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Ergon & Energex Regulatory Proposal 2020-25

Review of aspects of Ergon Energy and Energex's forecast capital expenditure

PUBLIC

Report to

Australian Energy Regulator

from

Energy Market Consulting associates

FINAL

September 2019

This report has been prepared to assist the Australian Energy Regulator (AER) with its determination of the appropriate revenues to be applied to the prescribed distribution services of Ergon and Energex from 1st July 2020 to 30th June 2025. The AER's determination is conducted in accordance with its responsibilities under the National Electricity Rules (NER). This report covers a particular and limited scope as defined by the AER and should not be read as a comprehensive assessment of proposed expenditure that has been conducted making use of all available assessment methods.

This report relies on information provided to EMCa by Energy Queensland for the Ergon and Energex regulated entities. EMCa disclaims liability for any errors or omissions, for the validity of information provided to EMCa by other parties, for the use of any information in this report by any party other than the AER and for the use of this report for any purpose other than the intended purpose.

In particular, this report is not intended to be used to support business cases or business investment decisions nor is this report intended to be read as an interpretation of the application of the NER or other legal instruments. EMCa's opinions in this report include considerations of materiality to the requirements of the AER and opinions stated or inferred in this report should be read in relation to this over-arching purpose.

Except where specifically noted, this report was prepared based on information provided by AER staff prior to 29 June 2019 and any information provided subsequent to this time may not have been taken into account.

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About EMCa

Energy Market Consulting associates (EMCa) is a niche firm, established in 2002 and specialising in the policy, strategy, implementation and operation of energy markets and related network management, access and regulatory arrangements. EMCa combines senior energy economic and regulatory management consulting experience with the experience of senior managers with engineering/technical backgrounds in the electricity and gas sectors.

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Executive Summary

Overarching findings

1. For the aspects of capex that we were asked to review, we consider EQ's total capex forecast of $1,743.0m for the next RCP (comprising $1,094.4m of repex for Ergon and $648.6m of combined ICT capex for Ergon and Energex) to be overstated. Our overarching findings to support this assessment are set out below, followed by our findings specific to proposed repex for Ergon and proposed ICT capex for Ergon and Energex.

Findings on EQ's governance, management and expenditure forecasting processes

2. In regard to the elements of each regulated entity's expenditure forecasts that we were asked to review, we consider that EQ does not consistently apply the structural elements of its investment governance and management framework and forecasting processes to a standard that would achieve a capex forecast that is prudent, efficient and reasonable in accordance with the NER capex criteria. Its forecasting processes have led to a systemic bias to over-estimation in the forecast that it has proposed.

3. Our specific concerns are based on:

    - emphasis on management (financial) constraints and implied tariffs in its top-down challenge to determine the size of the proposed capex program, rather than application of the capex criteria set out in the NER or testing against performance outcomes; and
    - insufficient information and insufficient evidence of rigour to justify the proposed expenditure either for internal assessment or to external reviewers, including a weak and poorly populated risk management framework.

Findings on Ergon repex

4. The repex proposed for Ergon is a bottom-up driven forecast that largely continues a reactive asset management approach, but with the addition of some new projects. It incorporates high volumes of low risk-rated projects under the guise of heightened safety. EQ has not demonstrated the application of an iterative top-down management challenge to achieve a risk-optimised position for the proposed Ergon repex allowance.

5. We observe that Ergon's forecast repex in the next RCP is 70.1% higher than Energex's forecast repex. This is despite both NSPs having similar volumes of actual and estimated repex in the current RCP. For instance, in the current RCP, Ergon has actual and estimated repex of $886.2m while Energex has actual and estimated repex of $864.4m. However, in the next RCP, Ergon's forecast repex is $1,094.4m whereas Energex's forecast repex is $643.4m. While it was not within our scope to review Energex's forecast repex, we consider this significant and unexplained variance to be consistent with the systemic bias to capex over-estimation that we have observed for Ergon.

6. We consider that amounts closer to its current RCP expenditure and closer to its initial Draft Forecast, are more likely to reflect prudent and efficient estimates of Ergon's repex requirements.

Findings on EQ ICT (applicable to Ergon and Energex)

7. EQ has proposed expenditure for minor system upgrade recurrent capex that is 56% higher than in the current RCP. EQ has not provided sufficient justification for this amount, which we would expect to exhibit greater stability over time.

8. EQ has proposed a high volume of non-recurrent ICT capex. Key projects in its current RCP are already running late, yet EQ has not demonstrated that it has taken this sufficiently into account, nor the deliverability of the proposed volume, its complexity and the inter-dependencies of the projects and programs on which it has based its forecast allowance.

9. We consider that a reasonable forecast of EQ's ICT expenditure allowances would:
   - remove expenditure contingencies that EQ has built into its forecasts;
   - reduce its proposed recurrent expenditure to be closer to current levels and
   - reduce proposed non-recurrent capex to more realistically allow for achievable program delivery.

10. For non-recurrent capex, we consider that reducing EQ's forecast by 10% to 15% would be a reasonable adjustment to take account of achievable program delivery; removal of expenditure contingencies would lead to a further reduction to EQ's proposed requirement.

1 Introduction

1.1 Purpose and scope of requested work

1.1.1 Purpose

11. The purpose of this report is to provide the Australian Energy Regulator (AER) with our findings from a review of defined elements of Ergon Energy (Ergon) and Energex's proposed capital expenditure (capex) forecast for the 2020-25 Regulatory Control Period (next RCP).

12. The assessment contained in this report is intended to assist the AER in its own analysis of the capex forecast as an input to its Draft Decision on Ergon and Energex's revenue requirements.

1.1.2 Scope

13. The scope of this review covers[1]:

    (i) Ergon's proposed repex;

    (ii) Ergon's proposed ICT capex; and

    (iii) Energex's proposed ICT capex.

1.1.3 Our approach

14. In undertaking our review, we:

    - completed a desktop review of the information provided to us by the AER, which included Ergon and Energex's Regulatory Proposal and associated supporting documents;

[1] As set out in our proposal dated February 2019 accepted by the AER for the Review of aspects of capital expenditure for EQ (Ergon Energy & Energex) and SAPN Regulatory Proposals 2020-25.

- prepared requests for specific additional information to be provided by Ergon and Energex;
- undertook onsite review meetings over two days with Ergon and Energex[2] to ensure we correctly understood the methodology and assumptions applied as the basis for its forecast expenditure requirements;
- undertook an assessment of Ergon and Energex's expenditure forecasts, which included reviewing for each business: (i) expenditure governance, management and forecasting framework; (ii) top-down portfolio challenge process; and (iii) application of expenditure justification and forecasting approach to a sample of projects and programs; and
- documented our evidence-based findings in this report.

15. We also provided feedback to AER staff on our preliminary findings in a teleconference on 11 June 2019, while drafting this report and presented our findings to the AER Board on 19 July 2019.

16. The specific and limited nature of our review does not extend to advising on all options and alternatives that may be reasonably considered by Ergon and Energex, nor does it consider all aspects of their capex forecast.[3] We have included additional observations in some areas based on our professional judgement that may assist the AER with its own assessment.

1.2 Structure of this report

17. Our main findings are summarised in the Executive Summary at the beginning of this report.

18. In this Section 1, we describe the purpose and scope of requested work, the approach we have applied in undertaking our review, and how this report has been structured to present our findings.

19. In Section 2, we present a contextual overview of Ergon and Energex's total capex program, including consideration of historical expenditure trends and capex forecasting performance.

20. In Section 3, we describe: (i) the governance and management framework that Ergon and Energex uses to plan and approve their capex projects and programs; (ii) Ergon and Energex's expenditure forecasting methodologies; and (iii) our observations of any systemic issues related to Ergon and Energex's application of this approach to forecast capital expenditure.

21. In Sections 4 and 5, we present the evidence-based assessment that support our findings for each in-scope aspect of capex, comprising:

    (i) Section 4 – Ergon Repex; and

    (ii) Section 5 – Ergon and Energex ICT.

[2] The onsite review meetings took place on 16 May 2019 and 17 May 2019.

[3] For example, our review does not include unit costs or supporting models, although we have included some observations where relevant.

1.3 Other

1.3.1 Information sources

22. We have examined relevant documents from Ergon and Energex's respective RPs, information supplied at the on-site meetings with Ergon and Energex personnel, and further documents provided by Ergon and Energex in response to our information requests. These documents are referenced directly where they are relevant to our findings.

23. Our assessment is based on our review of the information supplied, our observations from the onsite meetings, and our professional judgement. In our consideration of Ergon and Energex's responses to EMCa's information requests, and at the request of the AER, we have included additional advice to support our assessment.

24. Where available, we sourced expenditure data for analysis from Ergon and Energex's Reset Regulatory Information Notices (RIN). Any other data relied upon for analysis is referenced in our report.

1.3.2 Rounding of numbers and real conversion

25. Numerical totals in tables may not present as being equivalent to the sum of the individual numbers due to the effects of rounding. Also, some numbers in this report may differ from those shown in Ergon and Energex's regulatory submissions or other documents due to rounding.

26. This report refers to costs in real June 2020 dollars unless denoted otherwise.

2 Background

2.1 Introduction

27. In this section, we provide background and context to support our assessment of proposed capital expenditure for Ergon and Energex.

28. We first provide an overview of Ergon and Energex's total proposed capex for the next RCP and compare this forecast to actual and estimated capex for the current and previous RCP. Second, we include observations of Ergon and Energex's actual and forecast capex for the current RCP.

29. Finally, we summarise the National Electricity Rules (NER) capital expenditure criteria and capital expenditure objectives that guide our assessment.

2.2 Overview of proposed capex

2.2.1 Introduction

30. In this section, we provide an overview of Ergon and Energex's total capex, by asset category, for each year of the next RCP and the current RCP.

2.2.2 Overview of Ergon's actual and proposed total capex

31. Table 1 below shows Ergon's proposed capex by expenditure category for each year of the next RCP. Total forecast gross capex for the next RCP is $2,904.7m. After adjustment for capital contributions from customers of $206.0m, total forecast net capex is $2,698.7m. Compared to the current RCP, Ergon's forecast represents a $61.4m (2.2%) increase in total gross capex and a $65.9m (2.5%) increase in total net capex.

Table 1: Ergon's proposed total capex for the next RCP

$m, real June 2020	Forecast					Total Next RCP
	2020/21	2021/22	2022/23	2023/24	2024/25	
Replacement expenditure	200.1	199.6	221.3	234.2	239.1	**1,094.4**
Connections	79.3	76.8	72.8	73.0	74.0	**375.9**
Augmentation Expenditure	55.5	61.5	56.1	42.3	33.0	**248.5**
Non-network	162.9	168.6	169.9	153.4	157.5	**812.3**
Capitalised network overheads	70.9	72.0	73.9	76.6	80.1	**373.6**
Total gross capex	**568.8**	**578.5**	**594.1**	**579.5**	**583.8**	**2,904.7**
Less Capital Contributions	*41.1*	*41.3*	*40.8*	*41.0*	*42.0*	***206.0***
Total net capex	**527.7**	**537.3**	**553.3**	**538.5**	**541.8**	**2,698.7**

Source: Ergon Reset RIN.

32. Table 2 below shows Ergon's actual and estimated capex by expenditure category for each year of the current RCP. Total gross capex for the current RCP is $2,843.3m. After adjustment for capital contributions from customers of $210.6m, total net capex is $2,632.8m. This represents a $524.2m shortfall relative to the AER net capex allowance of $3,157m.

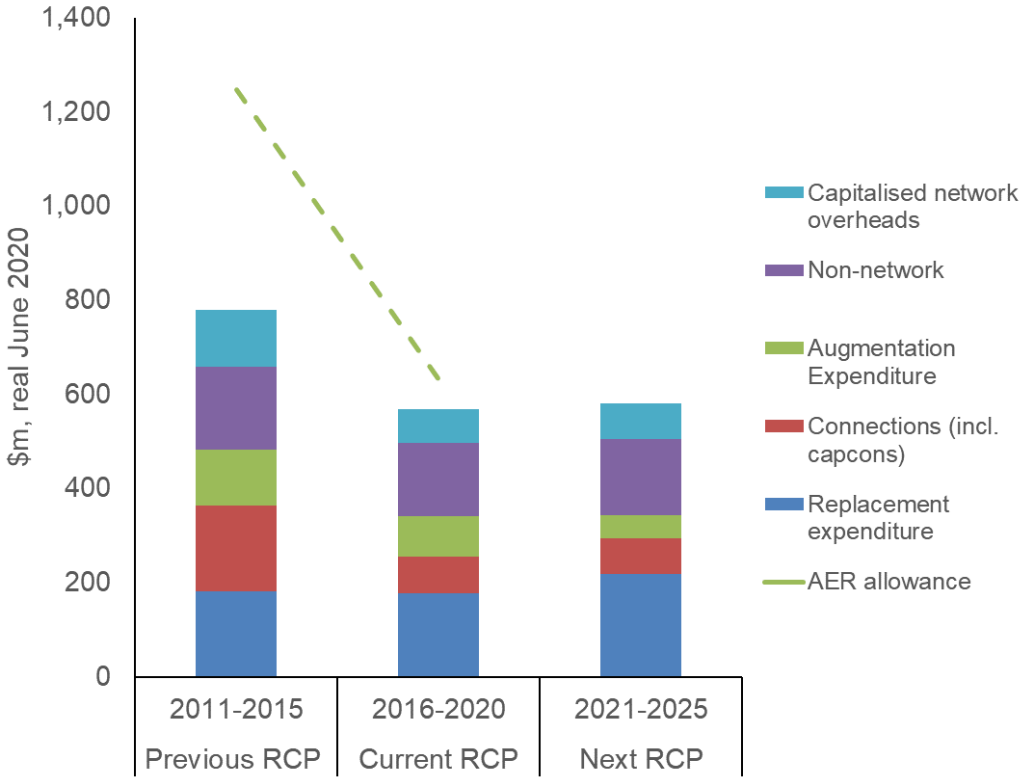
Table 2: Ergon's actual/estimated total capex for the current RCP

$m, real June 2020	Actual			Estimate		Total Current RCP
	2015/16	2016/17	2017/18	2018/19	2019/20	
Replacement expenditure	170.7	159.1	189.2	179.8	187.5	**886.2**
Connections	88.9	76.0	91.8	89.0	89.3	**435.0**
Augmentation Expenditure	142.3	132.0	41.5	38.4	35.6	**389.7**
Non-network	174.1	132.1	109.6	196.4	161.4	**773.6**
Capitalised network overheads	92.1	67.6	58.1	70.5	70.5	**358.8**
Total gross capex	**668.1**	**566.8**	**490.1**	**574.1**	**544.3**	**2,843.3**
Less Capital Contributions	*35.3*	*33.8*	*45.1*	*48.2*	*48.3*	***210.6***
Total net capex	**632.8**	**533.0**	**445.1**	**525.9**	**496.0**	**2,632.8**
AER allowance	736.8	664.3	611.5	*577.3*	567.2	**3,157.0**
Variance	*-104.0*	*-131.3*	*-166.4*	*-51.4*	*-71.2*	***-524.2***

Source: Ergon RP document Table 21 and AER final decision Attachment 6, pg 20

33. Figure 1 below shows Ergon's annualised total capex and expenditure category composition for each of the 2010-15 RCP (previous RCP), 2015-20 RCP (current RCP), and 2020-25 RCP (next RCP). The AER's capex allowance is also shown for the previous and current RCP.

Figure 1: Ergon's annualised total gross capex for the previous, current and next RCP by expenditure category and AER capex allowance



Source: Ergon RP Table 21 and 22, AER final decision 2011-15 Table 7.22, and AER final decision 2016-2020 Table 6.3.

34. Figure 1 shows that Ergon has significantly underspent the AER's capex allowance for both the current and previous RCP's. Compared to the current RCP, the figure also shows an upward trend in total gross annualised capex in the next RCP that is primarily driven by an increase in forecast repex.

35. Our assessment of Ergon's justification for historical underspend in the asset categories we have reviewed is presented in subsequent sections. However, the significant underspend relative to the AER capex allowance over a 10-year period indicates the possibility of a systemic bias to over-forecast capex requirements.

2.2.3 Overview of Energex's actual and proposed total capex

36. Table 3 below shows Energex's proposed gross and net capex by expenditure category for each year of the next RCP. Energex has forecast total gross capex for the next RCP of $2,326.9m. After adjustment for capital contributions from customers of $267.3m, total forecast net capex is $2,059.6m. Since net capex is not provided by Energex for the current RCP, we have limited our observation to gross capex. Compared to the current RCP, Energex's forecast represents a $518.6m (18.2%) reduction in total gross capex.

Table 3: Energex's proposed total capex by capex category for next RCP

$m, Real June 2020	Forecast					Total Next RCP
	2020/21	2021/22	2022/23	2023/24	2024/25	
Replacement	144.0	124.5	124.7	126.6	123.7	**643.4**
Connections	94.8	94.9	95.0	95.1	95.3	**475.0**
Augmentation	54.8	62.0	61.1	59.8	63.3	**301.1**
Non-Network	125.2	126.7	138.2	136.5	124.0	**650.5**
Capitalised Network Overheads	47.8	46.1	43.7	40.8	37.4	**215.7**
Capitalised corporate overheads	9.1	8.8	8.3	7.8	7.1	41.1
Total (Gross capex)	**475.7**	**462.9**	**471.0**	**466.5**	**450.8**	**2,326.9**
Less Capital Contributions	*53.5*	*53.5*	*53.5*	*53.5*	*53.5*	***267.3***
Total (Net capex)	**422.3**	**409.4**	**417.5**	**413.0**	**397.3**	**2,059.6**

Source: Energex Reset RIN.

37. The following table shows Energex's actual and estimated gross capex by asset category for each year of the current RCP. No information was provided for capital contributions from customers so we are unable to compare net capex as between the current and next RCP. Total gross capex for the current RCP is $2,845.5m. This represents a $376.0m under-spend relative to the AER allowance of $3,221.5m.

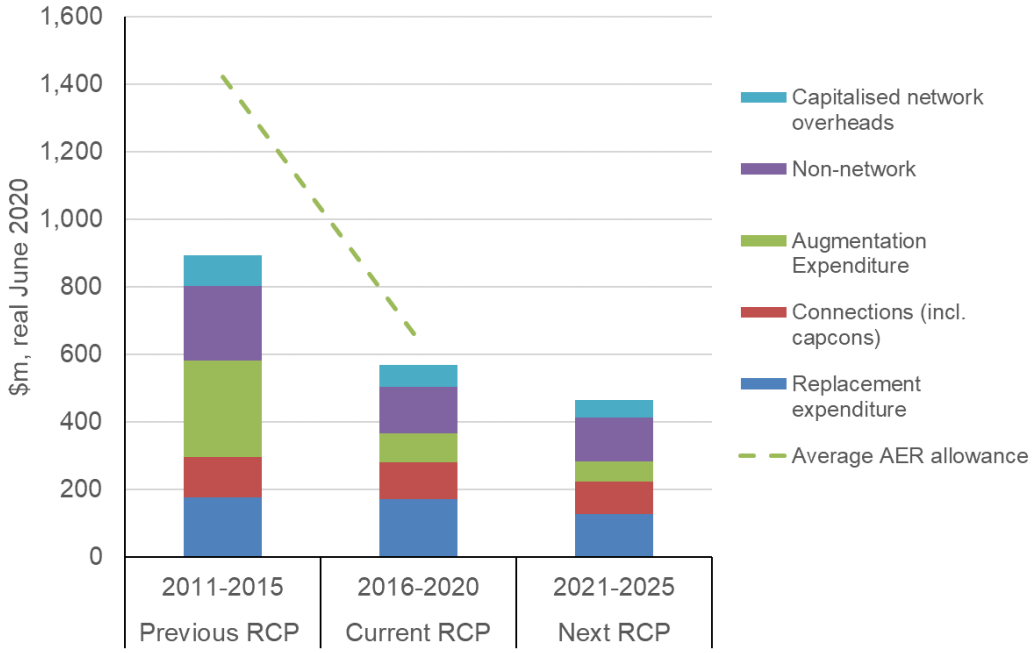
Table 4: Energex's actual/estimated total capex by capex category for current RCP

$m, Real June 2020	Actual			Estimate		Total Current RCP
	2015/16	2016/17	2017/18	2018/19	2019/20	
Replacement expenditure	202.7	220.1	168.6	135.6	137.4	**864.4**
Connections (incl. capcons)	126.4	122.3	101.8	96.9	95.6	**543.0**
Augmentation Expenditure	102.0	59.8	90.5	95.9	71.4	**419.6**
Non-network	134.1	111.6	116.4	177.3	161.0	**700.4**
Capitalised network overheads	65.5	68.5	68.1	58.0	58.0	**318.1**
Total gross capex	**630.7**	**582.3**	**545.4**	**563.7**	**523.4**	**2,845.5**
Average AER allowance	644.3	644.3	644.3	644.3	644.3	**3,221.5**
Variance	*-13.6*	*-62.0*	*-98.9*	*-80.6*	*-120.9*	***-376.0***

Source: Energex RP document Table 21 page 58

38. The figure below shows Energex's annualised total gross capex by expenditure category for each of the 2010-15 RCP (previous RCP), 2015-20 RCP (current RCP), and 2020-25 RCP (next RCP). For comparative purposes, the AER's capex allowance is also shown for the previous and current RCP.

Figure 2: Energex's annualised total gross capex for the previous, current, and next RCP by expenditure category, and AER capex allowance



Source: Ergon Reset RIN, RP document Table 21, pg 58

39. The figure above shows that Energex has significantly underspent the AER's capex allowance for both the current and previous RCP's. It also shows a significant downward trend in total gross annualised capex across these periods. As between the current and next RCP, there are significant forecast reductions across all expenditure categories. The largest forecast reductions are in repex and augex.

40. Our review of forecast capex for Energex is specific to ICT capex only. Accordingly, we have not provided an assessment of Energex's justification for historical capex underspend relative to the AER capex allowance.

2.3 NER Capex Objectives and Criteria

41. The AER must make its decision on Ergon and Energex's revenue allowance consistent with NER requirements – specifically, the 'capital expenditure criteria' and the 'capital expenditure objective' as stated in the figures below.[4]

42. The AER must accept Ergon and Energex's capex proposal if it is satisfied that the total forecast capital expenditure is prudent, efficient and reasonable, pursuant to the NER capex objectives and criteria.

43. The purpose of our review is to provide the AER with information and advice, consistent with these requirements, to assist its determination regarding specific aspects of Ergon and Energex's proposed capex for the next RCP.

[4] NER 6.5.7(c).

Figure 3: NER capital expenditure criteria

> *(c) The AER must:*
>
> *(1) subject to subparagraph (c)(2), accept the forecast of required capital expenditure of a Distribution Network Service Provider that is included in a building block proposal if the AER is satisfied that the total of the forecast capital expenditure for the regulatory control period reasonably reflects each of the following (the capital expenditure criteria):*
>
> *(i) the efficient costs of achieving the capital expenditure objectives;*
>
> *(ii) the costs that a prudent operator would require to achieve the capital expenditure objectives; and*
>
> *(iii) a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objectives.*

Source: NER 6.5.7(c).

44. The capital expenditure objectives referred to in the capital expenditure criteria are set out in the figure below.[5]

Figure 4: NER capital expenditure objectives

> *(a) A building block proposal must include the total forecast capital expenditure for the relevant regulatory control period which the Distribution Network Service Provider considers is required in order to achieve each of the following (the capital expenditure objectives):*
>
> *(1) meet or manage the expected demand for standard control services over that period;*
>
> *(2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;*
>
> *(3) to the extent that there is no applicable regulatory obligation or requirement in relation to:*
>
> *(i) the quality, reliability or security of supply of standard control services; or*
>
> *(ii) the reliability or security of the distribution system through the supply of standard control services,*
>
> *to the relevant extent:*
>
> *(iii) maintain the quality, reliability and security of supply of standard control services; and*
>
> *(iv) maintain the reliability and security of the distribution system through the supply of standard control services; and*
>
> *(4) maintain the safety of the distribution system through the supply of standard control services.*

Source: NER 6.5.7(a).

[5] NER 6.5.7(a).

3 EQ's governance and management framework and forecasting processes

3.1 Introduction

45. In this section, we provide an overview of Ergon and Energex's expenditure governance and management framework. We subsequently assess the extent to which expenditure forecasts developed under this framework, and that are within our scope of review, are likely to be prudent and efficient.

46. The extent to which Ergon and Energex's forecast requirements meet NER requirements is, in part, dependent on how the governance and management framework has been applied. Specifically:

- Section 4 considers how this framework was applied to repex for Ergon; and
- Section 5 considers how this framework was applied to ICT capex for Ergon and Energex.

3.2 EQ's expenditure governance, management and risk frameworks

47. Ergon provided a summary of the Energy Queensland Limited (EQL) Corporate Plan 2020 – 25, where it states that:[6]

'Energy Queensland was formed on 30 June 2016 to effectively merge the State's Government owned electricity distribution networks, regional retail electricity business (Ergon Energy Queensland Pty Ltd) and to prepare for the demands of the future in transitioning the Queensland energy sector.'

[6] EGX ERG 1.001 Corporate strategy JAN19

48. Further, Energy Queensland's Corporate Structure - Governance and Delegations document states that for both Ergon and Energex as Distribution Network Service Providers (DNSPs):[7]

> *'The main role of the Boards of the DNSPs is to operate their distribution networks in accordance with the strategy and control of the EQL Board, have oversight of the business of the DNSP, including legal and regulatory compliance and monitoring of financial performance and the solvency of the respective companies.'*

3.2.1 Investment governance framework

49. Ergon maintains an Investment Governance Framework (IGF) to provide guidance and accountability in respect of the development, determination and approval of investments.

50. Following the merger of Ergon and Energex, EQL implemented a common approach to its network planning with the development of new frameworks and governance processes. Ergon states that: [8]

> *'The program has been optimised, based on risk, across both networks and aligns to merger targets. A rigorous process of business cases, risk assessments and strategic estimates supports the program build which in turn assists the delivery of customer expectations and sustainable business outcomes. These business cases continue to be reviewed and the bottom-up build of the programs optimised, particularly with consideration for customer feedback and emerging asset related safety risks.'*

51. We sought evidence of the application of this common approach and governance process, including the optimisation and risk assessment process in our review of the proposed expenditure in sections 4 and 5.

3.2.2 Risk framework

Common risk management framework

52. Ergon states that the development of a common risk management framework was a priority for development of the common network planning approach. EQL adopted the Energex network risk management framework on the basis that it had been in use for some years:[9]

> *'This mature process has been applied across both Energex and Ergon in a consistent manner. While this methodology does not yet reflect some of the latest developments in risk management (e.g., full monetisation of risk), we believe that the maturity of the framework and its consistent application provides confidence that the developed programs demonstrate prudency and efficiency.'*

Network risk framework

53. Both Ergon and Energex maintain an integrated risk-based approach to the management of network assets that is aligned with ISO 55000: Asset Management.

[7] EGX ERG 17.021. Corporate Structure – Governance and Delegations Policy. JAN19.

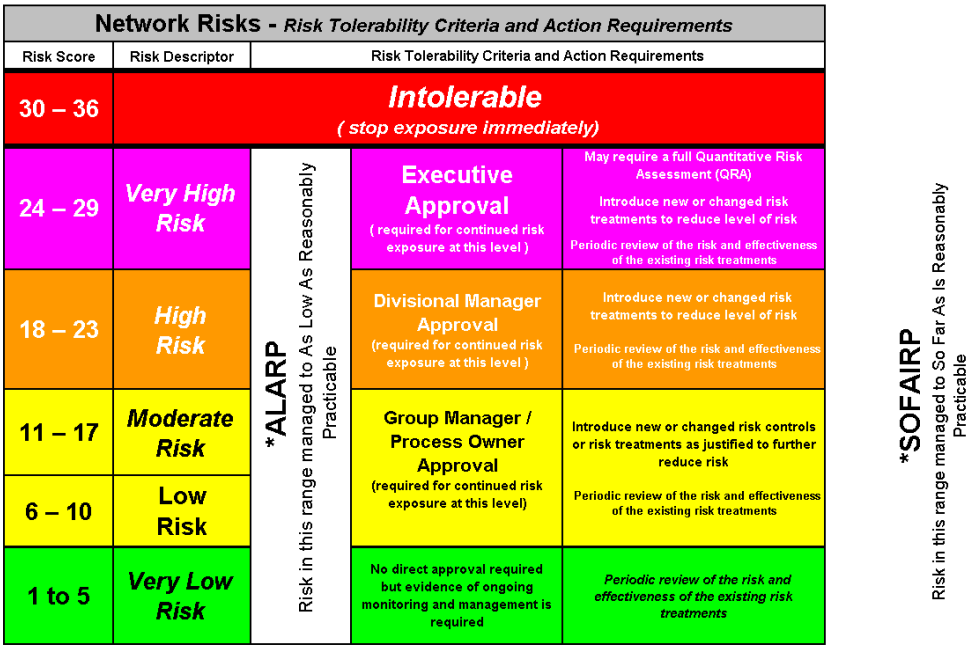
[8] EGX ERG 7.026. Asset Management Overview, Risk and Optimisation Strategy. JAN19.

[9] EGX ERG 7.026. Asset Management Overview, Risk and Optimisation Strategy. JAN19.

54. The Network Risk Framework exists as a subset of EQL's Enterprise Risk Management framework, developed in accordance with AS/NZS ISO 310000. The Network Risk Framework provides for assessment of risk consequences and likelihoods across five risk categories: (i) safety; (ii) environment; (iii) legislated requirements; (iv) customer impact; and (v) business impact, through application of a series of network risk evaluation tables.

55. The Network Risk Framework provides a mechanism to evaluate the tolerability of outcomes. It facilitates the prioritisation of investments that will control or mitigate the identified risks. EQ has produced a risk tolerability scale that relates the risk scores against the risk tolerability criteria as shown in the figure below.

Figure 5: Network risk tolerability scale



Source: EQ Attachment 7.026 Asset management overview, risk and optimisation strategy

Risk appetite

56. The Network Risk Framework includes Risk Appetite Statements (RAS) that describes the risk appetite of the Energy Queensland Board for each of the risk consequence areas. For example, for safety risk, as a major driver of repex, Ergon states that:[10]

> *'EQL has a very low risk appetite for risks that negatively affect the safety of our people and the community, resulting from the way our electricity distribution network is designed, operated or maintained. Mitigating risk so far as is reasonably practicable (SFAIRP) is a key objective focusing on a no compromise approach to community and staff safety, leveraging innovative solutions that enable continued improvements in the safe operation of our networks.'*

[10] EGX ERG 7.026. Asset Management Overview, Risk and Optimisation Strategy. JAN19.

3.3 EQ's capex forecasting processes

3.3.1 Introduction

57. In this section, we describe the methods by which Ergon and Energex developed the relevant elements of its capex forecast.

58. While some aspects of the methods applied by Ergon and Energex may apply across all components of its proposed capex forecast, the specific focus of our assessment is on the methods used to forecast expenditure in the categories that we were asked to review (namely, repex for Ergon and ICT for Ergon and Energex).

3.3.2 Network capex forecasting

Capex forecasting approach

59. Ergon describes its forecasting approach for network capex as comprising the following:

- Needs Analysis – establish network performance outcomes to deliver organisational targets, including in areas such as safety performance, responsibilities to the environment, financial outcomes and commitments to customers, as well as obligations to the community;
- Demand Analysis – critically review key inputs such as asset condition information, network demand growth and new technology against established performance outcomes to determine areas requiring intervention;
- Needs Solutions – prepare capital projects and programs that address the identified needs. This step includes capex / opex trade-offs and investigations of non-network solutions with the potential to defer the timing of major projects; and
- Portfolio Optimisation – reconcile projects and programs against top-down expenditure targets and optimise the portfolio having regard for a tolerable network risk profile.

Portfolio optimisation

60. Ergon describe its portfolio optimisation process for network capex as comprising the following steps:

- Step 1 – Bottom-Up Project and Program Build;
- Step 2 – Risk Assessment;
- Step 3 – Risk Score Review;
- Step 4 – Application of Top-Down Constraints;
- Step 5 – Develop Consolidated Risk-Optimised Program;
- Step 6 – Adjustment of Programs and Projects; and
- Step 7 – Program Approvals.

61. A separate investment governance and optimisation process was applicable to non-network expenditure including ICT and which we describe in section 5.

62. Ergon also states that:[11]

> *'The investment optimisation process uses a risk-based approach to enable comparisons of different bottom-up programs. This avoids issues of "picking winners" as it provides an objective comparison of diverse projects and programs and allows top-down constraints to be applied to risk-based bottom-up programs. It also allows a thorough understanding of the resultant risk profile of the program and ensures sustainability of approach. EQL acknowledges that other approaches to solve the program optimisation challenge are possible and we are committed to the ongoing development and refinement of optimisation techniques. However, at this point we have elected to optimise our program using the mature Network Risk Framework.'*

63. Ergon describes its process for developing the portfolio of projects and programs as being based on several critical considerations including:[12]

- '*the need to optimise the program subject to management-initiated constraints including long term sustainability, resource availability, and customer price. This includes comparison and optimisation across sub-programs that are different in nature and that have fundamentally different drivers;*
- *bundling planned works to obtain synergies across projects and programs, for delivery of the total program in the most efficient manner and least cost;*
- *the need to balance short-term imperatives with longer term sustainability and the incorporation of strategic technology solutions to address short-term issues in new and innovative ways (i.e., avoid the boom and bust cycles);*
- *the review of identified risks including significant industry changes; and*
- *mitigation options for risks including technology developments such as LV safety monitoring.*'

3.3.3 Ergon replacement activity forecasting

Overview

64. Ergon states that its repex program was developed through a combination of techniques including:[13]

- Individual Asset Assessments – for larger individual assets such as power transformers, circuit breakers and underground cables, an individual asset Condition Based Risk Management (CBRM) review is conducted to assess the failure risk of an asset. Risk scores are assigned to these assets which indicate the likelihood of failure, and replacement proposals are then made based on the risk score. Once these assessments are made, the planning and delivery of the work is coordinated and possibly combined with other works such as augmentation projects to enable efficient and timely delivery.
- Distribution Programs – where large asset populations exist, it is not feasible to conduct individual asset assessments and plans. Programs are developed based on a risk-based approach which considers aggregated condition assessments, failure information, age profiles, emerging trends

[11] EGX ERG Attachment 7.026. Asset Management, Risk and Optimisation Strategy. Page 7.

[12] EGX ERG Attachment 7.026. Asset Management. Risk and Optimisation Strategy. Page 7.

[13] EGX ERG Attachment 7.026. Asset Management, Risk and Optimisation Strategy. Page 5.

and specific asset risks. Each class of distribution asset (e.g., overhead conductors) is individually examined and a bottom-up proposal is developed. This is primarily based on the relevant Asset Management Plan (AMP), one of which exists for each major asset class. The AMPs provide all relevant information regarding the population including quantities, age profiles, common failure mechanisms, failure rate trends and detailed risk assessments.

Application of forecasting methods

65. Ergon uses two primary replacement strategies for its fleet of network assets: (i) proactive replacement based on Condition Based Reliability Monitoring (CBRM); and (ii) reactive replacement based on historical trends. A summary of the forecasting methods applied by Ergon to each asset class is provided in the figure below.

Figure 6: Summary of forecasting methods by asset class

Asset Class	Targeted	Inspection/Defect	In-service Failure
Poles	Asset Performance, Risk	Historical Trends	Historical Trends
Pole Top Structures	Incidental with Pole Replacement and Reconductoring	Historical Trends	Historical Trends
Overhead Conductor	Asset Performance, Risk	Historical Trends	Historical Trends
Services	Asset Performance, Risk	Historical Trends	Historical Trends
Distribution transformers	-	Historical Trends	Historical Trends
Switches	Asset Performance, Risk (substation only)	Historical Trends	Historical Trends
Substation Power Transformers	CBRM	-	Historical Expenditure (RTS*)
Circuit Breakers	CBRM	-	Historical Expenditure (RTS*)
Protection Relays	Age, Obsolescence, Asset Performance, Risk	Historical Trends	Historical Expenditure (RTS*)
SCADA	Age, Obsolescence, Asset Performance, Risk	Historical Trends	Historical Trends

Source: EQ's response to information request AER IR039

66. Where CBRM has not been applied,

- For distribution line assets, Ergon states that it has applied a performance driven replacement strategy. Ergon states that '*[t]he historical replacement rates and asset performance trends are used to forecast future replacement volume and expenditure. Where historical performance highlights a significant risk in a sub-population or asset class, target programs have been proposed.*'[14]
- For substation assets, Ergon states that it has applied a combination of condition and risk to initiate targeted replacement projects.

Application of CBRM forecasting for substation projects

67. As part of its proactive replacement approach, Ergon has adopted and applied EA Technology's CBRM modelling methodology. Its application to date has been to use CBRM on high value assets fleets where the effort required to develop, maintain, and collect the information required to support the models is justified. [15] The EA Technology CBRM methodology has been developed and applied by utilities over several years. Our expectation is that Ergon's use of CBRM would enable it to

[14] EQ's response to information request AER IR039

[15] ERG 7.050 Distribution Annual Planning Report DEC18 PUBLIC, page 121

provide detailed and compelling justification for asset replacement forecasts where it has been applied.

68. For Power Transformers, Circuit Breaker and Switchboard Replacement and Refurbishment, Ergon states that it has applied a CBRM approach to '*define the highest priority end-of-life replacement time of these assets, optimised for overall least cost and risk*.'[16]

69. For Control Systems (SCADA and DSS), Ergon does not apply the CBRM approach to its replacement and refurbishment forecasting but uses a proactive replacement approach where assets are replaced when the risk of in-service failure of equipment poses unacceptable risk to the safe operation of the network and to the business. [17] To do this Ergon uses risk factors such as asset performance, manufacturer support, business strategies, standards and future network needs. Setting the risk factors includes consideration of asset age, technological age limitations, obsolescence in the marketplace, failure rate (problematic units), spares availability, and internal business knowledge of the assets.[18]

Apportionment to RIN

70. Ergon has developed a bottom-up forecast of its proposed repex:

- For distribution-related expenditure - forecasts of each of the proposed defect management programs (P1, P2, CTGCTS and RTS),[19] and planned replacement projects and programs, have been apportioned to each of the RIN asset categories in a Distribution apportionment model;
- For substation-related expenditure - forecasts of each of the proposed projects and programs have been apportioned to each of the RIN asset categories in a Substation (SUBS) apportionment model; and
- For SCADA-related expenditure - forecasts of each of the proposed projects and programs have been apportioned to each of the RIN asset categories in a SCADA apportionment model.

71. A single consolidated apportionment model is provided that reconciles with the expenditure information provided in each of the apportionment models. After adjustment for[20] and inclusion of additional programs,[21] the consolidated apportionment model also reconciles to the RIN.

Justification statements

72. For each major asset type Ergon has developed a justification statement that outlines the rationale for its proposed repex. Within these documents, Ergon has included comparisons of the proposed repex forecast with outcomes of Ergon's modelling using the AER's repex model for each of the asset classes. Where

[16] ERG 7.050 Distribution Annual Planning Report. DEC18 PUBLIC. Page 122.

[17] EGX ERG 7.030 Asset Management Plan - Control Systems JAN19 PUBLIC, section 9.5.3, page 37

[18] EGX ERG 7.030 Asset Management Plan - Control Systems JAN19 PUBLIC, section 9.5.3, page 37

[19] Where P1 is Priority 1, P2 is Priority 2, CTGCTS is Clearance To Ground Clearance to Structure, and RTS is Return To Service

[20] Including removal of fleet costs, conversion to real $2020 and labour productivity of 3%.

[21] Including the LV Network Safety project.

justification statements were not provided (such as for SCADA projects), Ergon has provided Strategic Scope and Strategic Proposal documents.

3.3.4 ICT capex forecasting

73. The proposed ICT program is managed according to formal ICT investment governance, ICT portfolio management and project delivery lifecycle processes and methodologies and which exist separate to those for network capex. As discussed in section 5, EQ manages ICT asset replacements as either 'application' or 'infrastructure' assets and in accordance with its ICT Digital Asset Lifecycle Management guidelines.

3.3.5 Cost estimation approach

74. Ergon's cost estimation approach for network capex is largely based upon its revealed actual costs. Ergon reviews and monitors its cost estimation accuracy for projects and programs as follows:

- For project costs - Ergon has provided a review of the accuracy of larger value capital projects; and
- For program costs - the accuracy of estimated costs to actuals is monitored by the Network Operations Committee (NOC) which provides oversight of the program of work.

75. For ICT capex, EQ has not explicitly described its cost estimation methodology. However, all of its proposed ICT expenditure is supported by Business Cases. EQ also includes a self-assessment of the estimation accuracy (referred to by EQ as a 'Confidence rating') of the cost estimates.

3.3.6 Program deliverability

76. During our onsite discussion, Ergon claimed to have developed an integrated resource strategy and plan for delivery of its program of work. We requested a copy of this strategy from Ergon - however, at the time of preparing our report it had not been provided.

77. For its network capex program, Ergon has a dashboard to monitor progress of its program of work, for both cost and volumes.

78. For ICT capex, EQ has an ICT Project Delivery Lifecycle and applies the Digital Project Assurance Framework, which among other things includes the disciplines of a PMO, standard project progress tracking, health checks, project audits, and PIRs.

3.4 Our observations

3.4.1 Our observations on EQ's governance and management framework

79. Ergon's governance and management approach has been updated following the formation of EQ, including the development of a common network forecasting approach and governance process.

80. We observe that the Investment Governance Framework (IGF) including the risk framework and associated approval and justification processes should lead Ergon and Energex to develop a robust expenditure forecast. We sought evidence of the degree to which Ergon and Energex has applied its newly developed common investment governance process in the expenditure that we reviewed, and the evidence relied upon in complying with these processes.

81. In addition to adherence to its own process, we also looked for evidence that Ergon and Energex have satisfied the requirements of the NER and expenditure assessment guidelines, consistent with our scope of works.

3.4.2 Our observations on EQ's forecasting processes

82. Ergon has described the application of an iterative top-down challenge process to its capex forecast. We observe that this process includes application of management (financial) constraints. In our assessment of the proposed expenditure, we sought to understand the extent to which these management constraints have been applied to determine the size of the proposed capex program, and the implications to development of a prudent, efficient and reasonable program of forecast expenditure.

83. Specifically, in terms of the optimisation process applied by Ergon, we are concerned by the references made to the application of 'merger targets' in the development of a prudent and efficient level of expenditure, as the application of such constraints and targets may not be consistent with the requirements of the NER.

84. In our assessment of the proposed expenditure, we sought evidence of the justification of the proposed expenditure including how Ergon has applied its Network Risk Framework to its repex forecast. We also looked for evidence of how Ergon's forecasting methodologies have accounted for future Demand Management (DM) and other non-network solutions.

85. We note that the forecasting methodologies that apply to ICT for Ergon and for Energex differ from those applied to the remainder of the capex forecast, and we provide our observations on that process in section 5 of our report.

4 Ergon's proposed repex

4.1 Introduction

86. In this section, we provide our assessment of Ergon's repex forecast. We summarise and compare Ergon's proposed expenditure for the next RCP with actual/estimated expenditure for the current RCP. We subsequently provide our review of Ergon's forecast for each repex asset category and for the included sub-transmission major projects.

4.2 Summary of Ergon's proposed expenditure

4.2.1 Overview

87. Ergon has proposed a repex forecast of $1,094.4m for the next RCP. This reflects an increase of $208.2m (23.5%) when compared to actual/estimated expenditure of $886.2m in the current RCP. There are significant increases of $77.9m (154%) and $83.2m (42%) respectively in the 'Other repex' and 'Poles' asset categories as shown in the tables below.

Table 5: Forecast total repex by asset category for next RCP

$m, real June 2020	Forecast					Total Next RCP
	2020/21	2021/22	2022/23	2023/24	2024/25	
Poles	54.7	55.3	58.3	60.1	51.6	**279.9**
Pole top structures	24.9	25.0	25.8	26.2	24.2	**126.0**
Overhead conductors	20.0	20.1	20.7	21.1	19.5	**101.5**
Underground cables	0.8	0.8	0.8	0.8	0.8	**4.2**
Service lines	10.7	10.7	10.7	10.7	10.8	**53.6**
Transformers	33.5	34.2	38.7	43.4	47.7	**197.4**
Switchgear	21.4	17.3	29.8	29.9	30.1	**128.5**
Public lighting	2.6	2.6	2.6	2.6	2.6	**13.1**
Scada, network control and prote	13.3	12.3	9.3	11.3	15.5	**61.7**
Other	18.3	21.3	24.7	27.9	36.3	**128.5**
Total	**200.1**	**199.6**	**221.3**	**234.2**	**239.1**	**1,094.4**

Source: Ergon Reset RIN.

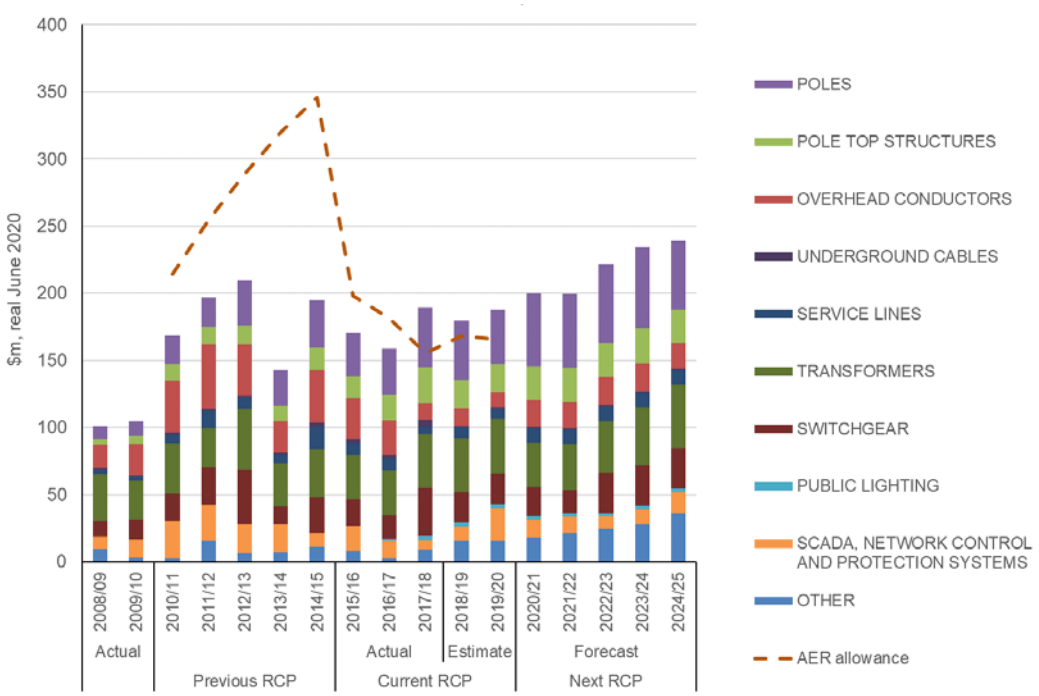
Table 6: Actual/estimated total repex by asset category for current RCP

$m, real June 2020	Actual			Estimate		Total Current RCP
	2015/16	2016/17	2017/18	2018/19	2019/20	
Poles	32.5	35.1	44.1	44.5	40.4	**196.7**
Pole top structures	16.4	18.5	26.9	20.6	20.6	**102.9**
Overhead conductors	30.3	25.9	12.5	13.4	11.5	**93.6**
Underground cables	3.3	2.3	5.1	0.8	0.9	**12.3**
Service lines	8.7	9.1	5.3	8.7	7.6	**39.3**
Transformers	33.2	33.2	40.5	40.0	40.7	**187.7**
Switchgear	19.6	17.9	35.6	22.6	22.9	**118.6**
Public lighting	0.0	1.4	3.2	2.9	3.0	**10.4**
Scada, network control and prote	18.5	13.2	7.2	10.8	24.4	**74.1**
Other	8.2	2.4	8.9	15.5	15.5	**50.6**
Total	**170.7**	**159.1**	**189.2**	**179.8**	**187.5**	**886.2**

Source: Ergon Reset RIN.

88. The figure below shows Ergon's actual, estimated and forecast repex, by asset category, for the previous, current and next RCPs. The AER's allowance for repex for the previous and current RCPs is also provided for comparison.

Figure 7: Repex for the previous, current and next RCPs

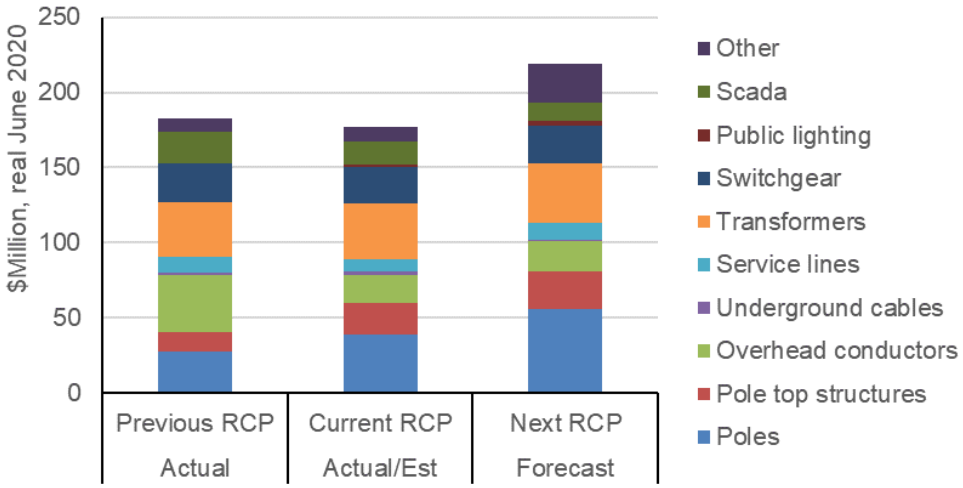


Source: Ergon Reset RIN.

89. The figure above shows that Ergon's replacement expenditure in the current RCP has been relatively flat. However, the forecast for the next RCP shows a steady year-over-year proposed increase across most expenditure categories, driven primarily by higher expenditure in the 'poles', 'pole-top structures', 'transformers', 'switchgear' and 'other' categories.

90. The figure below compares Ergon's annualised average repex for each expenditure category between the next RCP and the prior and current RCPs. This figure highlights the step increase in forecast annualised repex for the next RCP when compared to the stable and recurrent levels of historical annualised repex.

Figure 8: Annual average repex for the previous, current and next RCPs



Source: Ergon Reset RIN.

4.3 Assessment of Ergon's repex governance and management framework and forecasting processes

4.3.1 Introduction

91. In this section, we provide our assessment of the governance, management and forecasting process applied by Ergon in the development of its repex forecast.

4.3.2 Application of consumer price constraint

92. As a part of the optimisation process described in the previous section, Ergon states that programs are optimised to '*…ensure long-term sustainability and provision of a program that appropriately manages risks and fits within top-down constraints.*'[22]

93. We found statements in Ergon's justification statements that indicate to us that Ergon has applied a price constraint, where it states that '*[t]he proposed program is reflective of the commitment to constrain customer price impacts and continue to look for efficiencies in program delivery.*'[23]

94. We consider that a forecasting process designed to constrain expenditure levels to meet management constraints (such as a price outcome) may result in a network capex forecast - including repex - that is either too high or too low. In either case, we consider that this approach is not fit for purpose and does not reflect demonstrated system needs. It could be only by coincidence that this approach might result in a prudent and efficient expenditure forecast.

95. Capex - including repex - should be set to provide the prudent and efficient expenditure required to operate a safe and reliable network. We consider that application of management constraints on the overall business does not provide a meaningful discipline that would lead Ergon to a prudent and efficient capex level, unless this can be demonstrated as meeting the requirements of the NER.

96. It is our view that this externally driven view of expenditure prioritisation is not consistent with the NER criteria and is not consistent with good engineering or management practice. It leads us to consider the possibility that Ergon may have presented certain expenditure programs as 'ambit claims' to fall within an external target, and on the assumption that the regulator might disallow some. Therefore, and notwithstanding the apparent use of bottom-up forecasting methodologies at the category level, we paid particular attention to the application of those methods and their outcomes in order to advise in accordance with the NER criteria.

[22] EGX ERG 7.026 Asset Management Overview, Risk and Optimisation Strategy JAN19

[23] MULTIPLE Justification Statements.

4.3.3 Top-down assessment and portfolio adjustment process

Initial top-down challenge process appears to have led to a more prudent program than Ergon has proposed in its RP

97. Ergon describes a process of review and challenge undertaken with consumers that included: (i) preliminary consultation; (ii) development of the Draft Plan; and (iii) development of the Regulatory Proposal.

98. Ergon describes its top-down challenge process more fully in a response to our information request[24] and during the onsite discussion. As published in its Draft plans, Ergon describes having applied '…*an average $50 million per year top down constraint in our Ergon Energy repex forecast for the 2020 to 2025 regulatory control period. This will be delivered by leveraging better risk quantification and management of network risks through systems and technology*.' [25] We understand that Ergon applied its top-down constraint (i.e. of removing $50 million per annum) to its initial bottom-up forecast.

99. However, in Ergon's Regulatory proposal, its forecast repex increases from $886.2m to $1,094.4m. This represents a proposed increase of $208.2m. Ergon state that *'[s]ince our Draft Plans, a more detailed risk assessment has driven an increase to the Ergon Energy replacement capital expenditure forecast for safety driven projects in 2020-25.*'[26]

100. Ergon describes the increase as being developed to mitigate emerging risks, with overhead conductor and LV services programs materially increased. The key changes are summarised as:[27]

- additional $30m for Return to Service (RTS) allowances;
- additional $50m for substation projects;
- additional 72km per year of conductor replacement;
- additional 4,500 service line replacements;[28] and
- additional $100m to address Priority 2 (P2) defects to match historical performance.

101. Accordingly, from a methodology viewpoint, while the initial challenge process appears to have been effective in initially iterating towards a plan that appropriately considers safety and risk to arrive at a more prudent and efficient forecast, this outcome is not evident in Ergon's Regulatory Submission. We sought to understand the composition of the proposed expenditure including the risk assessment of the included projects and programs to justify the proposed increase in expenditure.

[24] Ergon's response to information request AER IR017.

[25] EQ Draft plans 2020-25. Page 77.

[26] ERG 1.004 2020-25. Regulatory Proposal. Page 5.

[27] Ergon's response to information request AER IR017.

[28] Assuming the current level of 4,000 p.a. which is lower than the historical replacement rate of 6,000 p.a.

4.3.4 Justification of expenditure

Bottom-up methodologies are based primarily on a reactive replacement approach

102. We note Ergon's use of different methodologies for forecasting required activity levels. We consider that use of the CBRM approach is generally appropriate where data exists for each asset class. However, in cases where historical information and trends has been relied upon, Ergon appears to favour a reactive management approach that is not consistent with good utility practice and does not provide sufficient information to support its proposed expenditure. Based on the application of a reactive management approach, the historical expenditure is unlikely to reflect efficient work practices, and an expenditure forecast based on a reactive management approach is not likely to be efficient.

103. In response to a request for information,[29] Ergon states that it '*has historically had a replacement program which was primarily reactive in nature and driven from defects identified through inspection. The combination of an aging network as well as observed deterioration in asset performance and increase in network risk has necessitated a change in asset management strategy to ensure that safety and legislative obligations as well as customer requirements are met. This change to a balance of proactive replacement as well as reactive programs provides a more sustainable approach to managing asset lifecycle and avoids the historical boom and bust investment cycles that have driven negative customer impacts. It is necessary to make this shift in strategy now to ensure that the observed asset performance trends and risks are managed in a sustainable manner and in a time frame that enables efficient and achievable delivery of work*.'

104. In our review of expenditure, we consider Ergon's application of its bottom-up methodologies to justify the repex forecast and whether this is reflective of a change in asset management strategy as described by Ergon.

Forecasting methods do not align with stated framework

105. We consider that the forecasting method applied by Ergon is not consistent with its description of its claimed robust approach to capex forecasting, which is stated to include: (i) needs analysis; (ii) demand analysis; (iii) needs solutions; and (iv) portfolio optimisation. For example, based on the information we reviewed, the defect driven distribution programs are based solely on historical levels of replacement and do not reflect performance-based outcomes arising from its inspection programs - or other critical review of inputs, as described by Ergon.

106. Ergon provided a summary of its expenditure forecast approval process, including elements that are under development. Ergon states that *'[o]ther elements of the Investment Approval framework including approvals for individual capex investment are in-development as EQL continues to harmonise the different approaches used by the Energex and Ergon Energy businesses*.'[30] In the absence of approvals for the components of the proposed capex program, we consider that Ergon has not demonstrated how its forecasting methods are aligned with an approved framework, including approval with its previous investment governance framework and in the absence of new processes and practices being developed.

[29] Ergon's response to information request AER IR013.

[30] Ergon's response to information request AER IR017.

4.3.5 Risk management

Concerns regarding application of the risk assessment process

107. Ergon states that[31] a '*risk-based approach has been used to develop individual bottom-up capital programs in the Energex and Ergon areas*.' Ergon includes a summary of its risk assessment approach in the supporting information provided for many of the projects included in the repex forecast. However, we did not see similar evidence for the many programs that we reviewed.

108. We did not find sufficient evidence or analysis to support the risk ratings that Ergon has adopted in either its projects or its programs.

Approach to ALARP and SFAIRP

109. Ergon's risk framework includes consideration of ALARP and SFAIRP. The framework applies the ALARP principle to its tolerability scale as presented in section 3. However, application of this framework in practice, including how ALARP has been assessed and achieved, is not evident in the justification statements or other supporting information provided in support of Ergon's forecast expenditure. Other than reference to ALARP and SFAIRP in tolerability scale documentation, we were not provided with an explanation of how Ergon makes its assessment for each of the projects and programs it has included in the proposed repex forecast.

4.3.6 Portfolio optimisation

Conservative assessment of risk ranking leads to inclusion of a large number of low risk projects

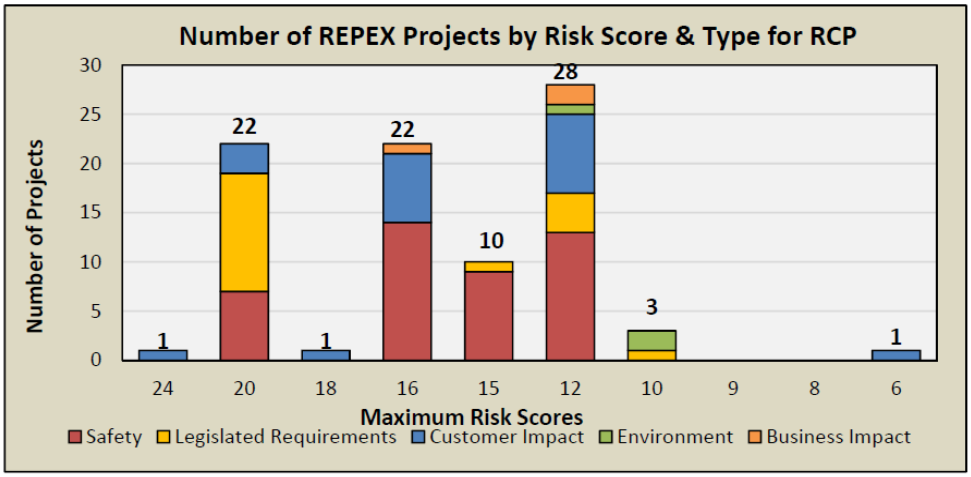
110. We are concerned that Ergon's risk framework may have led to an over-estimation bias in its repex forecast through inclusion of low risk projects without adequate justification for reasons discussed below.

111. In the figure below, Ergon presents a summary of its proposed repex program which it claims to reflect deferral of a number of lower risk projects.[32]

[31] EGX ERG 7.026. Asset Management Overview, Risk and Optimisation Strategy. JAN19.

[32] EQ's response to information request AER IR039.

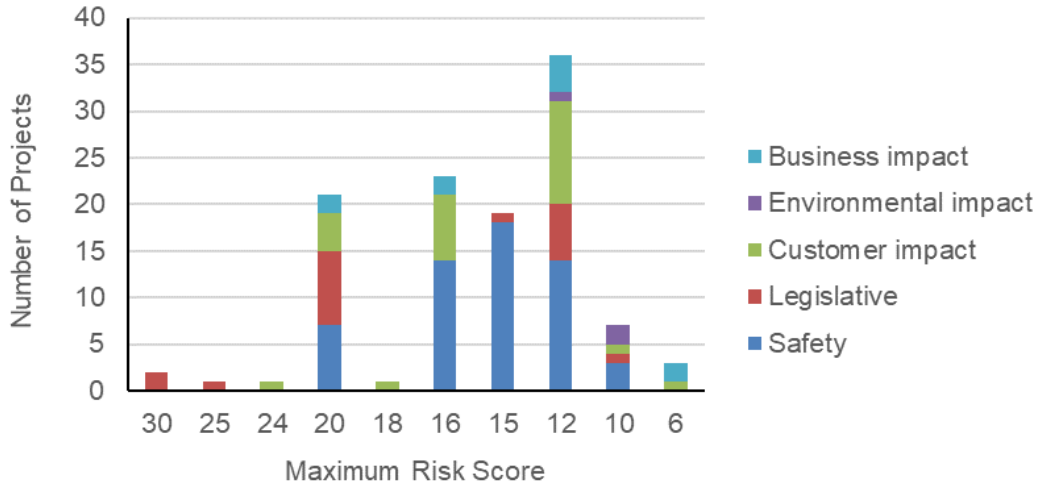
Figure 9: Summary of repex projects by highest risk score and associated risk category



Source: Ergon's response to information request AER IR038

112. The figure above includes 88 repex projects. We have undertaken our own analysis of the program of work submitted by Ergon. We calculate that the program comprises 114 unique projects and programs. This indicates that a higher number of projects have been included in Ergon's Regulatory Submission forecast.

Figure 10: Summary of repex projects by highest risk score and associated risk category



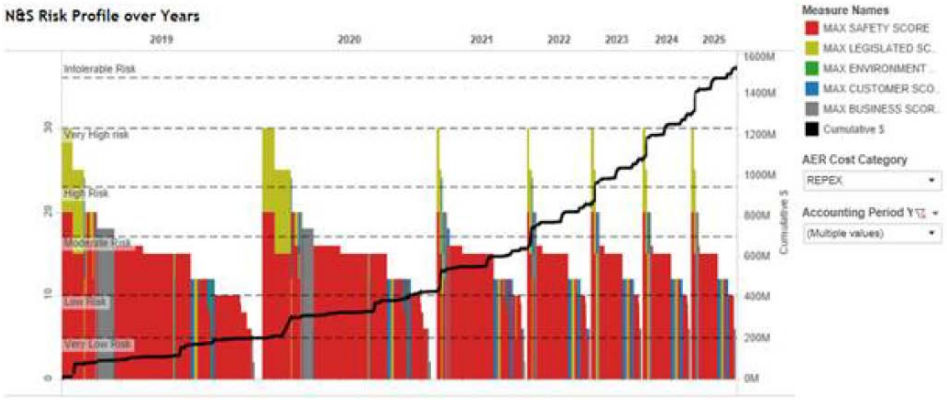
Source: EMCa analysis of data provided in Ergon's response to information request AER IR017

113. Based on the figure above, we observe that a higher number of lower risk projects appear to be present in the portfolio. This suggests to us that, on the basis that some projects were deferred where the risk was identified as low, other projects have subsequently been added to the program.

Portfolio view of risk reflects bias to inclusion of low risk projects

114. Ergon has presented a view of its program of work to illustrate the risk of an individual investment against the cumulative spend, reproduced in the figure below.

Figure 11: Summary of portfolio risk

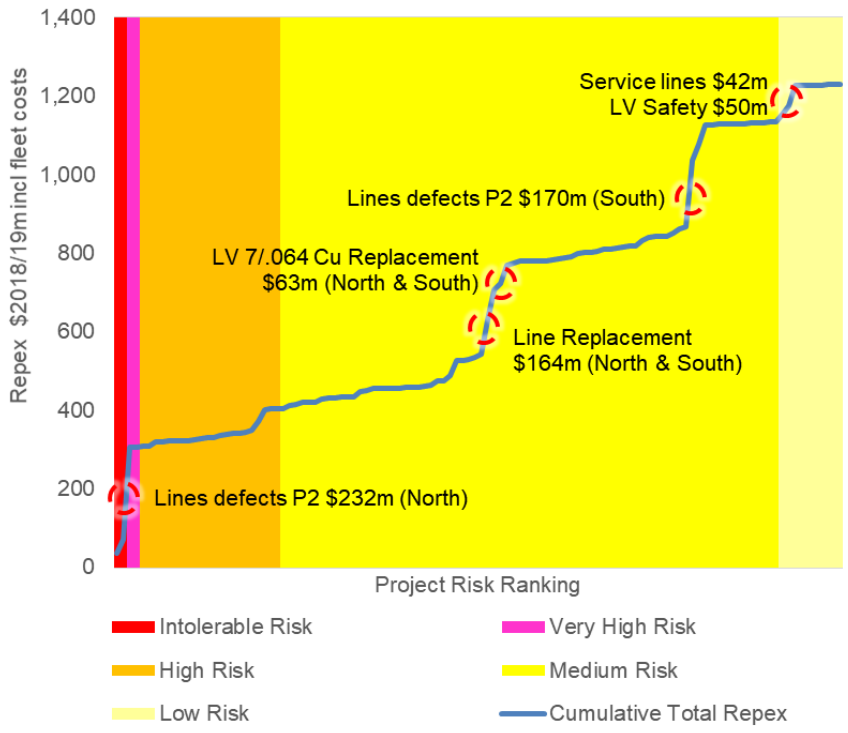


Source: Ergon's response to information request AER IR039[33]

115. From the above figure, we observe that the maximum risk level of an individual project and program is classified as 'Very High' when associated with a legislative risk. Also, that a large number of projects and programs are classified as moderate and low risk.

116. We sought to reproduce this chart from the program of work provided by Ergon and using the same general approach. However, we made changes to: (i) limit risks to the maximum value only to improve the presentation of the chart; and (ii) use the cumulative total RCP expenditure as a better indicator of relationship between the investment and the risk it is seeking to mitigate. The results of our analysis are presented in the figure below.

Figure 12: Summary of portfolio risk



Source: EMCa analysis of data provided in Ergon's response to information request AER IR017

[33] In the response, Ergon note that the cumulative expenditure may not reconcile with the proposed expenditure in the RIN.

117. In the above figure, we observe that there are only a small number of projects identified to address intolerable, very high and high risks, whilst the majority of the expenditure is targeting moderate/medium and low risks. We transposed a sample of the high expenditure projects onto the chart and observe, for instance, that:

- Low risk projects total $100m, including the service wire replacement program and LV Network safety project; and
- Lines defects P2 are classified as both Very High risk (for North) and Moderate risk (for South). The reason for the difference is not provided.

118. Ergon states that the risk assessments are reviewed and challenged by its SMEs. From our review of the information provided, the risk ratings of projects and programs evident in the proposed capex program do not appear to align with the description of risks in the network as provided by Ergon at the onsite meeting or the stated priorities of the program by Ergon.

119. We did not see evidence that the inclusion of its low risk projects and programs for other reasons such as meeting ALARP. Given these inconsistencies, the level of reliance that Ergon can place on this risk rating as a central component of its optimisation process appears questionable. In turn, this diminishes the likelihood that the proposed level of expenditure is prudent, efficient and reasonable.

Optimisation process is managed within a capex limit

120. Ergon explained that project optimisation is managed within a capital expenditure limit, whereby: '*[t]he program of replacement is managed on a risk basis within the portfolio of capital expenditure required for EQL.*'[34]

121. Also, '*[a]s described in 7.026, this program will be continually reviewed based on the emergence of new data, changes in asset condition, changes in customer and community requirements, changes in technology solutions and changes to ensure efficient delivery, such as resource smoothing. These changes may result in projects being advanced or deferred based on their risk comparative to the rest of the portfolio program. Projects will only be deferred where a project or program of higher risk is required to be introduced or advanced, and as such this will not have a material effect on the overall expenditure requirement.*'[35]

122. The explanation provided by Ergon indicates that the point of optimisation is set to achieve a capital expenditure outcome rather than a risk-optimised program of work. In our view, the data suggests that the optimal point based on risk score could deliver a lower overall repex program cost.

[34] Ergon Energy. Response to information request AER IR038 Capex_Governance_Repex_ICT_20190607_Final. Page 19.

[35] Ergon Energy. Response to information request AER IR038 Capex_Governance_Repex_ICT_20190607_Final. Page 28

4.3.7 Volume based forecasting

Forecast replacement volumes are not supported by evidence of observed performance

123. Ergon's forecast replacement volumes are based on its revealed historical replacement volumes. Based on the reactive replacement approach, we consider that reliance on historical trends is not sufficient justification for the forecast and may tend to overstate the required level of expenditure by repeating the same level of work.

124. This indicates that the work is a function of factors other than the observed performance of the assets. In the absence of better information, this could be the result of maintaining current management strategies or staffing levels.

Justification documentation is not robust

125. Ergon's justification statements did not include an adequate level of supporting evidence to justify the proposed expenditure. We therefore requested additional information from Ergon such as business cases, program documents, asset class plans, and asset condition reports to provide justification for the replacement volumes and expenditure forecast from Ergon. We also discussed our requests during our onsite meeting with Ergon and were led to believe that Ergon could provide such information, and that this was used as part of its own forecasting approach.

126. We observe that the information provided in response to our requests for information did not, in all circumstances, reflect the information that was referred to in discussions with staff during our onsite discussions and which we were led to believe exists in the business. We were not provided an explanation as to why the required evidence was not provided to justify the proposed expenditure forecast.

127. Ergon also stated that it had not needed to update its asset management plans as '*they do not include volume and costing forecasts.*'[36] Based on this information, we determined that the only source of volume and costing forecasts provided from Ergon aside from the RIN was the justification statements, and as noted above, the justification statements did not provide adequate justification.

128. Our review was hindered by the absence of evidence to justify the proposed volume and cost assumptions included in the proposed forecast, and how these assumptions reflect an optimised risk outcome as explained in its capital approval framework. Based on our experience, we consider that a typical DNSP should have this information readily available to support its claims. This is consistent with our experience of having undertaken numerous expenditure reviews for the AER and was reflected in our information requests of Ergon.

Review of its CBRM approach

129. To support Ergon's reliance on CBRM for forecasting repex, we would expect that Ergon would have provided independent assurance reports on the current level of maturity of its CBRM approach. For example, Ergon's implementation of EA Technologies CBRM method represents a significant project investment which we

[36] Ergon's response to information request AER IR039.

expect would be subject to periodic review and/or assessment by EA Technology or an independent assessor.

130. In our opinion, independent assessments of the current level of maturity of Ergon's CBRM, and the potential limitations due to immaturity, should have been provided by Ergon to support its proposal.

131. From the information provided by Ergon, we conclude that the current level of maturity of its CBRM methodology is relatively low. We formed this view based on the documentation that Ergon did provide, our on-site discussions, and review of the documentation provided to support major replacement projects. The following discussion provides further detail to elaborate on how we reached our views.

Support and justification expected for a CBRM-based expenditure forecast

132. Asset lifecycle management and CBRM have become mainstream asset management practices that we consider reflect good industry practice. Issues that affect the quality of outputs from CBRM applications include: (i) the quality and reliability of input data; and (ii) the maturity of the processes and the parameters that the business has set to derive the outputs (such as risk appetite level).

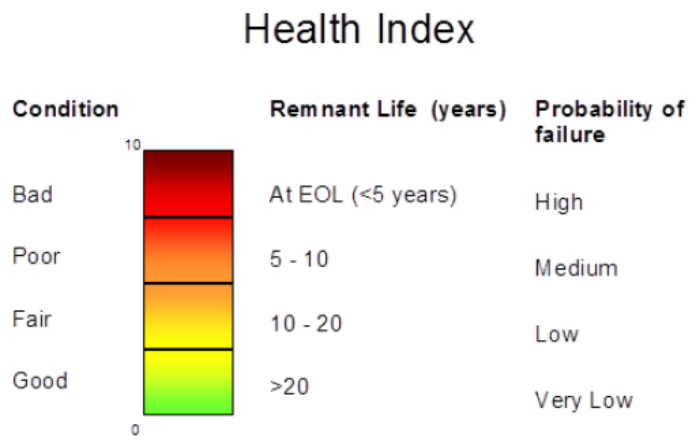
133. When applying CBRM, Ergon says[37] that it combines current asset condition information, engineering knowledge and practical experience to predict future asset condition, performance and residual life of assets. At a high-level Ergon's CBRM model documentation describes that it:

- establishes asset Health Indices (HI), and uses these, in conjunction with an engineering assessment, to form the initial list of candidate projects for replacement or refurbishment;
- sets risk scores to rank the candidate projects based on their consequence of failure in addition to their probability of failure; and
- applies top-down optimisation to the risk adjusted project and program list to form asset investment plans.

134. Ergon describes its assessment of asset health in reference to the figure below. Ergon has set the point at which it includes an asset in its list of candidates for replacement or refurbishment at a HI level of 7.5.

[37] Ergon Energy AER IR017-6a-EQL_CBRM Model Documentation, section 4.1, page 6

Figure 13: Health Index



Source: Ergon's response to information request AER IR017.

135. In addition to determining the asset health, Ergon also includes assets that have exceeded their technical life as potential candidates for replacement to avoid an unsustainable build-up of very aged assets. For example, substation transformers. The use of asset age alone to determine additional candidates for replacement undermines the use of CBRM.

136. We note that Ergon has in the past applied cost risk trade-offs for these assets:

> *'Historically, replacement within this asset category [substation transformers] has been deferred to provide allocation for distribution network replacement, however, the condition of the assets has reached a point where this is no longer considered feasible or tolerable from a risk perspective.'*[38]

137. Ergon has included an action in its asset management plan to remedy this issue:

> *'Increase the volume of substation asset replacement in the Northern and Southern region to address the existing Network Access Restrictions, and to deliver a long term sustainable program of replacement where assets are removed from the network prior to requiring a Network Access Restriction to be imposed due to condition.'* [39]

138. Instances where assets have been left in service until they have reached the point where access restrictions are applying significant constraints to the operation of substations suggests to us that there are issues with the accuracy and reliability of the asset condition data relied upon in its application of CBRM.

There are some data compatibility and reliability issues

139. Ergon says that, through a combination of inspection and testing the condition of substation transformers, it proactively monitors reactors and regulators. This includes dissolved gas testing and analysis to allow assessment of the asset's internal condition and remaining life.

140. Given this, we would expect Ergon to be able to demonstrate the accuracy and reliability of the data on which it bases its HI assessment. In support of a regulatory proposal, we would typically expect a NSP to include the results of periodic assessments of its data accuracy and reliability.

[38] ERG 7.076. Justification Statement - Substation Transformers. JAN19 PUBLIC. Page 4.

[39] ERG 7.076. Justification Statement - Substation Transformers. JAN19 PUBLIC. Page 39.

141. We would further expect periodic assessments to include assessments of any potential bias in asset inspection and testing applications. For example, it is possible that a bias towards pessimism can exist when individuals provide condition assessments. This can be due to the differences between the asymmetry of consequences arising from incorrect assessments. Periodic reviews can identify and address potential issues. We requested evidence of the above assessments. However, no such assessment reports have been provided. The absence of review reports on the reliability and accuracy of important data makes it difficult to conclude that output forecasts are reasonable and prudent.

142. We understand that Ergon and Energex are considering data quality initiatives that they claim will improve lifecycle management strategies and continue to support current strategies. The initiatives include the incorporation of asset condition data requirements in a new Enterprise Asset Management system. The objective of this initiative is to *'ensure the accurate and efficient capture of data from the field including provision for online condition sensor information.'*[40]

143. Furthermore, improvements to job completion processes within Ellipse would also see improvements in identifying lifecycle trends and lead to better engineering outcomes for the business. More details captured in job completion comments from field crews, when investigating and determining asset failures would be beneficial.[41]

144. Identifying and implementing ongoing improvements is reflective of good practice. Our primary concern regarding data reliability is that Ergon has provided insufficient information on the level of accuracy and reliability of its input data and the maturity of its application of CBRM. In the absence of this supporting information, it is not possible to determine if Ergon's proposed CBRM-based expenditure forecast is reasonable and prudent. We provide an example of the CBRM-derived replacement forecast to highlight our concerns below.

Substation transformer example of Ergon's CBRM application

145. Ergon has proposed a program for replacement of 31 substation transformers at a total estimated cost of $36.7 million: [42]

> *'Key actions for the lifecycle asset management of assets contained in this AMP include reviewing and aligning approaches to condition assessment, investigating causes of defects in OLTCs, and increasing the volume of substation asset replacement in the Northern and Southern regions to address the existing Network Access Restrictions and deliver a long-term sustainable program of replacement.'*
>
> *'Replacement of potential candidate assets is subsequently considered based on network requirements and in alignment with other network drivers such as augmentation and customer requested works to ensure the final option to address the identified limitation is the most cost effective from a whole-of-network perspective. The Ergon Energy risk framework is applied to prioritise asset replacement at a program level within financial and resource constraints.'*

146. In Ergon's Asset Management Plan for substation transformers we expected to find evidence of analysis and evaluation of the asset health data, including the

[40] EGX ERG 7.041. Asset Management Plan - Substation Transformers. JAN19 PUBLIC. Page 33.

[41] EGX ERG 7.030. Asset Management Plan - Control Systems. JAN19 PUBLIC. Page 33.

[42] EGX ERG 7.041 Asset Management Plan - Substation Transformers JAN19 PUBLIC

methodology through which it had tested the validity of its 7.5 HI threshold. Whilst the asset management plan included some information and discussion of the age profile and failure rates of the transformer assets, we were not provided with data or information on asset health, or other indicators to inform the basis for selection of the 31 substation transformers identified for replacement.

147. In our opinion, in respect of presentation of the HI analysis, the asset management plan should have included:

- a discussion on the reliability and accuracy of the data used to determine asset health;
- an explanation of how the data had been converted into HI;
- the current asset health profiles for the main asset types;
- the main components of the resulting list of assets to be replaced (e.g., chart of proportions of main asset types);
- an explanation of how risk assessment was applied to the list of assets;
- an explanation and the results of options and sensitivity analysis;
- the final list of assets to be included in the forecast (e.g., proportion of asset types in a chart); and
- the expected HI for the asset fleet at the end of the regulatory period.

148. In the absence of quality information on how Ergon applied its CBRM approach to develop its forecasts, it is not possible to conclude that the repex forecast is reasonable and prudent. Whilst the substation transformer example is only a single example, provided for illustrative purposes, we understand that this approach is reflected in other asset classes to which CBRM has been applied.

Delivery and cost efficiency are not demonstrated

149. Ergon has not provided sufficient analysis to support the reasonableness of the cost estimates included in its proposed forecast. In the absence of reasonable analysis, we consider that it is likely that costs and timing are providing a bias towards a higher-than-needed forecast for Major Projects and other related substation projects. For other projects and programs included in the repex forecast, we observe a heavy reliance on historical costs as the basis for its repex forecast.

150. Ergon has included a 3 percent productivity improvement in its program of works over the next RCP. This is applied to its labour costs for both forecast opex and capex. The productivity improvements are planned to be included in unit rates as part of annual budgets.

151. Ergon included the results of an external unit rates review by GHD for a range of repex and augex activities. GHD developed comparative estimates based on an accuracy of +/-40%, and assessed variance with reference to a reasonableness range of +/- 15%. The report concluded that in the opinion of GHD: '*Ergon Energy activity unit rates for the selected activities are reasonable and efficient compared with average marker costs for similar work in the Australian electricity industry*.'[43]

[43] Ergon. ERG 7.004. GHD External review.

152. The study was limited to presenting the variance between the GHD comparative assessment[44] and Ergon's own estimate. It did not include any other industry references, or detail the adjustments made to GHD's own data sources. We consider that the results of this study in its current form have limited value in undertaking a review of the efficiency of Ergon's unit costs.

153. We requested evidence of its resource strategy to ascertain how deliverability is considered by Ergon in developing its expenditure forecast, and how its resourcing decisions are reflected in efficient unit costs. We were particularly interested in how Ergon could demonstrate that the proposed increases in its repex forecast are deliverable, including those that are the result of continuing elevated levels of work from the current RCP.

154. Ergon did not provide a copy of its resource strategy. In the absence of better information, Ergon has not demonstrated that it will actually incur the forecast repex during the next RCP, or that the proposed repex is efficient.

4.4 Assessment of Ergon's proposed repex by asset category

4.4.1 Introduction

155. In this section, we present our assessment of forecast repex that Ergon has proposed for each asset category in the next RCP. Our review is focused on the major drivers of expenditure.

156. We reviewed the information provided by Ergon to support its proposed repex forecast, including a sample of projects and programs. Our focus was to ascertain the extent to which the issues identified in the preceding sections are evident at the activity level, and to validate that the forecast expenditure reflects the NER criteria.

157. We sought to establish the strategic basis for, and the reasonableness of, Ergon's proposed repex for each of the identified asset categories. We note that:

- the expenditure profile is increasing throughout the next RCP;
- public lighting has been included in its SCS repex forecast;
- Ergon has provided the bottom-up forecast and how this forecast has been apportioned to each of the RIN asset categories, and we have referred to this in our assessment; and
- the AER has provided EMCa with a summary of its preliminary modelling results using the AER's Repex model.[45] This identifies variances between its modelling and Ergon's repex forecast, the largest variance being associated with the asset categories of Poles, Switchgear and Transformers.

[44] Based on Class 4 estimates (+/-30%) for asset replacement activities and substation projects.

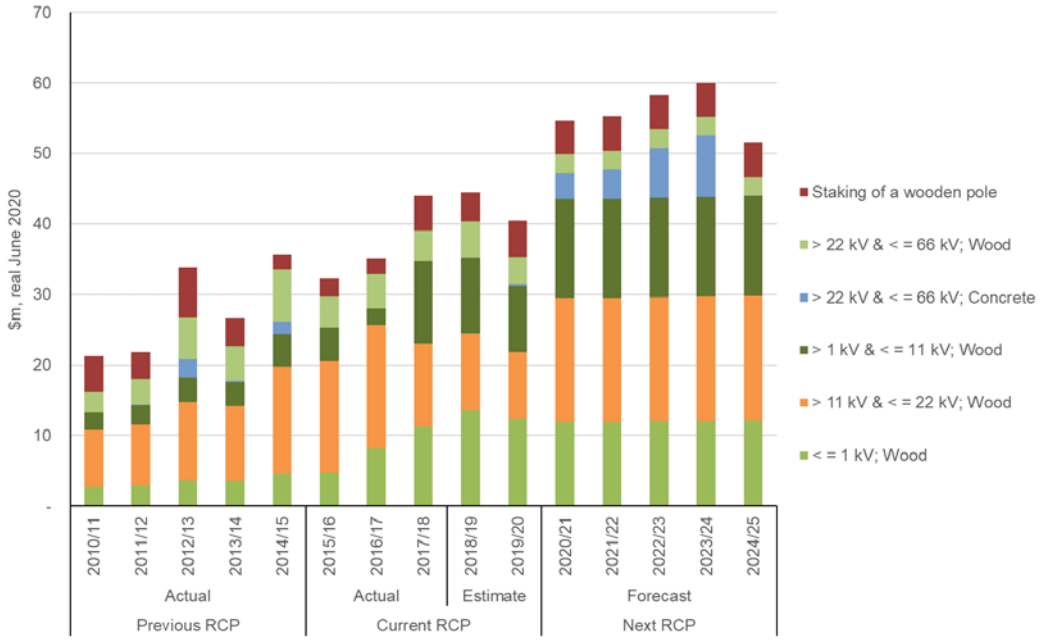
[45] EMCa has not been asked to review the AER Repex model as applied by Ergon or the AER or consider the reasonableness (or otherwise) of the forecast produced by the AER Repex model. Any comments pertaining to the AER's repex model are provided for information purposes only.

4.4.2 Poles

Ergon's forecast

158. Ergon has proposed $279.9m for the Poles asset category in its repex forecast for the next RCP. This represents an increase of $83.2m (42%) when compared with actual and estimated expenditure for the current RCP. The expenditure profile for the previous, current and next RCP for Poles is shown in the figure below.

Figure 14: Forecast repex for Poles asset category



Source: Ergon Reset RIN.

159. As shown in the figure above, there is a step increase in forecast repex for Poles in the next RCP. This step increase in expenditure is maintained for the first four years of the next RCP and then reduces to a lower level of expenditure in 2024/25, noting that the last year of the next RCP is still more than 20% higher than any year in the current RCP. According to the RIN, the largest increases are in 11kV wood, 22kV wood and 66kV concrete poles.

160. Ergon has included a description of its proposed pole and tower replacement programs in its Justification Statement – Poles and Towers.

Our assessment

161. The forecast repex for poles is based on the bottom-up forecasting method described above, including:

- For unplanned replacement, which is driven by expected line defects,[46] the historical replacement volume and the 3-year average unit cost[47] for each class of defects was used to develop the forecast expenditure. The historical replacement volume is similar to the 3-year average; however, the method of calculation or basis for the volume is not provided.

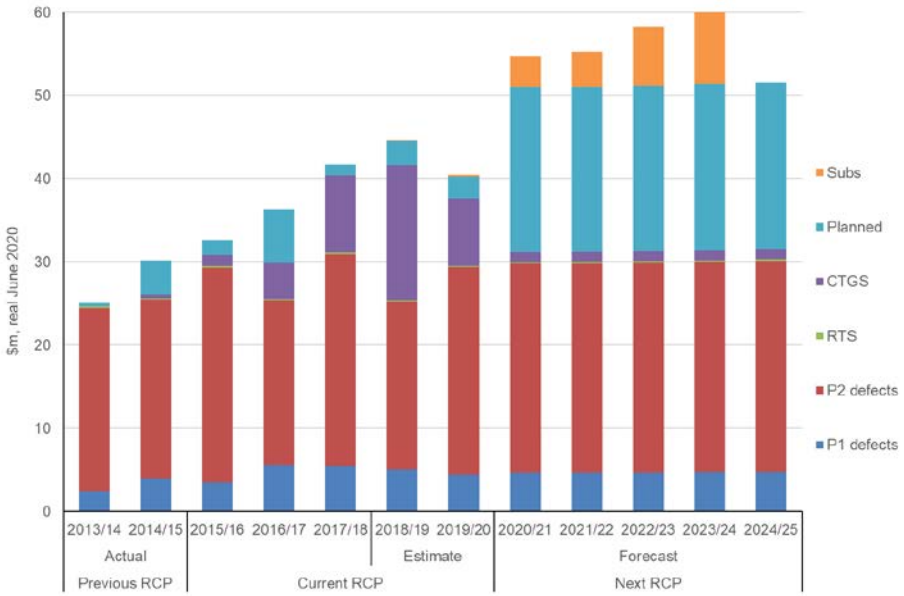
[46] Including P1 defects, P2 defects, clearance to ground, clearance to structure, and return to service.

[47] In general; however; some unit cost values were modified.

- For planned replacement, a total of 2,704 poles per annum comprising:
  - 1,998 poles associated with 500kms of targeted and condition-based conductor replacement (assuming 4 poles per km of re-conductoring);
  - 506 poles associated with historical volume of proactive replacements associated with small scale projects including to ensure clearances are maintained; and
  - an allowance of 200 poles per annum to replace aged poles in high risk locations.

162. We have reviewed the methodology for allocating repex to the asset categories in the RIN and present the expenditure profile for the previous, current and next RCP for the Poles asset category, by apportionment component, in the figure below.[48]

Figure 15: Bottom-up forecast of Pole asset category by apportionment component



Source: Ergon's response to information request AER IR017

163. We observe that the largest increases - and primary drivers of the increased expenditure - arise from the 'Planned' (distribution-related) and 'Subs' (substation-related) projects and programs.

164. In its justification statement, Ergon states that:[49] '*[t]he proposed forecast is based on historical volumes and limited by financial and resourcing constraints.*' We consider that:

- Ergon has not established through sufficient supporting information and analysis that (i) the historical level of defects, is a reasonable indicator of the future volume of renewal; and (ii) that proposed unit costs, which we observe vary by renewal driver, will result in an accurate representation of forecast expenditure;
- The proposed bottom-up expenditure forecast is subject to the forecasting biases that we identified in section 3; and

[48] We note that the profile of expenditure for the next RCP is aligned with the RIN; however, this is not the case for the previous and current RCPs.

[49] Ergon. ERG 7.069 Justification Statement - Poles and Towers.

- We were unable to determine the impact of the constraints applied by Ergon to the proposed expenditure.

165. Consistent with our review of Ergon's repex forecasting methods, the application of financial or resourcing constraints by management is not likely to lead to the development of an expenditure forecast that is prudent, efficient and consistent with NER requirements. We expected, but did not see, evidence to support the proposed defect driven expenditure forecast. We sought supporting evidence such as: (i) condition assessment and corresponding risk assessment of this asset class; (ii) contributions of failures and defects that have led to declining network performance; and/or (iii) other service measures.

166. Ergon describes the unassisted pole failure trend over the last four years as being indicative of poor performance. When considered alongside Ergon's expenditure forecast approach, this suggests to us that the pole management strategy is primarily defect driven and is unlikely to be optimal.

167. In addition to the defect driven program, Ergon included (i) planned programs for pole renewal associated with planned conductor replacement; and (ii) the 66kV feeder M028 (Childers – Degilbo – Gayndah) feeder replacement project comprising 1,312 concrete poles. Ergon classifies the 66kV feeder M028 replacement project as a major sub-transmission project and it is the highest cost project in the sub-transmission project portfolio.

168. The Childers - Gayndah M028 feeder replacement project includes the age/condition driven replacement of HDBC conductor and wooden poles. The M028 feeder is proposed to be replaced by a new 66kV single circuit concrete pole feeder, in place of its existing strategy to replace poles due to failure. The project was given an environmental risk score of 15 (moderate) due to potential bushfire risk from fallen conductor. Customer risk scored 12 (moderate) due to the potential for a greater than 12-hour interruption causing a shutdown to Mt Rawdon Gold Mine.

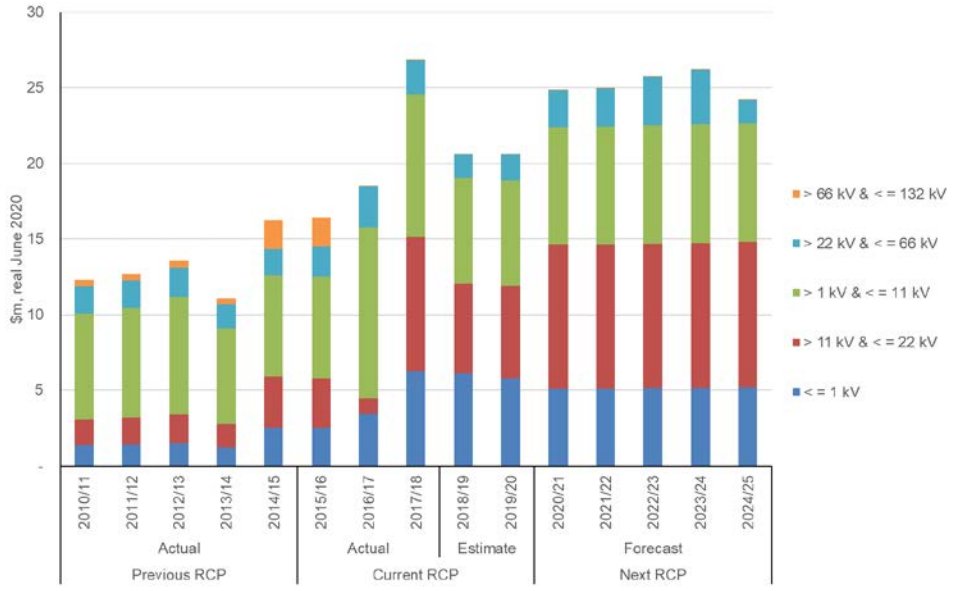
4.4.3 Pole-top structures

Ergon's forecast

169. Ergon has proposed $126.0m for the Pole-top structures asset category in its repex forecast for the next RCP. This represents an increase of $23.1m (22%) when compared with actual and estimated expenditure for the current RCP.

170. The expenditure profile for the previous, current and next RCP for pole-top structures is shown in the figure below.

Figure 16: Forecast repex for Pole-top structures asset category

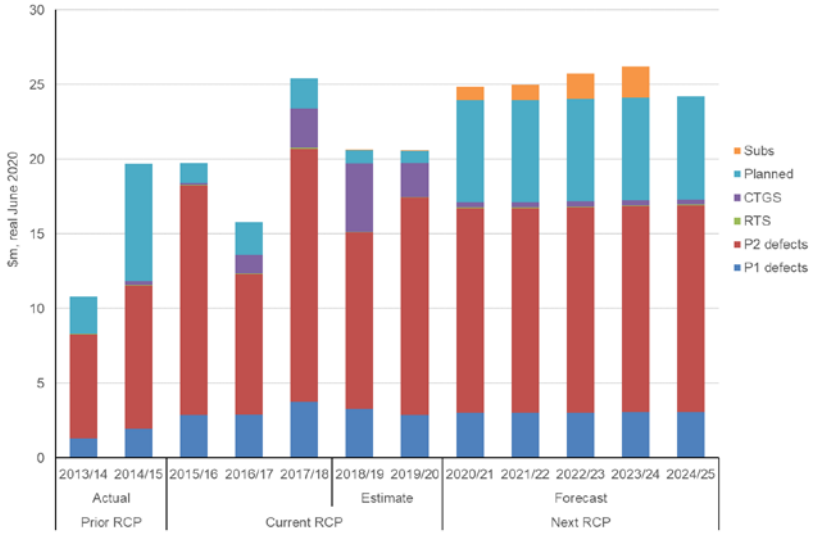


Source: Ergon Reset RIN.

171. As shown in the figure above, there is a step increase in forecast repex for Pole-top structures in the next RCP. This step increase in expenditure is maintained for the first four years of the next RCP and then reduces to a lower level of expenditure in 2024/25. According to the RIN, the largest increases are in the categories of 11kV wood, 22kV wood and 66kV concrete poles.

172. We have reviewed the methodology for allocating repex to the asset categories in the RIN and present the expenditure profile for the previous, current and next RCP for the Pole-top structures asset category in the figure below.[50]

Figure 17: Bottom-up forecast of Pole top structures asset category by apportionment component



Source: Ergon's response to information request AER IR017

173. As was the case for the poles asset category, we observe that the largest increases and primary driver of the increased expenditure arises from the 'Planned' and 'Subs' related projects and programs.

[50] We note that the profile of expenditure for the next RCP is aligned with the RIN; however, this is not the case for the previous and current RCPs.

174. Ergon has also included a description of its proposed Pole top replacement programs in Justification Statement – Pole top structures.

Our assessment

175. The forecast repex for the pole-top structure asset category is based on the forecasting method described above, including:

- For unplanned replacements, driven by expected line defects[51] - the historical replacement volume and the 3-year average unit cost[52] for each class of defects was used to develop the forecast expenditure. The historical replacement volume is similar to the 3-year average; however, the method of calculation or basis for the volume is not provided.
- For planned replacements – a total of 4,054 pole top structures average per annum comprising:
  - Pole-top structures associated with 500kms of targeted and condition-based conductor replacement;
  - Additional pole-top structures for clearance to ground and clearance to structure replacement programs; and
  - Pole-top structures associated with the 66kV feeder M028 (Childers – Degilbo – Gayndah) replacement project.

176. We have similar concerns as described in our assessment of proposed repex for the pole asset category, namely:

- Lack of information on condition or risk assessment to justify the proposed expenditure;
- We found evidence of the forecasting biases described in section 3; and
- Inability to determine a prudent and efficient level of expenditure as a result of application of management constraints to the proposed repex forecast for this asset category.

177. Further, the planned replacement exceeds the proposed volume of pole renewal (due to targeted pole renewal and conductor renewal) by an annual average of 1,350 poles. The basis for these additional pole-top structure replacements is not provided by Ergon in its supporting information.

4.4.4 Overhead conductors

Ergon's forecast

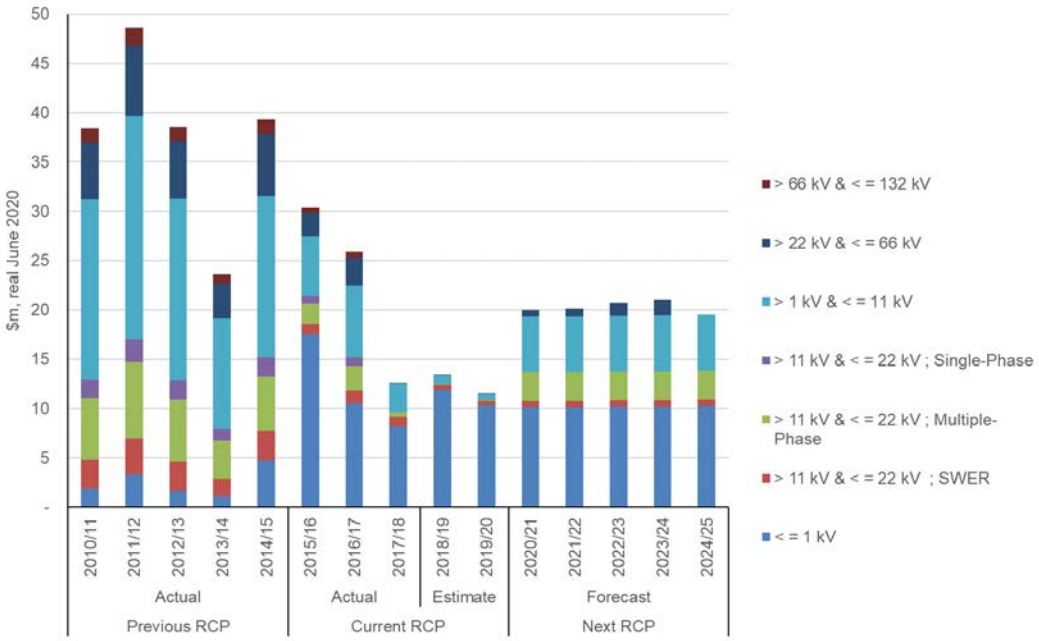
178. Ergon has proposed $101.5m for the Overhead Conductors asset category in its repex forecast for the next RCP. This represents an increase of $7.8m (8%) when compared with actual and estimated expenditure for the current RCP.

179. The expenditure profile for the previous, current and next RCP for Overhead conductors is shown in the figure below.

[51] Including P1 defects, P2 defects, clearance to ground, clearance to structure, and return to service.

[52] In general, however some unit cost values were modified.

Figure 18: Forecast repex for Overhead Conductors asset category



Source: Ergon Reset RIN.

180. As shown in the figure above, there is a step-up in expenditure for the start of the next RCP which is maintained throughout the RCP. This follows a reduction to the overhead conductor expenditure in the previous RCP and during the current RCP. According to the RIN, the largest increases are in 11kV and 22kV conductor replacement.

181. Ergon has included a description of its proposed pole and tower replacement programs in its Justification Statement – Overhead conductors.

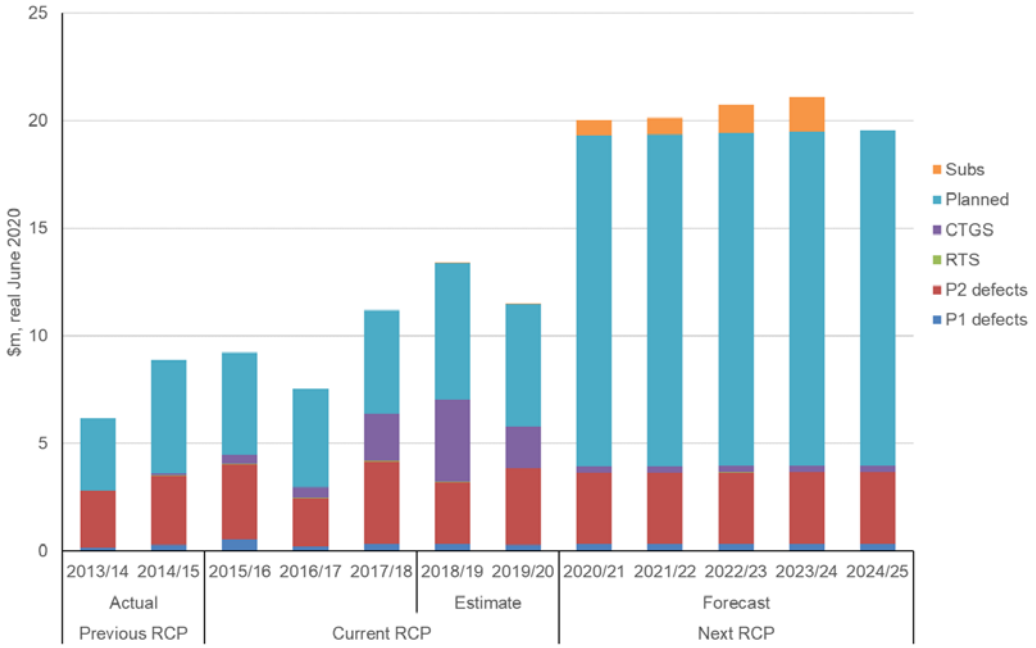
Our assessment

182. The forecast repex for conductors is based on the forecasting method described above, where the defects-driven expenditure is based on historical levels. We reiterate our view that the resultant forecast is unlikely to be prudent, efficient or reasonable due to:

- reliance on historical volumes of replacement to estimate future volumes of replacement;
- lack of data/information on condition or risk assessment;
- evidence of the forecasting biases described in section 3; and
- inability to determine a prudent and efficient level of expenditure as a result of application of management constraints that are not consistent with NER criteria.

183. We have reviewed the methodology for allocating the repex to the asset categories in the RIN and present the expenditure profile for the previous, current and next RCP for the Conductors asset category in the figure below.

Figure 19: Bottom-up forecast of Overhead Conductors asset category by apportionment component



Source: Ergon's response to information request AER IR017.

184. We observe that the largest increases and primary driver of the increased expenditure arises from the planned replacement projects and programs. Ergon describes the conductor failure history trend as resulting in a higher number of wires-down incidents, reflecting a heightened public safety risk, as the basis for increasing the number of planned projects.

185. The targeted programs are a larger proportion of the forecast and are aimed at known problematic conductor types such as small size copper conductor, coastal galvanised steel and aluminium conductor aged 70+ years. These programs are initially focused on populated, coastal regions where the likelihood of in-service asset failure is considered greater.

186. The targeted replacement programs that Ergon has proposed are typical of the focus of other DNSPs we have reviewed. They focus on conductor types in areas that are likely to correspond with the higher risk areas. However, Ergon has not provided sufficient evidence to support the volume of work underpinning the proposed expenditure forecast. We did not see evidence of condition assessment and corresponding risk assessment of this asset class, trends in asset defects or asset failures, contributions to declining network performance or other service measures.

187. Ergon describes a high-level approach to identify 'at risk' conductor and indicators of in-service condition. However, Ergon did not demonstrate how this approach has been applied to determine its forecast expenditure or to determine the level of risk it considers tolerable.

188. Specifically, Ergon has not demonstrated how it has determined that the proposed expenditure[53] '*reflects a tolerable risk position which balances the achievement of asset management objectives and customer service levels and ensures a level of*

[53] Ergon. ERG 7.065 Justification statement - Overhead Conductor.

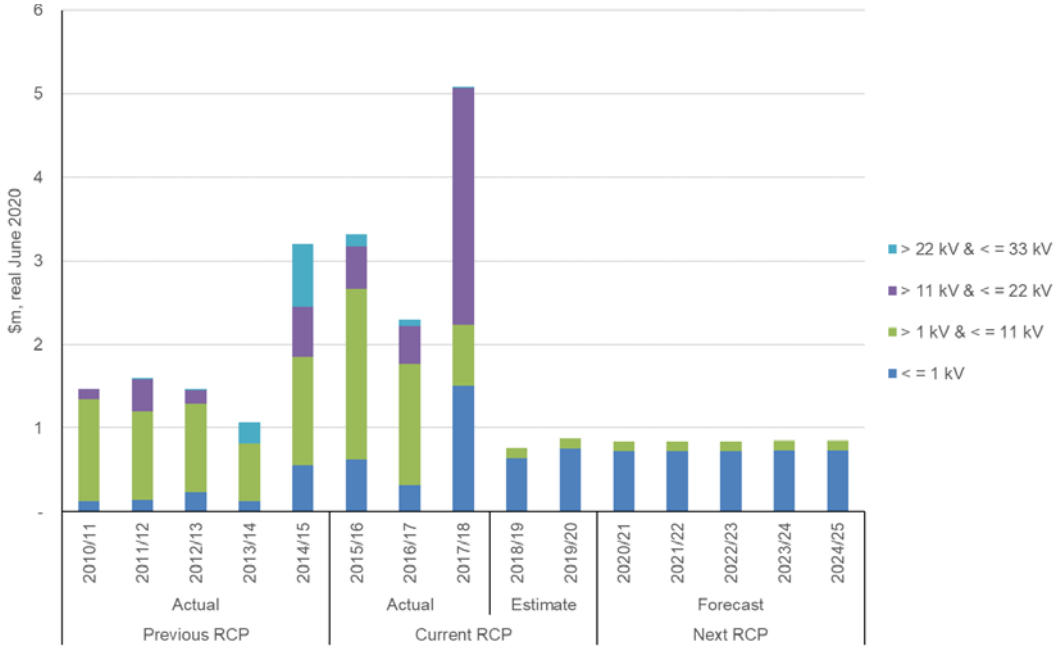
investment which avoids future regret based on the uncertainty associated with the capability new technologies may bring.'

4.4.5 Underground cables

Ergon's forecast

189. Ergon has proposed $4.2m for the Underground Cables asset category in its repex forecast for the next RCP. This represents a reduction of $8.1m (66%) when compared with actual and estimated expenditure for the current RCP. The expenditure profile for the previous, current and next RCP for Underground Cables is shown in the figure below.

Figure 20: Forecast repex for Underground Cables asset category



Source: Ergon Reset RIN.

190. As shown in the figure above, there is a step-down in expenditure during the last two years of the current RCP that is maintained throughout the next RCP. According to the RIN, the largest reductions are in the 11kV, 22kV and 33kV cable replacements. There is no forecast expenditure for 22kV and 33kV cable replacements in the next RCP.

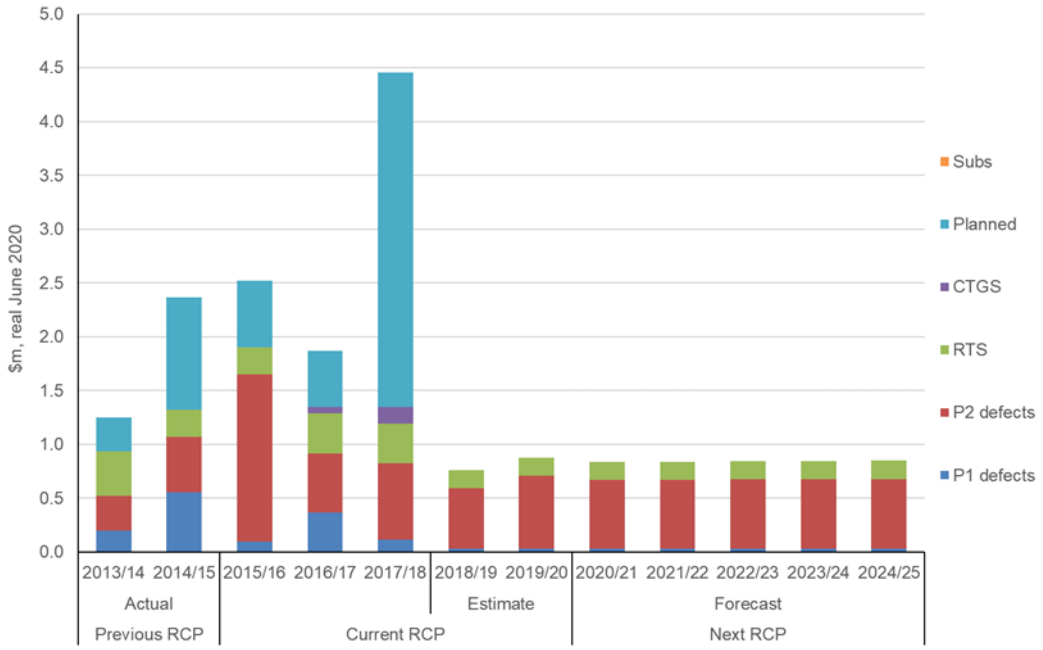
Our assessment

191. Distribution cables less than 33kV and low voltage cables are replaced upon identified defect or ultimate failure, and the forecast expenditure is based on historical levels consistent with the method described above.

192. We have reviewed the methodology for allocating the repex to the asset categories in the RIN and present the expenditure profile for the previous, current and next RCP for the Underground cables asset category in the figure below.[54] Ergon has also included a description of its proposed pole and tower replacement programs in its Justification Statement – Underground cables.

[54] We note that the profile of expenditure for the next RCP is aligned with the RIN; however, this is not the case for the previous and current RCPs.

Figure 21: Bottom-up forecast of Underground Cables asset category by apportionment component



Source: Ergon's response to information request AER IR017

193. We observe that the underlying level of defect-driven expenditure (for P2 defects) is similar to historical levels; however, planned projects and programs have not been included for the next RCP. Whilst we have similar concerns with the extent of supporting documentation, we observe that the proposed expenditure is a significant reduction on expenditure that Ergon has incurred in previous years.

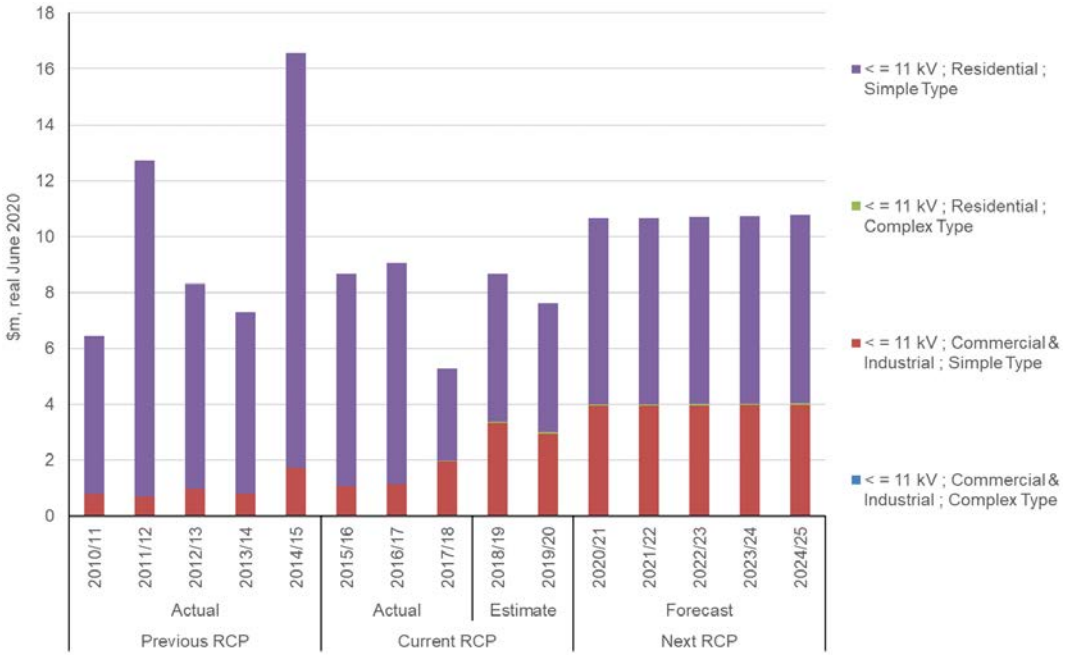
194. Ergon applies CBRM to forecast the retirement of underground cables greater than or equal to 33kV and has not identified any planned replacement in the next RCP.

4.4.6 Service lines

Ergon's forecast

195. Ergon has proposed $53.6m for Service Lines in its repex forecast for the next RCP. This represents an increase of $14.3m (36%) when compared with actual and estimated expenditure for the current RCP. The expenditure profile for the previous, current and next RCP for Service Lines is shown in the figure below.

Figure 22: Forecast repex for Service Lines asset category



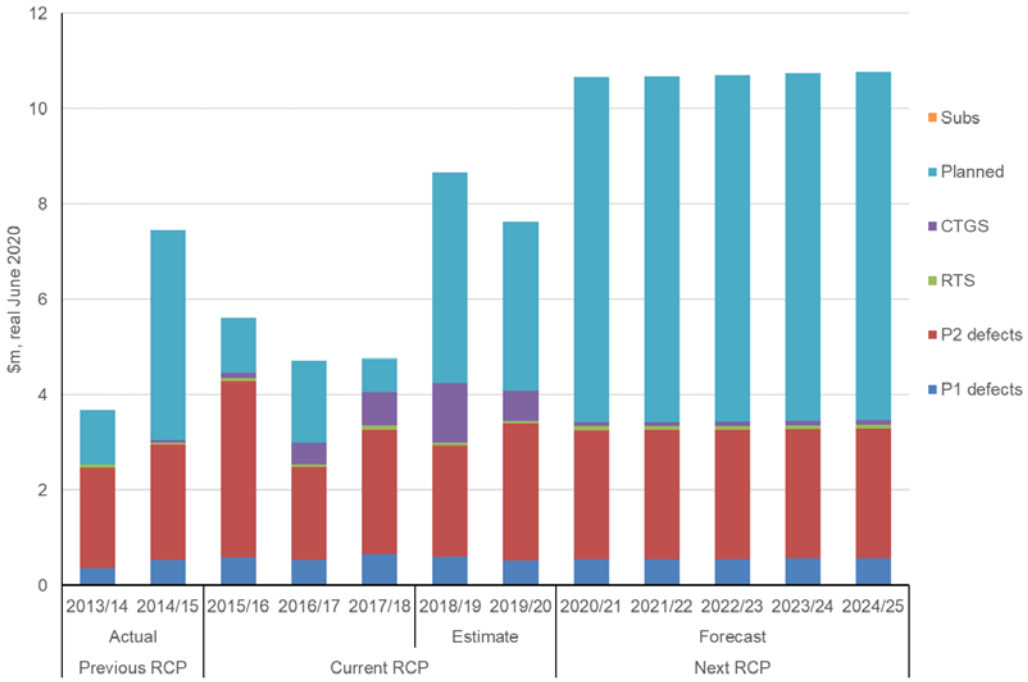
Source: Ergon Reset RIN.

196. As shown in the figure above, there is a step-increase in expenditure at the commencement of the next RCP that is maintained throughout the period. According to the RIN, the largest increase is associated with the 11kV commercial and industrial service lines. Ergon has also included a description of its proposed pole and tower replacement programs in its Justification Statement – Services.

197. We have reviewed the methodology for allocating the repex to the asset categories in the RIN and present the expenditure profile for the previous, current and next RCP for the Service lines asset category in the figure below.[55]

[55] We note that the profile of expenditure for the next RCP is aligned with the RIN; however, this is not the case for the previous and current RCPs.

Figure 23: Bottom-up forecast of Service lines asset category by apportionment component



Source: Ergon's response to information request AER IR017

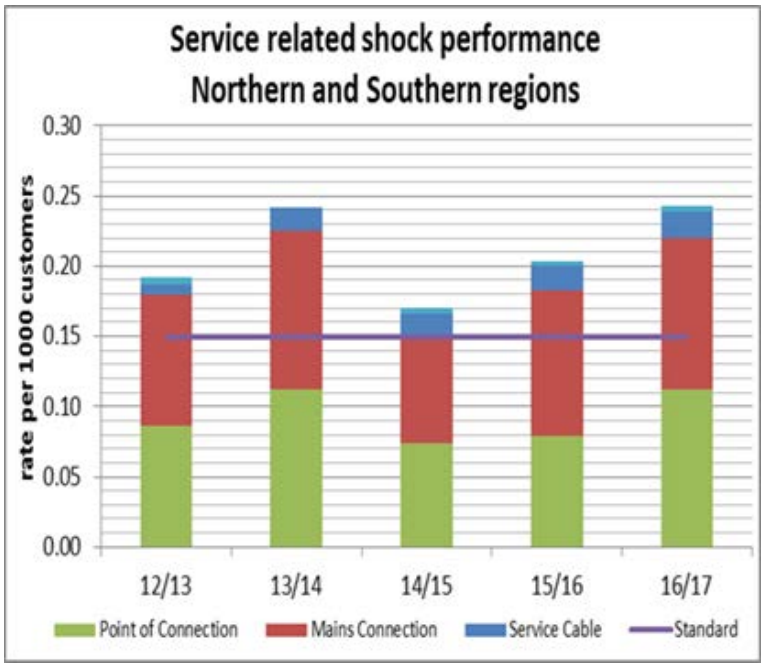
198. We observe that the driver of the increase is associated with an increased number and scope of planned projects and programs.

199. We first consider the contribution of service line defects and failures to the number of public shocks. Ergon states that:[56] '*this asset class, particularly within the coastal regions of Ergon Energy, has underperformed against these metrics. A proactive, planned replacement program has been initiated to arrest the annual number of reported shocks due to end of life overhead service assets to meet expected service levels and comply with regulatory requirements.*'

200. Ergon further states that its program '*is focussed on the removal of unsupported supply end taps, neutral screened and colour coded services, based on condition and historical performance, targeted on coastal communities where the majority of shocks are being reported.*' Ergon's current performance is averaging 0.21 shocks per 1,000 p.a. (157 shocks pa) as shown in the figure below.

[56] Ergon. ERG 7.073 Justification Statement – Services.

Figure 24: Summary of service-related shock performance[57]



Source: EGX ERG 7.040 Asset Management Plan - Services

201. From its own analysis, Ergon concludes that the in-service failure rate of overhead services is also steadily increasing and a change in management strategy is required to improve performance.

Our assessment

202. Ergon describes its services replacement program as a part of an ongoing strategy to ensure compliance with statutory regulations relating to condition assessment of customer services including reporting of electric shocks to members of the public.

203. Ergon has proposed a replacement rate of approximately 14,000 p.a. At this rate, it would take 15 years to address the high-risk service line population, not accounting for the effect of ongoing aging and degradation of current services. Whilst a higher replacement rate is proposed than Ergon has incurred in the current RCP, it represents a moderate increase from a historical replacement of approximately 6,000 p.a.[58]

204. Ergon describes the proposed replacement program as required to meet the required service level. Ergon identifies this program as 'low risk' in its program of work.[59] However, this risk assessment does not appear to be consistent with the level of risk associated with electric shocks described to us at our onsite discussion.

205. Ergon has identified that there are significant performance issues related to main connection boxes (MCBs). In its Asset Management plan, the largest contributors to electric shocks appear to be the MCB and PVC service cables, followed by the service tails.

[57] Public shocks are monitored on a monthly basis, with shocks related to neutral integrity being the most significant factor (60-70%). Public shocks are considered notifiable events, required to be reported to the Electrical Safety Office.

[58] Being an average of the actual replacement volume over the period 2015/16 – 2017/18.

[59] Capex portfolio provided as a part of Ergon's response to information request AER IR017.

206. This is supported by a recent audit of service lines, that highlighted that the MCB was the largest cause of defects found. According to the onsite discussion, the MCB and service tails are owned by, and are the responsibility of, the customer and not Ergon. However, Ergon states that it has a responsibility for inspection of these assets and the safety of this apparatus where it determines that there is a risk to public safety. Based on the information provided, we consider that Ergon (like other DNSPs) also has a responsibility to advise the owner of the apparatus (i.e., the customer) of the safety risk, and to engage with the customer on solutions to remove the risk prior to restoring the connection.

207. Based on Ergon's own analysis, it estimates that there are approximately 200,000 installations where a high risk of public shock is present. We sought to understand the composition of the 'at risk' population and the criteria used to form this assessment. However, Ergon was unable to provide this information.

208. Based on the reported performance of this asset category, and in the absence of better information on the composition and risk of the service line population, we consider that an increased level of replacement for Ergon is reasonable.

209. By comparison, Energex has been replacing service lines at a much higher volume than Ergon, and as a result of its historical replacement rate, is now seeking to reduce its replacement rate to much lower quantities in the next RCP. We are aware of an increased level of replacement in NSW and in other jurisdictions in response to elevated safety risks associated with overhead service lines.

210. Ergon has also included the LV Network safety project in its 'other repex' asset category and suggests that the replacement rates have been determined '*in consideration of the inclusion of the LV Network Safety Program,*'[60] representing a further $50m expenditure in the next RCP. We present our assessment of the LV Network Safety project as a part of our assessment of the 'other repex' asset category'.

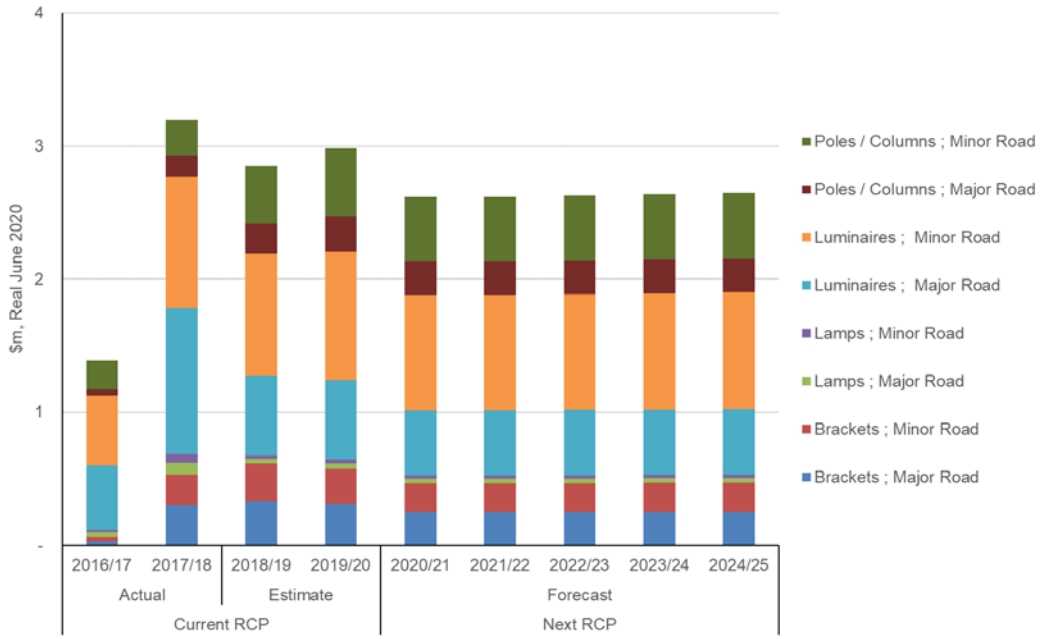
4.4.7 Public lighting

Ergon's forecast

211. Ergon has proposed $13.1m for Public lighting in its repex forecast for the next RCP. This represents an increase of $2.7m (26%) when compared with actual and estimated expenditure for the current RCP. The expenditure profile for the previous, current and next RCP for Public lighting as shown in the figure below.

[60] Ergon onsite presentation to AER and EMCa

Figure 25: Forecast repex for Public Lighting asset category[61]



Source: Ergon Reset RIN.

212. As shown in the figure above, there is a step-down in expenditure at the commencement of the next RCP that is maintained throughout the period. The primary driver of reduced expenditure in the next RCP, compared to the current RCP, is lower forecast expenditure in Luminaires (minor and major road).

213. Ergon has not included a specific document as a description of its proposed public lighting replacement program.

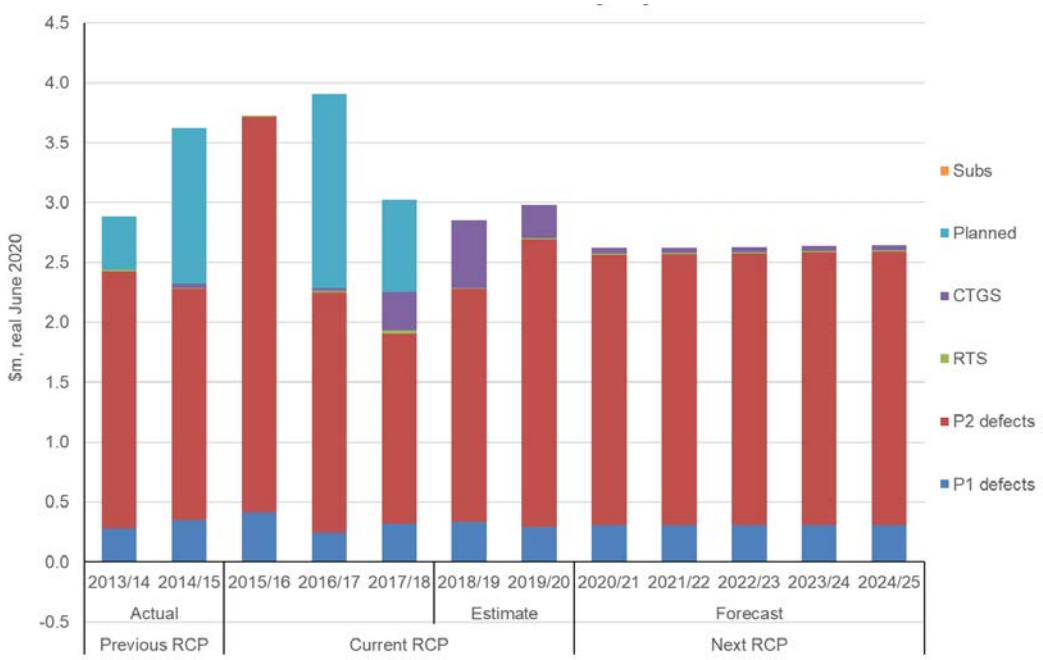
Our assessment

214. We have reviewed the reviewed the methodology for allocating repex to the asset categories in the RIN and present the expenditure profile for the previous, current and next RCP for the Public Lighting asset category in the figure below.[62]

[61] Additional historical data was not available

[62] We note that the profile of expenditure for the next RCP is aligned with the RIN; however, this is not the case for the previous and current RCPs.

Figure 26: Bottom-up forecast of Public Lighting asset category by apportionment component



Source: Ergon's response to information request AER IR017

215. We observe that the primary driver of expenditure in the next RCP is P1 and P2 defects, which are forecast to continue at similar levels to historical expenditure in the current and prior RCPs. Compared to the current RCP, the reduction in total Public Lighting expenditure in the next RCP is due to a marked reduction in CTGS and planned expenditure.

216. Ergon has classified public lighting as an ACS, consistent with the approved Framework and Approach and as stated in its RP. This is the same classification adopted in the current RCP. The historical expenditure reported in the RIN is not explained.

217. In response to a request for information, Ergon states that the repex included as SCS[63] includes incidental public lighting assets replaced through ancillary Standard Control Service overhead Repex programs such as poles, crossarm or conductor replacement.

218. Whilst street lighting assets may be replaced upon the replacement of a pole as suggested by Ergon, we consider that Ergon has not demonstrated that this expenditure should be classified as SCS, including by reference to industry practice. Accordingly, we suggest that the proposed expenditure be reviewed as part of Ergon's proposed ACS capex. As the review of ACS capex is not within our scope of review, we commend this to the AER to review the proposed expenditure as a part of its review of Ergon's proposed ACS capex.

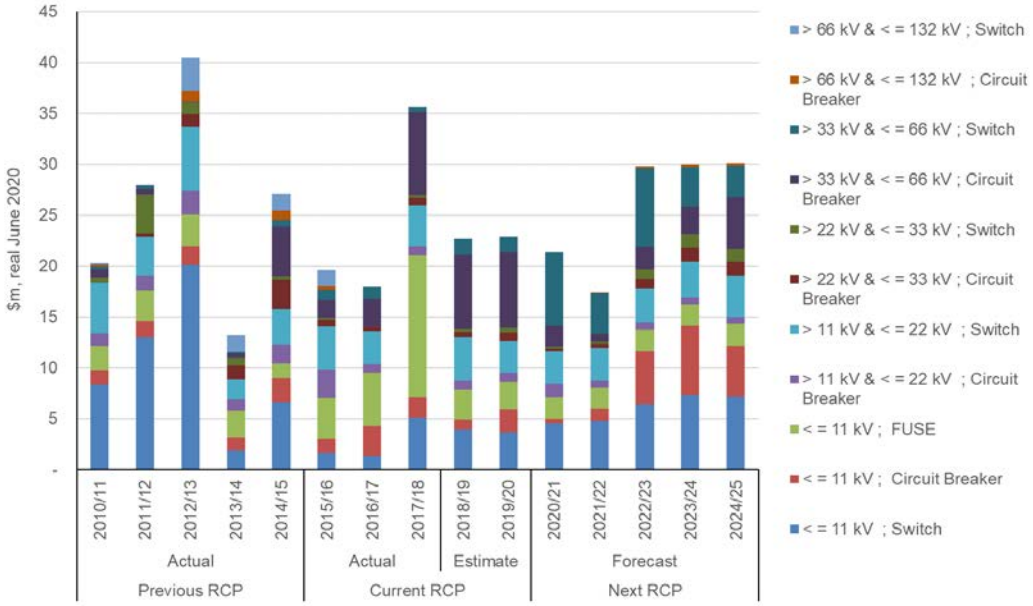
[63] Ergon's response to information request AER IR028.

4.4.8 Switchgear

Ergon's forecast

219. Ergon has proposed $128.5m for the Switchgear asset category in its repex forecast for the next RCP. This represents an increase of $9.9m (8%) when compared with actual and estimated expenditure for the current RCP. The expenditure profile for the previous, current and next RCP for Switchgear is shown in the figure below.

Figure 27: Forecast repex for Switchgear asset category



Source: Ergon Reset RIN.

220. As shown in the figure above, there is a step-increase in expenditure during the next RCP that is forecast to commence in 2022/23 of the next RCP and that is subsequently maintained at an elevated level for the remainder of the period. According to the RIN, the largest increase is associated with 11kV circuit breakers and 11kV switches.

221. Ergon has included a description of its proposed switchgear replacement programs in its Justification Statement – Switches incl RMUs; and Justification Statement – Circuit breakers and Reclosers.

Our assessment

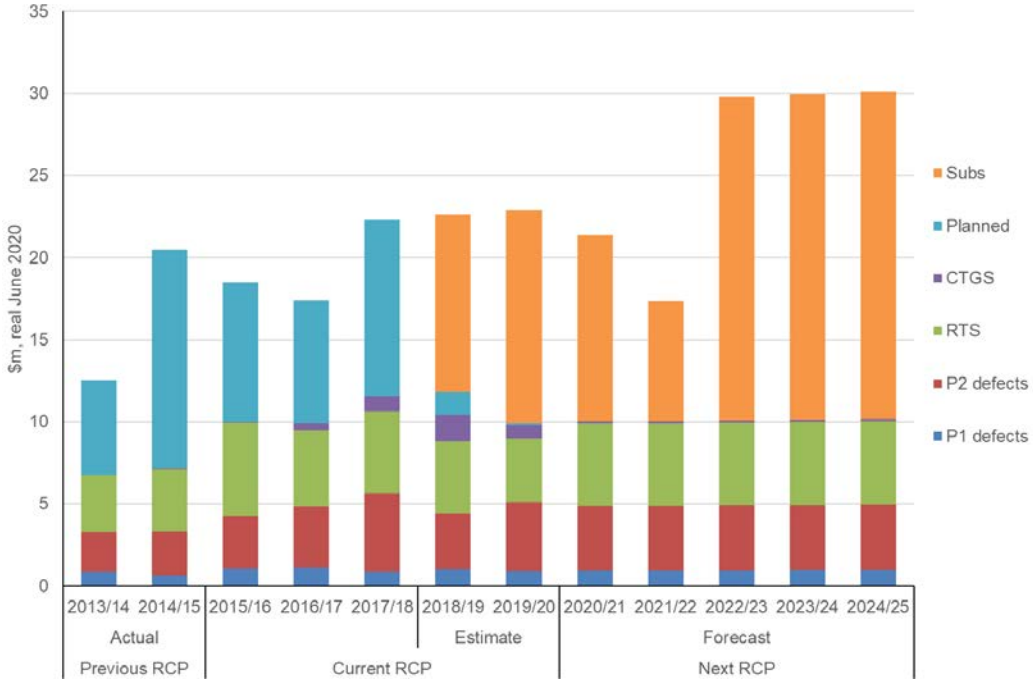
222. The proposed repex includes:

- For low voltage and distribution switchgear[64] - Ergon has based the proposed expenditure on historical levels, with no additional planned replacement program; and
- For substation switchgear - Ergon applies CBRM and projects greater than $3m are classified as major transmission projects.

[64] Reclosers, RMUs, HV and LV switches and fuse mechanisms.

223. We have reviewed Ergon's allocation of repex to the asset categories in the RIN and present the expenditure profile for the previous, current and next RCP for the Switchgear asset category in the figure below.[65]

Figure 28: Bottom-up forecast of Switchgear asset category by apportionment component



Source: Ergon's response to information request IR017

224. We observe that the driver of the increase is associated with an increased number and scope of substation-related projects and programs. Several of these projects are included in sub-transmission major projects where Ergon is proposing circuit breaker replacements as a component of a broader substation replacement. Examples include:

- Pialba substation (PIAL) in Hervey Bay, which includes replacement of seven 66kV circuit breakers as part of the wider substation replacement project;
- Highfields Area Condition Replacement and Reinforcement project involves a combination of replacement and growth drivers across three substations in the Highfields area; and
- Sarina substation (SARI) located near Mackay, in Central Queensland where the scope includes replacement of five 33kV circuit breakers as part of the broader replacement of the substation's 1965 vintage 33kV and 11kV switchgear.

225. The sub-transmission major projects that include circuit breaker replacements are primarily driven by asset age and condition. Ergon states that the asset age and condition generally lead to a moderate safety risk score, which Ergon is proposing to reduce to ALARP through the proposed major projects.

[65] We note that the profile of expenditure for the next RCP is aligned with the RIN; however, this is not the case for the previous and current RCPs.

226. The majority of sub-transmission major projects are at pre-concept stages and whilst the documentation for most of these projects describes the need and scope of individual projects, detailed analysis was not provided.

227. As noted previously, in regard to the proposed volume-based replacement, Ergon has not established the basis for relying on the historical volume of renewal for its defect driven repex. We consider that the forecasting biases discussed earlier are likely to be present in the forecast repex.

228. Further to our assessment of the CBRM modelling applied by Ergon in Section 3, as the basis for the planned and SUBS component, we consider that it is not possible to conclude that the forecast expenditure is reasonable and prudent in the absence of quality information on how Ergon used CBRM to develop its forecasts.

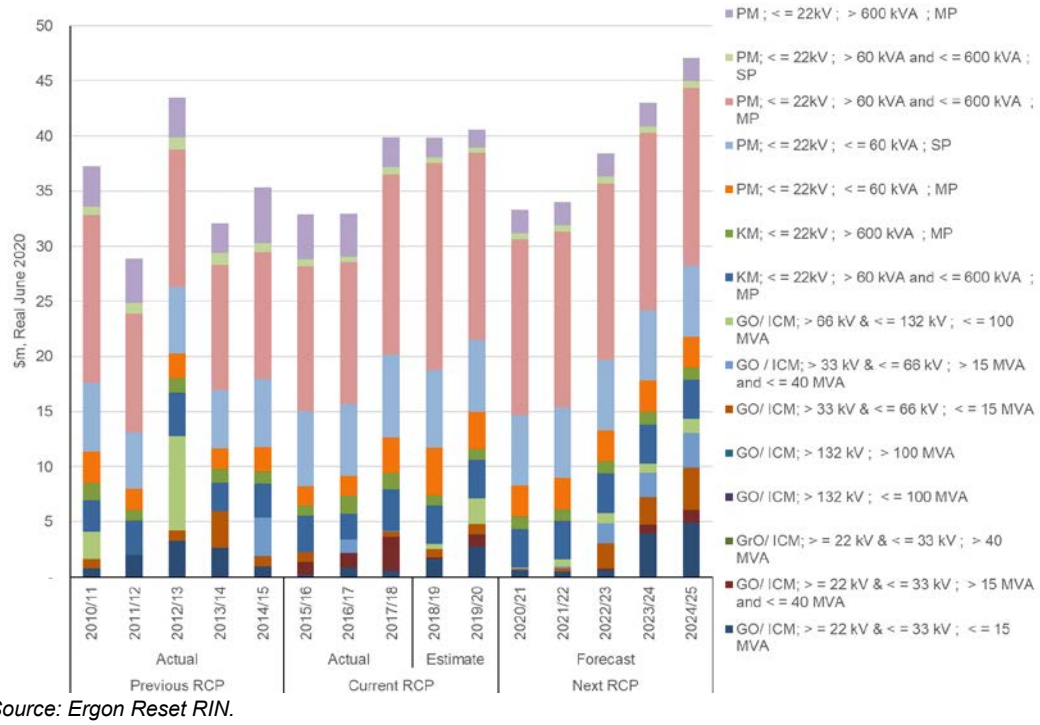
229. We provide further information on substation-related switchgear replacement included in the development of the transmission major projects in a subsequent section. Many of the observations in relation to transmission major projects are also applicable to other substation related projects.

4.4.9 Transformers

Ergon's forecast

230. Ergon has proposed $197.4m for the Transformers asset category in its repex forecast for the next RCP. This represents an increase of $9.7m (5%) when compared with actual and estimated expenditure for the current RCP. The expenditure profile for the previous, current and next RCP for Transformers is shown in the figure below.

Figure 29: Forecast repex for Transformers asset category



Source: Ergon Reset RIN.

231. As shown in the figure above, the profile over the next RCP follows a similar pattern to the current RCP, with lower expenditure in the first two years and higher expenditure in the next three years of the period. We also observe an upward trend

of expenditure in the next RCP. According to the RIN, the largest increase is associated with substation transformers.

232. Ergon has included a description of its proposed transformer replacement programs in its: Justification Statement – Substation transformers; Justification Statement – Distribution transformers; and Justification Statement – Instrument transformers.

Our assessment

233. The proposed repex for the transformer asset category includes:

- For distribution transformers, reactors and regulators[66] - Ergon has based the proposed expenditure based on historical levels, with no additional planned replacement program;
- For Instrument transformers - Ergon considers assets for replacement based on assessed end of technical life, condition and risk. Ergon's risk framework is applied to prioritise asset replacement at a program level within financial and resource constraints; and
- For substation transformers, reactors and SVCs - Ergon applies CBRM modelling to identify the poorest condition assets. The oldest substation assets in the population that have exceeded their technical life are also considered as potential candidates for replacement to avoid an unsustainable build-up of very aged assets.

234. We have reviewed the sub-transmission major projects that include substation transformer, reactor and SVC replacements. The sub-transmission major projects by their nature generally include a broader range of asset replacement. Examples include:

- Highfields Area Condition Replacement and Reinforcement project has a combination of replacement and growth drivers across three substations in the Highfields area;
- proposed works under the Mossman Substation Replacement project which develops the northern tableland network enabling replacement of aged 66 kV plant and lines; and
- two SVC replacement projects at Charleville and Georgetown proposed to replace aging assets with modern equivalents.

235. At the pre-concept stages the documentation produced by Ergon provides an overview of the project including why the project has been considered for inclusion in the repex forecast. However, the accuracy of the scope, timing and cost estimates is lower than we would typically expect to see, and therefore is less reliable for evaluating the reasonableness of the forecast.

236. For the two SVC replacement projects included in the forecast[67] Ergon has identified potential non-network options that could change the need for, or timing of the proposed replacements. However, the non-network options have not been

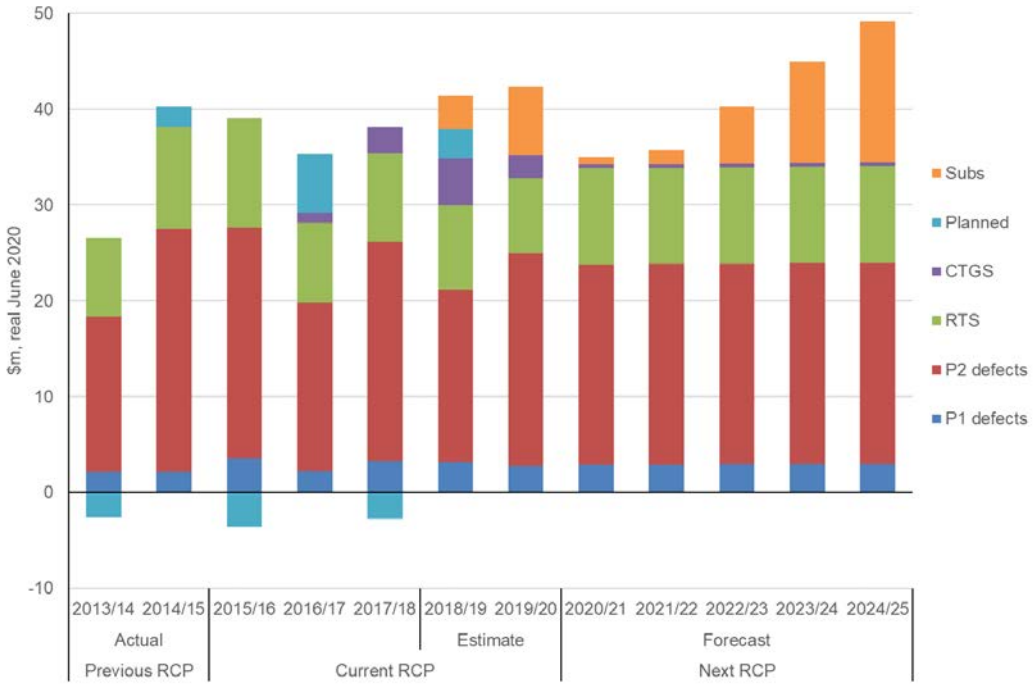
[66] Reclosers, RMUs, HV and LV switches and fuse mechanisms.

[67] The two SVC projects are included in the 'other repex' asset category, however included in the discussion of substation related assets with the sub-transmission major project related expenditure

included in the forecast. The Georgetown project is at the pre concept status and the Charleville project is at the concept stage.

237. We have reviewed Ergon's allocation of repex to the asset categories in the RIN and present the expenditure profile for the previous, current and next RCP for the Transformers asset category in the figure below.[68]

Figure 30: Bottom-up forecast of Transformers asset category by apportionment component



Source: Ergon's response to information request AER IR017

238. We observe that the driver of the increase is associated with an increased number/scope of substation related projects and programs.

239. As noted previously, Ergon has not established the basis for relying on the historical volume of renewal for its defect-driven repex, nor has It justified that this level of expenditure will continue to be required in addition to the planned replacement expenditure. We consider that the forecasting biases discussed in Section 3 are likely to be present in the forecast repex.

240. Further to our assessment of the CBRM modelling applied by Ergon in Section 3, we consider that it is not possible to conclude that the forecast expenditure is reasonable and prudent in the absence of quality information on how Ergon used CBRM to develop its forecasts.

241. We provide further information on the substation-related transformer replacement included in the development of the transmission major projects in a subsequent section. Many of the observations in relation to transmission major projects are also applicable to other substation related projects.

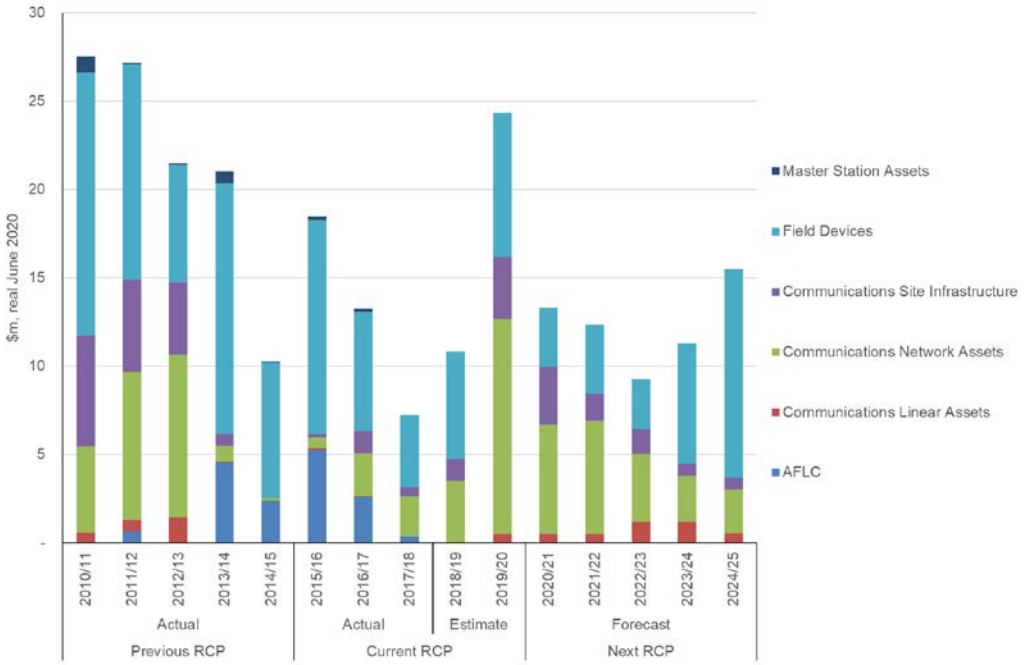
[68] We note that the profile of expenditure for the next RCP is aligned with the RIN, however this is not the case for the previous and current RCPs.

4.4.10 SCADA, Network Control and Protection System

Ergon's forecast

242. Ergon has proposed $61.7m for the SCADA, network control and protection system asset category in its repex forecast for the next RCP. This represents a reduction of $12.4m (17%) when compared with actual and estimated expenditure for the current RCP. The expenditure profile for the previous, current and next RCP for SCADA, network control and protection system is shown in the figure below.

Figure 31: Forecast repex for SCADA, network control and protection system asset category



Source: Ergon Reset RIN.

243. As shown in the figure above, the profile over the next RCP follows a similar pattern to the current RCP, decreasing in the early years, before increasing for the remainder of the period. According to the RIN, in the next RCP, we observe a decrease in field services expenditure that is partially offset by an increase in communications network assets expenditure.

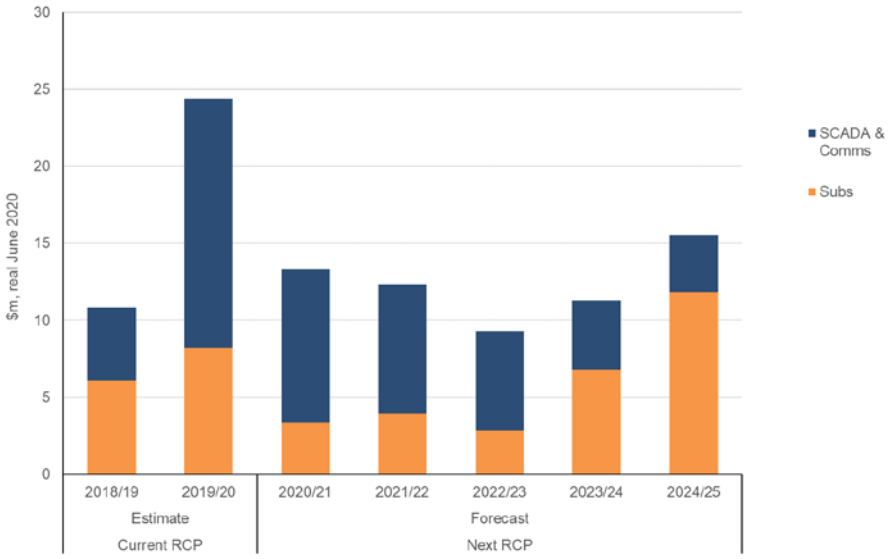
244. Ergon has included a description of its proposed SCADA, network control and protection systems replacement programs in its Strategic scope statements, and Strategic Proposal documents.

Our assessment

245. The forecast repex for the SCADA asset category comprises a combination of dedicated replacement programs for SCADA, network control and protection assets. The contribution of the expenditure relating to these assets is associated with other replacement projects and programs (e.g., transformer replacement).

246. We have reviewed Ergon's allocation of repex to the asset categories in the RIN and present the expenditure profile for the previous, current and next RCP for the SCADA, network control and protection system asset category in the figure below.[69]

Figure 32: Bottom-up forecast of SCADA, network control and protection system asset category by apportionment component



Source: Ergon's response to information request AER IR017[70]

247. We observe that the field device related expenditure associated with the Subs expenditure apportionment is forecast to increase in the next RCP. This is associated with an increased number and scope of substation related projects and programs. We review these in our assessment below. Specific to the SCADA & communications expenditure apportionment, we observe an increased level of expenditure continuing into the next RCP from the current RCP, which subsequently reduces as programs are completed.

248. Ergon has estimated a high level of expenditure to be incurred in the latter two years of the current RCP primarily associated with Field Mobile Voice Comms in the coastal region. The elevated level of expenditure is proposed to decline over the next RCP as projects are completed. However, there is a risk that due to the large step increase, projects will slip into the subsequent RCP and have the result of deferring some work beyond the next RCP.

249. During the next RCP, the communications forecast is dominated by $18.6m for Intelligent Grid data comms, totalling $23.0m over the 7 years[71]. A summary of the drivers of this expenditure is provided below.

[69] We note that the profile of expenditure for the next RCP is aligned with the RIN; however, this is not the case for the previous and current RCPs.

[70] Includes the SUBS and SCADA components of the SCADA, network control and protection systems asset category.

[71] Based on the available data commencing 2018/19.

Figure 33: Summary of Ergon's expenditure drivers for intelligent grid asset classes

Intelligent Grid Data	Driver
IP Network Equipment	Product Support Removal
OSS Servers	Condition Based Replacement
Microwave Radio Links	Product Support Removal
Commercial 3G Cellular Network	Commercial Product Removal
Private 3G Cellular Network	Product Support Removal

Source ERG 7.117 Strategic scope – Intelligent Grid Data Comms, Table 1

250. Ergon refers to high failure rates, high ongoing maintenance costs and extended outages as part of its description of the condition related and product support drivers. However, in regard to its claimed condition assessment Ergon states that whilst the equipment is assessed regularly during site maintenance '*there is little historic data to support its condition assessment.*'[72]

251. Whilst we see evidence of consideration of addressing the highest risks associated with these assets and of the nature of the obsolescence and vendor support risks described, we do not consider that sufficient information has been provided to support the proposed level of repex. Ergon has not provided sufficient information to support the deliverability for the proposed replacement program,[73] or the impact of delays to other parts of the program.

252. For its field device replacement expenditure, Ergon has described a prioritisation process to identify the highest risk assets for replacement:

- For RTU replacement programs, Ergon applies a risk prioritisation approach referred to as 'REA' to identify highest risk assets for replacement in the next RCP. This process considers the: (i) age; (ii) technical capability; and (iii) spares availability when identifying RTUs for replacement.
- For protection relay replacement programs, Ergon has applied its Priority Weighted Index (PWI) to represent asset condition by providing a score for each relay in the fleet, and its corresponding likelihood and consequence of in-service failure. The Asset Management Plan for Protection Relays documents the basis of the condition analysis and derivation of this score, using failure rate and age to identify the poorest condition assets.

253. However, it was difficult to ascertain the proposed expenditure for individual asset classes within the field devices category from the information provided by Ergon. Similarly, we were not able to reconcile the proposed replacement volumes and expenditure provided in its strategic scope documentation at an asset class level with the proposed capex program. For example:

- For RTUs, we could not identify a specific replacement program included into the capex program, as proposed in its strategic scope documentation. Rather we observed a number of replacement projects where RTU replacement was included in the scope of the project; and

[72] ERG 7.117 Strategic scope – Intelligent grid comms.

[73] We observed that the delivery timeframes provided in the Strategic scope documents differ from those included with the expenditure forecast, which appear to have been 'smoothed' for inclusion into the RIN. However, an explanation of the differences was not provided.

- For protection relays, a combination of large increases in individual protection relay replacement programs and increases related to major transmission projects in the final year of the next RCP was not explained.

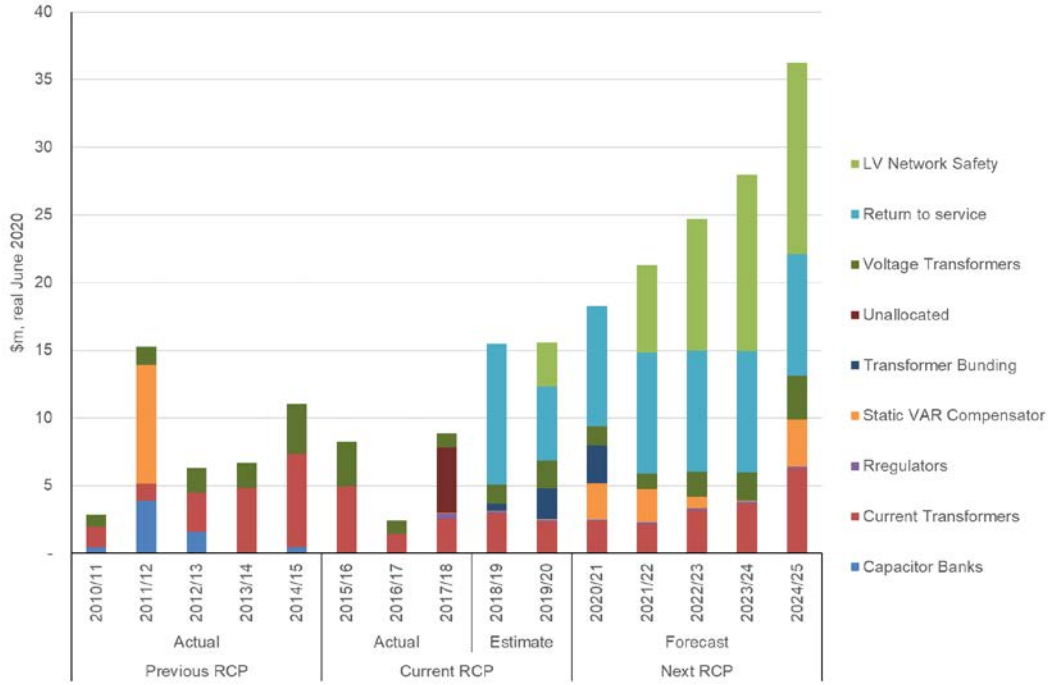
4.4.11 Other

Ergon's forecast

254. Ergon has proposed $128.5m for its 'Other' asset category in its repex forecast for the next RCP. This represents an increase of $77.9m (154%) when compared with actual and estimated expenditure for the current RCP.

255. The expenditure profile for the previous, current and next RCP for the 'Other' asset category is shown in the figure below.

Figure 34: Forecast repex for Other repex asset category



Source: Ergon Reset RIN.

256. As shown in the figure above, the profile over the next RCP is an exponentially increasing trend largely driven by the introduction of the LV Network Safety project. The Return to Service category is the next largest item. It was introduced into the estimated expenditure in 2018/19 and is maintained at a similar forecast level for the next RCP.

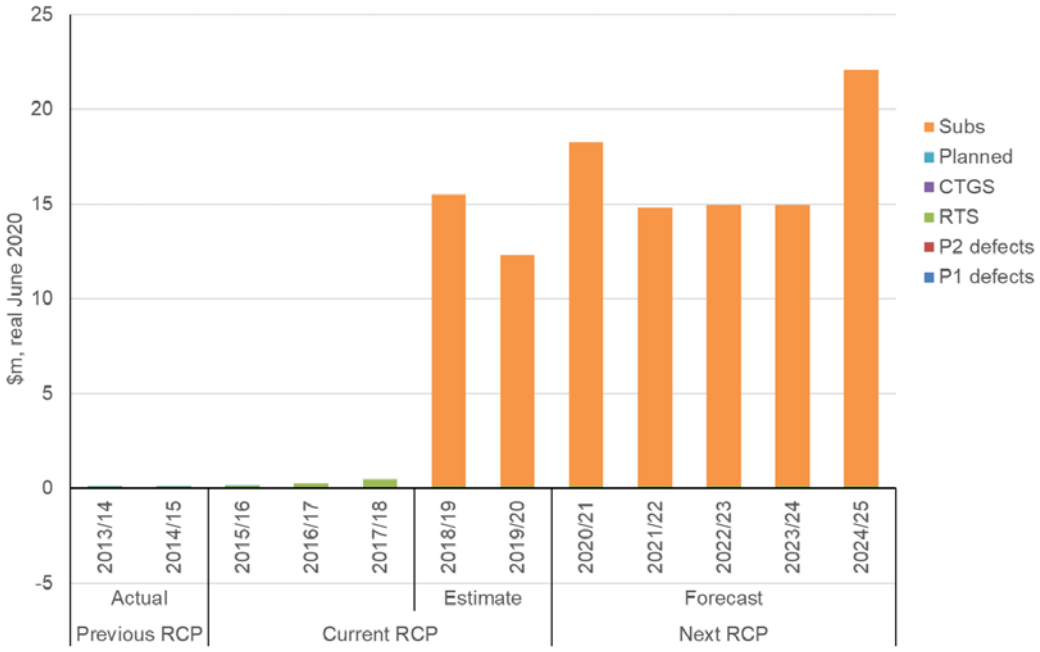
257. Ergon has not included a specific document to describe its proposed 'Other' repex asset category. Rather, documents have been provided for most of the included project components.

Our assessment

258. The Other repex asset category is dominated by the inclusion of expenditure from the sub-transmission major projects, for which we have included a separate assessment below. Accordingly, we comment here on items that are specific to the other repex category and not discussed as part of the major transmission projects below.

259. We have reviewed Ergon' allocation of repex to the asset categories in the RIN and present the expenditure profile for the previous, current and next RCP for the Other repex asset category, by apportionment component, in the figure below.[74]

Figure 35: Bottom-up forecast of Other repex asset category by apportionment component



Source: Ergon's response to information request IR017

260. From this figure, we observe that the forecast expenditure is solely driven by substation related projects and programs. The LV Network safety project was added to the repex forecast separate to the RIN apportionment process described by Ergon. When added to the forecast expenditure, the increase in forecast expenditure is clearly evident in the RIN.

Substation return to service program

261. Ergon defines the substation-related return to service (RTS) forecast expenditure associated with the response to in-service failure of substation assets. Ergon claims that this additional expenditure is required to facilitate the timely and economic replacement of failed substation assets to restore the network to the level of security to which it was designed to be operated to deliver customer service levels.

262. Ergon applies a proactive condition-based replacement strategy, however it forecasts that *'[a]lthough condition modelling can deliver reasonably accurate end of life predictions, it is inevitable that a small percentage of plant will fail prematurely as result of factors such as design and manufacturing defects, or natural events such as wildlife and weather.'*[75]

263. In its response to our request for information, Ergon states that the historical expenditure for RTS is already included at the asset category level in the RIN. We therefore are of the view that any assessment of, or conclusions drawn from, the

[74] We note that the profile of expenditure for the next RCP is aligned with the RIN; however, this is not the case for the previous and current RCPs.

[75] ERG 7.071 Justification statement – Return to Service.

asset management requirements of each asset class (as evidenced by this historical expenditure trend) should be undertaken at this same level.

264. Ergon has not demonstrated why a capex allowance should be added to the 'other repex' asset category which is in addition to the expenditure trend evident at the asset category level.

LV Network Safety project

265. Ergon has included the LV Network safety project in its forecast of expenditure for the next RCP. This project has not followed the apportionment method based on a bottom-up build of the repex program (as done for other projects and programs).

266. The aim of the project is to '*build the capability for detecting LV faults that contribute to shocks and tingles and consequently significantly reducing the associated risks through the deployment of network monitoring devices in targeted areas*'. [76] The project is presented as part of a longer-term aim for EQL to develop network visibility. The proposed expenditure '*enables a step change in improving customer safety by reducing the risks associated with neutral related public shocks*.'[77]

267. In response to our information request, Ergon states that:[78] *'[t]he absence of any LV network monitoring system means that the entire management approach is reactive - the asset has already failed and a situation of electrical risk established. Hence, every shock or tingle must be individually and urgently investigated and resolved.'*

268. Based on the justification of this project provided by Ergon, we do not see how this expenditure directly addresses the legislative obligations cited by Ergon. Specifically, that '*[u]nder the Queensland Electrical Safety Act 2002 and the Queensland Work Health and Safety Act 2011, Ergon Energy has a duty to eliminate electrical safety risk so far as is reasonably practicable, and where not practicable, to mitigate the risk so far as is reasonably practicable. In regards of a safety risk, where new technology is developed such that what was previously considered not practicable is now practicable, Ergon Energy has a duty to take steps to mitigate or eliminate the safety risk.'*

269. Ergon's recommended option (2a) is to install 200,000 network monitoring devices at customer premises in high risk areas at a capital cost of $50m. Our principle concern is that a monitoring system, by its very design, is a passive system that based on a series of inputs can provide information on a set of pre-determined conditions. The underlying root cause of the hazard, should it be identified by this system, will require additional expenditure to resolve and importantly to remove the underlying safety risk. As identified in our assessment of the service line asset category, many of the issues may exist on private installations and therefore may be considered separately to SCS.

270. We consider that Ergon has not sufficiently assessed a reasonable set of options to address the root cause of the safety risk in its network, separate to the issues present in the Energex network. Instead, Ergon has focused on deployment of a technology-based monitoring solution.

[76] EGX ERG 7.093 Strategic Proposal – LV Safety and Network Visibility.

[77] EGX ERG 7.093 Strategic Proposal – LV Safety and Network Visibility.

[78] Ergon's response to information request AER IR038.

271. We reviewed a number of alternative options with Ergon during the onsite meeting, and which should be further explored using a cost-benefit analysis. For example, Ergon dismissed the option of ramping-up replacement of service wires on the basis of cost, resourcing and the availability of what it referred to as *'a lower cost safety mitigation through technology-based monitoring.'* We did not see robust analysis of this option, or a combination of a higher replacement volume with other options. For instance, increased replacement volumes to target high risk areas, in combination with inspection programs, has been the practice in other jurisdictions and was previously adopted for Energex in response to the safety risk associated with the service line.

272. During our onsite discussion, Ergon stated that it had 200,000 high risk locations involving service lines. As described earlier, this number is not accounted for in its: (i) justification of the proposed volume of service line replacements; (ii) assessment of the risk of the service line replacement program; or (iii) the LV Network safety program, which is in the low tolerability range of Ergon's risk framework.[79]

4.4.12 Proposed Sub-transmission Major Projects repex

273. Ergon has identified a total of 18 Sub-transmission Major Projects in its repex forecast[80] as shown in the table below. Sub-transmission Major Projects are those with an estimated cost of the preferred option that is greater than $3m.[81]

274. The total expenditure forecast for Sub-transmission Major Projects in the next RCP is $156.3m as shown in the table below. The highest cost project is the Childers - Gayndah M028 feeder rebuild, which accounts for $33.8m (22%) of the proposed forecast.

[79] EGX ERG 7.093. Strategic Proposal – LV Safety and Network Visibility.

[80] We have extracted the project value from Ergon's repex portfolio including conversion to $2020 for the repex component of the Sub-transmission Major projects.

[81] Based on $2018/19 (incl fleet costs).

Table 7: Sub-transmission Major Projects list for repex ($m, June 2020)

Project No	Proj ID	Total
1266688	FD RPL WB CHIL-GAYN LINE M028	**33.8**
1214829	ZS WB KILK KITO ASSET REPLACE REINFORCE	**12.7**
1273666	NI K N MOSS Upgrade ZS to 132kV Retire 66kV yard and install 132/22kV	**11.5**
1339616	CBRM CA ROSO 1*Z6_32MVA 06-CBRM-PP-Portfolio-Transformer Replace	**10.9**
1339663	SW MERN Replace CBs CTs VTs & ISs 06-CBRM-SP-Portfolio SubstationRefurbish	**10.3**
1310762	Garbutt 132/66/11kV substation (T046) Re	**9.8**
1339684	CBRM SW WETO Stage2 9 33CB 4 VT & 33 IS Second stage of WR1073652	**8.4**
1073652	CBRM SW WETO 11kV SWB - 1st stage Replace 11kV SWB - new demountable	**8.3**
1339630	FN TURK Replace CBs CTs VTs ESs & ISs06-CBRM-SP-Portfolio SubstationRefurbish	**8.1**
1339636	CBRM MK SARI 2*TX 33SWBD 11SWBD	**7.9**
1339698	WB PIAL Replace 7 CBs 3 CTs & 3 ISs 06-CBRM-SP-Portfolio SubstationRefurbish	**7.2**
445103	Charleville SVC Replacement	**6.1**
1256310	BS AUG CHIN Remove 110kV Assets ARP CBRM SW CHIN Replace 8 CT's	**4.8**
1273694	CBRM FN GEOR 1*SVC	**3.6**
1339599	CBRM CA BILO 1*11SWB 5*66CT 3*66VT 36*PR	**3.5**
1305132	Cape River East Future Substation Concept Design	**3.4**
1339627	FN MOGA Replace 2 TRs 11 ISs & 1 IE 06-CBRM-SP-Portfolio SubstationRefurbish	**3.2**
1339634	MK MORA Replace 12 CTs 5 ISs & 4 IEs 06-CBRM-SP-Portfolio SubstationRefurbish	**2.8**
Total		**156.3**

Source: EMCa's analysis of Ergon 7.136 Sub Transmission Major Project List and Ergon's response to information request AER IR017

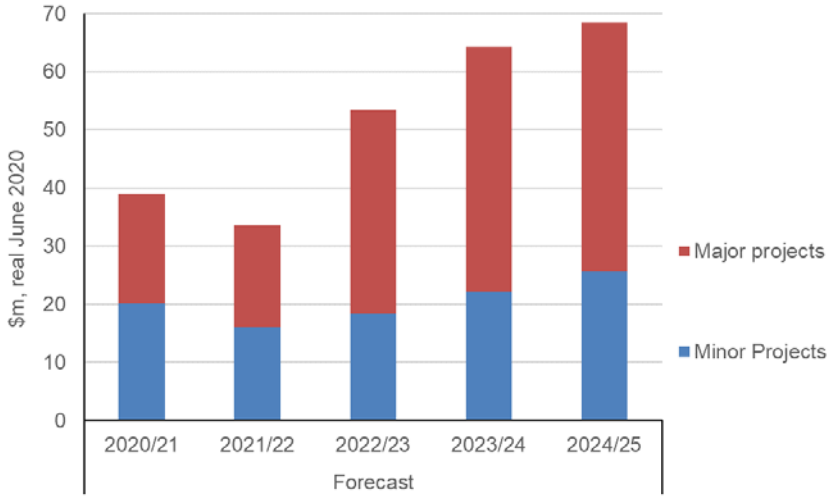
275. The five largest projects account for 51% of the total Sub-transmission Major Projects forecast and are dominated by substation asset replacement projects including two replacements of Static Var Compensators (SVC).[82]

Our assessment

276. The expenditure associated with Sub-transmission Major Projects has been included in each of the forecast RIN categories using the RIN apportionment method described above, as a part of the SUBS component of the bottom-up forecast as shown in the figure below.

[82] Static Var Compensators (SVCs) are devices used to regulate and control the voltage to a required set point under normal steady state and contingency conditions.

Figure 36: Allocation of Sub-transmission Major Projects repex to SUBS apportionment for next RCP



Source: EMCa analysis of Ergon's response to information request AER IR017-3 SUBS Reset RIN apportionment.

277. As shown in the above figure, the increasing component of 'Subs' related expenditure is driven by the inclusion of its associated Sub-transmission Major Projects.

278. Ergon associates a project status gate (Pre-concept, Concept or Development) to each of the 18 projects. These status gates are different to the cost estimation accuracy that Ergon describes in its Unit Cost Methodology and Estimation Approach booklet.[83] However, in our onsite discussion, Ergon told us that the accuracy levels were generally aligned (e.g., concept status for a project aligns with the end use status concept/program assessment, in the cost estimation methodology).

279. In its response to an additional question requesting further explanation on estimation accuracy, Ergon stated that: '*[t]ypically for projects at Strategic Planning/Pre-Concept phase there is a +-40% accuracy, driven predominantly by the detail of the scope definition. This is then refined, moving towards a +-20% accuracy at Project Approval/Concept phase.*' [84]

280. Our understanding of Ergon's explanation is that:

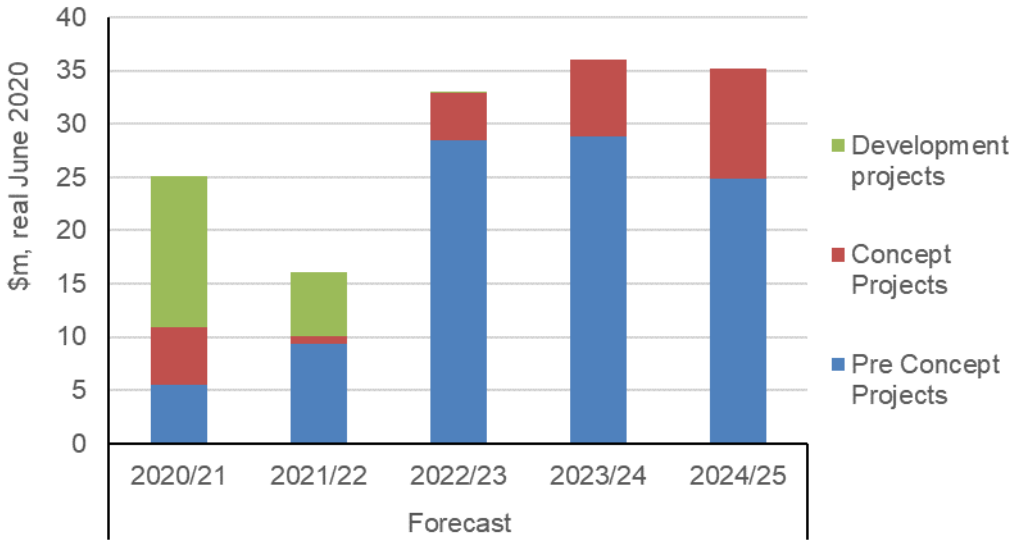
- Pre-concept projects have +/- 40% accuracy;
- Concept projects have +/- 20% accuracy; and
- Development projects have +/- 10% accuracy (i.e., budget approval status).

281. Ergon did not provide analysis supporting its use of the mid-point in its Sub-transmission Major Project forecast. For example, we would have expected that historically substation replacement projects would have had a greater accuracy than overhead line replacements. This is because there will be more certainty of the environment and construction conditions for substation replacements.

[83] EGX ERG 7.005. Unit Cost Methodology and Estimation Approach. JAN19 PUBLIC. Figure 3. Page 6

[84] Ergon's response to information request AER IR038. Capex_Governance_Repex_ICT_20190607_Final. Page 27.

Figure 37: Sub-transmission Major Project by status



Source: EMCa analysis of Ergon's response to information request AER IR017-4a Repex progrom of work.

282. An important consideration when assessing the appropriateness of project cost estimates is the level of certainty that the sub-transmission major projects will be undertaken, and forecast costs incurred, in the next RCP. In previous reviews we have found that the proposed replacement projects and programs can change materially from those that were originally proposed. Given the high proportion of Pre-concept and Concept projects in the list, we consider that there is a relatively high level of uncertainty that the portfolio of sub-transmission major projects will proceed as planned.

283. For example, for the replacement of the Charlesville SVC with a 10MVAr STATCOM - Internal Option, and the replacement of the Georgetown SVC, Ergon has provided inadequate justification. As Ergon discussed during the onsite sessions, these projects still have ongoing investigations regarding potential non-network solutions.

284. We expected that Ergon would provide analysis on the level of certainty it has achieved on its Sub-transmission Major Projects during the current RCP to support the position it has presented for the projects in the next RCP. For example, the issue of project timing is generally seen in the roll-in / roll-out effect between RCPs. Projects not started or completed in the current RCP may roll-over into the next. If this effect is seen, then some projects included in the Sub-transmission Major Projects list for the next RCP may roll-out into the future RCP.

285. Most projects are triggered by CBRM on aging assets and have safety as the primary driver. The majority of projects are included on a like-for-like replacement basis, yet there is increasing uncertainty of future demand for network services.

286. The supporting information indicates that risk assessments for several projects are preliminary and economic analysis is limited. Inclusion of some projects into the forecast suggests to us that the portfolio optimisation process is occurring at low risk scores and is not reflective of a prudent and efficient level.

4.5 Findings and implications for Ergon's proposed repex forecast

4.5.1 Our findings

287. In reviewing Ergon's repex forecast, we found evidence of a number of systemic issues that we identified in our review of the governance, management and forecasting methods in Section 3 applied by Ergon. We provide a summary of these below.

Ergon has not provided sufficient evidence to support its proposed expenditure

288. Ergon has not provided documentation that is consistent with its own governance process and capex forecasting methodology that requires, among other things, robust justification and supporting analysis. For example, we would have expected to see evidence to support the proposed condition-based expenditure forecasts. This would include condition assessment and corresponding risk assessment of the asset class and information regarding contributions of failures and defects that have led to declining network performance or other service measures.

289. During our onsite discussions, we sought to understand how the asset management plans developed for Ergon had been applied to generate the expenditure forecast included in its justification statements, strategic scope documents and ultimately the forecast provided in its RIN. We formed a view at the onsite discussion that Ergon has supporting information that exists within the business and which describes the decisions it made and the assumptions it applied in developing its expenditure forecast on a reasonable economic basis. However, Ergon did not provide this information in response to our requests for information.

290. We therefore consider that Ergon has not provided sufficient information to support the proposed replacement capital expenditure included in its Regulatory Proposal. We note that the Expenditure Assessment Guidelines state that:[85]

> *'The AER intends to assess forecast capital expenditure (capex) proposals through a combination of top down and bottom up modelling of efficient expenditure. Our focus will be on determining the prudent and efficient level of forecast capex. We will generally assess forecast capex through assessing: the need for the expenditure; and the efficiency of the proposed projects and related expenditure to meet any justified expenditure need. This is likely to include consideration of the timing, scope, scale and level of expenditure associated with proposed projects. Where businesses do not provide sufficient economic justification for their proposed expenditure, we will determine what we consider to be the efficient and prudent level of forecast capex. In assessing forecasts and determining what we consider to be efficient and prudent forecasts we may use a variety of analysis techniques to reach our views.'*

[85] AER Better Regulation Expenditure Forecast Assessment Guideline for Electricity Distr bution.

Proposed expenditure is not prudent and efficient

291. Ergon describes the application of its risk framework to prioritise asset replacement at a program level within financial and resource constraints. In the program expenditure we reviewed, we did not find evidence of the risk assessment, or other assessment that explains why such a high number of projects with a risk level of low and moderate have been included in the forecast.

292. In the justification statements provided by Ergon to support the forecast expenditure for each of the asset categories included in its repex forecast, we found evidence that Ergon has applied financial and resourcing constraints to its forecast expenditure.[86]

293. As discussed earlier, we consider that a forecasting process designed to constrain expenditure levels to meet management constraints (such as a price outcome) may result in a network capex forecast that is either too high or too low. In either case, it could be only by coincidence that it might reflect a prudent and efficient expenditure forecast that is based on demonstrated system needs.

Forecast expenditure reflects a reactive asset management approach

294. A large proportion of the proposed expenditure forecast has been prepared on the basis of a reactive asset management approach consistent with incurring future volumes of replacement that are commensurate with historical volumes of replacement.

295. Ergon has not established that the historical volume of renewal primarily on the historical level of defects is a reasonable indicator of the future volume of renewal, or that the proposed unit costs, which vary by renewal driver, are an accurate representation of the expenditure that Ergon will incur. Whilst historical actual expenditure can potentially be used as a substitute estimate in the absence of better information, Ergon has proposed further increases to the historical actual expenditure as a result of its planned programs The combined effect is an elevated level of expenditure that has not been justified as a portfolio or its component parts.

296. It is also not clear to us whether the planned (and committed) efficiency savings by EQL in the merger of Ergon and Energex have been taken into account.

297. We have not seen compelling evidence of a change in asset management strategy that seeks to move away from a primarily reactive management approach, as Ergon has claimed, or that its current approach reflects an efficient or optimised asset management approach.

Cost estimation accuracy likely to be low with potential bias to over estimation

298. We expected that the cost accuracy of project assessments would be supported by analysis of the cost outcomes of historical projects against initial forecasts. This information would demonstrate the accuracy of forecasts at each status level and for different categories of projects. In its Regulatory Proposal, Ergon did not provide any evidence that it had undertaken this analysis. We requested further information

[86] For example: ERG 7.069 Justification Statement - Poles and Towers.

and/or analysis on the historical performance of projects against forecast. Ergon stated that:[87] '*[i]t needs to be noted that these estimates are +-%, although typically from the Strategic Planning to Concept phase estimates typically increase, not decrease, in value as the scope is further refined.*'

299. In the absence of sufficient analysis that demonstrates the level of accuracy of historical projects, we consider that there is likely to be a material degree of inaccuracy. Because unit costs are continually updated, Ergon's claim that estimates are usually less than outcomes are difficult to accept without evidence. In addition, if this were the case, Ergon should have been able and keen to demonstrate the result.

300. Understanding the accuracy of the individual project forecasts is important as Ergon's Major Project list has a high proportion of projects at the low-resolution stages of pre-concept and Concept:

- 66.6% of forecast is for Pre-concept status projects;
- 19.4% of forecast is for Concept status projects; and
- 14% of forecast is for Development status projects

301. As we would expect, higher resolution cost estimates have only been completed for some projects in the early years of the Regulatory Proposal. The proportional value of pre-concept low resolution projects included in the Major Projects forecast is very high.

Economic analysis of options appears to be limited

302. For projects where Ergon provided supporting documentation, most include economic analysis of options. However, for the higher value and more certain projects, we expected to see detailed economic analysis. For all projects, the economic assessment is based on the present value of net project costs. From our project reviews we have some concerns that the analysis has not been sufficiently robust to fully include the costs that should have been considered.

303. For example, the Planning Proposal 7.086 Childers - Gayndah M028 feeder rebuild identifies that, over time, 63% of the poles on this line have been replaced. Ergon's proposal would strand at least some of the recent investment in pole replacement. It is not clear if or how this has been taken into account in Ergon's assessment.

304. Given that most of Ergon's proposed Major Projects are only at the Pre-concept and Concept status, the economic analysis is likely to be preliminary. However, we expected to see sufficiently robust economic analysis provided with the proposal to allow independent scrutiny.

Optimisation based on project risk scores appears overly conservative

305. Ergon states that it uses its risk score method to optimise its list of potential projects. However, the risk scores appear relatively low. For the replacement programs, we were not provided with documentation to support the risk assessment. For the Major Projects, the risk scores appear to be relatively low, with most risk scores below 15. This corresponds to moderate risk. For example:

[87] Ergon's response to information request AER IR038 Capex_Governance_Repex_ICT_20190607.

- the project to construct a new 132/66/11kV Kilkivan bulk supply substation and decommission the existing KILK T12 132/66kV and KITO 66/11kV substations[88] includes a risk score table. The project has risk scores in the low to moderate range; and
- the Highfields Area Condition Replacement and Reinforcement[89] project has risk scores of 12 for safety risk, 12 for legislative risk and 9 for customer impact risk. These scores correspond to low/moderate risk.

306. Our review of the sub-transmission major projects indicates that the risk scores on which the project list is optimized appears to have a relatively low threshold. The inclusion of these projects suggests a low/moderate risk appetite has been applied by Ergon when it compiled the sub-transmission major projects list.

307. Given the low resolution of project development, uncertainty of costs and project timing and lack of clear top-down optimisation, we consider that Ergon's forecast repex for sub-transmission major projects is unlikely to be reasonable and prudent. This view was reinforced when we considered the documentation Ergon provided for each of its sub-transmission major projects, with many at pre-concept status.

4.5.2 Implications

308. We observe that compliance with key elements of the common investment governance process appears to be lacking. We were not provided with sufficient information and did not see sufficient evidence of rigour to support the proposed expenditure. We make this observation based on the information that we would typically expect to find in the expenditure reviews undertaken of other DNSPs.

309. For instance, in our assessment of Ergon's proposed expenditure, we sought evidence to support the 'rigorous process of business cases, risk assessment and strategic estimates' claimed by Ergon from application of its governance processes. However, we did not see sufficient evidence of these processes having been applied to the selection of repex projects that we reviewed.

310. Whilst Ergon considers that the capex program it has proposed represents its response to an elevated level of risk, it has not demonstrated that the iterative process reflects an optimal risk/cost position to achieve a prudent and efficient level of expenditure. In the absence of a robust management framework and review process to calibrate and/or downgrade the project and program risk assessments, it is likely that this has contributed to an elevated level of proposed expenditure activity.

311. Based on the projects and programs we reviewed, we find that Ergon's repex forecast in its RP does not meet the NER expenditure criteria because it has not demonstrated that it is efficient, prudent and reasonable.

312. We consider that the systemic issues identified in our assessment are reflected in a number of biases that have led to a material over-estimation of forecast replacement capital expenditure. We consider that a level of replacement expenditure similar to that which Ergon proposed in its Draft Plan, following its initial top-down review and the level that it expects to incur in the current RCP are each more likely to reflect prudent and efficient levels for the next RCP.

[88] Ergon. ERG 7.087 Planning Proposal - Kilkivan - January 2019.

[89] Ergon. ERG 7.088 Planning Proposal - Meringandan. January 2019.

5 Ergon and Energex's proposed ICT capex

5.1 Introduction

313. In this section, we provide our assessment of Ergon's and Energex's ICT forecast capex. We first summarise the proposed ICT capex of both DNSPs. We then consider the ICT-related governance and management practices and forecasting processes of the two DNSPs. Since both Ergon and Energex operate as subsidiaries of Energy Queensland Ltd, these practices and processes should be aligned for development of their respective ICT capex forecasts.

314. Finally, we consider the expenditure proposed in each of the ICT expenditure categories. The Business Cases all propose, to a greater or lesser extent, replacing or upgrading and consolidating systems, tools and data from the two DNSPs.

315. The ICT expenditure reviewed in this section 5 is directed to Standard Control Services (SCS) only unless otherwise denoted.

5.2 Summary of Ergon and Energex proposed expenditure

316. In this section, we provide an overview of Ergon and Energex's proposed ICT capex for each year of the next RCP and its actual and estimated expenditure for the current RCP.

5.2.1 Ergon

317. Ergon has proposed total ICT capex of $356.0m for the next RCP compared to its actual and estimated expenditure in the current RCP of $364.0m, as shown in the tables below. Compared to the current RCP, this represents a forecast reduction in total ICT capex of $8.0m (2.2%).

318. As shown in the two tables, Ergon has five main categories of ICT capex. For the next RCP, the core drivers of ICT capex are ICT asset replacement ($176.2m) and capitalised overhead ($145.9m). Together, these two categories represent $322.1m (90.5%) of total forecast ICT expenditure.

Table 8: Ergon forecast total ICT capex by asset category for next RCP

$m, Real June 2020	Forecast					Total Next RCP
	2020-21	2021-22	2022-23	2023-24	2024-25	
ICT capability growth	4.6	4.5	4.4	3.9	4.2	**21.6**
ICT asset extensions	2.0	1.9	1.4	2.7	2.1	**10.0**
ICT asset remediation	0.5	0.4	0.3	0.6	0.5	**2.3**
ICT asset replacement	37.3	37.1	36.7	30.6	34.5	**176.2**
Capitalised overhead	27.7	28.1	28.9	29.9	31.3	**145.9**
Total ICT Capex	**72.1**	**72.1**	**71.6**	**67.7**	**72.6**	**356.0**

Source: Ergon Reset RIN and IR002.

Table 9: Ergon actual/estimated total ICT capex by asset category for current RCP[90]

$m, Real June 2020	Actual			Estimate		Total current RCP
	2015-16	2016-17	2017-18	2018-19	2019-20	
ICT capability growth				9.7	4.5	
ICT asset extensions				5.7	5.4	
ICT asset remediation				2.3	2.8	
ICT asset replacement				55.2	35.6	
Capitalised overhead				27.5	27.5	
Total ICT Capex	**73.8**	**56.7**	**57.3**	**100.4**	**75.9**	**364.0**

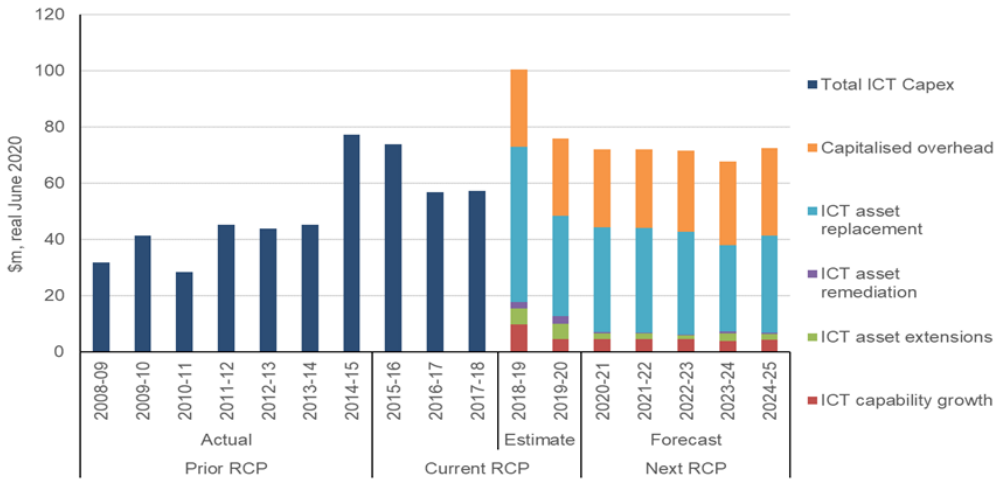
Source: Ergon Reset RIN.

319. Although Table 9 above reflects incomplete historical information for the current RCP, as provided by Ergon, it does illustrate the abnormally high level of ICT capex estimated in 2018/19, of which ICT asset replacement expenditure appears to be a key driver.

320. In the figure below we show the total ICT capex for each year of the prior, current and next RCPs.

[90] EQ only provided the breakdown details of ICT capex from 2018-19 onward.

Figure 38: Ergon total ICT capex for the previous, current and next RCPs



Source: Ergon Reset RIN.

321. We observe that the current level of forecast annual expenditure in 2019/20 is expected to continue into the next RCP and to remain relatively stable at an annualised average of $71.2m.

322. Although the historical data set is limited, the expenditure category detail is helpful to identify prospective drivers of change in the forecast. For example, we also observe that the relative mix of ICT asset category expenditure in each year of Ergon's forecast for the next RCP is similar to Ergon's estimated mix of ICT asset category expenditure for 2019/20.

5.2.2 Energex

323. Energex has proposed ICT capex of $292.6m for the next RCP compared to its actual and estimated expenditure in the current RCP of $307m as shown in the tables below. Compared to the current RCP, this represents a forecast reduction in total ICT capex of $14.4m (4.7%).

324. Identical to Ergon, Energex has five main categories of ICT capex. The core drivers of ICT capex in the next RCP are also the same, being ICT asset replacement ($159.6m) and capitalised overhead ($99.7m). Together, these two categories represent $259.3m (88.6%) of Energex's total forecast ICT capex in the next RCP.

Table 10: Energex forecast total ICT capex by asset category for next RCP

$m, Real June 2020	Forecast					Total Next RCP
	2020-21	2021-22	2022-23	2023-24	2024-25	
ICT capability growth	3.8	3.8	4.3	3.9	3.9	**19.7**
ICT asset extensions	2.4	2.2	1.7	2.4	2.5	**11.1**
ICT asset remediation	0.5	0.5	0.4	0.6	0.6	**2.6**
ICT asset replacement	30.3	30.4	36.1	31.6	31.3	**159.6**
Capitalised overhead	22.1	21.3	20.2	18.8	17.3	**99.7**
Total ICT Capex	**59.1**	**58.1**	**62.7**	**57.3**	**55.4**	**292.6**

Source: Energex Reset RIN.

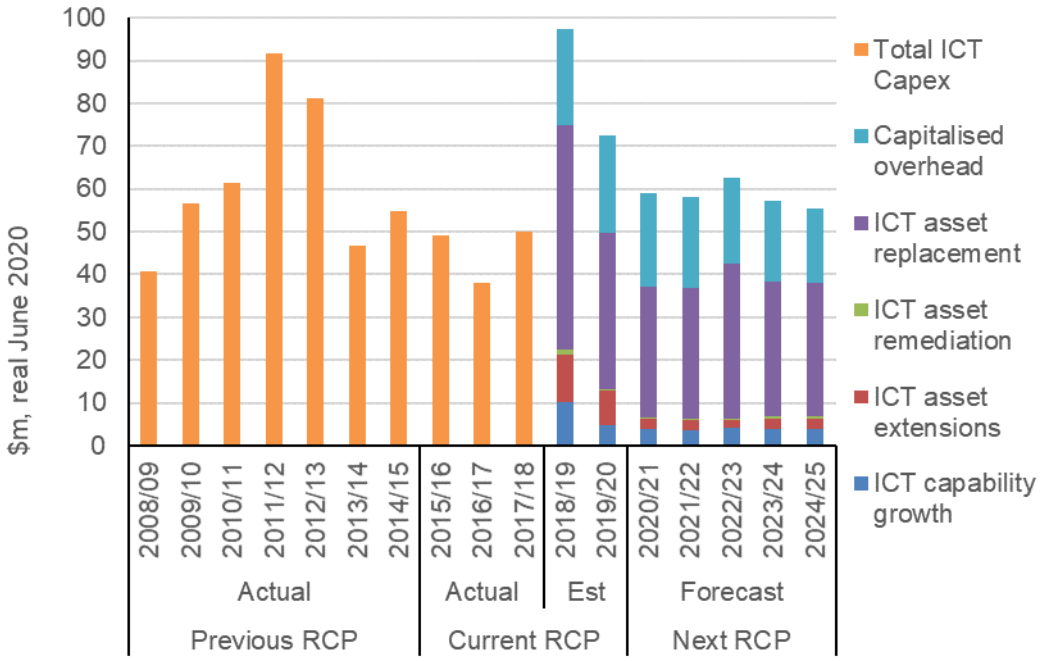
Table 11: Energex actual/estimated total ICT capex by asset category for current RCP[91]

$m, Real June 2020	Actual			Estimate		Total current RCP
	2015-16	2016-17	2017-18	2018-19	2019-20	
ICT capability growth				10.1	4.9	
ICT asset extensions				11.1	8.1	
ICT asset remediation				1.3	0.2	
ICT asset replacement				52.4	36.7	
Capitalised overhead				22.5	22.5	
Total ICT Capex	**49.2**	**37.9**	**50.0**	**97.5**	**72.4**	**307.0**

Source: Energex Reset RIN.

325. The figure below shows Energex's actual, estimated, and forecast ICT capex, by asset expenditure category, for the previous, current and next RCPs.

Figure 39: Energex Total ICT capex for the previous, current and next RCPs ($m, real June 2020)



Source: Energex Reset RIN.

326. The figure above shows a step-change increase in forecast expenditure for the 2018 – 2020 period of the current RCP that is largely driven by increased ICT asset replacement expenditure. Subsequently, in the next RCP, we observe a reduction in forecast total ICT capex. This reflects a forecast stabilisation of ICT asset replacement at a lower annual amount and a sustained reduction in both ICT asset extensions and ICT capability growth.

[91] EQ only provided the breakdown details of ICT capex from 2018-19 onward.

5.3 Assessment of EQ's ICT governance and management framework and forecasting processes

5.3.1 Introduction

327. In this section, we provide an overview of EQ's expenditure governance and management framework specific to ICT capex.

5.3.2 Overview of EQ's governance and management framework and forecasting processes for ICT

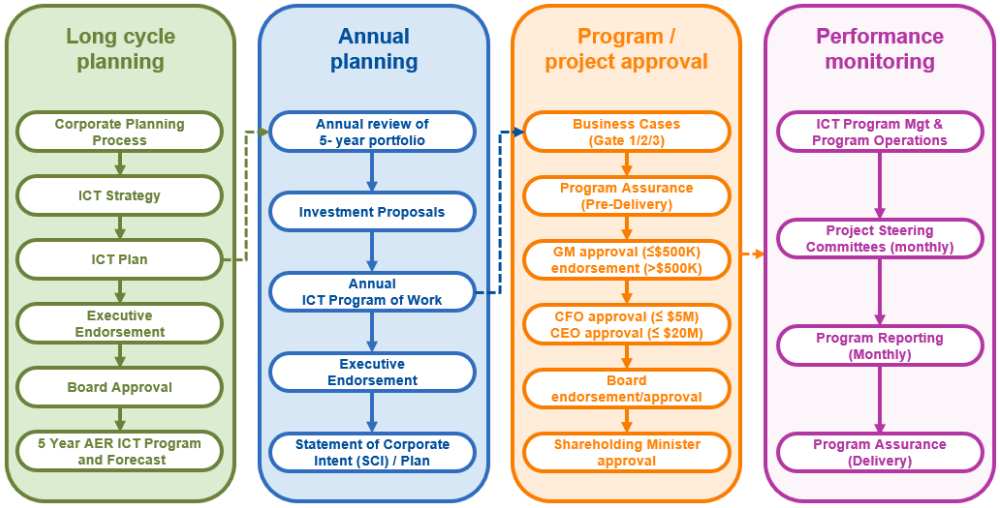
328. EQ advises that its:[92]

- ICT Program is managed according to formal ICT investment governance, ICT portfolio management and project delivery lifecycle processes and methodologies. These processes and methods include phased stage gates, regular progress reporting, risk management and project dependency management;
- ICT Portfolio Management Framework is based on the Axelos Global Best Practice Model for Management of Portfolios;
- ICT Investment Governance Process is a gated process which extends to the management of variations during the delivery phase of projects; and
- ICT Project Delivery Lifecycle supports its Investment Governance Process and '…*aligns with the same stage gates whilst providing additional controls during the 'execution' phase*.'

329. The ICT investment governance lifecycle (or process) illustrates the Executive and other forms of oversight for the ICT portfolio as shown in the figure below. EQ also applies a Digital Project Assurance Framework which, among other things, includes the disciplines of a Program Management Office (PMO), standard project progress tracking, health checks, project audits, and Project Implementation Reviews (PIRs).

[92] EGX ERG 7.007. ICT Plan. January 2019. Page 48.

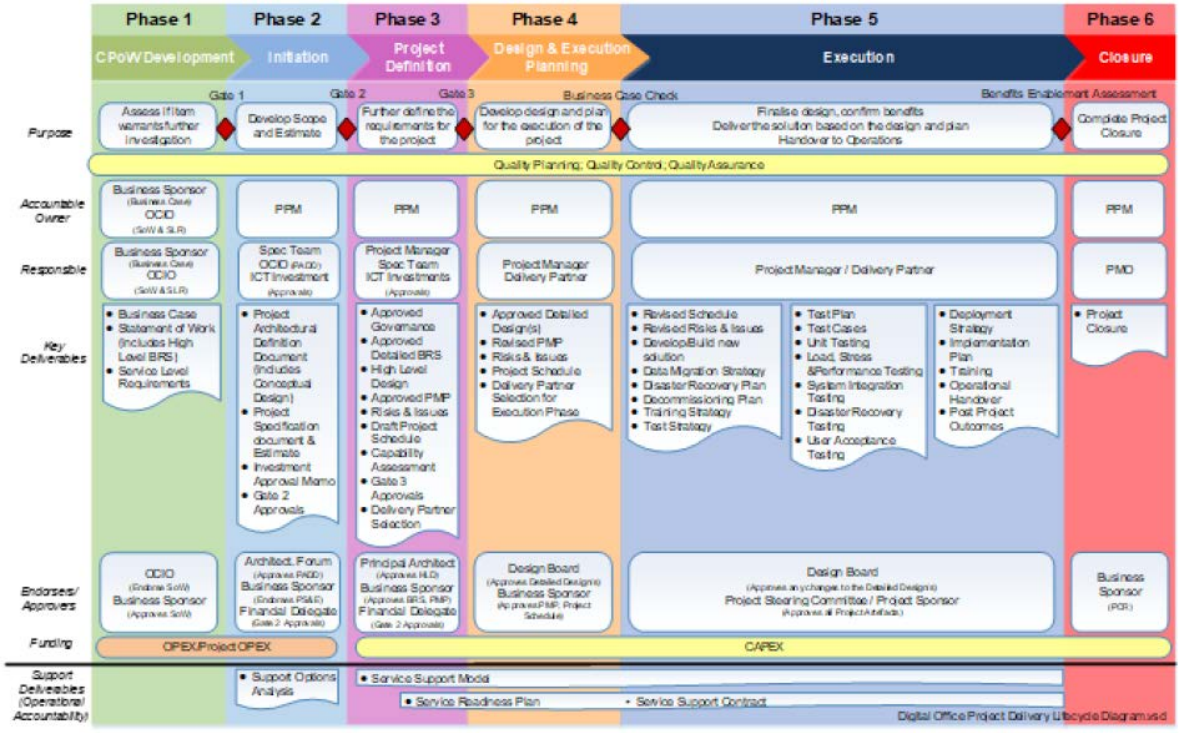
Figure 40: EQ ICT investment governance lifecycle



Source: EGX ERG_EMCa Site Visit_ICT Proposal Discussion. 17 May 2019) V1_4. Slide 5

330. The figure below shows EQ's 'Project Delivery Lifecycle' which aligns with 'stage gates' in the Program/project approval phase.

Figure 41: EQ's Project Delivery Lifecycle



Source: EGX ERG 7.007. ICT Plan. January 2019. Page 48

331. EQ's ICT Plan is the cornerstone document for its 5 year program for the next RCP. It is the outcome of EQ's ICT asset management planning, which is a product of four iterative steps:[93]

- ICT strategy refinement;
- Investment forecast for asset lifecycle management;
- Optimisation for synergy, improvement and risk; and

[93] EQ. EGX ERG_EMCa Site Visit_ICT Proposal Discussion. 17 May 2019) V1_4. Slide 13.

- Review and endorsement.

332. We consider these steps in our discussion of the sub-sections that follow.

EQ's ICT strategy

333. EQ advises that Ergon and Energex will focus on ICT as an enabler of business performance consistent with the following ICT strategic themes:[94]

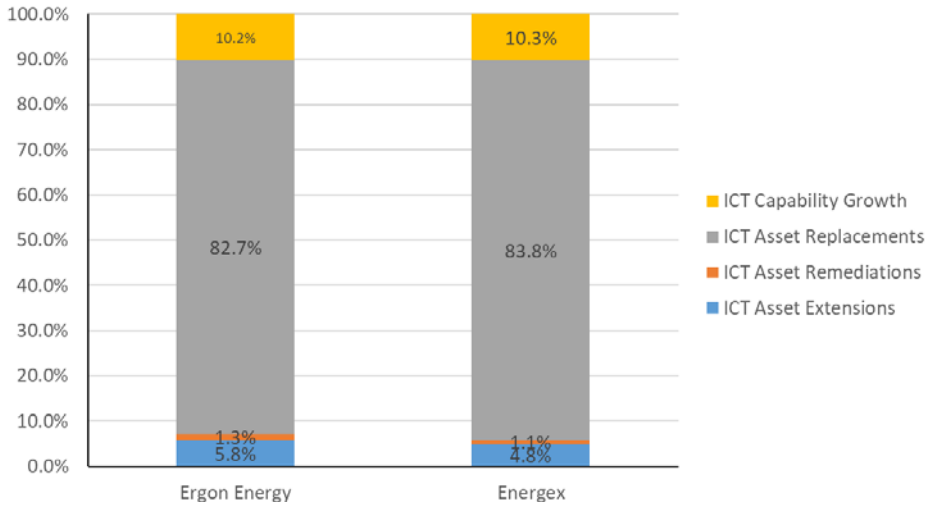
- '*Maintain systems for sustainability, cybersecurity and operational safety;*
- *Leverage ICT replacements for digital transformation, enabling Energex and Ergon Energy's productivity improvement targets;*
- *Maintain efficient ICT performance in a rapidly changing technology environment; and*
- *Leverage innovative technologies and techniques for efficiency and customer service*.'

334. EQ characterises its ICT strategy as a '*digital transformation*' and claims that the benefits will enable Energex and Ergon to reduce indirect costs by 10% and reduce program of work delivery costs by 3%.

EQ's ICT expenditure forecasting process

335. The figure below shows the apportionment of EQ's ICT expenditure between the four ICT asset categories in the next RCP. Of the 18 business cases supporting the proposed expenditure in the next RCP, 90% are classified by EQ as asset replacement and 10% to grow capability.

Figure 42: ICT asset category expenditure for next RCP



Source: EQ. EGX ERG 7.007 ICT Plan. January 2019. Table 4, page 15

336. EQ manages ICT asset replacements as either 'application' or 'infrastructure' assets and in accordance with its ICT Digital Asset Lifecycle Management guidelines.

[94] EQ. EGX ERG 7.007 ICT Plan. January 2019. Page 2.

ICT application lifecycle management

337. EQ's ICT application lifecycle management approach supports: (i) managing the cost of operating ICT by consolidation and retirement of superseded systems; (ii) business productivity by improved system capability and processes; and (iii) maintaining sustainable '*technology debt*' by maintaining applications at a supportable level of currency. Applications are categorised based on their operational purpose and criticality using the Gartner "PACE Layer" model, which comprises three layers: systems of record, systems of differentiation, and systems of innovation. Upgrade and replacement plans also consider compliance obligations, risks, cybersecurity implications and economic improvement opportunities.[95]

ICT infrastructure lifecycle management

338. EQ's ICT Infrastructure Asset investments are also forecast based on industry-typical asset maintenance and renewal guidelines for each category (e.g. end user devices, servers, storage, corporate network equipment, technology software.) EQ's ICT infrastructure lifecycle management approach is designed to ensure: (i) ICT systems and platforms remain available and supportable; (ii) ICT cybersecurity and information privacy are maintained within an appropriate risk posture; and (iii) Optimised cost effectiveness of ICT infrastructure asset ownership.[96]

EQ's portfolio optimisation approach

339. EQ advises that the 18 business cases were developed from grouping individual application investments for delivery synergy and efficiency and with defined interdependencies and sequencing. The productivity benefits were developed '*iteratively through stakeholder engagement, business area analysis and subject matter expert assessment.*'[97]

340. The further steps in refining the ICT portfolio[98] include review by EQ's Executive leadership, further refinement of benefits analysis (consistent with stakeholder feedback), and review of risk assessments for consistency with EQ's network risk management practices. The final ICT Plan and business cases were reviewed and approved together by the Executive and Board as part of finalising the EQ Regulatory Proposals.

341. As a result of this process, EQ advises that the combined $461m (SCS, $2020) ICT forecast in the '*Our Draft Plans 2020-25*' document released for public comment in September 2018 was reduced to $402m (SCS $2020), a 12.8% reduction.

Cost estimation methodology

342. EQ has not explicitly described its cost estimation methodology. However, all of its proposed ICT expenditure is supported by Business Cases which show the cost

[95] EQ. EGX ERG 7.007 ICT Plan 2020-25. January 2019. Page 11

[96] EQ. EGX ERG 7.007 ICT Plan 2020-25. January 2019. Page 12

[97] EQ. Response to information request AER EGX IR023 Capex Non-Network ICT_20190510. Question 2a

[98] EQ. Response to information request AER EGX IR023 Capex Non-Network ICT_20190510. Question 2a.

structure and cost assumptions (for each option). Further, in response to our request for information, EQ has provided the following:[99]

- NPV spreadsheets for each Business Case which show time-phased expenditure for each option, and source cost input data (although the costs are hardcoded);[100]
- a self-assessment by EQ of the estimation accuracy (referred to by EQ as a 'Confidence rating') of the cost estimates as either High (±10%), Medium (±20%) or Low (±30%), with 12 of the 18 business case estimates rated as High, four as Medium accuracy and two (ID01 and ID07) as Low accuracy;[101]
- a spreadsheet modelling the cost breakdown for the Business Cases and the labour unit rates;[102] and
- evidence of application of an 85% 'delivery synergy and efficiency factor' to recognise the estimated cost efficiencies that should derive from combining Energex and Ergon ICT applications and infrastructure.

343. EQ's IR response[103] states that:

- the initial values were '*derived through a combination of methods including parametric estimation techniques, knowledge of existing investments and previous bottom up estimates, internal expertise and external advice*';
- '*Experience of the market, solution requirements and other initiatives have been used to validate the indicative reasonableness of the likely Product & Vendor Costs value. This amount includes the forecast costs for purchases of product software, databases and technical platform licensing. It also includes product specialist configuration and implementation expertise acquired from the product vendor or equivalent third parties'*;
- for planning purposes, a Delivery Synergy & Efficiency Factor of 85% is applied to the cost estimates to recognise 'synergies achieved through consolidating renewal of multiple capabilities into integrated delivery initiatives and efficiencies through joint delivery between Energex and Ergon Energy'; and
- '*Based on the forecast confidence rating, the capital estimation accuracy factor' is applied*.' The factors are: 1.1 for High confidence estimates, 1.2 for Medium rated estimates, and 1.3 for Low confidence estimates. This factor is applied to the 'Consolidated Refined Forecasts (i.e. which include the Delivery Synergy & Efficiency factor), increasing the cost estimates by 10%, 20% and 30% respectively.

[99] EQ. Response to information request AER ERG IR002 and AER EGX IR003. Question 3.

[100] EQ. Responses IRG IR002 and EGX IR003. Question 3.

[101] EQ. Response to Energex AER IR023 Capex Non-Network ICT_20190510. Question 5.

[102] EQ. Response to Energex AER IR023 Capex Non-Network ICT_20190510. Question 5.

[103] EQ. Response to Energex AER IR023 Capex Non-Network ICT_20190510. Question 5.

5.3.3 Our findings

G&M framework elements are consistent with common industry practice

344. The elements of EQ's governance and management framework for ICT are generally consistent with good industry practice, including the inclusion of non-network IT expenditure within the PMO.

EQ's expenditure forecasting methodology inappropriately includes project contingency amounts

345. EQ applies two adjustment factors to the initial cost estimates to arrive at consolidated forecasts:

- a delivery synergy and efficiency factor of 85% to recognise the 15% cost reduction it expects to achieve through joint delivery between Ergon and Energex. Although EQ has not presented any further information to support the quantum of this factor, based on our experience, and noting the complexities inherent in consolidating disparate systems across two businesses, we consider the 85% factor to be reasonable; and
- an estimation accuracy factor, ranging from +10% to +30% applied to each business case cost estimate. This is equivalent to a contingency amount, and which we consider is at odds with the capex criteria in the NER. The reasonable expectation is for some projects to be delivered under budget, whilst others will be delivered over budget, such that at this stage of the portfolio development lifecycle there should be no net provision included in EQ's forecast expenditure.

EQ's 'digital transformation' strategy is appropriate, but is inadequately linked to its proposed expenditure

346. EQ's 'digital transformation' strategy is designed to enable efficient business operations, customer service, and safety management. There is no explicit link between the ICT plan and EQ's Intelligent Grid Technology Plan, with the latter incorporating SCADA and communications operation technology.

347. The 18 projects are positioned by EQ as '*primarily replacements required for the purposes of sustainability, serviceability and security*.' We test this claim in our assessment of the expenditure categories comprising the ICT portfolio for 2020-25. EQ equates its strategy to be realised through 90% asset replacement and 10% capability growth.[104] This is not entirely consistent with the figure in section 5.3.2 and the designation of only 10% of the ICT program to growing capability appears to be arbitrary. Again, we test this apportionment in our assessment below.

348. Leveraging IT to reduce operating costs is a common strategy amongst DNSPs and EQ's planned consolidation of 'aged' and disparate systems as part of its lifecycle management work appears reasonable.

[104] EQ. Ergon Energy AER IR023 Capex Non-Network Historical_20190507_Final. Page 6

EQ's assessment of delivery risk is not compelling

349. We note that EQ reduced its initial bottom-up forecast $461m SCS-only ICT expenditure to $402m.[105] We understand from the information provided (including in response to Requests for Information and at our on-site meeting with EQ) that the reduction was achieved through 'refinement of costs, benefits, risks, and NPV analyses' but not by deferring any of the initially planned work.

350. We consider that EQ has not adequately accounted for project complexity, and project dependencies, and has not included sufficient time between dependent projects following 'go live' of the upgraded and consolidated systems/tools to fix bugs and other issues. Our concerns with the deliverability of EQ's proposed ICT 2020-25 portfolio are significant and are discussed further in section 5.4.

5.4 Assessment of EQ's proposed ICT portfolio

5.4.1 Introduction

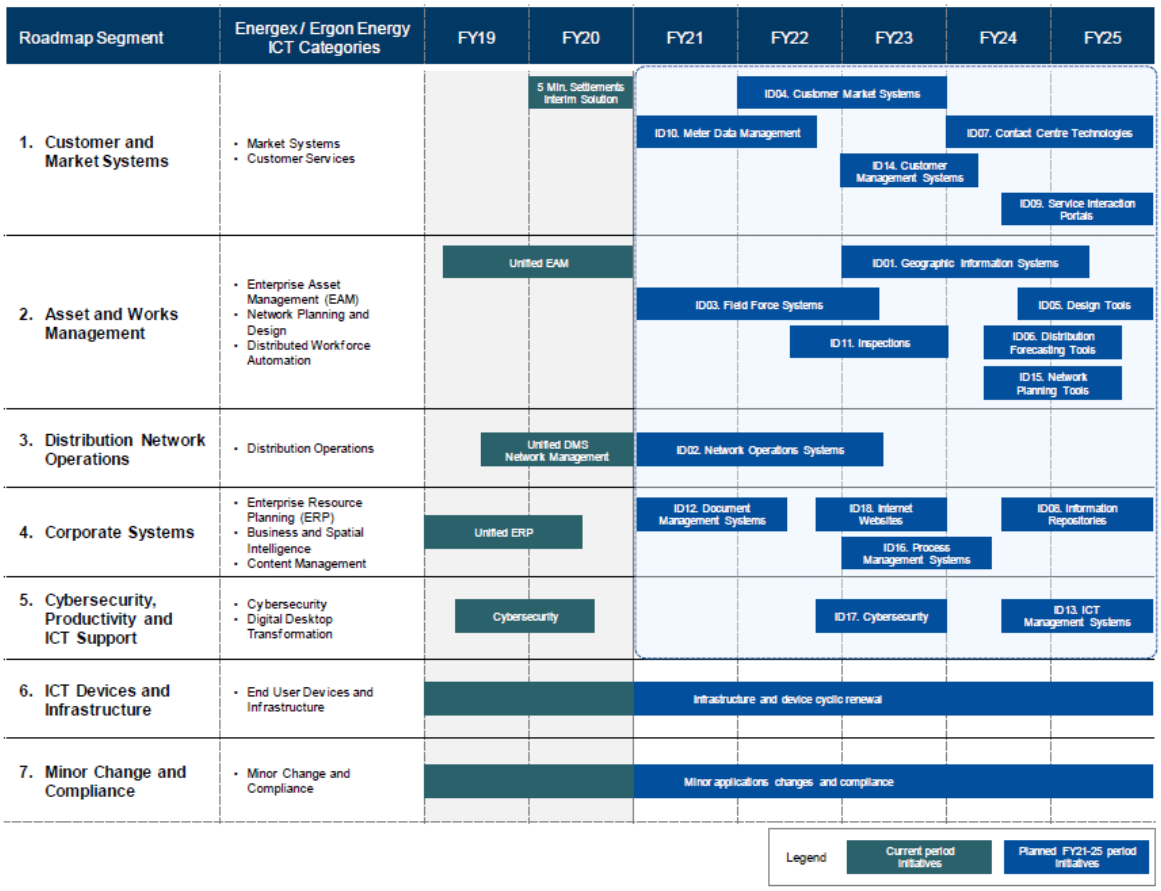
351. In this section we present our assessment of EQ's ICT portfolio which is focused on the risks to efficient delivery of EQ's proposed portfolio of ICT work.

5.4.2 Overview of EQ's ICT portfolio

352. The figure below shows EQ's ICT capital project portfolio for the 2020-25 period, which comprises seven segments. It is evident from this figure that EQ is seeking to deliver a large and complex portfolio of work, however, not all of the interdependencies are apparent from this diagram alone.

[105] EQ. Ergon Energy AER IR025 Capex Non-Network ICT_20190510_Final. Page 7

Figure 43: EQ's ICT portfolio



Source: EQ. EGX ERG 7.007 ICT Plan. January 2019. CONFID. Figure 4

5.4.3 Our assessment

There is a material risk that EQ will not deliver all of its 2019-2025 ICT projects on schedule

353. In response to an Information Request, EQ has provided two monthly ICT program reports to the Executive Steering Committee:

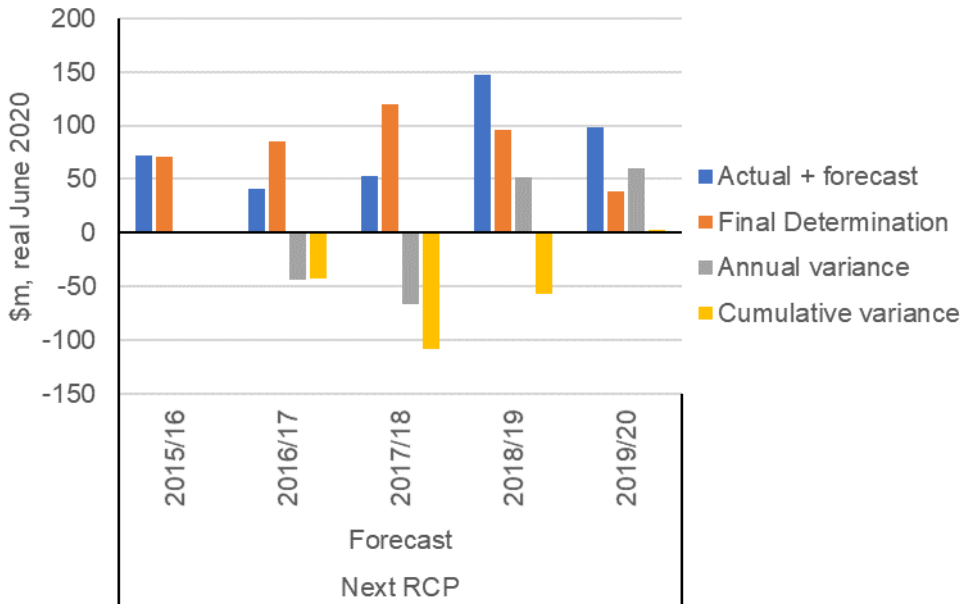
- Digital Enterprise Building Blocks (DEBBs) Report – DEBBs are strategic Enterprise Building Block initiatives centred around the ERP EAM renewal. The report shows that all but two of 13 projects are on track financially but that 5 of 13 (40%) projects/initiatives are between 10% - 20% behind schedule, with one project more than 20% behind schedule as of May 2019;[106] and
- Digital Delivery Performance Report – this covers non-DEBBs projects >$0.5m: the report shows that the majority of projects are on schedule, with a projected 13% underspend of the 2018/19 budget.[107]

[106] EQ. Response to information request AER ERG IR038-Question-39A01-20190523. The Digital Enterprise Building Blocks (DEBBs) Report. May 2019. Page 2.

[107] EQ. Response to information request AER ERG IR038-Question-39A01-20190523. The Digital Delivery Performance (DDP) Report - April 2019. Page 3.

354. The figure below shows that at the end of 2017/18, Ergon and Energex had a combined $108.6m (SCS only, $2020) underspend against the EQ combined 2015-20 regulatory allowance of $408.8m. By the end of 2018/19, EQ advises that it expects to have recovered to an underspend of $57.2m and by the end of the current RCP to have overspent by $3.0m.

Figure 44: EQ's actual and forecast ICT expenditure variance in current RCP (SCS only)



Sources: EQ. Response to Energex AER IR023 Capex Non-Network ICT_20190510. Question 1 EQ. Response to Ergon AER IR025 Capex Non-Network ICT_20190510. Question 1.

355. Based on current performance and our understanding of the complexities involved in the in-flight projects, we consider that:

- there is a material risk that EQ will not be able to recover project schedules for the complete 2015-20 ICT program of work in the final two years of the current RCP; and
- if there is slippage, this is likely to increase delivery risk for its 2020-25 ICT portfolio.

Projects within the next RCP are complex and may take longer to complete than allowed for in EQ's Roadmap

356. The Roadmap for the next RCP is dominated by a significant investment in replacing and consolidating core systems across both Ergon and Energex.

357. The Business Cases provided by EQ show that many of the projects included in the proposed ICT capex forecast are large and complex. We consider that EQ's Business Cases do not adequately consider deliverability risk related to schedule and integration. Specifically, in our opinion, the project risk statements do not adequately assess the time and the inter-dependency risks of the projects. We consider that data migration risk will be a significant factor as many projects require normalising and migrating data from two organisations into a coherent dataset for the proposed new replacement systems.

358. For example, EQ's GIS Business Case states that: '*Energex's GIS solution is primarily based on a custom-built Network Facilities Management (NFM) system…NFM is a complex "home grown" application operating on an Oracle*

database platform. It currently serves as both the asset database and the network connectivity model, with interfaces to over 100 other systems and tools. The application was developed and deployed in the 1990s and has become highly customised for Energex's historical operating practices.' The inherent project risk associated with migration and alignment complexities within and between the two businesses has been rated by EQ as High but the residual risk is rated as low-moderate .[108] We do not see enough evidence that the time allowed for the project is commensurate with the assessed residual risk. For example, addition of hypercare windows to the project timeline would help achieve EQ's target residual risk levels,

There are complex interdependencies across RCP boundaries and within the next RCP which may lead to delivery delays

359. Our review of the ICT Program Roadmap, the ICT Plan, Business Cases and responses to Information Requests leads us to conclude that there are significant inter-dependencies between projects in the next RCP as well as some dependencies with projects in full flight in the current RCP.

360. With the number of large, complex, dependent projects the phasing becomes critical. The phasing adopted by Ergon and Energex is back-to-back; this dramatically increases the risk profile associated with delivery. The Roadmap view does not show evidence of Hypercare windows between dependent projects to allow for any re-work or settling in of the new technologies. In a number of dependent projects, the portfolio view shows an overlap of project-end and project-start times that considerably increases the risk of a total portfolio overrun.

361. EQ does not appear to have adequately considered, or factored in time contingency for the above effects

There is a high likelihood of program slippage

362. Based on evidence of: (i) some of the projects within EQ's 2015-20 ICT portfolio running late; (ii) the complexities within, and dependencies between, projects in the proposed portfolio; and (iii) the likelihood that insufficient time has been allowed in 2020-25 ICT project schedules; we believe that it is highly unlikely that the proposed ICT program of work for the next RCP will be completed as proposed.

5.5 Assessment of EQ's proposed recurrent ICT capex

5.5.1 Introduction

363. In this section, we review the three components of expenditure underpinning EQ's proposed recurrent IT capex in the next RCP: (i) ICT Devices and Infrastructure; (ii) Other Minor Application Upgrades and Updates, and (iii) Minor Applications change and compliance. EQ's total forecast capex for recurrent ICT is $121.5m.

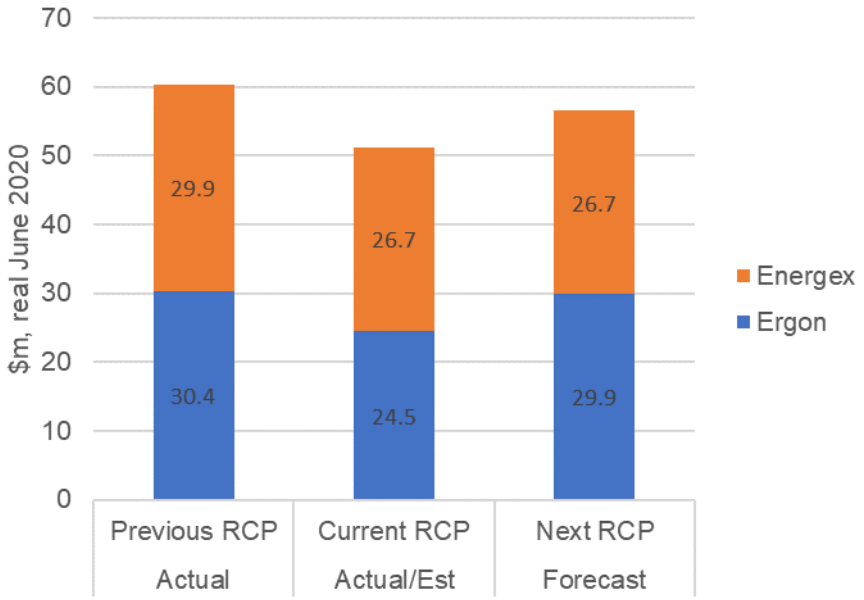
[108] EGX ERG 7.008 ID01 GIS Consolidation and Replacement. January 2019. Pages 9, 43.

5.5.2 ICT Devices and Infrastructure

EQ's forecast

364. The ICT Devices and Infrastructure program represents capex associated with End-user devices, Infrastructure storage, Servers, Video Conferencing (VC) equipment and Shared EQ infrastructure. EQ advises that prior to the next RCP, Ergon and Energex did not itemise VC equipment capex separately – it is currently part of the Non-Network Property asset base. For the next RCP, VC equipment capex renewal is classified as Non-Network ICT capital.

Figure 45: EQ actual/estimated and forecast ICT Infrastructure and devices Program capex



Sources: EMCa analysis referring to EQ. Ergon Energy AER IR011 Capex Non Network, ICT_20190325_Final, Energex AER IR012 Capex Non Network ICT_20190325_Final, (ICT Energex)-17.046 - Regulatory Determination RIN template 2020-25 - January 2019 v1.2, (REPEX and ICT) ERG 17.053 2020-25 Regulatory Determination RIN template JAN19 PUBLIC v2.7

365. Ergon has proposed $29.9m and Energex has proposed $26.7m of forecast expenditure[109] for their respective ICT Devices and Infrastructure Programs in the next RCP. In the figure above, we show the combined capex profile for the previous, current and next RCP for these Infrastructure Programs.

Our assessment

366. EQ has not provided a Business Case for this segment of its Roadmap. It simply advises that the forecast expenditure is based on its 'ICT Infrastructure Guidelines' ('Guideline') and that the devices and infrastructure are *'…managed and renewed on a progressive basis.'*[110] We have reviewed the Guideline and information provided in response to Information Requests which were necessary in the absence of any other supporting information from EQ for the proposed $56.6m capex in this category. We present our assessment of the proposed expenditure below.

[109] EQ. Response to information request AER ERG IR038. Capex_Governance_Repex_ICT_20190607_Final. Pages 38 and 39 (SCS).

[110] EQ. Response to information request AER EGX ERG 7.007 ICT Plan 2020-25. January 2019. Page 45.

EQ's ICT Infrastructure Guidelines are reasonable

367. The Guideline classifies the various forms of infrastructure into a series of infrastructure categories and subcategories, with prescribed replacement forecasts for each. EQ advises that the replacement cycles are based on industry practices *'with a focus on investment prudency and efficiency'.*[111]

368. From our review of the Guideline, we observe that:

- the replacement cycles consider (i) failure; (ii) financial obsolescence; (iii) vendor end of support (asset obsolescence); and (iv) end of functional life (technical obsolescence) and that they are consistent with common industry practice;
- forecast replacement ages are consistent with our expectations (based on our experience); and
- it provides the flexibility for Ergon and Energex to defer replacement depending on the specific application, EQ's own experience, and support options (such as extending warranty) for which cost-risk trade-offs are made.

369. On this basis, we consider that the Guideline presents a reasonable basis for expenditure forecasting for this Roadmap segment.

Forecast capex is consistent with historical capex

370. Given the relatively high volume and cyclical nature of the replacement decisions, trend analysis from historical expenditure is a reasonable assessment tool. As shown in the figure above, the 5-year total capex for the next RCP is approximately 10% higher than for the current RCP, but we note the forecast for the next RCP now includes VC equipment. The forecast capex for the next RCP is within the range of the current and previous RCP expenditure levels and, given the 'addition' of the VC equipment capex to this category, we consider it to be reasonable.

Migration to IaaS is unlikely to materially impact the forecast for the next RCP

371. We do not consider it likely that EQ will unwind its move from Infrastructure as a Service (per SPARQ Solutions) to a point that it transfers significant capex to opex in the next RCP based on our understanding of its arrangements and strategy.

5.5.3 Other minor application upgrades and updates

372. This category is also referred to by EQ as System Upgrades in its ICT Plan.[112] In each of the non-recurrent Roadmap segments discussed in section 5.6.1 – 5.6.5, EQ has included brief descriptions of '*minor applications upgrades and updates for continued serviceability*'. They are described as '*mid-life investments in [Ergon Energy's and Energex's] application set to optimise service life and ensure medium-term sustainability, supportability and cybersecurity.'*[113] On this basis we consider these to be recurrent expenditure.

[111] EQ. Response to information request AER ERG IR011 Capex Non-Network_ICT_Attachment_20190325. November 2018. Page 2.

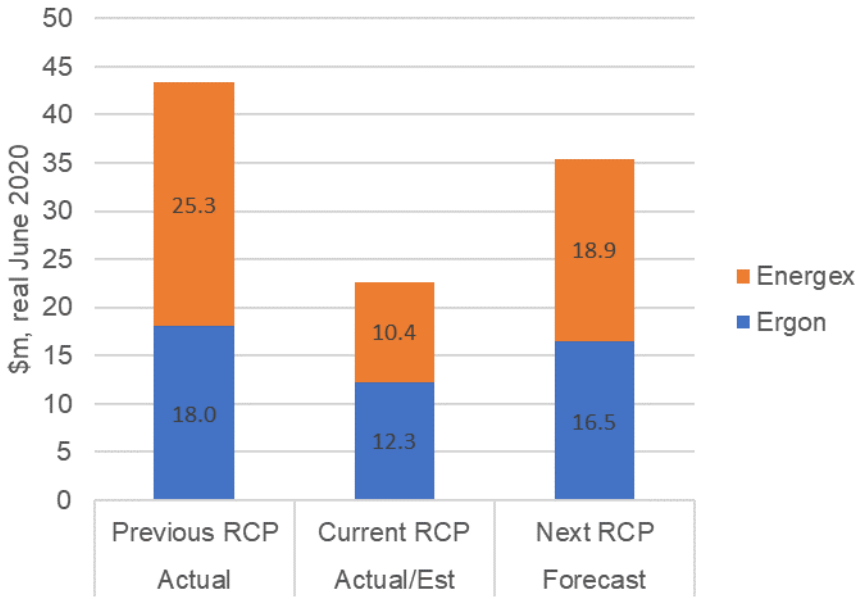
[112] Tables 17 and 18; this is not to be confused with the reference in the same tables to 'Minor Applications Change - Minor Apps Change & Compliance'

[113] EQ. Response to information request AER IR011 Capex Non Network ICT_20190325_Final. Page 2.

EQ's forecast

373. The total forecast capex in this sub-category across the five Roadmap segments is $35.4m in the next RCP, with the expenditure profile shown in the figure below.

Figure 46: Other minor applications upgrades and updates



Source: EQ. EGX ERG 7.007 ICT Plan. January 2019. CONFID. Tables 17 and 18

Our assessment

374. The total forecast capex in the next RCP is 56% higher than the total actual/forecast expenditure in the current RCP.

375. EQ has provided only a paragraph in each Roadmap segment to justify the proposed capex in the next RCP. EQ identifies affected systems/tools in its ICT Plan (sections 5.4.1 – 5.4.5). There are references to the need for the interim period upgrades of systems covered in this sub-category in the corresponding business cases for the applicable Roadmap segment. For example, Ergon and Energex have recently upgraded to SAP HANA (EIP), which is a fundamental platform for the Information Repositories consolidation and replacement project identified in Business Case ID08. We assume this would be classified as a System of Record and will be due for a minor upgrade within 3 – 5 years of implementation according to the Guideline.

376. From the description of the application lifecycle management in section 5.3.5, we infer that the 'other minor' upgrade decisions are also made based on their operational purpose and criticality using the Gartner PACE Layer model.

377. We are satisfied from the descriptions provided that to a material extent:

- there is no overlap between this non-recurrent minor upgrade/update capex sub-category and the recurrent 'minor applications change & compliance'; and
- there is no overlap between the systems/tools planned for replacement in this sub-category and the major non-recurrent replacement projects.

378. However, given the significant proposed increase ($12.7m) from the current RCP expenditure level, we would expect that a prudent DNSP would adopt a risk-based approach to upgrading/updating its applications, deferring upgrades beyond the reference lifecycle which we assume it has applied, particularly given the other activities underway which are changing the IT landscape considerably. EQ has not given any indication in the information provided that it has done so. EQ has not justified the 56% increase that it has proposed for the next RCP and we consider it likely that EQ will underspend its proposed forecast.

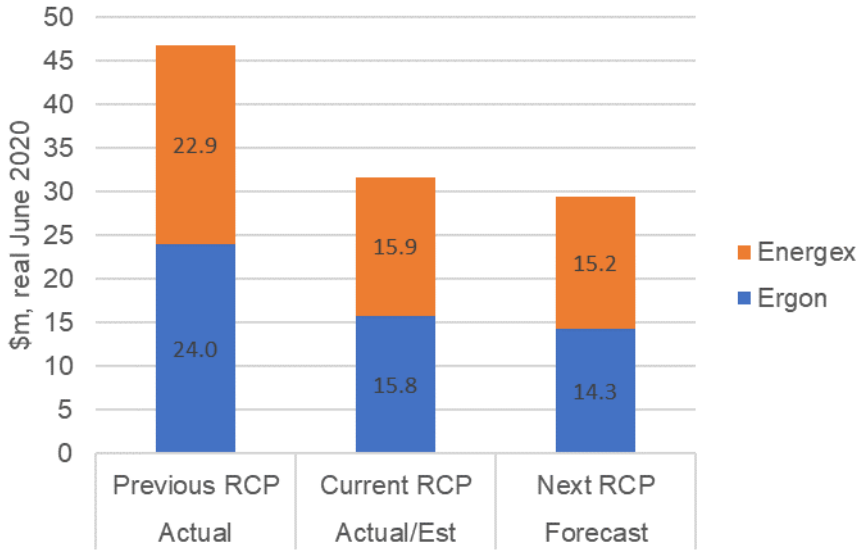
5.5.4 Minor applications change & compliance

EQ's forecast

379. This segment of EQ's ICT expenditure comprises '*minor ICT changes to support mandatory business change driven from safety initiatives, risk assessments, network growth to support new customers, electricity market changes and audit recommendations.*'[114]

380. Ergon has proposed $14.3m and Energex has proposed $15.2m in forecast capex[115] on their respective ICT Minor Applications programs in the next RCP. The combined capex profile for each year of the previous, current and next RCP is shown in the figure below.

Figure 47: EQ actual/estimated and forecast ICT Minor Applications Change capex



Sources: EMCa analysis referring to EQ. Ergon Energy AER IR011 Capex Non Network ICT_20190325_Final, Energex AER IR012 Capex Non Network ICT_20190325_Final, (ICT Energex)-

[114] EQ. EGX ERG 7.007 ICT Plan. January 2019 CONFID. Page 45.

[115] EQ. Response to information request AER ERG IR038. Capex_Governance_Repex_ICT_20190607_Final. Pages 38 and 39 (SCS).

17.046 - Regulatory Determination RIN template 2020-25 - January 2019 v1.2, (REPEX and ICT) ERG 17.053 2020-25 Regulatory Determination RIN template JAN19 PUBLIC v2.7

Our assessment

381. We observe a trend of declining expenditure across the RCPs for this expenditure category, with forecast capex for the next RCP being significantly lower than in the previous or current RCP.

382. EQ has not provided a Business Case for this segment of its Roadmap. It provides no details about the derivation of its combined $29.4m capex forecast in its ICT Plan nor in its responses to relevant Information Requests.[116]

383. In lieu of supporting detail regarding the approach to generate the forecast for the next RCP, we have relied upon trend analysis for our assessment. As shown in Figure 45 above, EQ's forecast capex in this subcategory is slightly lower than the current RCP. Together with our earlier comments regarding the application of the Guideline, we consider the forecast expenditure to be reasonable.

5.6 Assessment of EQ's proposed non-recurrent ICT capex

384. In this section we consider the Business cases and other supporting information presented by EQ to justify its proposed $280.8m on non-recurrent IT initiatives. We first consider the five Roadmap segments that collectively address non-recurrent ICT capex requirements and then separately consider the benefits claimed from the initiatives.

385. In each of the 18 Business Cases provided in support of the forecast capex, EQ has selected Option 1 (consolidate/replace) after considering two others: 'independent Ergon and Energex systems replacement', and 'do minimal'. In each case the selected Option 1 is assessed by EQ to have the highest NPV (which is, in most cases, negative).

5.6.1 Customer and Market Systems

386. Customer and Market Systems include ICT applications, tools and data stores to support Energex and Ergon Energy's market compliance, customer and stakeholder management functions.

EQ's forecast

387. EQ proposes five initiatives in the next RCP, with supporting information provided in five Business Cases, as shown in the table below. The combined cost of the five initiatives is $79.6m with a -$45.9m NPV, including $35.1m net present benefits. EQ also proposes $2.9m in 'system upgrades' in this Roadmap segment. We consider EQ's system upgrades capex in section 5.5.

[116] EQ. Response to information request AER IR011 ERG non-network ICT; Response to AER IR012 EGX non-network ICT

Table 12: Summary of EQ's Customer & Market Systems Business Cases

Business case	BC ID	Capex ($m) [1]	Benefit ($m, NPV) [2]	NPV ($m) [2]	PACE classification [2] [3]	System/tool being replaced [2]	Age at planned investment (years) [2] [4]	Obolescence classification [2] [5]
Meter data management	ID10	13.4	10.7	-6.8	SoR	Toht	14	F, A
						MVRS	14	T, F, A
Customer market systems	ID04	36.6	11.0	-33.0	SoR	PEACE	7-16	A, T
						Shine NBM	7-16	A, T
						MARS	7-16	A, T
Customer Management systems	ID14	6.4	1.1	-7.0	SoD	Cherwell	13-16	A, T
						Mobile app	10	A, T
						SLIM, PLUMS	16-17	A, T
						Salesforce, LightMap	10	A, T
Contact Centre technologies	ID07	14.4	7.0	9.1	SoR	CCT	10	F, A
Service interaction portals	ID09	8.8	5.3	-8.3	SoD	SI Portal	9-14	A, T
Minor system upgrades	n/a	2.9	-	-	-	iTron Enterprise Edition	-	-
Total		**82.4**	**35.1**	**-45.9**				

[1] Source: EQ. Response to AER IR038 Onsite. Table 8, Table 9, $2020; SCS only
[2] Source: EQ Business Case; Preferred option; SCS + ACS; $2017
[3] SoR = System of Record; SoD = System of Differentiation
[4] The range covers both EGX and ERG systems/tools
[5] A = Asset, F = Financial, T = Technical

388. The common themes of the business cases for this 'Roadmap segment' are:

- The forecast capital expenditure is primarily required to maintain the quality, reliability and security of supply of SCSs;
- Obsolescence of the systems/tools based on application of the Gartner PACE-based Guideline, which in turn helps justify the timing of the proposed work; and
- Option 1 (replace/consolidate) is selected on the basis of strategic alignment and the least negative NPV.

389. The Guideline includes the following PACE classification definitions:

- Systems of Record - replacement is recommended 12 years after implementation;
- Systems of Differentiation - replacement is recommended 7 years after implementation; and
- Connective Technologies - replacement is recommended 10 years after implementation.

390. As shown in the table above, EQ has identified a PACE classification and an obsolescence 'type' for each of the systems to be replaced. EQ defines three forms of obsolescence:[117]

[117] EQ. EGX ERG 7.017 ID10 MDM JAN19 CONFID. Page 11.

- 'Financial obsolescence - the cost of maintaining the solution outweighs the value derived from it;
- Technical obsolescence – the solution is still functional but not supportable; and
- Asset obsolescence – the asset has reached the end of its reasonable functional life as indicated through failure rates, inability to meet business requirements.'

Our assessment

391. Consistent with EQ's ICT strategy, the approach in this segment of EQ's ICT Roadmap is to consolidate systems and replace/upgrade them to manage foreseeable requirements.

392. We have reviewed the allocation of EQ's Customer & Market Systems tools to the PACE classifications shown in the table above and we consider them to be appropriate. The obsolescence classifications are also reasonable.

393. The younger ages at replacement in the above table typically relate to Ergon's systems/tools. In the case of the Customer Market Systems consolidation initiative (ID04), the current versions of the Ergon software/tools planned for replacement in 2023 will be 'younger' than the Guideline of 12 years. However, the Guideline for major upgrades of Systems of Record is 7 years, and EQ advises that the Ergon software deployments in 2016 were based on Energex software versions deployed 16 years ago in 2003. On this basis, we are satisfied that the timing of the replacement of the Ergon tool/systems as part of this initiative is not at odds with the Guideline. However, it is clear that neither Energex nor Ergon has in the past adhered rigidly to the PACE classifications and respective asset lifecycle guidelines.

394. Nonetheless, it is reasonable to assume, based on the information provided, that it will be operationally and commercially prudent to replace the nominated systems in the next RCP or shortly thereafter. In our view, the sequencing of the projects proposed by EQ in its ICT Roadmap is appropriate. However, as discussed in section 5.4, we consider it likely that there will be some slippage in the projects, with one of more of the projects in this segment unlikely to be completed in the next RCP.

5.6.2 Asset and Works Management

395. Asset and Works Management systems include ICT applications, tools and data stores to support Energex and Ergon's asset management, planning and works delivery functions.

EQ's forecast

396. EQ proposes six Asset and Works initiatives in the next RCP, with supporting information provided in six Business Cases, as shown in the table below. The combined capex for the six initiatives is $128.3m with -$17.2m NPV, including claimed $140.6m net present benefits. EQ also proposes $5.4m in 'system upgrades' in this Roadmap segment which we consider in section 5.5.

Table 13: Summary of EQ's Asset & Works Business Cases

Business case	BC ID	Capex ($m) [1]	Benefit ($m, NPV) [2]	NPV ($m) [2]	PACE classification [2] [3]	System/tool being replaced [2]	Age at planned investment (years) [2] [4]	Obolescence classification [2] [5]
Geographic Information Systems	ID01	48.4	19.1	-37.8	SoD	EnergGISe, ArcGIS, Google Earth	14-17	T, F, A
						NFM, ERAT, ERA2, GISEP, Landbase,	13-30	T, F A
Field Force Systems	ID03	40.8	74.4	24.5	SoR	ABB Service Suite	8-15	A, T
						Microscheduler	5-9	A, T
						GE Fieldsmart	6	A, T
Design Tools	ID05	15.6	19.2	0.6	SoD	CBMD, Stride	20	T, A
						ProjectWise, eDMS	13-25	T, A
						Worksplan, Smallworld	22-25+	T, F, A
						CATAN	17	17
Inspections	ID11	6.9	7.2	-4.9	SoD	CBRM, IPS	11	T, F, A
						JAMIT, FMC, AIS	11-18	T, F, A
						ROAMES	7-11	T, A
Distribution Forecasting	ID06	6.5	9.4	1.1	SoD	NLF, SIFT	13-17	T, F, A
Network Planning Tools	ID15	10.1	11.4	-0.7	SoD	DINIS, DFD, NetPlan	15-23	T, F, A
						PSS-SINCAL	16-18	T, A
Minor system	n/a	5.4	-	-	-	Various	-	-
Total		**133.7**	**140.6**	**-17.2**				

[1] Source: EQ. Response to AER IR038 Onsite. Table 8, Table 9, $2020; SCS only
[2] Source: EQ Business Case; Preferred option; SCS + ACS; $2017
[3] SoR = System of Record; SoD = System of Differentiation
[4] The range covers both EGX and ERG systems/tools
[5] A = Asset, F = Financial, T = Technical

Our assessment

397. Consistent with EQ's ICT strategy, the approach in this segment of EQ's ICT Roadmap is to consolidate systems and replace/upgrade them to manage foreseeable requirements. EQ's Asset & Works suite of initiatives are primarily driven by one or more forms of obsolescence, as indicated in the table above.

398. We have reviewed the allocation of EQ's Asset and Works tools to the PACE classifications shown in the table above and we consider them to be appropriate. The obsolescence classifications are also reasonable.

399. The ages of the majority of the systems/tools identified for replacement are considerably higher than the benchmark replacement age according to the PACE classification. There are exceptions in the Field Force project, with the proposed replacement of Ergon's and Energex's Microscheduler and Ergon's GE Fieldsmart tools[118] well under the 12-year benchmark. The early replacements are justified by EQ on the grounds of overall net benefits from replacing the separate Energex and Ergon ABB Service Suite with a consolidated solution platform. The Field Force project has a strongly positive NPV.

400. EQ's strategy for consolidating systems and tools across the two businesses when replacing on the basis of obsolescence is appropriate given the opportunity to both reduce overall costs and to manage supportability and business continuity risk. The

[118] the GE Fieldsmart product is only used by Ergon; Microscheduler was developed in-house by Energex and deployed in Ergon recently

fact that most of the systems/tools denoted in the table above have been deployed for much longer than the benchmark times in the Guideline indicates that:

- the risk of extending beyond recommended lifecycles is often manageable (e.g., with upgrades and extended vendor support); and
- major upgrades or replacements are likely to be prudent in the next RCP for the majority, provided there is capacity to do so.

401. The Asset & Works suite of initiatives is the primary driver of tangible benefits from the 2020-25 ICT portfolio. According to EQ's own analysis, the NPV is negative overall. Nonetheless, we consider that the systems/tools are important enablers of Ergon's and Energex's operations.

402. EQ's position is that the bulk of the proposed expenditure is necessary *'to ensure their ongoing supportability, serviceability and security and to ensure they remain fit-for-purpose to meeting changing business and regulatory requirements.'*[119]

403. Based on the information provided in the business cases, it is reasonable to assume that it will be prudent to replace the nominated systems in the next RCP or shortly thereafter given the age of the systems and the cost reduction and efficiency benefits of consolidation or unification.

404. We note that there are complex implementation interdependencies with other projects and our review of the Asset and Works Management business cases illustrates concerns that we identified from our governance and management assessment of EQ's ICT plan.. For example, (i) the Field Force project is scheduled to be completed prior to the GIS project, necessitating double handling of transition/integration of the GIS tools with the Field Force tools, and (ii) the Field Force project is scheduled to be implemented in parallel with the Network Operations project. As discussed in section 5.4, we consider it likely that there will be slippage of some projects within the portfolio.

5.6.3 Distribution Network Operations

405. Distribution Network Operations systems include ICT applications, tools and data stores to support Energex and Ergon Energy's electricity network control and management functions.

EQ's forecast

406. EQ proposes one initiative in this ICT Roadmap segment: Network Operations consolidation and replacement. Supporting information is provided in Business Case ID02. The capex forecast is $39.7m, with -$55.7m NPV, including claimed $11.8m net present benefits. EQ also proposes $11.9m in 'system upgrades' in this Roadmap segment which we consider in section 5.5.

Our assessment

407. EQ proposes replacing nine systems through this project, with the age of the systems at the planned investment time ranging from six to 23+ years. The systems are either classified as Systems of Record or Systems of Differentiation. On this basis, the guideline for replacement is between seven to 12 years, depending on

[119] EQ. EGX ERG 7.010 ID03 Field Force Systems. January 2019. Page 11

the specific application. The Enterprise Protection Information System (EPIS) will have been deployed for only six years when it is planned for consolidation and replacement in 2023.

408. The Business Case describes the target state for each of the systems and the consolidation around new unified systems, which will integrate with other upgraded (or replaced) EQ systems such as PowerOn Advantage and the Enterprise Intelligence Platform.[120]

409. EQ's position is that the proposed expenditure is necessary to '*ensure their ongoing supportability, serviceability and security and to ensure they remain fit-for-purpose to meeting changing business and regulatory requirements.'*[121]

410. The large negative NPV is driven by the Ergon costs, which are an order of magnitude higher than Energex's. EQ explained that this is because (i) Energex has already implemented GE PowerOn OMS, and (ii) Ergon must replace the legacy FieldStat and ECorp databases – the former is a *'highly complex custom built set of 22 applications which are closely integrated with a broad collection of existing business critical operational systems'.*

411. Despite the high negative project NPV, based on the information provided in business case, we consider that it will be operationally and commercially prudent to undertake the nominated work in the next RCP given the age of the systems and the cost reduction and efficiency benefits of consolidation or unification.[122]

412. Again, it is clear that neither Energex nor Ergon has in the past adhered rigidly to the PACE classifications and respective asset lifecycle guidelines.

413. The Network Operations Systems project is dependent on (i) the completion of the Energex PowerOn Advantage upgrade, (ii) the Energex DMS upgrade and Ergon's transition to it, (iii) the Common Operating Procedures initiative, (iv) the ERP EAM Program, (v) the Field Force automation project. In turn, three other projects are dependent on the implementation of this project.[123] This aligns with our view about the complexity and interdependencies of the EQ's proposed ICT Roadmap, discussed in section 5.4.

5.6.4 Corporate Systems

414. Corporate systems include ICT applications, tools and data stores to support Energex and Ergon Energy's enterprise business functions.

EQ's forecast

415. EQ proposes four Corporate Systems initiatives in the next RCP, with supporting information provided in four Business Cases. As shown in the table below, the combined capex for the four initiatives is $30.3m with -$8.5m NPV, including

[120] EQ. EGX ERG 7.009 ID02 Network Operations Consolidation and Replacement JAN19 CONFID. Figure 3. Page 24

[121] EQ. EGX ERG 7.009 ID02 Network Operations Consolidation and Replacement JAN19 CONFID. Figure 3. Page 14

[122] Including replacement of the EPIS tool just prior to the benchmark in the Guideline

[123] EQ. EGX ERG 7.009 ID02 Network Operations Consolidation and Replacement JAN19 CONFID. Pages 26-28

claimed $22.8m PV benefits. We considered the minor system upgrades capex in section 5.5.

Table 14: Summary of EQ's Corporate Systems Business Cases

Business case	BC ID	Capex ($m) [1]	Benefit ($m, NPV) [2]	NPV ($m) [2]	PACE classification [2] [3]	System/tool being replaced [2]	Age at planned investment (years) [2] [4]	Obolescence classification [2] [5]
Document Management Systems	ID12	6.9	2.3	-6.1	SoR, SoD	OpenText eDocs HP Records Manager (TRIM)	16 13	A, T, F A, T, F
Internet Websites	ID18	2.4	4.0	0.0	SoD	Internet Website	12	T, A
Information Repositories	ID08	10.1	9.5	-3.0	CT	EPM, DMA, EDW Network analytics Tableau server	10-17 17 14	F, A T, F, A A, T
Process Management Systems	ID16	4.9	6.9	0.6	SoR	Process2Go, Process Zone	14	T, A
Minor system upgrades	n/a	6.1	-	-	-	SAP HANA	-	-
Total		**30.3**	**22.8**	**-8.5**				

[1] Source: EQ. Response to AER IR038 Onsite. Table 8, Table 9, $2020; SCS only
[2] Source: EQ Business Case; Preferred option; SCS + ACS; $2017
[3] SoR = System of Record; SoD = System of Differentiation, CT = Connective Technologies
[4] The range covers both EGX and ERG systems/tools
[5] A = Asset, F = Financial, T = Technical

Our assessment

416. EQ proposes replacing a large number of systems/tools, with the age of the systems at the planned investment time ranging from 10 to 17 years. The systems/tools are variously classified as Systems of Record, Systems of Differentiation, or Connective Technologies. On this basis, the guideline for replacement is between seven to 12 years, depending on the specific application. The Business Case describes the target state for each of the systems and the consolidation around new 'unified' systems, which will integrate with other upgraded (or replaced) systems.

417. Again, it is clear that neither Ergon nor Energex has in the past adhered rigidly to the PACE classifications and respective asset lifecycle guidelines. Despite the negative NPV, we consider that it will be operationally and commercially prudent to replace the nominated systems in the next RCP or shortly thereafter given the age of the systems and the cost reduction and efficiency benefits of consolidation or unification.

418. We also are of the view that the sequencing of the projects proposed by EQ in its ICT Roadmap is appropriate, but as discussed in section 5.4, we consider it likely that there will be slippage of some projects across the portfolio.

5.6.5 Cybersecurity, productivity and management support

419. This roadmap segment includes Cybersecurity, End User Productivity, and ICT Management tools to support Energex and Ergon Energy's distribution business operations.

EQ's forecast

420. EQ proposes two 'Cybersecurity, productivity and management support' initiatives in the next RCP, with supporting information provided in two Business Cases, as shown in the table below. The combined capex for the two initiatives is $9.0m with a -$18.9m NPV, including claimed $5.5m net present benefits. We considered EQ's 'Minor system upgrades' capex ($19.0m) in section 5.5.

Table 15: Summary of EQ's Cybersecurity, productivity and management support Business Cases

Business case	BC ID	Capex ($m) [1]	Benefit ($m, NPV) [2]	NPV ($m) [2]	PACE classification [2] [3]	System/tool being replaced [2]	Age at planned investment (years) [2] [4]	Obolescence classification [2] [5]
Cybersecurity	ID17	4.1	-	-19.0	SoD	Axway Secure FTS	13	T, F, A
						Forcepoint	15	T, F, A
						McAfee Endpoint	20	T, F, A
						Splunk Enterprise	10	T, F, A
Management systems	ID13	4.9	5.5	0.2	SoD	BMC Remedy	12	T, A
						Jira	17	T, A
						Casewise	17	T, A
						Enterprise Architect	10	T, A
Minor system	n/a	19.0	-	-	-	Various	-	-
Total		**27.9**	**5.5**	**-18.9**				

[1] Source: EQ. Response to AER IR038 Onsite. Table 8, Table 9, $2020; SCS only
[2] Source: EQ Business Case; Preferred option; SCS + ACS; $2020 CHECK
[3] SoD = System of Differentiation
[4] The range covers both EGX and ERG systems/tools
[5] A = Asset, F = Financial, T = Technical

Our assessment

421. EQ proposes to replace a large number of systems/tools on the basis of obsolescence, with the age of the systems at the planned investment time ranging from 10 to 20 years. The systems/tools are classified as Systems of Differentiation. On this basis, the guideline for replacement is seven years.

422. EQ has described its cybersecurity state in terms of the Cybersecurity Capability Maturity Model (C2M2), with a recent review highlighting that both Ergon's and Energex's maturity level is exposing both businesses to potential cybersecurity risks.[124] EQ advises that it has '*recently undertaken a digital cyber strategy review in partnership with PwC. Further to that review the VirtuGrp have completed an organisation wide current state review of cybersecurity risks using the Sherwood Applied Business Security Architecture (SABSA) model. This review has provided a suite of recommendations and a roadmap for implementing best practice in cybersecurity risk management.*'[125]

423. We understand AEMO has mandated a minimum requirement of C2M2 Maturity Indicator Level (MIL) 2 for Australian NSPs. EQ does not identify its current C2M2 scores across the 10 dimensions in its Business Case, but based on the maximum level of three, and the information provided, EQ appears to be targeting acceptable

[124] AEMO intend to apply this model to measure progress with achieving and sustaining adequate cybersecurity risk levels.

[125] EQ. EGX ERG 7.024 ID17 Cyber Security System JAN19 CONFID. Figure 2, Page 5.

minimum levels in all dimensions.[126] No financial benefits are identified for this initiative, which accords with the nature of the expenditure.

424. The Management systems business case describes the target state for each of the systems/tools and the consolidation around new 'unified' systems, which will integrate with other upgraded (or replaced) systems. The positive benefit is derived from aligning ICT management systems across the state, leading to operational efficiencies and a small positive NPV.

425. Again, it is clear that neither Ergon nor Energex has in the past adhered rigidly to the PACE classifications and respective asset lifecycle guidelines. Nonetheless, it is reasonable to assume that it will be operationally and commercially prudent to replace the nominated systems in the next RCP or shortly thereafter given:

- the age of the systems and the cost reduction and efficiency benefits of consolidation or unification in the case of the Management systems project; and
- the intent to achieve at least the minimum AEMO-designated C2M2 maturity levels.

426. We are also of the view that the sequencing of the two projects proposed by EQ in its ICT Roadmap is appropriate, but as discussed in section 5.4, we consider it likely that there will be some slippage in the projects.

5.6.6 Combined ICT benefits

EQ's claimed benefits

427. EQ states that its digital transformation will enable realisation of a combined 10% reduction in indirect costs and 3% improvement in program of work (PoW) delivery over the next RCP. Many ICT related projects are considered by EQ to bring capability to enable other initiatives. EQ cites the common ERP to enable efficiencies in financial processing across two legacy entities with different systems by way of example.

428. EQ also states that '*many ICT projects are 'sustain' type projects to stay current with technology to avoid obsolescence which in many instances also bring improvements in capability as a by-product or deliberately through minor incremental spend.'* [127]

429. EQ has identified tangible savings in each of the 18 Business Cases provided in support of its non-recurrent ICT expenditure for the next RCP with the exception of Cybersecurity (ID17). In response to an Information Request, EQ has provided summary spreadsheets (one for Energex and one for Ergon) with more detail regarding the rationale and assumptions underpinning the claimed productivity-related benefits in each Case attributable to the two businesses.

430. [redacted]

[126] EQ. EGX ERG 7.024 ID17 Cyber Security System JAN19 CONFID. Figure 2, Page 20.

[127] EQ. Response to information request AER EGX IR023 Capex Non-Network ICT_20190510_Final. Page 9.

[redacted]

[redacted]

431. EQ states that through a combination of merger benefits and ICT-enabled benefits, it expects to achieve opex and capex savings as below, and that it has allowed for these savings in its Regulatory Submission expenditure forecasts:

- for Energex: *'The 10% reduction in Energy Queensland's overhead costs is reflected in the productivity factor of 1.72% and the 3% PoW improvement is incorporated into the price growth forecast in the Base-Step-Trend calculation for opex. The capex proportion of the 3% improvement in the PoW delivery is included in the calculation of the direct capex forecasts. Therefore without these ICT programs, and adjustments to the opex base year, Energex's opex and capex forecasts would be higher by $201 million and $60 million respectively;'*[129] *and*
- for Ergon: '*The 10% reduction in EQ's overhead costs is reflected in a productivity factor of 2.58% and the 3% PoW improvement is incorporated into the price growth forecast in the Base-Step-Trend calculation for opex. The capex proportion of the 3% improvement in the PoW delivery is included in the calculation of the direct capex forecasts. Therefore without these ICT programs, Ergon Energy's opex and capex forecasts would be higher by $223 million and $25 million respectively.'*[130]

432. Therefore, over the next RCP the combined forecast saving from these merger and ICT-related sources is stated by EQ to be $424m opex and $85m capex.

Our assessment

433. EQ has based its proposed ICT expenditure on maintaining the quality, reliability, security and safety of the distribution system at what it claims is the least cost. There are no benefit-driven projects. Nonetheless, it has also cited in virtually every business case the contribution of the ICT initiatives in enabling significant indirect cost and productivity improvements.

434. EQ's use of internal subject matter advice to identify potential efficiencies and converting the productivity improvements into reduced FTE head count is a common approach. Whilst the potential efficiencies are estimates, provided that the forecast benefits are clearly deducted from the RCP 2020-25 forecast expenditure, then the business would have an incentive to at least achieve the savings.

435. The combined benefits that EQ has estimated in the 17 business cases for which it claims quantified benefits, amount to savings of $94.3m opex and $51.5m capex over the next RCP. We note that these are components of the opex and capex savings that EQ claims to have accounted for in its Regulatory Proposal forecasts.

[129] EQ. Response to information request AER EGX IR017 Capex Non-Network ICT_20190514_Final CONF. Page 4.

[130] EQ. Response to information request AER ERG IR018 Capex Non-Network ICT_201904015_Final_CONF. Page 4.

Six of the 17 Business Cases for which benefits are claimed have a positive NPV, with Field Force Systems (ID03) having the largest positive NPV at $24.5m.

436. EQ has provided a reasonably detailed explanation of both the source of assumed savings and the benefits realisation assumptions. It has also broken down the savings in six sub-categories in response to an Information Request, which provides some confidence in EQ's analysis.[131] On this basis, considering the stage of each project in its lifecycle, we consider EQ's approach to be reasonable and the claimed benefits to be a reasonable approximation. It is not within our scope to confirm that those forecast benefits have in fact been accounted for in the opex and overall capex forecasts in Ergon and Energex's Regulatory Proposals, though EQ claims to have done so.

5.7 Findings and implications for EQ's proposed ICT capex forecast

5.7.1 Our findings

437. In reviewing EQ's ICT capex forecast, we consider that:

- EQ is unlikely to deliver the planned ICT portfolio of work due to an underestimation of the time to complete each project and the potential impact of delays on interdependent projects;
- EQ has added contingency amounts to its cost estimates for non-recurrent ICT projects which should be removed from the forecast capex for the next RCP.
- EQ has provided insufficient information to support its proposed combined $35.4m capex on recurrent 'Other minor applications upgrades and updates'; and
- the benefits claimed by EQ in 17 of the 18 non-recurrent business cases are reasonable estimates of realisable indirect and PoW cost reductions and contribute to a broader EQ commitment to reduce its costs.

5.7.2 Implications

438. Based on our assessment of EQ's proposed ICT projects and programs, we consider that EQ's proposed ICT capex forecast does not represent a reasonable, prudent and efficient level of expenditure.

439. In addition to the removal of contingency amounts from individual projects, we consider that the following adjustments are necessary to achieve what we consider to be a deliverable prudent and efficient level of ICT capex:

- a reduction to EQ's forecast non-recurrent capex for the next RCP to account for the likely under-delivery of the proposed portfolio of non-recurrent projects; and

[131] EQ. Response to information request AER IR015 CONFID EGX Benefits of IT Expenditure, noting that this response included relevant information for Energex and Ergon benefits calculations

- a reduction to EQ's forecast recurrent ICT capex for the next RCP, and for which EQ has not justified its proposed increase from current levels.

440. We have been asked to estimate an adjustment to account for the likely under-delivery of non-recurrent projects within the period, and which we assess to be in the range of 10% to 15% of EQ's proposed expenditure.

Appendix A - Record of Information Request Responses & RP Supporting Documents

Documents provided to us by AER

Item No.	Filename
1	EQ Draft Plan Capex Questions (Final Draft).docx
2	EQ Draft Plans 2020 to 2025.pdf
3	EQ Repex Modelling Discussion - 11 December 2018.PPTX
4	AER - Issues Paper - Energex and Ergon Energy proposals for 2020-25 - March 2019_1.pdf
5	EGX 1.003 Regulatory Proposal 2020-25 - January 2019.pdf
6	ERG 1.004 2020-25 Regulatory Proposal JAN19 PUBLIC.pdf
7	EGX ERG 7.007 ICT Plan JAN19 CONFID.pdf
8	EGX ERG 7.008 ID01 GIS Consolidation and Replacement JAN19 CONFID.pdf
9	EGX ERG 7.009 ID02 Network Operations Consolidation and Replacement JAN19 CONFID.pdf
10	EGX ERG 7.010 ID03 Field Force Systems JAN19 CONFID.pdf
11	EGX ERG 7.011 ID04 Customer Market Systems JAN19 CONFID.pdf
12	EGX ERG 7.012 ID05 Design Tools JAN19 CONFID.pdf
13	EGX ERG 7.013 ID06 Distribution Forecasting Tools JAN19 CONFID.pdf
14	EGX ERG 7.014 ID07 Customer Contact Technology JAN19 CONFID.pdf
15	EGX ERG 7.015 ID08 Information Repositories JAN19 CONFID.pdf
16	EGX ERG 7.016 ID09 Service Interaction Portal JAN19 CONFID.pdf
17	EGX ERG 7.017 ID10 MDM JAN19 CONFID.pdf
18	EGX ERG 7.018 ID11 Asset Inspections and Planning JAN19 CONFID.pdf
19	EGX ERG 7.019 ID12 Document Management System JAN19 CONFID.pdf
20	EGX ERG 7.020 ID13 ICT Mgt Systems JAN19 CONFID.pdf
21	EGX ERG 7.021 ID14 ICT customer mgt JAN19 CONFID.pdf
22	EGX ERG 7.022 ID15 Network Planning Tools JAN19 CONFID.pdf
23	EGX ERG 7.023 ID16 Process Management System JAN19 CONFID.pdf
24	EGX ERG 7.024 ID17 Cyber Security System JAN19 CONFID.pdf
25	EGX ERG 7.025 ID18 Internet Websites JAN19 CONFID.pdf
26	EGX 7.153 - Forecast Capex Model(s) and Methodology - January 2019.xlsb
27	EGX ERG 7.005 - Unit Cost Methodology and Estimation Approach - January 2019.pdf
28	EGX ERG 7.045 - Asset Management Policy - January 2019.pdf
29	EGX ERG 7.047 - Customer Quality of Supply Strategy - January 2019.pdf
30	EGX ERG 7.048 - Customer Reliability Strategy - January 2019.pdf
31	EGX ERG 7.051 - Demand Management Strategy and Plan 2020-25 - January 2019.pdf
32	EGX ERG 7.056 - Intelligent Grid Technology Plan - January 2019.pdf
33	EGX ERG 7.093 - Strategic Proposal - LV Safety and Network Visibility - January 2019.pdf
34	EGX ERG 7.096 - Strategic Proposal - Protection Schemes - January 2019.pdf
35	EGX ERG 7.111 - Strategic Scope - DC Supplies Duplication - January 2019.pdf

36 ERG 1.004 2020-25 Regulatory Proposal JAN19 PUBLIC.pdf
37 ERG 17.033 - Demand Management Outcomes Report 2015-16 - August 2016.pdf
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240 Ergon Energy AER IR038_CR035 - Supply Abolishment Meter Provider Filter v0.1.pdf
241 Ergon Energy AER IR038_CR037 - Change Request Unreg - Bundling v0.3.pdf
242 Ergon Energy AER IR038_CR039 - Defect CL Job Code Changes v0.2.pdf
243 Ergon Energy AER IR038_CR040 - Delay SSW where waiting on MSW v0.1.pdf
244 Ergon Energy AER IR038_CR041 - Unreg Portal - Addition of SLA Priority Column v0.1.pdf
245 Ergon Energy AER IR038_CR042 - Remove MP Portal functionality from scope v0.1.pdf
246 Ergon Energy AER IR038_EGX_EE_DecBoard_v6.pdf
247 Ergon Energy AER IR038_EQL Business Plan 2018-19 - highlighted.pdf
248 Ergon Energy AER IR038_EQL NOC Agenda - 18 February 2019.pdf
249 Ergon Energy AER IR038_Ergon-IR017-4a Repex Program of Work with approval status.xlsx
250 Ergon Energy AER IR038_MajorProject_EstimateAccuracy.xlsx
251 Ergon Energy AER IR038_Q015 EQL Risk Appetite Statement - Oct 2018_CONF.pdf
252 Ergon Energy AER IR038_Repex - Request for Information.pdf
253 Ergon Energy AER IR038_Repex Q35.pdf
254 Ergon Energy AER IR038_SASP Business Plan 2018-19 - highlighted.pdf
255 Ergon Energy AER IR038_SPF Annual Timeline for Baselining Strategic PoW.pdf
256 Ergon Energy AER IR038_WHSQ slides from SIA presentation - 30.04.19.pptx

EQ documents received after assessment cut-off date (29th June 2019)

None identified

EQ yet to respond to EMCa questions

None identified.