19, direct costs) of TasNetworks' total repex forecast using the repex model. This represents 94 per cent of TasNetworks' total repex forecast. Figure B.4.2 outlines that TasNetworks' modelled repex is 56 per cent greater than our 'repex model threshold' ('cost scenario').

Figure B.4.2 TasNetworks' repex model scenarios ($2018-19, million, direct costs)



Source: AER analysis.

Our repex model threshold amount of $210 million is slightly above GHD's report, which estimated a modelled repex range between $175 and $200 million. Similar to the 'cost scenario', GHD's analysis used benchmark unit costs and calibrated expected

[66] TasNetworks, *GHD modelled repex forecast 2019-24 - TasNetworks distribution,* January 2018, p. 2.

asset replacement lives. However, GHD's benchmark unit costs were based on older comparative data and therefore produced a forecast slightly below our modelled threshold.

Figure B.4.2 shows that TasNetworks' repex forecast for poles and switchgear is broadly in line with our repex model results. Figure B.4.2 also shows that TasNetworks' repex forecast differs most significantly from our repex modelling scenarios in the overhead conductor, service line and underground cable asset groups. In particular, TasNetworks' repex forecast:

- for overhead conductors ($100 million) is 89 per cent greater than our repex model threshold amount ($53 million)
- for service lines ($33 million) is 230 per cent greater than our repex model threshold amount ($10 million)
- for underground cables ($35 million) is 94 per cent greater than our repex model threshold amount ($18 million).

TasNetworks' proposed repex for these asset groups exceeds both the 'cost scenario' and the 'lives scenario', which indicates that TasNetworks' forecasts for these asset groups have, on average, high unit costs and lower expected replacement lives than other distributors. These three asset groups are therefore a specific focus of our bottom-up review and are discussed further below.

Although TasNetworks' forecast repex for transformers exceeds the amount forecast by the repex model, the proposed amount lies between the 'cost scenario' and the 'lives scenario'. This indicates that for transformers, TasNetworks' forecast has higher unit costs than other distributors, but on average it expects to operate these assets for a longer time period compared with other distributors.

Our position in this draft decision is that our repex model threshold amount of $210 million ($2018-19, direct costs) is an estimate of modelled repex that would form part of a total capex forecast that we are satisfied reasonably reflects the capex criteria. Our bottom-up and top-down considerations discussed below support this view.

TasNetworks' remaining repex forecast of $22 million ($2018-19, direct costs) cannot be modelled using the repex model. Our position in this draft decision is that TasNetworks' unmodelled repex forecast is prudent and efficient, and would form part of a total capex forecast that reasonably reflects the capex criteria.

Bottom-up and top-down considerations

We engaged Arup to undertake a technical and engineering review of TasNetworks' capex forecast. The scope of Arup's review included an assessment of TasNetworks' governance framework, the reasonableness of its bottom-up forecast and the top-down constraints applied by TasNetworks in arriving at its final capex forecast.

TasNetworks noted in its proposal that its repex forecasts have been developed through a careful 'bottom-up' evaluation of investment requirements for each asset

class, combined with a top-down discipline to optimise program synergies ensuring optimal timing of any proposed expenditure.[67]

Bottom-up considerations

As discussed above, TasNetworks' proposed repex for overhead conductors, service lines and underground cables were a particular focus of our bottom-up review due to our repex modelling results. For these asset groups, TasNetworks has proposed proactive replacement programs or increased replacement rates, driven by apparent safety risks. The proactive nature of these programs largely accounts for the difference between TasNetworks' proposed repex amount (for modelled repex) and our modelled threshold amount. Our assessment of the proposed repex for each of these asset groups is discussed below.

Overhead conductors

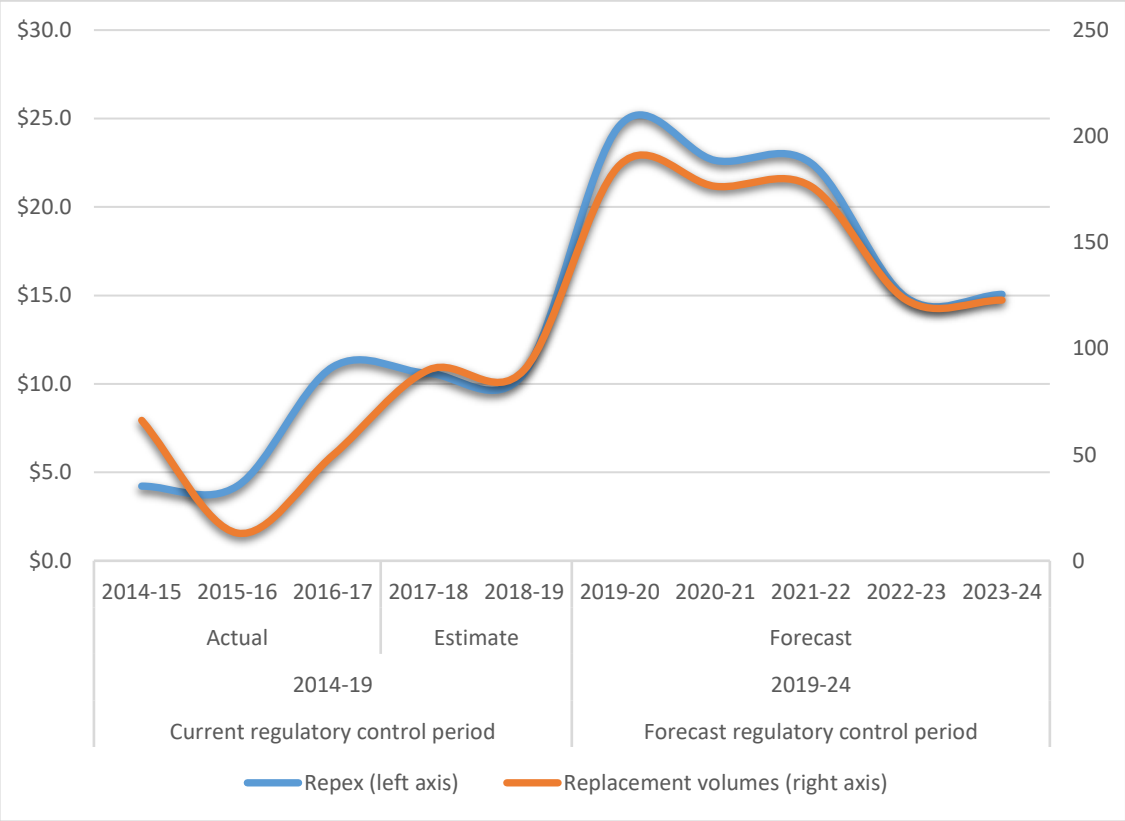
TasNetworks proposed $100 million ($2018-19, direct costs) in forecast repex for overhead conductors. It submitted that it has "identified accelerated thermal degradation and corrosion associated with copper, galvanised iron and certain aluminium conductors" and "conductor failure reduces overall network reliability, poses a risk to public safety coupled with increasing the probability of bushfire".[68]

The proposed proactive replacement of overhead conductors associated with bushfire risk mitigation programs largely accounts for the difference between TasNetworks' proposed repex amount and our modelled results. Figure B.4.3 outlines that TasNetworks is forecasting a significant increase in both overhead conductor repex and replacement volumes over the 2019–24 regulatory control period.

[67] TasNetworks, *Transmission and Distribution Regulatory Proposal*, January 2018, p. 92.

[68] TasNetworks, *Transmission and Distribution Regulatory Proposal*, January 2018, p. 121.

Figure B.4.3 Actual and forecast repex and replacement volumes for overhead conductors, 2014-15 to 2023-24 ($2018-19, million, direct costs) (units)



Source: AER analysis.

TasNetworks is proposing a 145 per cent increase in repex on overhead conductors, from an annual average of $8.1 million in the 2014–19 period to $19.9 million in the 2019–24 period.

Approximately $62 million of proposed repex relates to proactive asset replacement programs under TasNetworks' new Bushfire Risk Mitigation (BFM) Plan. The majority of this repex is for the replacement of overhead conductors within the High Bushfire Loss Consequence Area (HBLCA) defined by TasNetworks.

In support of the proposed repex, TasNetworks' BFM Plan includes:[69]

- a descriptive analysis of TasNetworks' operating environment, including historical trends of bushfire occurrences in Tasmania and an analysis of fire causes in its network;

[69] TasNetworks, *Bushfire Risk Mitigation Plan Version 4.0,* September 2017.

- modelling results from HBLCA Model, which broadly applied the Victorian Bushfire Royal Commission approach to defining high bushfire loss consequence areas; and
- bushfire mitigation programs of work, which primarily include the replacement of overhead conductors in the distribution network that are located within the HBLCA.

TasNetworks submits that its plan complies with a number of statutory and regulatory responsibilities.[70] TasNetworks also submits that based on historical analysis, extreme fire weather events are far less common in Tasmania than on the mainland. However, it submits that these events are "still possible".[71] TasNetworks did not provide any probability-based risk analysis in support of this statement.

Based on the information we have received, we consider that TasNetworks has not substantiated its forecast repex for BFM programs and projects that apply to the HBLCA. We came to this position based on the following information:

- no quantitative risk-based analysis was provided by TasNetworks in support of its forecast. Arup made a similar observation. Consistent with previous determinations, we expect distributors to provide quantification of the risks, including safety risks, associated with the relevant replacement programs;
- the HBLCA model only identifies the high bushfire loss consequences area, but does not quantify the risk consequences of a bushfire in this area;
- TasNetworks' existing business-as-usual overhead conductor replacement programs are likely to mitigate bushfire risk to some degree. TasNetworks has not accounted for this;
- there has not been any change in regulatory obligations relating to bushfire mitigation in the current period; and
- there is limited evidence of bushfires in Tasmania compared with the mainland, and more importantly, no major bushfires in Tasmania have been caused by TasNetworks' assets. Arup came to the same conclusion.

On the final point, TasNetworks' BFM Plan includes an extract of analysis undertaken by Hennessy et al[72] (reproduced in Table B.4.1). Table B.4.1 shows that Tasmania experiences significantly less 'high and 'very high' bushfire danger days per year, compared with other regions. Arup considered this analysis and concluded that it does not agree with TasNetworks' assessment that Tasmania is one of the highest bushfire risk regions in the world.[73]

---

70 Electricity Supply Industry Act 1995, Electricity Industry Safety and Administration Act 1997, Tasmanian Electricity Code and Occupational Licensing Act 2005.

71 TasNetworks, *Bushfire Risk Mitigation Plan Version 4.0,* September 2017, p. 17.

72 Hennessy, Lucas, Nicholls, Bathol, Suppiah & Ricketts, *Climate change impacts on fire-weather in South Eastern Australia,* 2005.

73 Arup, *Review of TasNetworks' proposed capital expenditure for the 2019-24 regulatory control period,* August 2018, p. 37.

Table B.4.1 Historical analysis of fire danger occurrence, 1974-2003

Location		Number of days with FDI 25-49 per year	Number of days with FDI >50 per year
Tasmania	Hobart	3.4	0.3
	Launceston	1.5	0.0
Victoria	Melbourne	9.0	0.6
	Bendigo	17.8	1.6
	Mildura	79.5	10.4

Relationship between fire danger index (FDI) and Fire Danger Rating: 0-11: Low-Moderate, 12-24: High, 25-49: Very High, 50-74: Severe, 75-99: Extreme, 100+: Catastrophic.

Arup also reviewed the other overhead conductor replacement programs proposed by TasNetworks (for overhead conductors outside the HBLCA), where TasNetworks has proposed to replace conductors of varying materials based on condition. Arup found that:

- in many cases the condition of the overhead conductors in the replacement forecast is 'unknown', meaning that it has not been established that the condition of these overhead conductors is substandard;
- the benefits of the reduced risk of asset failure were not quantified in the NPV analysis provided; and
- the NPV analysis was applied inconsistently and the sensitivity analysis applied to assess investment options was inadequate.[74]

Our position is therefore to use our repex modelling results for this asset group.

Service lines

TasNetworks proposed $33 million ($2018-19, direct costs) in forecast repex for services lines. It submitted that it is "seeking to actively replace substandard overhead service wires and employing a targeted program to replace 10 mm copper services over a seven year period with two pilot programs currently underway".[75]

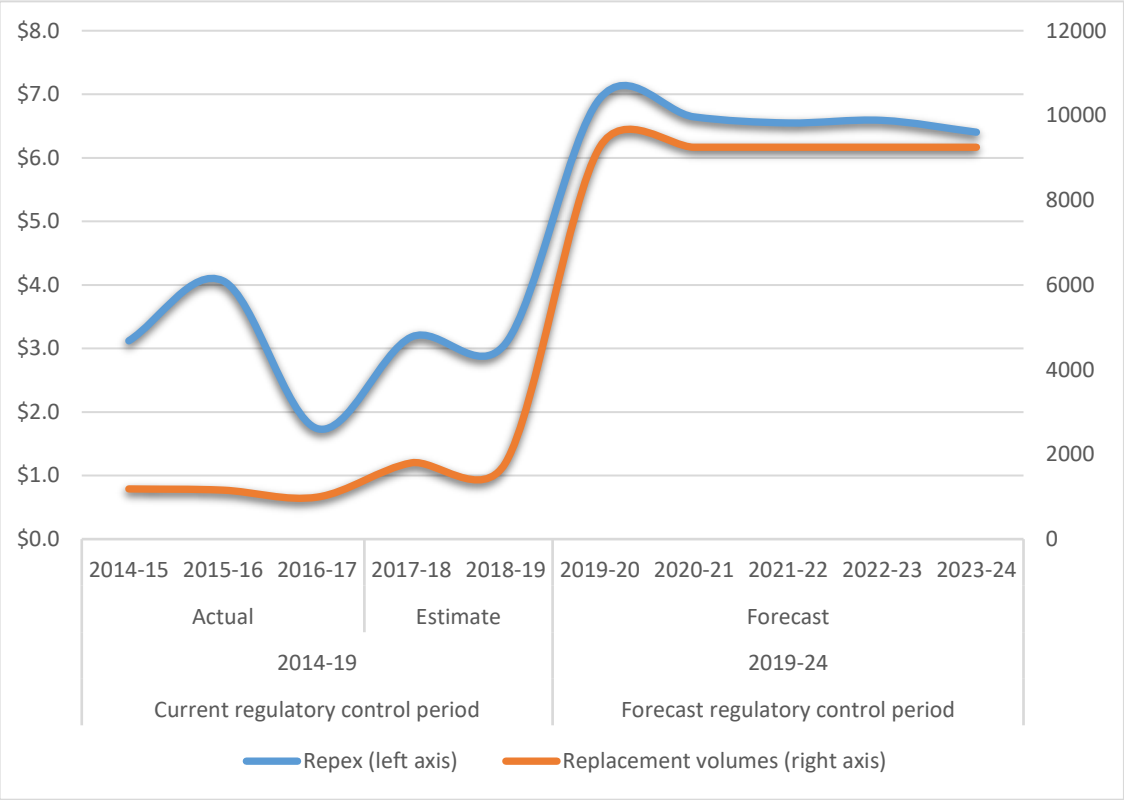
The proposed proactive replacement of service lines (evidenced by the forecast increase in replacement rate) accounts for the difference between TasNetworks' proposed repex amount and our modelled results. Figure B.4.4 shows that

[74] Arup, *Review of TasNetworks' proposed capital expenditure for the 2019-24 regulatory control period,* August 2018, pp. 97–98.

[75] TasNetworks, *Transmission and Distribution Regulatory Proposal*, January 2018, p. 121.

TasNetworks is forecasting a significant increase in both service line repex and replacement volumes over the 2019-24 regulatory control period.

Figure B.4.4 Actual and forecast repex and replacement volumes for service lines, 2014-15 to 2023-24 ($2018-19, million, direct costs) (units)



Source: AER analysis.

Arup noted that "there doesn't appear to have been consideration of the potential benefits associated with the program in the NPV analysis, such as in avoiding unserved energy costs".[76] Arup also submitted that TasNetworks should "undertake a full cost benefit analysis for the program, providing a probabilistic approach to consequence that quantifies the benefits of investment".[77] Our position is therefore to use our repex modelling results for this asset group.

Underground cables

TasNetworks proposed $35 million ($2018-19, direct costs) in forecast repex for underground cables. It submitted that underground cable "failures present a serious public safety risk due to the potential for electric shock" and that it is "currently

[76] Arup, *Review of TasNetworks' proposed capital expenditure for the 2019-24 regulatory control period,* August 2018, p. 86.

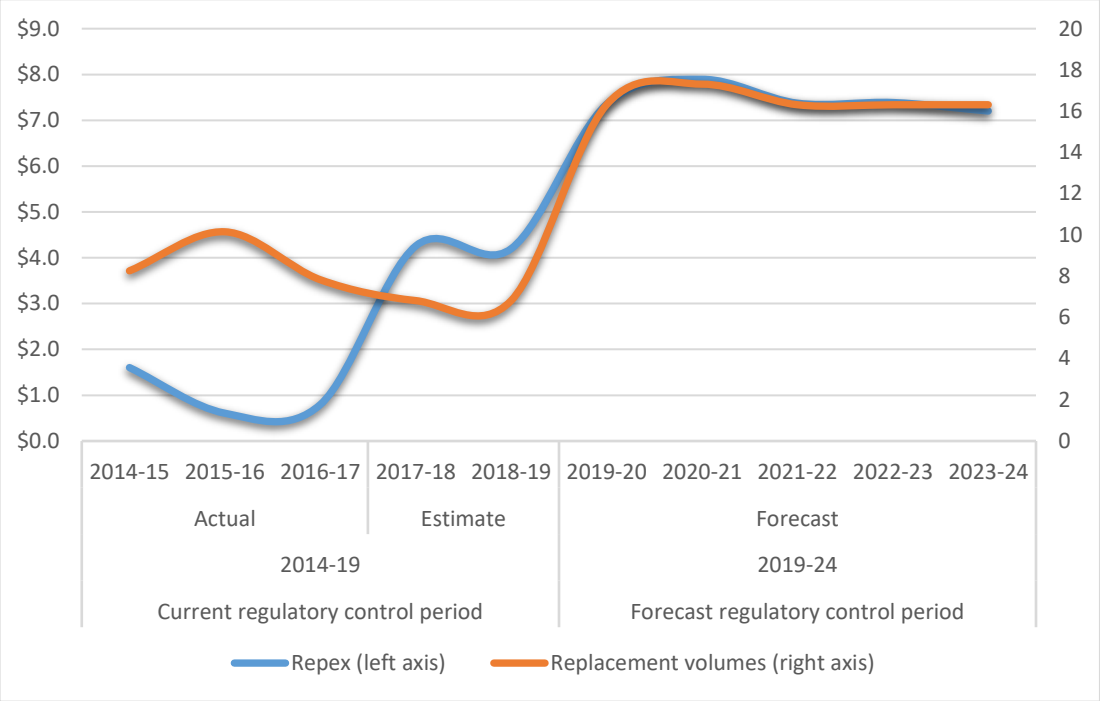
[77] Ibid, p. 87.

progressively replacing CONSAC[78] cables and are planning to accelerate this program to replace all CONSAC within our network".[79]

The proposed proactive replacement of underground cables (evidenced by the forecast increase in replacement rate) accounts for the difference between TasNetworks' proposed repex amount and our modelled results. Figure B.4.5 outlines that TasNetworks is forecasting a significant increase in both underground cable repex and replacement volumes over the 2019–24 regulatory control period.

CCP13 submitted that TasNetworks' should have undertaken more sensitivity analysis, particularly regarding the VCR inputs and assumptions. It noted that this analysis can defer particular replacement programs, specifically TasNetworks' low-voltage CONSAC cable replacement program.[80]

Figure B.4.5 Actual and forecast repex and replacement volumes for underground cables, 2014-15 to 2023-24 ($2019, million, direct costs) (units)



Source: AER analysis.

[78] Concentric neutral solid aluminium conductor.

[79] TasNetworks, *Transmission and Distribution Regulatory Proposal*, January 2018, p. 122.

[80] Consumer Challenge Panel, CCP Sub-Panel No. 13, *Advice to the AER, Response to proposals from TasNetworks for a revenue reset for the 2019–24 regulatory period*, 16 May 2018, p. 36.

TasNetworks is forecasting a 225 per cent increase in repex on underground cables, from an annual average of $2.3 million in the 2014–19 period to $7.4 million in the 2019–24 regulatory control period.

TasNetworks has 167km of CONSAC cables in its network. It currently replaces 6km of CONSAC cables per annum, but has proposed to increase its replacement rate to 15km per annum to ensure that all CONSAC cables will be replaced by 2029. TasNetworks submitted that the "primary driver of this program is to reduce the public risk in regards to broken neutral and hence of electric shock".[81] TasNetworks also submitted that "over 70% of LV cable failures were directly related to CONSAC cables, despite being only 17% of the total LV cable population".[82]

Despite submitting that safety is the primary replacement driver for this program, TasNetworks also provided an NPV analysis to justify the program on the basis that the benefits of the increased replacement rate will outweigh the costs through reduced unserved energy.[83] However, TasNetworks did not quantify the safety risks associated with CONSAC cable failures in its NPV analysis.

We reviewed the NPV analysis provided and compared TasNetworks' current approach (replace 6km per annum) with its new proposed approach (replace 15km per annum). We consider that a number of assumptions made in the NPV analysis overstate the level of unserved energy, namely:

- Value of Customer Reliability (VCR)—this represents a customer's willingness to pay for the reliable supply of electricity. TasNetworks assumes a VCR figure of $39.43 per kWh, which is the general figure AEMO recommends for Tasmania. CCP13 submitted that a more suitable figure would be the residential VCR of $28.58 per kWh.[84] Although we are unable to verify that all of TasNetworks' CONSAC cables are in residential areas, we consider that TasNetworks should conduct greater sensitivity analysis to support its proposed option
- Failure rate—TasNetworks assumes that CONSAC failures will continue to increase at the rate observed in the last three years. We consider this is unrealistic given that TasNetworks is prioritising replacements in areas that have experienced recent failures.

After making only minor adjustments to these assumptions within the NPV analysis, the preferred approach (representing the greatest net benefit) is TasNetworks' current approach to replace 6km per annum.

Arup reviewed the investment evaluation summaries (IES) and NPV analysis and noted that targeting areas based on geographical and neutral integrity monitoring could

---

81 TasNetworks, *Asset management plan - underground system - distribution,* October 2017, p. 21.

82 Ibid.

83 TasNetworks, *TN-Response IR019 - Replace LV CONSAC cable - NPV,* June 2018.

84 Consumer Challenge Panel subpanel 13, *Response to proposal from TasNetworks for a revenue reset for the 2019-24 regulatory period*, 16 May 2018, p. 35.

reduce the failure rate and therefore the risk cost due to safety and unserved energy.[85] We agree with Arup's assessment and conclude that because TasNetworks has not quantified the apparent safety risks that it proposes to address, the total benefits of its proactive replacement program are unknown.

Our position is therefore to use our repex modelling results for this asset group. We encourage TasNetworks to provide updated cost-benefit analysis that reflects the quantified safety risks in its revised proposal.

Top-down considerations

In addition to a bottom-up review of several key programs and projects, we also engaged Arup to undertake a top-down assessment of TasNetworks' capex proposal. Overall, we agree with Arup's conclusion that TasNetworks has governance and risk management processes in place to identify risk, but there is a lack of risk quantification in the underlying cost-benefit analysis supporting its repex forecast.

After reviewing TasNetworks' governance and risk management documents and processes, Arup concluded that "TasNetworks' risk identification appears to be a prudent approach, but the lack of quantifying risk consequences means that TasNetworks' approach to risk analysis is inadequate in fully understanding the impact of risks to the network".[86] In addition, Arup identified that "TasNetworks employs qualitative risk assessment in its analysis" and "the risks are mapped to a risk matrix".[87]

Consistent with our previous decisions for other distributors, we expect businesses to provide a properly constructed cost-benefit analysis that would typically identify and measure costs, benefits and risks. This includes the probability of an asset failing and the subsequent probability of this asset failure causing an incident or consequence. We also expect the cost of this incident or consequence to be quantified. This analysis ensures that the option that maximises net benefits is chosen from all different options or scenarios, including a business-as-usual or 'do-nothing' case.

In submitting its revised proposal, we encourage TasNetworks to review the lack of risk quantification in the underlying cost-benefit analysis supporting its repex forecast. Our recent engagement with TasNetworks indicates that its approach to risks is currently under review and it has an intent to quantify network risks in the future.[88]

Top-down optimisation

---

85 Arup, *Review of TasNetworks' proposed capital expenditure for the 2019-24 regulatory control period,* August 2018, p. 81.

86 Arup, *Review of TasNetworks' proposed capital expenditure for the 2019-24 regulatory control period,* August 2018, p. 24.

87 Arup, *Review of TasNetworks' proposed capital expenditure for the 2019-24 regulatory control period,* August 2018, p. 23.

88 Arup, *Review of TasNetworks' proposed capital expenditure for the 2019-24 regulatory control period,* August 2018, p. 24.

TasNetworks has 'optimised' its capex proposal by applying a five per cent ($36.4 million) top-down adjustment to its distribution capex forecast. TasNetworks noted that this was in response to customer concerns regarding affordability and "to minimise price impacts on customers".[89]

We asked TasNetworks how this efficiency was identified and how it will be achieved. In response, TasNetworks noted that its distribution capex forecast mainly consists of a large number of low-cost projects and programs, and therefore they anticipate that there will be opportunities to find efficiencies in program execution.[90]

Arup concluded that TasNetworks is unable to identify how these savings will be delivered.[91] We agree with this conclusion, as TasNetworks was unable to identify efficiencies specific to a project or program, or why the optimisation amount was five per cent instead of a higher or lower amount. It is commendable that TasNetworks has applied some form of 'optimisation' to its capex forecast, but we consider the optimisation amount to be an arbitrary figure.

Network health indicators

The condition of assets currently in commission is an indicator of the health of TasNetworks' network, and in turn, its repex requirements. In assessing the health of TasNetworks' network, we have reviewed:

- measures of reliability on TasNetworks' network;
- the age profile of network assets and the age of these assets relative to other comparable distributors (where possible). Asset age is a reasonable proxy for asset condition, which affects a distributor's repex requirements; and
- utilisation of the TasNetworks network (where spare capacity should be correlated to asset condition). This measure provides an indication as to whether TasNetworks' assets are likely to deteriorate more or less than would be expected given the age of the assets.

Our analysis of network health indicators and relevant benchmarks has assisted us to form high-level observations about whether TasNetworks' past replacement practices have allowed it to meet the capex objectives.

Network reliability

Figure B.4.6 outlines TasNetworks' SAIFI over time. SAIFI is a measure of the frequency of interruptions.[92] Over the 2008-09 to 2016-17 period, TasNetworks' SAIFI

---

89 TasNetworks, *Transmission and Distribution Regulatory Proposal*, January 2018, p. 122.

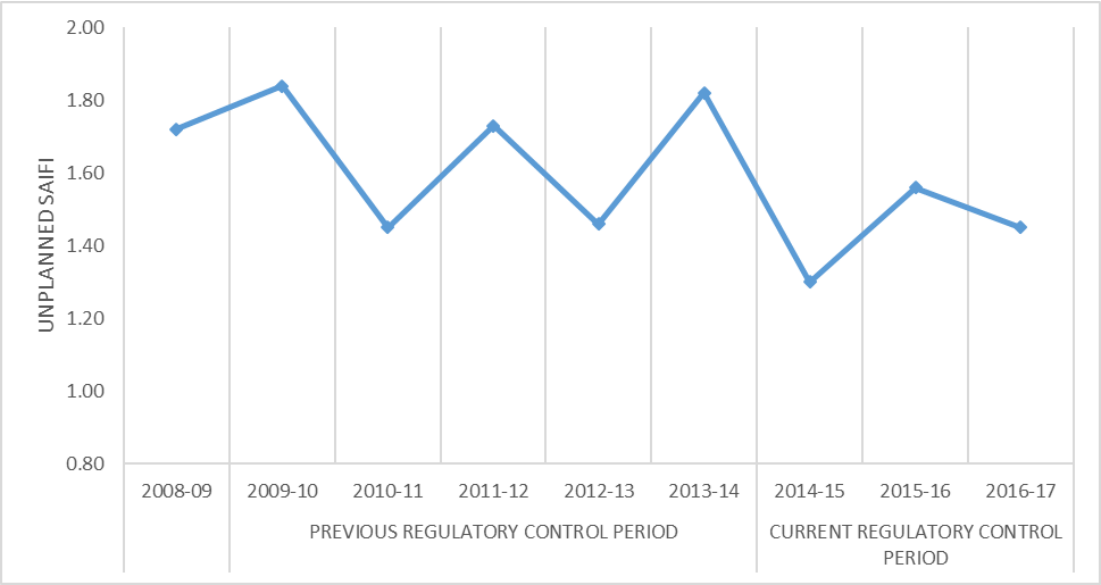
90 TasNetworks, *Response to information request 19*, 4 June 2018, p. 25.

91 Arup, *Review of TasNetworks' proposed capital expenditure for the 2019-24 regulatory control period,* August 2018, p. 14.

92 The SAIFI measure used is the one that excludes major event days and excluded events. See TasNetworks, *Economic Benchmarking Regulatory Information Notice* - 3.6 Quality of Service.

has decreased slightly. This suggests that TasNetworks' past asset management and replacement practices have been sufficient to maintain network reliability.

Figure B.4.6 TasNetworks whole-of-network unplanned SAIFI (historical 2008-09 to 2016-17)

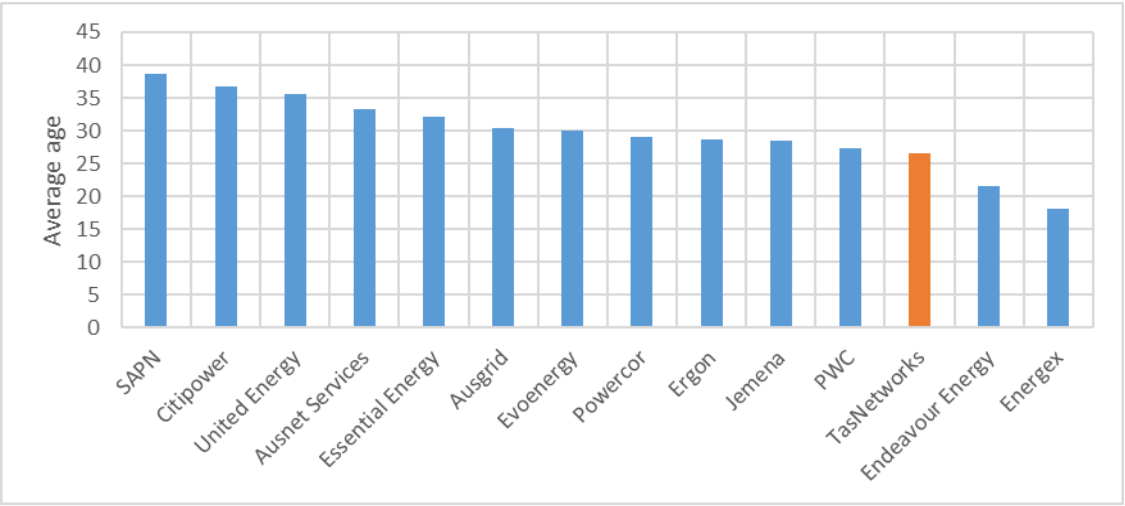


Source: AER analysis. See TasNetworks, *Economic Benchmarking Regulatory Information Notice* - 3.6 Quality of Service.

Average asset age

We considered the average age of TasNetworks' assets compared with other distributors. Figure B.4.7 outlines that compared with other distributors, TasNetworks has the third youngest network. It is expected that young assets will be in better condition that older assets, and following this logic, TasNetworks' assets should generally be in reasonable condition.

Figure B.4.7 Electricity distributor network average asset age



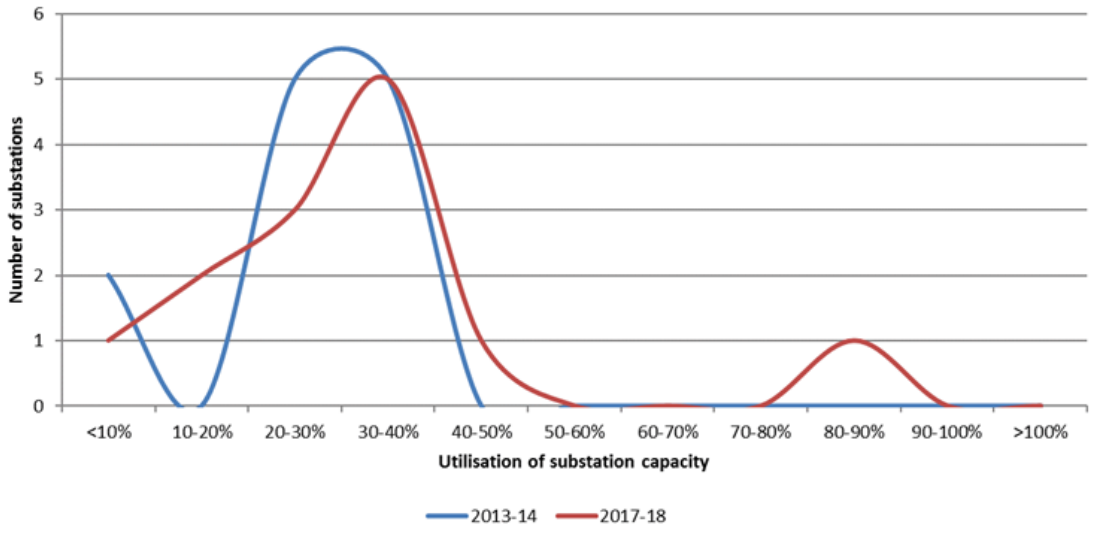
Source: AER analysis, TasNetworks, *Category Analysis RIN workbooks* - 5.2 Asset Age Profile, 9 March 2018.

Asset utilisation

We consider that the degree of asset utilisation can have an impact on the condition of certain network assets. The relationship between asset utilisation and condition can vary between asset types. The relationship between asset utilisation and condition is not necessarily a linear one and the condition of an asset may be difficult to determine. Early-life asset failures may therefore be due to utilisation or a combination of factors.

Figure B.4.8 illustrates that TasNetworks has generally increased its level of asset utilisation between 2013-14 and 2017-18. This increase has predominantly been for assets that were at very low levels of utilisation, with the exception of one substation that has moved into the utilisation band of 80 to 90 per cent. All but one of these assets currently have utilisation rates below 60 per cent and we therefore expect that a large number of TasNetworks' zone substations are in a reasonable condition.

Figure B.4.8 TasNetworks zone substation utilisation 2013-14, and 2017-8 actual



Source: AER analysis, TasNetworks, *Regulatory Determination Workbooks* - Consolidated - 27 June 2018

Note: The utilisation rate is the ratio of maximum demand and the normal cyclic rating of each substation for the specified years.[93] Forecast utilisation in this figure is based on forecast weather corrected 50% POE maximum demand at each substation and existing capacity without additional augmentation over 2019-24. For data reasons, we have not developed a forecast utilisation rate for 2022-23.

[93] Normal cyclic rating is the maximum peak loading based on a given daily load that a substation can supply each day of its life under normal conditions resulting in a normal rate of wear.

B.5 Forecast non-network capex

Non-network capex relates to expenditure on information and communications technology (ICT) assets, fleet, land and buildings. We have also assessed TasNetworks forecast capex for network operational support systems as part of this category.

B.5.1 TasNetworks' proposal

TasNetworks proposed total non-network capex of $151.6 million ($2018–19, including overheads) for the 2019–24 regulatory control period. This is a 12 per cent increase from actual and estimated non-network capex for the five year period 2014–19.[94] Non-network capex, including operational support systems, accounts for 21 per cent of TasNetworks' total forecast capex.

B.5.2 Position

TasNetworks has not demonstrated that its proposed non-network capex of $151.6 million is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria. We have instead provided for an alternative estimate of $127.8 million in this draft decision, which is 16 per cent below TasNetworks' forecast. This reflects our decision on TasNetworks' forecast non-network ICT capex which we consider does not reasonably reflect efficient and prudent expenditure for this category of forecast capex.

B.5.3 Reasons for our position

Our assessment and conclusions for each category of non-network capex are set out below.

Non-network ICT capex

TasNetworks proposed distribution ICT capex of $103.8 million ($2018–19, including overheads) for the 2019–24 regulatory control period, an average of $20.8 million per year. This is a 32 per cent increase from actual and estimated non-network ICT capex for the previous five year period.[95] TasNetworks submitted that:[96]

- the proposed program of works has been designed to address both expected market changes and changes in regulatory requirements
- while TasNetworks has developed a single combined ICT strategy that addresses transmission and distribution needs together, a large component of the proposed ICT capex relates to market systems that are specific to the provision of distribution services.

-[94] TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, p. 85.

[95] TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, pp.111–112.

[96] TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, pp. 98–126.

TasNetworks has not demonstrated that its proposed non-network ICT capex of $103.8 million is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria. We have instead provided an alternative estimate of $79.4 million for this draft decision, which is 24 per cent below TasNetworks' forecast. Our draft decision reflects adjustments to TasNetworks proposed non-network ICT as follows:

- a reduction of approximately $23 million ($2018-19) relating to the meter data management system replacement project. We are not satisfied that TasNetworks' preferred option and cost estimates for this project are prudent and efficient
- a small reduction of approximately $1 million ($2018-19) relating to the meter data management system upgrades program. We are not satisfied that TasNetworks' estimated costs for this program are efficient and prudent.

We have applied several assessment techniques to assess TasNetworks' proposed non-network ICT capex forecast against the capex criteria. In reaching our position, we:

- assessed trends comparing historical actual and forecast non-network ICT capex; and
- reviewed TasNetworks' expenditure forecasting methodology, including a review of key inputs and assumptions and the project documentation supporting TasNetworks' proposal.

We sought further information and clarification from TasNetworks as necessary, and also had regard to stakeholder submissions and advice on TasNetworks' forecast non-network ICT capex from our consultant Arup.

Trend analysis

Trend analysis allows us to draw general observations about how a business is performing. In addition, one capex factor that we must have regard to is the actual and expected capital expenditure during any preceding regulatory control period.[97]

Our use of trend analysis is to gauge how TasNetworks' actual non-network ICT capex compares to forecast expenditure for the 2019–24 regulatory control period. Where past expenditure was sufficient to achieve the capex objectives, this can be a reasonable indicator of whether an amount of forecast non-network ICT capex is likely to be efficient and prudent, and therefore contributes to a forecast of total capex that reasonably reflects the capex criteria.[98] The ICT category can however be characterised by lumpy, non-recurrent investments, for example when major enterprise systems require replacement within a particular regulatory control period.

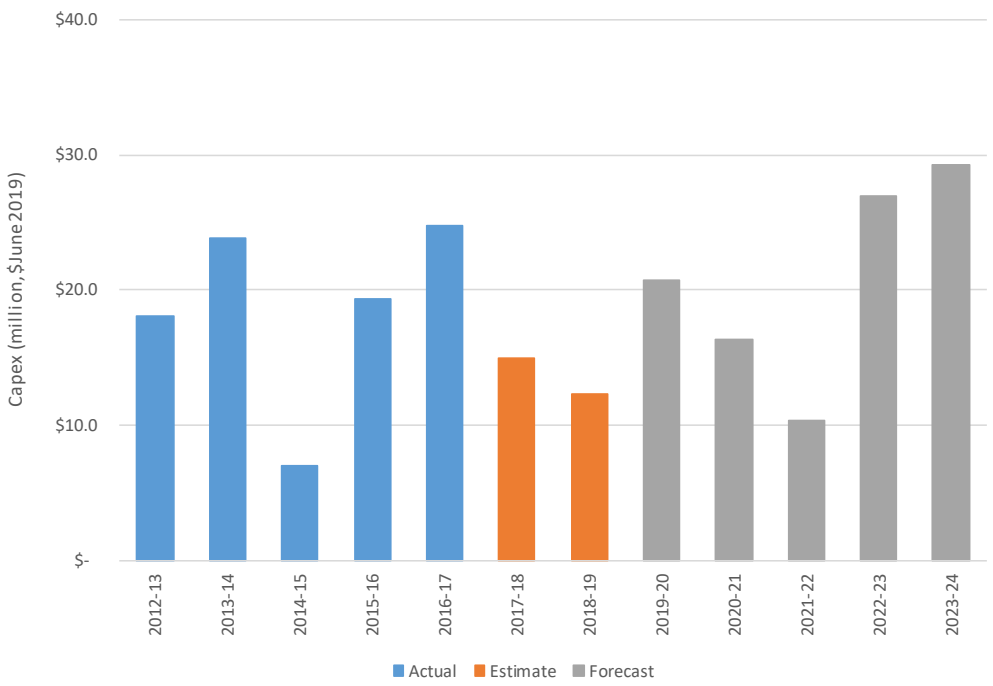
---

97 NER, cl. 6.5.7(e)(5).

98 AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 7–9.

Figure B.5.1 shows TasNetworks' actual and estimated non-network ICT capex since 2012-13 and its forecast non-network other capex for the 2019–24 regulatory control period. This shows an increasing trend in forecast non-network ICT capex in the 2019–24 regulatory control period, peaking in the final two years of the forecast period at a historically high level of expenditure.

Figure B.5.1 TasNetworks' historical and forecast non-network ICT capex ($2018-19)



Source: TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, p. 112.

We consider that the forecast 32 per cent increase in non-network ICT capex in the 2019–24 regulatory control period warrants further review, with particular focus on the drivers of the historically high levels of investment forecast for the final two years of the period.

Forecasting methodology and project review

Our assessment of TasNetworks forecast non-network ICT capex has focussed on the drivers of increased costs above historical levels of expenditure in this category.

TasNetworks' non-network ICT capex proposal includes expenditure for both recurrent or business as usual needs, and non-recurrent project specific investments. A large component of the proposed ICT capex relates to market systems. TasNetworks identified that significant investments in this area included the Meter Data Management System (MDMS) replacement project, with a total project cost of $63 million, of which $30 million is included in TasNetworks' forecast capex for the 2019–24 regulatory control period. Other significant projects and programs include an ongoing MDMS upgrade program to address requirements from AEMO's biannual change program,

which alters procedures or data requirements for market participants; and the IT infrastructure core services program, which addresses asset end of life and capability issues for core IT infrastructure assets.[99]

In our view, TasNetworks' proposed increase in ICT capex is driven by these major projects, and most importantly by the MDMS replacement project. The proposed $30 million cost of the MDMS replacement project alone accounts for more than the total increase in ICT capex in the 2019–24 regulatory control period compared to the previous five year period.

We sought further information from TasNetworks through a series of information requests in order to obtain a better understanding of the proposed non-network ICT capital expenditure, particularly with regard to the cost-benefit analysis supporting the major ICT projects.[100] In addition to the investment evaluation summaries provided with TasNetworks' initial proposal, TasNetworks provided:[101]

- project NPV analyses for its major ICT capex projects, and
- more detailed project cost estimate breakdowns.

Our assessment approach also included having regard to submissions from stakeholders, and seeking advice from our technical consultant Arup to review and identify critical issues in relation to TasNetworks' ICT capex proposal.

We have also considered the ICT capex forecast in the context of the ICT capex program and ICT asset strategies submitted by TasNetworks (and accepted by the AER) for the current two year regulatory control period (2017–19). Due to the short duration of the current regulatory control period, the ICT asset strategies submitted by TasNetworks in 2016 for the current determination also covered the 2019–24 forecast years now under review. This has provided some basis of comparison, and allowed us to assess how TasNetworks' ICT capex program requirements, drivers and project cost estimates have changed over this two year period.

Submissions

We have had regard to a number of submissions from interested stakeholders on TasNetworks' forecast non-network ICT capex. Common issues raised in the submissions included the need for greater scrutiny of ICT expenditure in line with other network expenditure, the desirability of avoiding the replacement of entire platforms on a regular basis, the importance of selecting fit for purpose systems over premium systems, and including only expenditure that is compliance driven. Key aspects of these submissions are set out below and have been considered during our analysis.

---

99 TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, pp. 126–130.

100 AER, *Information request #017*, 4 May 2018; AER, *Information request #018*, 22 May 2018; and AER, *Information request #031*, 27 June 2018.

101 TasNetworks, *Response to AER information request #017*, 14 May 2018; TasNetworks, *Response to AER information request #018*, 4 June 2018; and TasNetworks, *Response to AER information request #018*, 5 July 2018.

CCP13 recommended that we pay particular attention to ICT expenditure as it is very high for a business with less than 800 employees and less than 300,000 customers. CCP13 did however acknowledge that some of this expenditure results from TasNetworks having to comply with NEM standards, where economies of scale mean there can be significant fixed costs irrespective of the number of customers served.[102] We acknowledge this concern, and have undertaken detailed analysis of the ICT capex proposal in order to determine if this expenditure is efficient and prudent.

The Tasmanian Small Business Council submitted that the judicious selection of IT platforms results in deployment of systems which are capable of being continuously upgraded over an extended period (20 years), without the disruption and cost which accompanies replacement of entire platforms, particularly 'Tier 1' enterprise systems. This submission expressed concern at the level of expenditure proposed given TasNetworks' small customer base, and urged us to scrutinise the proposed expenditure with the assistance of experts, in order to determine an appropriate amount for consumers to pay on the basis that systems are fit for purpose and have not been the subject of poor management decisions, for which consumers should not bear the costs.[103] We sought advice from Arup to assist us in our review of TasNetworks' proposed ICT capex.

An anonymous submission argued that a network service provider seeking to implement a new system and/or software should be able to show that the cost of implementing the system will be less than the cost of not implementing the system. This submission also noted that the reasons for using 'Tier 1' IT systems, especially for small network service providers, should be assessed very carefully as while these systems may provide the necessary functions, there may be a cost premium involved in their acquisition. It is not appropriate that the customers bear the cost premium.[104] We agree with the importance of a robust cost benefit assessment and options analysis to justify the prudency and efficiency of investment proposals, as discussed further below.

AER assessment and conclusions

Based on our assessment of the information available, we are not satisfied that TasNetworks' non-network ICT capex proposal reasonably reflects the capex criteria.

Our assessment of the investment evaluation summaries, NPV analyses and project cost estimates submitted by TasNetworks in support of major non-network ICT capex projects identified a number of concerns regarding TasNetworks' justification for this expenditure. Specifically, we found:

- a lack of transparency in the justification for selecting preferred ICT project options, including when selecting project options that are not lowest cost or highest NPV:

---

[102] Consumer Challenge Panel, CCP Sub-Panel No. 13, *Advice to the AER, Response to proposals from TasNetworks for a revenue reset for the 2019–24 regulatory period*, 16 May 2018, 16 May 2018, p. 39.

[103] Tasmanian Small Business Council, *Submission to the AER*, 24 May 2018, pp. 47–51.

[104] Anonymous, *Submission to the AER*, 16 May 2018, pp. 2–3.

- TasNetworks' preferred option for the MDMS replacement project is not the lowest cost or highest NPV credible option considered.[105] It appears that TasNetworks' preferred option selection is driven by alignment with an IT strategy to integrate functions with its Enterprise Resource Planning system.[106] It is not clear how TasNetworks has weighted its qualitative and quantitative assessments to select its preferred option
- Arup noted that the alternative option provides a strong argument as it is lower cost, has less risk, is less complex, has lower business impact and can be delivered in a more effective time[107]
- TasNetworks has acknowledged this issue and, in response to our information request, advised that it is working to refine its analysis and assumptions around the project options. TasNetworks will update, and if necessary revise, its preferred option following the review of its current assumptions. We anticipate that this will occur in the context of TasNetworks' revised proposal.[108]

- a lack of identification and quantification of expected project benefits:
  - none of TasNetworks' NPV analyses for the three major ICT projects which we reviewed included quantified benefits associated with the investment
  - while the underlying driver of the MDMS replacement project is replacement due to the age and functionality of the existing system, TasNetworks' preferred option (the SAP solution) is higher cost and appears to provide additional functionality and integration with existing systems beyond minimum compliance requirements. We consider that these additional costs should not be borne by consumers unless justified by identified project benefits such as efficiency savings
  - Arup noted that TasNetworks had not specified details or metrics for the improvements to administrative and operational costs, customer service and business efficiency and effectiveness associated with this investment.[109]
- insufficient justification for using 'order of magnitude' estimates instead of detailed costings when determining ICT project option costs:
  - TasNetworks' investment evaluation summaries for major ICT projects/programs state that the cost estimates used have a level of accuracy of ±30 per cent.[110]

---

105 TasNetworks, *TN-Response IR18 – TN_IT_NPV_Calculations_1897 - V3 - CONFIDENTIAL*, 4 June 2018.

106 TasNetworks, *IES - Market Systems - MDMS replacement*, 31 July 2017, p. 19.

107 Arup, *Final report - Review of TasNetworks. Proposed capital expenditure for the 2019–24 regulatory control period*, 10 August 2018, p. 135.

108 TasNetworks, *Response to AER information request #018*, 4 June 2018, p. 9; and TasNetworks, *Response to AER information request #018*, 5 July 2018, p. 4.

109 Arup, *Final report - Review of TasNetworks. Proposed capital expenditure for the 2019–24 regulatory control period*, 10 August 2018, p. 135.

110 TasNetworks, *IES - Market Systems - MDMS replacement*, 31 July 2017, p. 10.

- TasNetworks received a range estimate of vendor costs for its preferred option for the MDMS replacement project, but applied the top end of this range on the basis that the estimates 'likely' did not include certain customisation and data migration costs.[111]
- It is not clear that these cost estimates reasonably reflect the efficient costs of achieving the capex objectives, or a realistic expectation of the cost inputs required to achieve the capex objectives as required by the NER.[112]
- Arup considered that with the amount of analysis and planning accomplished, it would expect a submission with an accuracy of no more than ±10 per cent.[113]

- insufficient supporting evidence for increases in project and vendor costs:
  - the forecast capex proposed for the MDMS upgrades program and IT infrastructure core services program align with the costs identified in TasNetworks' 2016 ICT asset strategy. However, TasNetworks' estimate of costs required for the MDMS replacement project in the 2018 proposal is significantly above the 2016 estimate. While it is possible that some increase is justified by changes in regulatory obligations since 2016, the extent of the increase (more than triple the cost) is concerning.
  - Arup considered that the costs in general for the MDMS replacement project appear high, and that TasNetworks' forecasts require further justification before being judged as prudent or efficient.[114]
  - TasNetworks has also not provided strong evidence for a specific increase in costs for the MDMS upgrades program in the 2019-20 year. The expected costs for this project are otherwise assumed to be equal in each year of the regulatory control period as the project reflects an average level of ongoing upgrade work arising from future regulatory changes.[115] Making specific allowances for 'above average' years is therefore likely to overstate costs over time.

On the basis of the issues outlined above, we are not satisfied that TasNetworks' forecast non-network ICT capex is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria. Our alternative estimate of prudent and efficient non-network ICT capex in the 2019–24 regulatory control period reflects a substantially lower estimate of required capex for the MDMS replacement project, and a minor reduction to the MDMS upgrades program. In summary:

---

111 TasNetworks, *IES - Market Systems - MDMS replacement*, 31 July 2017, p. 27.

112 NER, cl. 6.5.7(c).

113 Arup, *Final report - Review of TasNetworks. Proposed capital expenditure for the 2019–24 regulatory control period*, 10 August 2018, p. 134.

114 Arup, *Final report - Review of TasNetworks. Proposed capital expenditure for the 2019–24 regulatory control period*, 10 August 2018, p. 137.

115 TasNetworks, *Response to AER information request #018*, 4 June 2018, p. 13.

- TasNetworks has not demonstrated that its preferred option (SAP integration) and cost estimates for the MDMS replacement project are prudent and efficient. The alternative option (upgrade with existing vendor) appears to provide the necessary functionality at a lower cost and risk. Our alternative estimate is derived from TasNetworks' own 2016 cost estimate for the project. We expect that TasNetworks will submit updated project cost estimates in its revised proposal.
- We have made a minor reduction to TasNetworks' forecast capex for the MDMS upgrades program in the 2019-20 year to ensure the forecast for this program reflects the expected average level of costs in each year. The average cost level should already account for years in which system change costs might be above or below average, such that making a specific allowance for above average years is likely to overestimate program costs over the 2019–24 regulatory control period.

Our alternative estimate of TasNetworks forecast non-network ICT capex in the 2019–24 regulatory control period which we are satisfied reasonably reflects the capex criteria is $79.4 million ($2018-19, including overheads). This is approximately in line with actual and estimated expenditure in this category in the 2014–19 period.

Non-network other capex

Non-network other capex includes expenditure on fleet, land and buildings assets.

TasNetworks proposed non-network other capex of $25.9 million ($2018-19, including overheads) for the 2019–24 regulatory control period. This is a 6 per cent increase compared to actual and estimated non-network other capex for the five year period 2014–19.[116] Non-network other capex accounts for 3.5 per cent of TasNetworks' total forecast capex.

We are satisfied TasNetworks' forecast non-network other capex of $25.9 million is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria. We have therefore included this amount in our estimate of total forecast capex for the 2019–24 regulatory control period.

We have applied several assessment techniques to assess TasNetworks' proposed non-network other capex forecast against the capex criteria. In reaching our position, we:

- assessed trends comparing historical actual and forecast non-network other capex at both the total and sub-category level; and
- reviewed TasNetworks' expenditure forecasting methodology, including a review of key inputs and assumptions and the project documentation supporting TasNetworks' proposal.

We did not receive any stakeholder submissions specifically relating to TasNetworks' forecast non-network other capex.

---

[116] TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, 31 January 2018, p. 111.

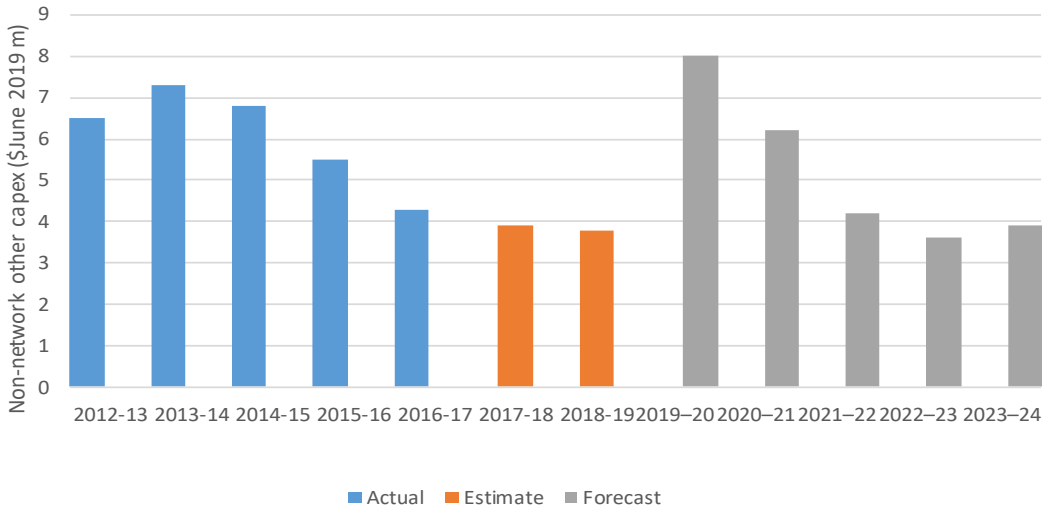
Trend analysis

Trend analysis allows us to draw general observations about how a business is performing. In addition, one capex factor that we must have regard to is the actual and expected capital expenditure during any preceding regulatory control period.[117]

Our use of trend analysis is to gauge how TasNetworks' actual non-network other capex compares to forecast expenditure for the 2019–24 regulatory control period. Where past expenditure was sufficient to achieve the capex objectives, this can be a reasonable indicator of whether an amount of forecast non-network other capex is likely to be efficient and prudent, and therefore contributes to a forecast of total capex that reasonably reflects the capex criteria.[118] The non-network other category can however be characterised by lumpy, non-recurrent investments, for example for major building works.

Figure B.5.2 shows TasNetworks' actual and estimated non-network other capex since 2012-13 and its forecast non-network other capex for the 2019–24 regulatory control period. This shows a step up in forecast non-network other capex in the initial years of the 2019–24 regulatory control period, declining to historically low levels of capex in later years.

Figure B.5.2 TasNetworks historical and forecast non-network other capex ($2018-19)



Source: TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, p. 130.

We expect that forecast non-network other capex would generally be consistent with historical levels of expenditure given the typically recurrent nature of expenditure in this

[117] NER, cl. 6.5.7(e)(5).

[118] AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 7–9.

category. On average, TasNetworks' forecast non-network other capex for the 2019–24 regulatory control period is approximately in line with actual and estimated capex in the five year period from 2014 to 2019.

The trend analysis shows that TasNetworks' forecast non-network other capex is declining across the period towards historically low levels of expenditure. However, the initial spike in expenditure in the first two years of the forecast period warrants further review, to determine the specific drivers of this expenditure at the sub-category level.

Fleet capex review

TasNetworks proposed $14.4 million for fleet capex for the 2019–24 regulatory control period, an average of $2.9 million per year. This is slightly below the average annual capex of approximately $3.1 million per year for the 2014-19 period.[119]

We reviewed TasNetworks' forecasting methodology and the drivers of forecast fleet capex. We found that:

- TasNetworks' Fleet Management Plan appears consistent with good management practices in respect to strategies and actions for the operation and maintenance of fleet assets. TasNetworks' Fleet Management Plan addresses a range of relevant considerations including: safety, fit for purpose, asset life cycle approach, monitoring performance, risk management and continuous improvement in asset management practices[120]
- the fleet replacement criteria applied by TasNetworks are similar to those of other Australian electricity network service providers.[121]

On this basis, we are therefore satisfied that TasNetworks' forecast fleet capex is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria. We have included TasNetworks' forecast of fleet capex in our estimate of non-network other capex for the 2019–24 regulatory control period.

Land and buildings capex review

TasNetworks proposed $11.3 million for land and buildings capex for the 2019–24 regulatory control period, an average of $2.3 million per year. This is slightly above the average annual capex of approximately $1.8 million per year for the 2014–19 period.[122]

Our review of TasNetworks proposed land and buildings capex identified two specific projects in this category driving the overall increase in non-network other capex in the 2019-20 and 2020-21 years - the Maria Street operations building upgrade, and Campbell Town upgrade. We sought further supporting documentation from

---

119 TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, 31 January 2018, p. 130.

120 TasNetworks, *Tool of Trade Fleet Management Plan*, October 2017.

121 TasNetworks, *Tool of Trade Fleet Management Plan*, October 2017, p. 21.

122 TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, 31 January 2018, p. 130.

TasNetworks to demonstrate the need and economic justification for these projects.[123] TasNetworks provided its investment evaluation summaries for these two projects.[124]

The Maria Street operations building upgrade provides for upgrades to improve the functionality of the site and address compliance issues, including provision of a lift and upgraded stairs, toilets, external paths and ramps, lighting controls, and other building upgrades.[125] The scope of the Campbell Town upgrade includes separating the depot and general functions at the site to improve safety, and providing for upgraded store, office and meeting facilities.[126]

Based on our review of the information available, we consider that TasNetworks' facilities management plan appears to be consistent with good management practices in respect to the lifecycle management of TasNetworks' facilities assets. TasNetworks has a number of facility asset programs that are designed to maintain quality, retain usability, improve asset value and extend the useful life of the assets.[127] TasNetworks' facilities assets replacement criteria appear reasonable in respect to the assets' estimated life span and replacement options.[128]

In regard to the specific projects proposed at Campbell Town and Maria Street, we consider that TasNetworks' investment evaluation summaries include some level of detail to support the investment need, a high level risk evaluation, options analysis, and a high level economic analysis assessing project costs and benefits. However, we also consider that the investment evaluation summaries submitted reflect some of the deficiencies we identified in the context of similar documentation related to repex and non-network IT projects. For example, the investment evaluation summaries could benefit from the consideration of additional options and further transparency in setting out the justification for selecting preferred options.

On balance, for this draft decision we have made no specific adjustment to TasNetworks' forecast non-network land and buildings. We have included TasNetworks' forecast as a reasonable estimate of land and buildings capex requirements in our estimate of total forecast capex for the 2019–24 regulatory control period.

Operational support systems

Operational support systems capex relates to network control capex for SCADA and associated operational information systems as well as asset management systems. TasNetworks' requirements for operational support systems are considered across the transmission and distribution networks as a whole.[129]

---

123 AER, *Information request #017*, 15 May 2018.

124 TasNetworks, *Response to AER information request #017*, 15 May 2018.

125 TasNetworks, *IES - Operations building compliance upgrade and refresh*, 12 June 2017, p. 4.

126 TasNetworks, *IES - Campbell Town Upgrade*, 22 March 2017, p. 4.

127 TasNetworks, *Facilities Asset Management Plan*, October 2017.

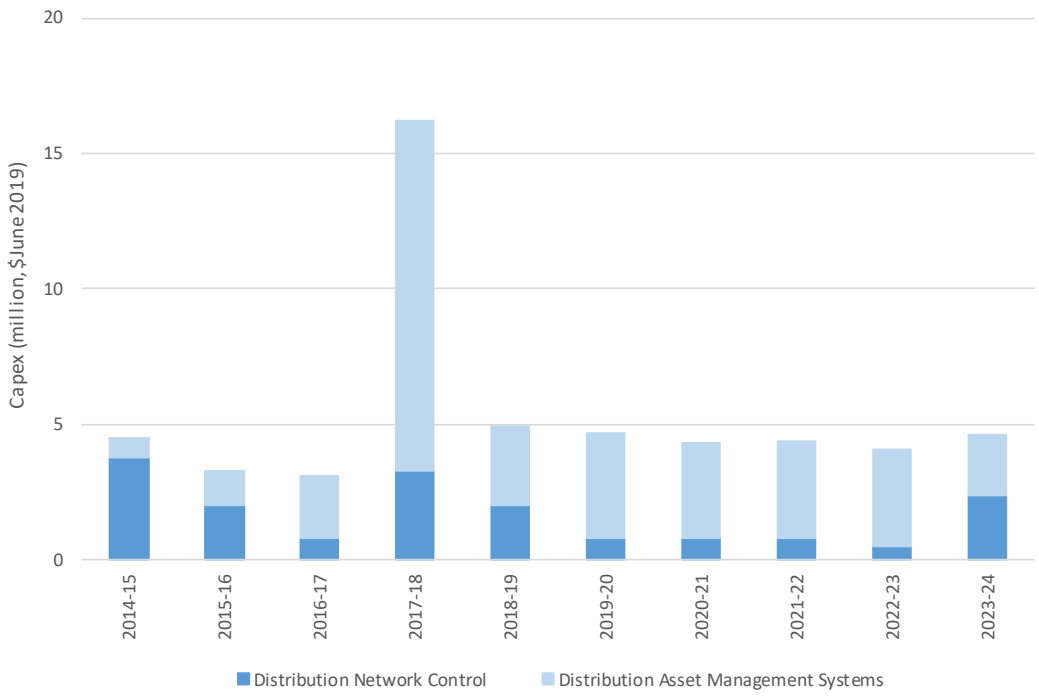
128 TasNetworks, *Facilities Asset Management Plan*, October 2017, p. 33.

129 TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, 31 January 2018, pp. 95–96.

TasNetworks proposed operational support systems capex of $22.0 million for the 2019–24 regulatory control period, an average of $4.4 million per year. This is a 31 per cent reduction from the average annual operational support systems capex of $6.4 million for the previous five year period.[130]

Figure B.5.3 shows TasNetworks' actual and estimated operational support systems capex since 2012-13 and its forecast capex for the 2019–24 regulatory control period. This shows forecast operational support systems capex declining from the current regulatory control period to a more consistent level of expenditure approximately in line with longer term expenditure in this category.

Figure B.5.3 TasNetworks' historical and forecast operational support systems capex ($2018-19)



Source: TasNetworks, *Revenue Proposal 2019/20-2023/24*, 31 January 2018, p. 123.

We consider that historical trend analysis supports TasNetworks' operational support systems capex as likely to reflect a prudent and efficient level of capex for this category. Expenditure in this category is forecast to decline and is consistent with longer term average levels of investment in this category.

[130] TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, 31 January 2018, p. 123.

Our more detailed bottom up review of projects and programs within the operational support systems proposal has not identified any particular areas of concern regarding the prudency and efficiency of the forecast capex for this category.

In term of asset management systems, TasNetworks has proposed capex related to asset knowledge management, asset planning, asset condition monitoring, asset risk management, network performance and asset data analytics and reporting. Priority will be given to ensuring that systems and data are available to support risk based asset management for relevant distribution asset classes.[131] The network control capex supports TasNetworks' smart grid technology for real time operation of the power system and the storage of operational information captured and maintained by TasNetworks' Networks Operations Control System.[132] TasNetworks' operational information system, Historian, requires renewal to ensure it has vendor support and has the capability to meet the increasing data recording and reporting requirements.[133]

We sought additional information from TasNetworks to demonstrate the need and economic justification for the proposed operational support systems expenditure.[134] TasNetworks advised that some of this expenditure is to develop data-analytic systems and tools in order to support continued improvements to overall asset management maturity. TasNetworks submitted that this will enable better access to higher quality data that will in turn result in efficiencies and optimisation within their network capital works program.[135]

TasNetworks also submitted that its asset management information system is composed of multiple systems that require further development or renewal within the 2019–2014 regulatory control period. The geographic information system is approaching end of life and requires modernisation, and other operational support systems such as the condition based risk management system, the vegetation management system and technical and engineering drawing systems are also scheduled for upgrade.[136]

Based on the information available, we are satisfied that the forecast capex for this category is efficient and prudent and would form part of a total forecast capex allowance that reasonably reflects the capex criteria. We have therefore included TasNetworks' forecast operational support systems capex in our estimate of total forecast capex for the 2019–24 regulatory control period.

---

131 TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, 31 January 2018, 31 January 2018, p. 125.

132 TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, 31 January 2018, 31 January 2018, p. 124.

133 TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, 31 January 2018, 31 January 2018, p. 124.

134 AER, *Information request #017*, 4 May 2018.

135 TasNetworks, *Response to AER information request #017*, 14 May 2018, p. 9.

136 TasNetworks, *Response to AER information request #017*, 14 May 2018, p. 9.

C Engagement and information-gathering process

Initial proposal

TasNetworks lodged its proposal on 31 January 2018, which included the primary documents that relate to capex for the 2019-24 regulatory control period. The initial proposal included the supporting documentation that typically accompanies a proposal. TasNetworks submitted several Investment Evaluation Summaries (IESs), but that it did not submit all the IESs listed in its proposal. In addition, TasNetworks did not provide any underlying risk calculations and cost-benefit analysis.

Information-gathering process

During the review process, we requested further information relating to TasNetworks' capex proposal through several information requests. We sent six information requests relating to TasNetworks' distribution repex forecast. The questions aimed to test our understanding of the material provided and to clarify capex-related issues. TasNetworks responded to all six information requests and its responses were broadly on time.

Engagement

We have engaged with TasNetworks and CCP13 on numerous occasions throughout the review process. We met with TasNetworks staff via teleconference on 13 March 2018 to discuss AER information request 004, which sought to rectify several data issues related to distribution repex.

We also engaged with TasNetworks staff on our repex modelling approach on 17 April 2018. This included a discussion on the latest modelling refinement, which is discussed in D.5 below, and how it affected TasNetworks. This was an opportunity for TasNetworks to understand the underlying assumptions of the repex model and how it affected their repex proposal. We also presented our refined repex modelling approach to CCP13 on 21 March 2018.

In addition, we engaged with TasNetworks staff and CCP13 following the TasNetworks public forum in Hobart on 10 April 2018. We also met with staff during an on-site visit with our consultant, Arup, on 21 and 22 May 2018. We asked a range of questions, including questions relating to TasNetworks' distribution capex forecast, during these meetings. Finally, we met with senior TasNetworks staff on 3 August 2018 to discuss our draft decision position.

D Repex modelling approach

This section provides a guide to our repex modelling process. It sets out:

- relevant background information
- the data used to run the repex model
- the key assumptions underpinning our repex modelling approach
- the repex model outcomes under different scenarios.

D.1 Background to predictive modelling

In 2012, the AEMC published changes to the National Electricity and National Gas Rules.[137] Following these rule changes, we undertook a "Better Regulation" work program, which included publishing a series of guidelines setting out our approach to regulation under the new rules.[138]

The expenditure forecast assessment Guideline (Guideline) describes our approach, assessment techniques and information requirements for setting efficient expenditure allowances for distribution network service providers (distributors).[139] It lists predictive modelling as one of the assessment techniques we may employ when assessing a distributor's repex. We first developed and used our repex model in our 2009–10 review of the Victorian electricity distributors' 2011–15 proposals and have also used it in subsequent electricity distribution decisions.

The technical underpinnings of the repex model are discussed in detail in the replacement expenditure model handbook.[140] At a basic level, our repex model is a statistical tool used to conduct a top-down assessment of a distributor's replacement expenditure forecast. Discrete asset categories within six broader asset groups are analysed using the repex model. These six asset groups are poles, overhead conductors, underground cables, service lines, transformers and switchgear.

The repex model forecasts the volume of assets in each category that a distributor would be expected to replace over a 20-year period. The model analyses the age of assets already in commission and the time at which, on average, these assets would be expected to be replaced, based on historical replacement practices. A total replacement expenditure forecast is derived by multiplying the forecast replacement volumes for each asset category by an indicative unit cost.

---

137 AEMC, *Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012*, 29 November 2012.

138 See AER *Better regulation reform program* web page at http://www.aer.gov.au/Better-regulation-reform-program.

139 AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013; AER, *Expenditure Forecast Assessment Guideline for Electricity Transmission*, November 2013.

140 AER, *Electricity network service providers: Replacement expenditure model handbook*, November 2013.

The repex model can be used to advise and inform us where to target a more detailed bottom-up review, and define an alternate repex forecast if necessary. The model can also be used to benchmark a distributor against other distributors in the NEM.[141]

As detailed in the repex handbook, the repex model is most suitable for asset groups and categories where there is a moderate to large asset population of relatively homogenous assets. It is less suitable for assets with small populations or those that are relatively heterogeneous. For this reason, we exclude the SCADA and other asset groups from the modelling process and do not use predictive modelling to directly assess the asset categories within these groups.

Expenditure on and replacement of pole top structures is also excluded, as it is related to expenditure on overall pole replacements and modelling may result in double counting of replacement volumes. In addition, distributors do not provide asset age profile data for pole top structures in the annual category analysis RINs, so this asset group cannot be modelled using the repex model.

D.2 Data collection

The repex model requires the following input data:

- the age profile of network assets currently in commission
- expenditure and replacement volume data of network assets
- the mean and standard deviation of each asset's expected replacement life.

This data is derived from distributors' annual regulatory information notice (RIN) responses, and from the outcomes of the unit cost and expected replacement life benchmarking across all distribution businesses in the NEM. The RIN responses relied on are:

- annual category analysis RINs – issued to all distributors in the NEM
- reset RINs – distributors are required to submit this information with its proposal.

Category analysis RINs include historical asset data and reset RINs provide data corresponding to distributors' proposed forecast repex over the upcoming regulatory control period. In both RINs, the templates relevant to repex are sheets 2.2 and 5.2.

Our current approach of adopting a standardised approach to network asset categories provides us with a dataset suitable for comparative analysis and better equips us to assess the relative prices of cost inputs as required by the capex criteria.[142]

D.3 Scenario analysis

[141] This includes TasNetworks.

[142] NER, cl 6.5.7(c).

In this section we set out the broad assumptions used to run a series of scenarios to test distributors' forecast modelled repex. The specific modelling assumptions applied for each distributor are outlined in each individual repex modelling workbook. The four scenarios analysed are:

1. historical unit costs and calibrated expected replacement lives
2. comparative unit costs and calibrated expected replacement lives
3. historical unit costs and comparative expected replacement lives
4. comparative unit costs and comparative expected replacement lives.

Comparative unit costs are defined as the minimum of a distributor's historical unit costs, its forecast unit costs and the median unit costs across the NEM. Comparative replacement lives are defined as the maximum of a distributor's calibrated expected replacement life and the median expected replacement life across the NEM.

D.4 Calibration

The calibration process estimates the average age at replacement for each asset category using the observed historical replacement practices of a distributor. The length of the historical period analysed during this process is referred to as the 'calibration period'. The inputs required to complete the calibration process are:

- the age profile of network assets currently in commission
- historical replacement volume and expenditure data for each asset category.

The calibrated expected replacement lives as derived through the repex model differ from the replacement lives that distributors report. During the calibration process, we assume the following:

- the calibration period is a historical period where a distributor's replacement practices are largely representative of its expected future replacement needs[143]
- we do not estimate a calibrated replacement life where a distributor did not replace any assets during the calibration period, because the calibration process relies on actual historical replacement volumes to derive a mean and standard deviation
- where a calibrated replacement life is not available, we substitute the value of a similar asset category.

D.5 Comparative analysis approach

Previous distribution determinations where we have used on the repex model have primarily focused on the 'historical scenario'. This scenario forecasts a distributor's

[143] Each distributor's specific repex modelling workbook outlines more detailed information on the calibration period chosen.

expected repex and replacement volumes based on its historical unit costs and asset replacement practices (which are used to derive expected replacement lives).

Our refined comparative analysis repex modelling approach builds on this previous analysis and now introduces the historical performances of other distributors in the NEM into the forecast period. The 'cost, lives and combined' scenarios rely on a comparative analysis technique that compares the performance of all distributors in the NEM. The technique analyses the two variable repex model inputs – unit costs and replacements lives.

The 'cost scenario' analyses the level of repex a distributor could achieve if its historical unit costs were improved to comparative unit costs. The 'lives scenario' analyses the level of repex a distributor could achieve if its calibrated expected replacement lives were improved to comparative expected replacement lives.

Unit costs

The comparative analysis technique compares a distributor's historical unit costs, forecast unit costs and median unit costs across the NEM. Historical unit costs are derived from a distributor's category analysis RIN and forecast unit costs are derived from a distributor's reset RIN, which is submitted as part of its proposal.

The median unit costs across the NEM are based on each distributor's historical unit cost for each asset category. The median unit cost is used for comparative analysis purposes because this approach effectively removes any outliers, either due to unique network characteristics or data reporting anomalies.

The United Kingdom's Office of Gas and Electricity Markets (Ofgem) has a similar approach to unit costs benchmarking, where Ofgem applies a unit cost reduction where the distributor's forecast unit cost was higher than industry median.[144] The unit cost input used in the 'cost' and 'combined' scenarios is the minimum of a distributor's historical unit costs, its forecast unit costs and the median unit costs across the NEM.

Expected replacement lives

For expected replacement lives, the comparative analysis technique compares a distributor's calibrated replacement lives (based on historical replacement practices) and the median expected replacement lives across the NEM. Median expected replacement lives are based on each distributor's calibrated replacement lives for each asset category. Once again, using the median value effectively accounts for any outliers.

---

[144] Ofgem, *Strategy decisions for the RIIO-ED1 electricity distribution price control - tools for cost assessment*, 4 March 2013.

The expected replacement life input used in the 'lives' and 'combined' scenarios is the maximum of a distributor's calibrated replacement life and the median replacement life across the NEM.

Repex model threshold

Our 'repex model threshold' is defined taking these results and other relevant factors into consideration. For the 2019–24 determinations, our proposed approach is to set the repex model threshold equal to the highest result out of the 'cost scenario' and the 'lives scenario'.[145] This approach gives consideration to the inherent interrelationship between the unit cost and expected replacement life of network assets.

For example, a distributor may have higher than average unit costs for particular assets, but these assets may in turn have longer expected replacement lives. In contrast, a distributor may have lower than average unit costs for particular assets, but these assets may have shorter expected replacement lives.

D.6 Non-like-for-like replacement – the treatment of staked wooden poles

The staking of a wooden pole is the practice of attaching a metal support structure (a stake or bracket) to reinforce an aged wooden pole.[146] The practice has been adopted by distributors as a low-cost option to extend the life of a wooden pole. These assets require special consideration in the repex model because, unlike most other asset types, they are not installed or replaced on a like-for-like basis.

Replacement expenditure is normally considered to be on a like-for-like basis. When an asset is identified for replacement, it is assumed that the asset will be replaced with its modern equivalent and not a different asset.[147] The repex model forecasts the volume of old assets that need to be replaced, not the volume of new assets that need to be installed. This is simple to deal with when an asset is replaced on a like-for-like basis – the old asset is simply replaced by its modern equivalent. Where like-for-like replacement is appropriate, it follows that the number of assets that need to be replaced matches the number of new assets that need to be installed.

However, where old assets are commonly replaced with a different asset, we cannot simply assume the cost of the new asset will match the cost of the old asset's modern equivalent. As the repex model forecasts the number of old assets that need to be replaced, it is necessary to make adjustments for the asset's unit cost and calibrated

---

[145] Our modelling approach means the 'historical scenario' will always be higher than the 'cost scenario' and the 'lives scenario', and the 'combined scenario' will always be lower than the 'cost scenario' and the 'lives scenario'.

[146] The equivalent practice for stobie poles is known as "plating", which similarly provides a low-cost life extension. SA Power Networks carries out this process. For simplicity, this section only refers to the staking process.

[147] For example, conductor rated to carry low voltage will be replaced with conductor of the same rating, not conductor rated for high-voltage purposes.

replacement life. For modelling purposes, the only category where this is significant is wooden poles.

TasNetworks also typically undertakes significant non-like-for-like replacement throughout its network. This is primarily because TasNetworks generally replaces older low-voltage wooden, steel or concrete poles with new fibreglass poles. The way these assets are accounted for in the repex modelling is similar to the explanation above and is explained in more detail in TasNetworks' specific repex modelling workbook.

Staked and unstaked wooden poles

Staked wooden poles are treated as different assets to unstaked poles in the repex model. This is because staked and unstaked poles have different expected replacement lives and different unit costs.

There are two asset replacements options and two associated unit costs that may be made by a distributor – a new pole could replace the old one or the old pole could be staked to extend its life.[148]

Also, there are circumstances where an in-commission staked pole needs to be replaced. Staking is a one-off process. When a staked pole needs to be replaced, a new pole must be installed in its place. The cost of replacing an in-commission staked pole is assumed to be the same as the cost of a new pole.

Unit cost blending

We use a process of unit cost blending to account for the non-like-for-like asset categories. For unstaked wooden poles that need to be replaced, there are two appropriate unit costs – the cost of installing a new pole and the cost of staking an old pole. We use a weighted average between the unit cost of staking and the unit cost of pole replacement to arrive at a blended unit cost.[149]

For staked wooden poles, we ask distributors for additional historical data on the proportion of staked wooden poles that are replaced. The unit cost of replacing a staked wooden pole is a weighted average based on the historical proportion of staked pole types that are replaced. Where historical data is not available, we use the asset age data to determine what proportion of the network each pole category represented and use this information to weight the unit costs.

---

[148] When a wooden pole needs to be replaced, it will either be staked or replaced with a new pole. The decision on which replacement type will be carried out is made by determining whether the stake will be effective in extending the pole's life and is usually based on the condition of the pole base. If the wood at the base has deteriorated significantly, staking will not be effective and the pole will need to be replaced. If there is enough sound wood to hold the stake, the life of the pole can be extended and the pole can be staked, which is a more economically efficient outcome.

[149] For example, if a distributor replaces a category of pole with a new pole 50 per cent of the time and stakes this category of the pole the other 50 per cent of the time, the blended unit cost would be a straight average of the two unit costs. If the mix was 60:40, the unit cost would be weighted accordingly.

Calibrating staked wooden poles

Special consideration also has to be given to staked wooden poles when determining their calibrated replacement lives. This is because historical replacement volumes are used in the calibration process. The RIN responses provide us with information on the volume of new assets installed over the calibration period. However, the repex model forecasts the volume of old assets being replaced. Since the replacement of staked poles is not on a like-for-like basis, we make an adjustment for the calibration process to function correctly.

We need to know the number of staked poles that reach the end of their economic life and are replaced over the calibration period, so an expected replacement life can be calibrated. The category analysis RINs currently only provide us with information on how many poles were staked each year, rather than how many staked poles were actually replaced. This additional information is provided by each of the distributors. Where this information is not available, we estimate the number of staked wooden poles replaced over the calibration period based on the data we have available.

E Demand

TasNetworks has utilised demand forecasts to help determine its forecast capex. We have reviewed TasNetworks' demand forecast in order to determine whether or not the proposed capex reasonably reflects a realistic expectation of forecast demand. Accurate, or at least unbiased, demand forecasts are important inputs to ensuring efficient levels of investment in the network.

Maximum demand trends give a high level indication of the need for expenditure on the network to meet changes in demand. Forecasts of increasing system demand generally signal an increased network utilisation which may, once any spare capacity in the network is used up, lead to a requirement for augex. Conversely forecasts of stagnant or falling system demand will generally signal falling network utilisation, a more limited requirement for augex, and the potential for the network to be rationalised in some locations.

E.1 TasNetworks' proposal

TasNetworks submitted that it had adopted the Australian Energy Market Operator (AEMO) 2017 connection point maximum demand forecasts for Tasmania to assess constraints and inform long-term development plans for its distribution network.[150]

AEMO's connection point forecasts for Tasmania show no significant growth in maximum demand over the 2019–24 regulatory control period, and overall are forecast to be flat, trending slightly upwards over the 20-year forecast period after an initial period of modest decline. TasNetworks submitted that, as a result, its augex forecasts are largely driven by non-demand related constraints, such as fault level and community reliability, together with renewal strategy and rationalisation projects.[151]

E.2 Position

We consider that AEMO's connection point demand forecasts for Tasmania, which TasNetworks has adopted as its forecast of maximum demand for the 2019–24 regulatory control period, reflect a realistic expectation of forecast demand for TasNetworks' transmission network.

E.3 Reasons for our position

We consider that AEMO's Tasmanian connection point maximum demand forecast is based on a consistent and well established forecasting methodology. AEMO produces connection point demand forecasts for each jurisdiction in the NEM as part of its national transmission planner functions.

---

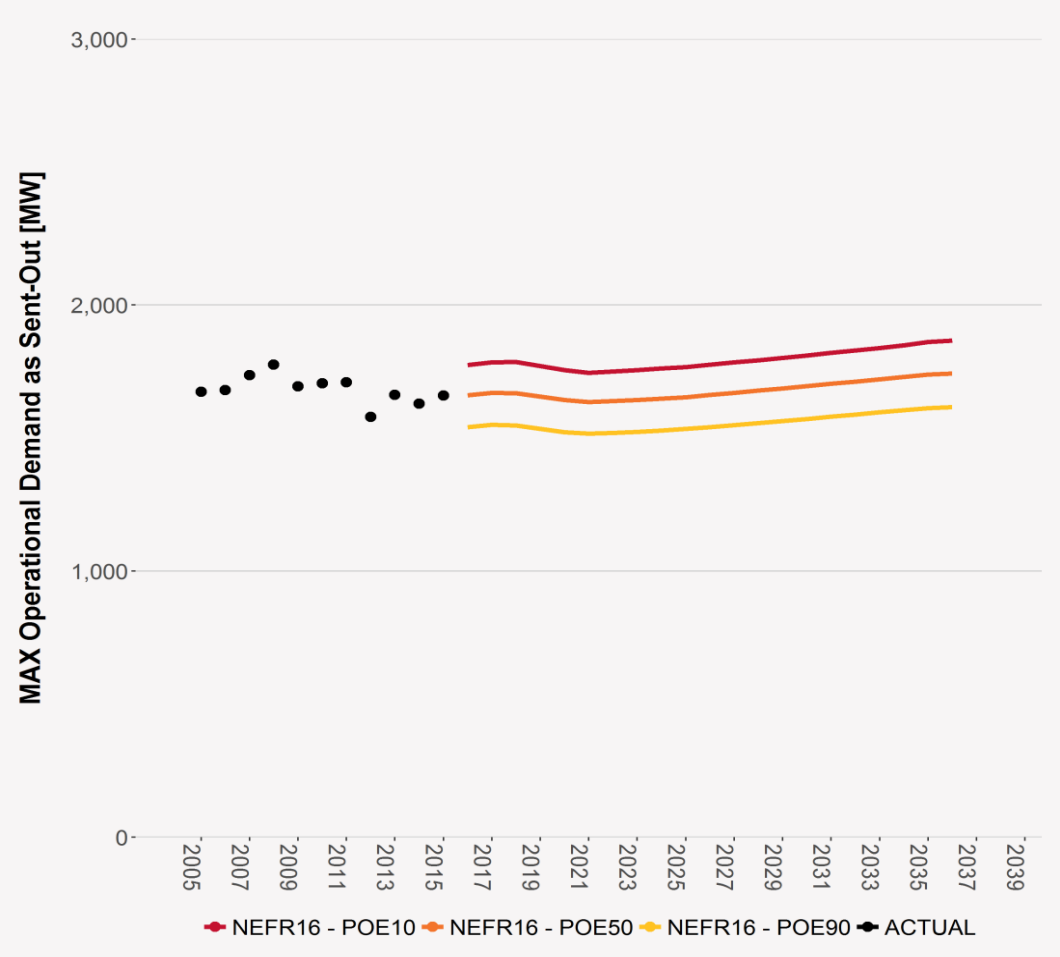
150 TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, 31 January 2018, p. 69.

151 TasNetworks, *Transmission and Distribution Regulatory Proposal 2019-2024*, 31 January 2018, p. 69.

AEMO's independent forecast of maximum demand in Tasmania is consistent with the long term underlying demand trend which occurred on TasNetworks' network historically. This trend showed flat or declining maximum demand in Tasmania, consistent with AEMO's demand forecasts for the 2019–24 regulatory control period. This is also consistent with the low levels of demand driven augex incurred by TasNetworks in the current regulatory control period and forecast by TasNetworks for the 2019–24 regulatory control period. This is discussed further in section B.2.

Figure E.3.1 shows that actual weather adjusted connection point maximum demand in Tasmania grew from 2006 to 2008, but steadily declined for the next five years (from 2008 to 2012). The demand then increased after 2012, but has not returned to the level previously observed in 2008 and has shown little or no growth since then.

Figure E.3.1 Actual and Forecast Maximum Demand for Tasmania



Source: TasNetworks, *Regulatory Proposal 2019-2024*, 31 January 2018, p. 70.

We received submissions in relation to TasNetworks' forecast demand. CCP13 expressed concern that TasNetworks had not provided detailed analysis of its demand

forecasts, and had relied on the 2016 AEMO National Electricity Forecasting Report forecasts and historic substation diversity factors.[152] The Tasmanian Small Business Council observed that the transmission load and generation connection forecasts are opaque.[153]

We consider that AEMO's transmission connection point demand forecasts are likely to be unbiased, and are based on a consistent and well-established forecasting methodology. Details of AEMO's transmission connection point maximum demand forecasting methodology are available on AEMO's website, which provides transparency to stakeholders regarding the forecasting methodology, inputs and assumptions applied in determining the demand forecasts.

While we are satisfied that AEMO's transmission connection point maximum demand forecasts are likely to reasonably reflect a realistic expectation of demand, AEMO has published updated transmission connection point maximum demand forecasts since TasNetworks submitted its initial proposal. We therefore anticipate that TasNetworks will utilise the latest available updated demand forecasts in developing its revised proposal.

[152] Consumer Challenge Panel Subpanel 13, *Response to proposals from TasNetworks for a revenue reset for the 2019-24 regulatory period*, 16 May 2018, p. 64.

[153] Tasmanian Small Business Council, *TasNetworks Transmission Revenue and Distribution Regulatory Proposal, 2019-20 to 2023-24 Submission*, May 2018, p. 20.

F Ex-post efficiency and prudency review

We are required to provide a statement on whether the roll forward of the regulatory asset base from the previous period contributes to the achievement of the capital expenditure incentive objective.[154] The capital expenditure incentive objective is to ensure that where the regulatory asset base is subject to adjustment in accordance with the NER, only expenditure that reasonably reflects the capex criteria is included in any increase in value of the regulatory asset base.[155]

The NER require that the last two years of the previous regulatory control period (for the purposes of this decision, the 2017–19 regulatory control period) are excluded from the ex-post assessment of past capex. However, the review period includes the last two years of the period preceding the previous regulatory control period (for this decision, the 2012–17 regulatory control period).[156] Accordingly, our ex-post assessment for this decision applies only to the 2015-16 and 2016-17 regulatory years.

We may exclude capex from being rolled into the RAB in three circumstances:[157]

1. Where the distribution business has spent more than its capex allowance.
2. Where the distribution business has incurred capex that represents a margin paid by the distribution business, where the margin refers to arrangements that do not reflect arm's length terms.
3. Where the distribution business's capex includes expenditure that should have been classified as opex as part of a distribution business's capitalisation policy.

F.1 Position

We are satisfied that TasNetworks' capital expenditure in the 2015-16 and 2016-17 regulatory years should be rolled into the RAB.

F.2 AER approach

We have conducted our assessment of past capex consistent with the approach set out in our capital expenditure incentive guideline (the Guideline). In our Guideline we outlined a two stage process for undertaking an ex-post assessment of capital expenditure:[158]

- Stage one - initial consideration of actual capex performance
- Stage two - detailed assessment of drivers of capex and management and planning tools and practices.

---

154 NER, cl. 6.12.2(b).
155 NER, cl. 6.4A(a).
156 NER, cl. S6.2.2A(a1).
157 NER, cl. S6.2.2A(b).
158 AER, *Capital Expenditure Incentive Guideline*, November 2013, pp. 19–22.

The first stage considers whether the distribution business has overspent against its allowance and past capex performance. In accordance with our Guideline, we would only proceed to a more detailed assessment (stage two) if:

- a distribution business had overspent against its allowance
- the overspend was significant; and
- capex in the period of our ex-post assessment suggests that levels of capex may not be efficient or do not compare favourably to other transmission businesses.

F.3 AER assessment

We have reviewed TasNetworks' capex performance for the 2015-16 and 2016-17 regulatory years. This assessment has considered TasNetworks' out-turn capex relative to the regulatory allowance given the incentive properties of the regulatory regime for a distribution business to minimise costs.

TasNetworks incurred total capex above its forecast regulatory allowance in these regulatory years. Therefore, the overspending requirement for an efficiency review of past capex is satisfied.[159] We consider that the 'margin' and 'capitalisation' RAB adjustments are not satisfied.

Where we consider that the overspending requirement is satisfied, in accordance with our Guideline we then consider a range of factors to determine whether to move to stage two of the ex post review. These factors are:[160]

- whether the overspend is significant
- what is the distribution business's history of capex
- how the distribution business has performed relative to other businesses.

We have identified that TasNetworks overspent total net capex in 2015-16 by approximately 3 per cent, and in 2016-17 by approximately 28 per cent. The cumulative capex overspend across the ex post review period was 15.9 per cent. We consider that this cumulative overspend across the two years of the ex post review period could be considered significant, despite the relatively immaterial overspend in the 2015-16 year.

In order to consider the context for TasNetworks' capex overspend in the ex post review period, we then considered TasNetworks' history of capex, and how the business has performed relative to other businesses.

In considering TasNetworks' history of capex, as we stated in the Explanatory Statement for our Guideline:[161]

---

159 NER, cl. S6.2.2A(c).

160 AER, *Capital Expenditure Incentive Guideline*, November 2013, p. 14; and AER, *Explanatory statement - Capital Expenditure Incentive Guideline*, November 2013, p. 47.

> In making this assessment we are likely to take into account the differences between timing in regulatory control periods and the ex post review period when we look at a distributor's history of capex during stage 1 of our ex post review process. In particular, we will have regard to the available information on how a distributor has spent against its regulatory allowance for the regulatory control period.

We are conscious that the ex post review period does not align with the regulatory control period over which a capex forecast allowance is provided, in this case the 2012–17 regulatory control period. Our analysis of TasNetworks' actual net capex against the forecast regulatory allowance for this period, including the two years of the ex post review period, is shown below.

Table F.3.1 TasNetworks' actual net capex versus capex allowance - 2012-17 regulatory control period ($nominal)

Category	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Total net capex allowance	101.7	107.8	102.8	98.4	100.3	511.0
Total net actual capex	85.9	95.7	86.2	101.5	128.8	498.2
Capex overspend / (underspend)	(15.8)	(12.0)	(16.5)	3.1	28.5	(12.8)

Source: AER, *Aurora final determination 2012-17 PTRM*, 30 April 2012; AER, *TasNetworks final determination 2017-19 RFM*, 28 April 2017; TasNetworks, *Distribution RFM - Standard Control, January 2018*; and AER analysis.

Our analysis of TasNetworks' history of capex shows that although TasNetworks overspent its forecast net capex allowance in the 2015-16 and 2016-17 years (corresponding to the ex post review period for this decision) it underspent its total forecast net capex allowance for the 2012-17 regulatory control period. We consider that this suggests TasNetworks total actual capex for the 2012-17 regulatory control period, which includes the entirety of the ex post review period, is likely to reasonably reflect the capex criteria. We are therefore satisfied that including this actual capex in the RAB is likely to contribute towards achieving the capital expenditure incentive objective.[162]

This is because our approach to forecasting capex is to forecast the total amount of efficient capex required over the regulatory control period. Typically, a distribution business is then best placed to decide the projects and programs it needs to carry out. This means, from time to time, a distribution business may choose to defer expenditure that we initially considered to be prudent and efficient when forming our forecast of total capex for the regulatory control period. We consider it is important to provide

---

161 AER, *Explanatory Statement - Capital Expenditure Incentive Guideline*, November 2013, p. 54.

162 NER, cl. 6.4A(a).

incentives to efficiently defer capex (or bring forward other efficient capex) as circumstances change during the regulatory control period.

We have also had regard to some measures of input cost efficiency as published in our latest annual benchmarking report.[163] We recognise that there is no perfect benchmarking model, however we consider that our benchmarking models are the most robust measures of economic efficiency available and we can use this measure to assess a distribution business's efficiency over time and compared with other distribution businesses. The results from our most recent benchmarking report suggest that TasNetworks' overall efficiency declined in 2016, but improved in 2015. While TasNetworks was ranked ninth of thirteen on our multilateral total factor productivity score, it has achieved productivity increases in recent years.[164] We note that while this provides a relevant context, we have not used our benchmarking results in a determinative way for this capex draft decision, including in relation to this Ex-post efficiency and prudency review.

We also note that, in assessing the prudency and efficiency of TasNetworks capex in the ex post review period, we may only take into account information and analysis that the TasNetworks could reasonably be expected to have considered or undertaken at the time that it undertook the relevant capex.[165] We have therefore not taken into account the information and analysis relied upon in other areas of this draft decision, for example Arup's analysis and advice on aspects of TasNetworks' forecast capex, for this Ex-post efficiency and prudency review.

For the reasons set out above, we are satisfied that TasNetworks' capital expenditure in the 2015-16 and 2016-17 regulatory years should be rolled into the RAB.

---

[163] AER, *Annual benchmarking report: Electricity distribution network service providers*, November 2017.

[164] AER, *Annual benchmarking report: Electricity distribution network service providers*, November 2017, p. 8. However, TasNetworks could be considered an outlier compared to its peers in terms of system structure, which influences its multilateral total factor productivity score to some extent. Compared with other distributors, TasNetworks operates substantially less high voltage subtransmission assets and has a comparatively high proportion of lower voltage lines.

[165] NER, cl. S6.2.2A(h)(2).