ElectraNet Revenue Determination:
Technical Review

Advice on Forecast Capital and Operational Expenditure, Contingent Projects and Performance Scheme Parameters

PUBLIC (REDACTED) version

Report to

Australian Energy Regulator

Energy Market Consulting associates
Strata Energy Consulting

30th October 2012

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 transmission services of ElectraNet from 1 July 2013 to 30 June 2018. The AER's determination is conducted in accordance with its responsibilities under the National Electricity Rules (NER).

This report relies on information provided to EMCa by ElectraNet. 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.

Energy Market Consulting associates
PO Box 542,
St Leonards, NSW 2065
Australia

Phone: **0412 559 138 / Phone (intl):+61 412 559 138**
Email: **psell@emca.com.au**
Web: **www.emca.com.au**

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 access and regulatory arrangements. Its Director, Paul Sell, is an energy economist and previous Partner in Ernst & Young and Vice President of Cap Gemini Ernst & Young (now Capgemini). Paul has advised on the establishment and operation of energy markets and on matters such as electricity network open access, pricing and regulation and forecasts for over 30 years.

About Strata

Strata Energy Consulting Limited specialises in providing services relating to the energy industry and energy utilisation. The Company, which was established in 2003, provides advice to clients through its own resources and through a network of Associate organisations. Strata Energy Consulting has completed work on a wide range of topics for clients in the energy sector both in New Zealand and overseas.

Authorship

Prepared by:	Paul Sell and Bill Heaps, with key input from Stephen Lewis and Dave Frow
Quality approved by:	Paul Sell
Date:	27/11/2012 11:49 AM
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1 Introduction and Background

1.1 Purpose of this review

1. The Australian Energy Regulator (AER), in accordance with its responsibilities under the National Electricity Rules (NER), is required to conduct an assessment of the appropriate revenue to be obtained from provision of prescribed transmission services provided by ElectraNet from 2013/14 to 2017/18 (the next regulatory control period, or RCP). The process that the AER is required to follow is described in Chapter 6A of the NER.

2. ElectraNet provided its Revenue Proposal (RP) for the period 2014-18 to the AER on 31st May 2012.[1]

3. The AER engaged EMCa and Strata Energy Consulting (Strata) as a Technical Consultant to review and provide advice on specific areas of ElectraNet's RP. The focus of the review is on ElectraNet's past and forecast capital expenditure (capex) and operational expenditure (opex), associated policies and procedures, proposed contingent projects and its service standard proposals.

1.2 Regulatory framework

1.2.1 The NER requirements

4. The main relevant chapter of the NER for our assessment of transmission RPs is Chapter 6A which deals with the rules for economic regulation of transmission services including such services provided by ElectraNet.

[1] Transmission Network Revenue Proposal 1 July 2013 – 30 June 2018 - ENET002(P)

5. The RP must establish how forecast expenditure meets ElectraNet's regulatory obligations. To do this the forecast expenditure must meet the submission guidelines, be for prescribed transmission services, and be provided as a total and for each year of the regulatory control period. In addition, the RP must identify whether forecast capex is for reliability, augmentation (i.e. to meet the reliability standards in the NER or State legislation) or has met the regulatory test or regulatory investment test for transmission.

6. Under the NER, the AER must accept ElectraNet's proposal if the costs are considered efficient, prudent, and realistic in relation to forecast demand and anticipated input costs as set out in the Operating Expenditure Criteria (cl 6A.6.6 (c)) and the Capital Expenditure Criteria (cl 6A.6.7(c)).

7. ElectraNet can propose contingent projects as part of its RP. These are subject to the same capex and opex tests as non-contingent expenditure. Additionally, a trigger must be set to determine if and when the capex and opex associated with contingent projects will be added to the aggregate annual revenue requirement (AARR). When the trigger event occurs, ElectraNet must make an application to the AER for inclusion of the contingent capex and opex in a revised revenue allowance.

1.2.2 Regulation in South Australia

8. The Electricity Act 1996 (and regulations) and the National Electricity (South Australia) Act 1996, and the National Electricity Law and National Electricity Rules made under that Act, together with the Essential Services Commission Act 2002, provide the basis for regulation of the electricity supply industry in South Australia.

1.2.3 The Electricity Act

9. Under section 14 of the Electricity Act 1996, the electricity supply industry is declared to be a regulated industry for the purposes of the Essential Services Commission Act 2002. This provides the mandate for the Essential Services Commission to exercise its regulatory powers and functions in respect of the electricity industry including licensing, price regulation and performance monitoring.

10. The role of the Essential Services Commission of South Australia (ESCOSA) includes, amongst other things,

    a. Administering the licensing regime for electricity entities (generation, transmission, distribution, retail and system control), including the issuing and on-going monitoring of those licences;

    b. Monitoring the performance of licensed entities with regulatory obligations imposed under Acts of Parliament, the licences they hold and industry codes, rules and guidelines issued by the Essential Services Commission and reporting on that performance;

    c. Making industry codes (such as the Energy Retail Code, regulating the behaviour of licensed entities; and

d. Enforcing compliance with licensees' regulatory obligations, including undertaking enforcement action as appropriate.[2]

11. ElectraNet is required to comply with the Electricity Transmission Code established by ESCOSA under the provisions of Part 4 of the Essential Services Commission Act 2002 (ESC Act).

1.2.4 The Electricity Transmission Code

12. The South Australian Electricity Transmission Code (ETC) requires ElectraNet to maintain specified levels of reliability and supply restoration standards. Methodologies and practices adopted by ElectraNet in order to achieve the reliability standards required by the Transmission Code are relevant to the levels of both forecast and actual capex and opex.

13. Following a review and consultation, ESCOSA has published the Electricity Transmission Code[3] which takes effect on and from 1 July 2013. The Transmission Code requires ElectraNet to plan and develop its transmission system such that each exit point or group of exit points is allocated to one of five reliability-related categories in accordance with the relevant standards for that category.

14. The Transmission Code requires ElectraNet to meet any change in capacity requirements for connection points or groups of connection points identified by its customers in a forecast agreed maximum demand[4], within specified time limits. Through this provision, ElectraNet's agreement of demand forecasts with its customers is a driver of forecast growth-related capex.

1.3 Scope and approach

1.3.1 Scope

15. The scope for this review covers the requirements for the technical consultant as set out in the AER's "Terms of Reference for Technical Consultant and Demand Forecast Consultant" (the TOR). Our interpretation of the TOR was also informed by direct reference to the NER, as described above. The TOR for the technical consultant were subject to a number of clarifications and some changes of emphasis as the review progressed.

[2] Essential Services Commission of South Australia, Electricity Overview, http://www.escosa.sa.gov.au/electricity-overview.aspx

[3] The current report relies on version TC/07

[4] Agreed forecast maximum demand is the agreed maximum demand forecast for a given year that is agreed by ElectraNet and its customer three years prior to when the agreed maximum demand is contracted.

16. This review is primarily focused on ElectraNet's proposed capital and operational expenditure. EMCa, in association with NZIER, was engaged separately by the AER to undertake an assessment of ElectraNet's demand forecast. The findings from the demand forecasting review have been considered are reported separately[5] and are used as an input assumption for the purposes of this technical review.

17. ElectraNet provided its' RP for the period 2014-18 to the AER on 31st May 2012. In the course of preparing its proposal, AEMO was engaged to assist ElectraNet by reviewing its augmentation and connection capex and its proposed contingent projects, and AEMO provided its report on these matters. The AER required EMCa to undertake a high-level review of those aspects of ElectraNet's proposal on which AEMO had contributed and provided its opinion. Our TOR excluded detailed analysis of these aspects.

18. Findings from our high level issues review were provided to the AER during the course of the current project. The AER subsequently engaged EMCa to undertake further analysis. The current report includes the outcomes from this further assessment, where relevant, and represents the totality of our findings to date.

19. This technical review considers ElectraNet's actual expenditures for the current RCP and considers the reasons for any significant variances from the expectations and assumptions on which the revenue allowance was based. This assessment also takes into account material variations between historical expenditures (planned and actual) and the proposal. Our high-level assessment of AEMO's opinions and a summary of the work undertaken by AEMO are included in this report.

20. The following table provides a summary of the main components covered in this review.

Asset governance and management framework	A review of ElectraNet's framework relating to asset management (network and non-network) under which capex and opex programs and projects are established
Capex & opex in the current RCP	A review of actual and forecast expenditure for the current RCP and identification of variations from forecasts on which the current RCP revenue allowance was based. Assessment of any implications arising from the findings on the forecast expenditures for the next RCP.

[5] *Review of Demand Forecast Proposed by ElectraNet, Report to the Australian Energy Regulator;* EMCa (October 2012)

Capex & opex forecast methodologies and assumptions	A description and assessment of the methodologies and assumptions used by ElectraNet when determining the capex and opex forecasts. An assessment of ElectraNet's innovation and efficiency management and potential future gains.
Capex planning methodologies	A description of the methodology and assessment of ElectraNet's capex planning and management methodologies. An assessment of the likelihood of the methodologies producing reasonable outcomes.
Cost estimation methodologies	A review of the cost estimation methodologies used by ElectraNet for capex and opex projects
Contingent projects review	A review to establish the reasonableness of ElectraNet's proposed contingent projects and compliance with the requirements of the NER.
Capex projects review	A review of a sample of projects that are included in ElectraNet's forecast capex for prescribed transmission services.
Opex planning and management	A review of ElectraNet's asset management and maintenance methods and systems and their application. Review of input data and opex plan development methodologies and practices (including asset age and condition monitoring, total asset life cycle management, work prioritisation). Assessment of the use of and performance against comparative benchmarks.
Service Target Performance Incentive Scheme	A review of the appropriateness of the methodology used and targets proposed by ElectraNet for STPIS.

1.3.2 Structure of this report

21. The structure of this report is, to the extent possible, aligned with the structure of the AER TOR and with the above scope for the review.

Section	Title	Content
1	Introduction and Background	Sets out the purpose and scope of this review
2	Findings and recommendations	Provides our key findings and recommended capex adjustments
3	Expenditure in the current Revenue Control Period	Reviews capex and opex for the current RCP and its implications for expenditure forecasts in the RP for the next RCP
4	Review of ElectraNet's asset management framework	The section provides an overview and assessment of ElectraNet's approach to: • Integrated asset management: ▪ Total asset life cycle methodology ▪ System condition and risk management ▪ Project management methodology • Innovation and efficiency • Benchmarking
5	ElectraNet's proposed capex for the next Revenue Control Period	Provides an outline of ElectraNet's forecast capex for the next RCP
6	Review of ElectraNet's proposed capex	This section includes: • A review of capex forecasting methodologies and assumptions • A review of capex cost estimation methodologies • A review of ElectraNet's capex planning methodology • Consideration of the findings from AEMO's input to ElectraNet's RP • Consideration of the capex/opex trade-offs • Assessment of deliverability • A summary of our findings from the review of a sample of capex projects and the

Section	Title	Content
		implications for the proposed forecast capex.
7	ElectraNet's proposed operational expenditure in the next Revenue Control Period	Provides an outline of ElectraNet's opex forecast for the next RCP
8	Review of ElectraNet's proposed opex	This section covers our assessment and findings for: • Deployment of the condition based regime and assessment of the resulting: ▪ Corrective maintenance ▪ Operational refurbishment ▪ Routine maintenance ▪ Support costs and network operations ▪ Other controllable operational expenditure
9	Contingent projects	Our findings on ElectraNet's proposed contingent projects for the next RCP
10	Service Target Performance Incentive Scheme	Our analysis and recommendations on ElectraNet's STPIS proposal

22. Further and more detailed information is provided in a series of annexures.

1.3.3 Data sources

23. In the course of this review we have examined a large quantity of documents. This includes documents that ElectraNet provided to the AER with its RP and a number of other significant documents that were provided in the course of the on-site meetings or in response to the AER and our requests for information.

24. We wish to acknowledge here the additional information that was provided by ElectraNet over the course of our review. This was provided in a professional manner. However we need to note that a greater amount of this information than we would have expected, including the initially-provided RP, was found to contain errors or omissions which detracted from its usefulness. This applies to demand, capex, opex and STPIS information. In the case of STPIS information, this has meant that we were unable to provide alternative parameters.

25. This report report has been redacted for public release, based on advice from AER.

1.4 Additional engagement with ElectraNet

26. In early October 2012 we were asked by the AER to assist with a further engagement with ElectraNet, and which followed on from our original onsite presentations, workshops and meetings in late June/early July. In the October engagement process, we presented our draft findings and sought information from ElectraNet to assist in finalising those findings. This was a constructive process and we have reported relevant information and our assessment of that information in an addendum to this report (Annex D).

27. Our findings in section 2, including the quantified implications of these findings, reflect the updated information and assessments presented in that addendum. In some instances the addendum may modify information or assessments in other sections of this report and we have not updated the whole of this report to fully reflect the additional information provided. To the extent that there may be differences, the information and assessments in the addendum prevails.

1.5 Our qualifications

28. To support our management-level approach, our review team was comprised solely of people with senior management, governance board and senior advisory experience with electricity network businesses. The review team and our qualifications are described in Annex C.

2 Findings and recommendations

2.1 Introduction

29. In this section we present our findings and recommendations. In order to provide context, we first present our over-arching observations on ElectraNet's management of its assets. We then present our recommendations regarding acceptance of those aspects of ElectraNet's proposal that we were asked to review, followed by summary reports of each finding. These summaries include the supporting logic for each finding and its implications for the forecast opex and capex costs and performance parameters. In section 2.6 and 2.7, we summarise the capex and opex adjustments that would follow if the AER adopts these findings.

30. The substance of our review is covered in sections 3 to 9 and further supporting detail is covered in a series of Annexures.

2.2 Observations on ElectraNet's asset management and organisational culture

31. From our review of ElectraNet's asset management governance structure and its capital and operating expenditure forecasting processes, we find that ElectraNet has a highly-structured governance and expenditure management framework supported by well-developed information systems and a culture of innovation and improvement that represents good practice standards. We found that ElectraNet's managers are involved in and focused on continuous improvement of management practices and have established programs to identify and develop opportunities.

32. We found that the commitment to improvement and innovation was driven by senior management and had been actively adopted across the organisation. We found that ElectraNet has introduced an organisational culture which in many areas actively seeks out and develops efficiency initiatives.

33. Over the last five years, new and enhanced asset management strategies have driven significant changes in many of ElectraNet's commercial and asset management practices. The organisation has made significant investment in an integrated asset management structure and methodologies based on condition and risk-based total asset life cycle management regime (TALC), which ElectraNet initially adopted from Powerlink but has then refined and adapted to better suit its needs. Whilst a substantial proportion of this framework is in place, it should still be considered a work in progress.

34. Importantly, we observe that the development of the mechanisms for asset strategy optimisation are not yet mature and may not yet be producing fully optimised outputs that make best use of the new asset management framework. We consider that some aspects of the application of this framework for the purposes of producing a capex and opex budget for the RP, are not yet sufficiently rigorous and have led to the proposal of some items of expenditure that have not been adequately justified. In particular, the benefits of ElectraNet's investment in its enhanced asset management regime have not been presented adequately: ElectraNet has proposed significant increases in maintenance expenditure, with insufficient articulation of the benefits of that expenditure.

35. Whilst we have made further enquiries to ElectraNet, our view is that there may be inherent justification that has either not yet been prepared or has not been presented to us, for some items. For other items, we take a firmer view that there is unlikely to be justification that would warrant the inclusion of the proposed level of expenditure in the AER's determination.

36. We have been mindful of the NER requirements that, if the AER is not satisfied that the expenditure meets the capital or operating expenditure criteria, then it must not accept that expenditure[6]. Our findings therefore inevitably focus on those aspects of the proposed expenditure that we consider are not reasonable, and do not to meet the NER criteria.

2.3 Headline recommendations

2.3.1 Capital Expenditure

37. EMCa recommends that the AER accepts some but not all components of ElectraNet's forecast of required capital expenditure because, in our opinion, these do not reasonably reflect[7]:

a. the efficient costs of achieving the capex objectives;

b. the costs that a prudent operator in the circumstances of the relevant Transmission Network Service Provider would require to achieve the capex objectives; and

[6] NER clause 6A.6.7(c) and 6A.6.6 (c)

[7] NER clause 6A.6.7(c)

c. a realistic expectation of the demand forecast and cost inputs required to achieve the capex objectives (the capital expenditure criteria).

2.3.2 Operational expenditure

38. EMCa recommends that the AER not accept ElectraNet's forecast of controllable operational expenditure because, in our opinion, these do reasonably reflect[8]:

a. the efficient costs of achieving the operating expenditure objectives;

b. the costs that a prudent operator in the circumstances of the relevant Transmission Network Service Provider would require to achieve the operating expenditure objectives; and

c. a realistic expectation of the demand forecast and cost inputs required to achieve the operating expenditure objectives (the operating expenditure criteria).

2.3.3 Contingent Projects and STPIS

39. EMCa recommends that the AER accepts the contingent project proposed as "Davenport reactive support", which we consider to be compliant in terms of the "reasonableness" requirements of the NER, while noting that in our view, the triggers could be improved. We recommend that the AER does not accept the other proposed contingent projects.

40. EMCa recommends that the AER does not accept the proposed STPIS parameters. STIPS targets should be recalculated on accurate data using an appropriate methodology.

[8] NER clause 6A.6.6(c)

2.4 Specific findings and recommendations

2.4.1 Main Findings

FINDING 1: Asset Management Framework	
Finding: The design, structure and components of ElectraNet's Asset Management Framework (AMF) are considered to be at or beyond a good industry practice standard. At the time of this review we have found that ElectraNet's AMF is not yet fully implemented and that this has reduced its' ability to determine appropriate trade-offs. ElectraNet's application of its AMF in practice does not indicate sufficient analysis has been undertaken to conclude that the proposed expenditures reflect optimal cost/risk, capex/opex and current/future cost economic trade-offs. Further benefits will be realised through ElectraNet's focus on continuous improvements	
Review summary: We consider that implementation of the asset management framework is 'work in progress'. In particular, we consider that development and implementation of the sensitivity analysis and economic analysis components of TALC management are yet to be fully addressed. In the absence of this, the full benefits of the considerable investment made by ElectraNet in SCAR and TALC are unlikely to be realised. Due to our reservations regarding TALC sensitivity and economic analysis, we cannot conclude that the expenditure forecasts for the next RCP are reasonable and prudent. ElectraNet demonstrated that it has adopted detailed asset management policies and has used these to develop high level strategies for network development and maintenance and detailed asset strategies that guide and inform the business on asset management decisions. ElectraNet has adopted, and built upon, well proven asset management systems and has intelligent asset management strategies supported by increasing use of asset data. ElectraNet uses and is continuing to develop benchmarks and good practice standards for driving its continuous improvement programs. We consider that this is likely to reduce costs over time and provide valuable financial and non-financial benefits to consumers. We consider that ElectraNet will realise efficiency and performance gains through its focus on continuous improvement and these gains will be realised in the next RCP. We consider that ElectraNet's proposed capex efficiency adjustment is appropriate, as this provides for the development of savings as programs are implemented and allows ElectraNet to see some benefit if improvements are introduced more rapidly. We consider that a similar efficiency adjustment should also be applied to opex as this expenditure is a primary target of ElectraNet's continuous improvement focus.	
Recommendations: Recommendations based on these findings are provided in the specific findings listed below.	**Impact:** N/A. (Impacts covered under specific findings)

FINDING 2: Demand-driven augmentation and connection capex

Finding:

As described in our report on ElectraNet's proposed demand forecast, we consider that ElectraNet's 2017/18 demand forecast is overstated by approximately 14%. Therefore we consider that the proposed augmentation and connection capex budgets are similarly overstated.

Review summary:

In our assessment of ElectraNet's demand forecast, we have come to the view that this is overstated and that the 2012 AEMO demand forecast is more reasonable. We have developed a connection point trend forecast that we consider to be suitably consistent with AEMO's state-wide forecast. This forecast is 14% lower than ElectraNet's 2017/18 demand forecast in the RP.

We do not agree with ElectraNet's contention that it is locked by provisions of the ETC into using ETSA's connection point forecasts for its capex planning for the next RCP.

The lower demand forecast implies a reduced need for load-driven capex. ElectraNet declined AER's invitation to estimate the impact of a reduced demand of this order but has estimated the impact of a "low growth" scenario that corresponds to a 6% lower demand. In the absence of an estimate from ElectraNet, we have made an assessment by considering deferral of load-specific augmentation and connection projects, based on ElectraNet's augmentation and connection project lists and some advice from ElectraNet on this choice of projects. We have also incorporated a load-driven reduction in replacement capex, based on ElectraNet's advice.

Our assessment leads to considerably less than a pro-rata reduction in capex, because (a) some projects have already commenced, (b) ElectraNet has proposed a considerable amount of non load-driven capex in these categories (primarily telecoms expenditure) and (c) a lower overall demand forecast does not translate to lower forecasts at the connection point level on an exact pro rata basis.

Recommendations:	**Impact:**
We recommend that the AER not accept ElectraNet's proposed augmentation and connection capex, and makes a reduction that accounts for a lower demand forecast consistent with that proposed in our demand forecast report.	$105m reduction in capex, comprising reductions of : • $18m augmentation • $30m connection • $57m replacement

FINDING 3: Strategic land and easement acquisition

Finding:

The majority of the proposed expenditure on strategic land and easement acquisitions is proposed for contingent projects and does not appear to meet the requirements of the NER for consideration as forecast capex.

Review summary:

The proposed expenditure on land easements is $66m and represents 8% of the proposed capex. This expenditure all relates either to contingent projects or to possible network projects which would not be commenced until beyond the next RCP.

We have found that ElectraNet's management of future land access has primarily focussed on land acquisition strategies and we consider that ElectraNet's proposed expenditure could be reduced if it is more effective in securing designated transmission corridors. We consider that the proposed land acquisition costs are likely to be inflated because of this.

Our interpretation of the NER capex objectives appears not to support the inclusion of land purchases for contingent projects that have not yet triggered and are not certain to trigger in the subsequent RCP.

Whilst we consider that more cost-effective strategies could have been deployed, on balance we consider, in the absence of these strategies, that the remaining expenditure proposed is reasonably required to maintain reliable supplies for consumers in the subsequent RCP.

Recommendations:	**Impact:**
We recommend that the AER disallows the proposed strategic land and easement expenditure that is related to contingent projects.	$51m reduction in capex

FINDING 4: Substations supplying water pumping stations

Finding:

The proposed expenditure on replacement of substations providing supplies to water pumping stations has been insufficiently justified and management of potential stranding risks is inadequate given the level of proposed expenditure.

Review summary:

The proposed expenditure on replacement of water pumping substations is $123m, or 14% of proposed capex. The condition assessments of the substations supplying water pumping stations indicate that these are in poor condition and require attention. However we consider that there are significant issues with the program as currently proposed:

- The proposed program does not adequately account for changes in the required service that could be expected to occur over a hundred-year time horizon (i.e. from the time the current assets were installed until the end of the life of the proposed replacement assets);
- It has not been adequately demonstrated that the relationship between the electrical supply components and the water pumping components of the total infrastructure have been strategically aligned. We consider that the current "grandfathering" arrangement that was newly-introduced in the NER during the current RCP, may be leading to sub-optimal outcomes in which there is a material risk that the replaced electrical assets may be stranded or inappropriately-specified. We consider that insufficient attention has been given to the stranding risks that would then be imposed on general SA consumers.
- In some instances we observe what appears to be a change in the required service, and a work program that does not involve like-for-like replacement. If so, then this would mean that the replacement program would lead to the assets being reclassified as providing a "negotiated service".

Whilst we consider that the condition assessments for these substations indicates an inherent need for attention to the assets, we consider that insufficient justification has been provided for the proposed program of expenditure at this level to be incurred within this RCP. We consider that the work should be re-prioritised as an integrated program, with appropriate risk management and a demonstrated alignment with long term water pumping requirements.

Recommendations:	**Impact:**
We recommend that the AER disallows the proposed water pumping station supply substation replacement expenditure.	$123m reduction in capex

FINDING 5: Other replacement and refurbishment capex

Finding:

The benefits arising from ElectraNet's investment in a Total Asset Life Cycle (TALC) management regime, and from associated higher maintenance expenditure, are not evident in ElectraNet's proposed refurbishment and replacement capex expenditure forecasts. We would expect to see clear evidence that the more-focused maintenance regime is resulting in extended asset lives and deferment of replacement and refurbishment capex (i.e. a capex/opex trade-off).

Review summary:

During the current RCP, and continuing into the next RCP, ElectraNet has made and is proposing to make considerable investment in TALC asset management methods and systems, which we estimate to be of the order of $50m. This new regime includes investment in a comprehensive asset condition inspection and data collection program and increased routine and corrective maintenance. Whilst ElectraNet has not provided a documented business case that established the basis for the investment decision, we consider that it is reasonable to expect that the investment costs incurred will (at a minimum) be recovered through benefits realised during the next RCP.

Accordingly, we consider that replacement and refurbishment capex should be reduced to reflect the realisation of the expected benefits.

Recommendations:	**Impact:**
We recommend that the AER reduces the replacement and refurbishment capex by $50m (in aggregate).	$ 50m reduction in replacement and refurbishment capex

FINDING 6:Capex prudency

Finding:

Further consideration by ElectraNet will identify reduced needs and/or more prudent decisions and options identification in regards to some projects and this should be allowed for in setting the forecast capex on a prudent basis

Review summary:

For the most part, the need for the proposed projects and the delivery options to meet these needs have been appropriately assessed. However the majority of proposed expenditure for the RCP is at the "pre-project" stage where such assessments are very high-level.

We consider that further evaluation by ElectraNet will identify some reduced needs and/or more prudent options and that this should be allowed for in setting a reasonable level of capex. Our sample project review revealed areas in which prudent decisions would lead to lower costs, specifically in some replacement capex projects and we assessed this impact at 7% of the proposed project expenditure.

Recommendations:	**Impact:**
We recommend that the AER applies a prudency adjustment of 7% to the replacement and refurbishment components of capex.	$ 32m reduction in replacement and refurbishment capex

FINDING 7: Portfolio risk factor

Finding:

The portfolio risk factor is overstated as it is based on historical outcomes and should be reduced to take account of recent improvements to the quality and accuracy of ElectraNet's cost estimation systems. We consider that it is not appropriate to apply a portfolio risk factor to replacement capex

Review summary:

ElectraNet has a well-developed methodology for project scoping and costing and this methodology has been continuously improved, particular in recent years.

ElectraNet has proposed a portfolio risk factor of 4.9% which has been added to its' costing. This is based on analysis of earlier projects, which were estimated prior to recent methodology improvements. It is more than the equivalent factor (2.6%) that the AER previously determined for ElectraNet (2008) and also more than the factor of 3.0% that the AER allowed in its 2012 decision on Powerlink.

The RCP forecasts have been estimated using ElectraNet's improved methodology. Accordingly we consider it reasonable that ElectraNet allows for a portfolio risk factor that is no more than the level that the AER included in its previous ElectraNet decision.

Further, we consider that any rationale for applying this factor does not apply to replacement and refurbishment capex, as the circumstances for these projects are more certain than for greenfield augmentation and connection projects.

Recommendations:	**Impact:**
We recommend that the AER: • Applies a portfolio risk factor to replacement and refurbishment capex that is thereby reduced from 4.9% (as proposed) to 0%; • Applies a portfolio risk factor to all other capex categories where ElectraNet has applied a portfolio risk factor that is thereby reduced from 4.9% (as proposed) to 2.6%.	$ 16m reduction in replacement and refurbishment capex $ 3m reduction in augmentation and connection capex $0.5m reduction in "other" capex

FINDING 8: Corrective maintenance

Finding:

The level of proposed expenditure for corrective maintenance of substations and transmission lines has not been adequately justified and appears to be in excess of justifiable requirements.

Review summary:

- **Corrective maintenance - substations**

ElectraNet proposes spending $23m on corrective maintenance of substations. This work is presented as addressing a backlog of already-identified defects as well as accounting for a level of expected new defects.

We consider that this forecast is overstated as it does not take account of reductions in the rate of new defects from having completed the first condition assessment cycle.

Further, the forecast includes the cost of rectifying defects on new substation assets, based on a "bathtub" defect curve over the asset lifecycle. We consider that modern substations display this beginning-of-life effect to a much lesser extent than was traditionally the case, and further, that such defects should substantially be covered by warranty provisions given ElectraNet's high level of outsourcing and ability to secure favourable contract terms.

- **Corrective maintenance – lines**

ElectraNet proposes spending nearly $40m on corrective maintenance of lines. This is a substantial increase given its spending averaged around $2m per year over the current RCP and is predicated on an assumed revelation of defects from the condition assessment program that it is part-way through. It is presented as addressing a backlog of defects already identified as well as accounting for a level of expected new defects.

We consider that this $40m forecast is overstated. It extrapolates from a very short history of lines defect identification, in which initial defects are being found from the new condition assessment program. ElectraNet has already focused on rectifying fire hazard defects and has a prioritised program for addressing further defects in descending order of risk. Consequently, we consider that the level of defects, and particularly the level of new high-risk defects, will fall considerably as the condition assessment program advances and particularly as the first cycle of defect identification is completed.

- **Assessed requirement**

We have taken account of the above factors and have used defect incidence and risk information provided by ElectraNet, to assess a reduced corrective maintenance requirement that we consider to be reasonable. We have used information provided by ElectraNet that shows that the reduced level of expenditure will be more than sufficient to cover all high-risk defects, together with a significant proportion of lower risk defects.

Recommendations:	**Impact:**
We recommend that the AER substitutes a lower level of corrective maintenance, by disallowing substations backlog maintenance, reducing ongoing substations corrective maintenance by $5m and reducing lines corrective maintenance (base + backlog) by $11.2m.	$ 8.2m reduction in opex substations $ 11.2m reduction in opex on lines

FINDING 9: Operational refurbishment

Finding:

The level of proposed expenditure for operational refurbishment is insufficiently substantiated and appears to be in excess of justifiable requirements, particularly with regards to the level of proposed expenditure on further lines condition assessment and with regards to a risk-based cut-off for remaining projects.

Review summary:

- **Operational refurbishment - Cost/risk trade-off**

ElectraNet proposes spending $61m on Operational Refurbishment projects, which is almost double the current RCP spend. The risk-based TALC framework should make it possible to identify cost/risk trade-offs and to determine the appropriate level of operational refurbishment expenditure for a given risk profile. However in applying the framework, ElectraNet has not supported the level of proposed work by a compelling case for the cut off, in terms of a risk continuum, for inclusion of the proposed refurbishment projects.

Given the circumstances in which the level of refurbishment projects was determined, we consider it likely that there is a tail of lower risk projects that could be deferred, with minimal risk impact. In the absence of further justification, we propose that the AER accepts half of the proposed increase.

- **Operational refurbishment – Condition assessment**

Within the operational refurbishment budget of $61m, ElectraNet has proposed condition assessment of transmission lines of [redacted]. This is the remainder from a larger program that has involved significant expenditure on condition assessment of substation equipment and transmission lines.

While we are generally supportive of condition-based maintenance and the need for condition data that this entails, we have sought and have not been presented with a business case which justifies this level of expenditure and which quantifies the expected benefits. We consider that such a business case would likely have revealed a sampling and prioritisation approach that would have provided a more efficient condition-based asset management implementation.

The absence of a business cases makes the condition assessment program inconsistent with ElectraNet's governance framework. Without such justification, and the rigour that the governance framework implies, we come to the view that the full level of proposed expenditure is not reasonable. However we consider this to be part of the wider issue of cost/risk trade-off within operational refurbishment, as covered above, and we have proposed a single adjustment to cover both findings.

Recommendations:	**Impact:**
We recommend that the AER scales back proposed refurbishment costs to allow 50% of the proposed increase.	$ 14.5m reduction in refurbishment opex

FINDING 10: Support costs and Network Operations – Choice of base year

Finding:

The use of the base year 2011/12 estimate is not appropriate for the projection of support costs (asset manager support, maintenance support and corporate support) and network operations costs. A more reasonable base year can be provided by using years for which actual expenditure is available for this purpose.

Review summary:

ElectraNet has forecast asset support, maintenance support, corporate support and network operations costs using growth and escalation factors off a base year. Overall, we consider that this methodology is sound for these components. However ElectraNet has used its estimate of expenditure for 2011/12 as the proposed "base year". On review, we find that the aggregate expenditure for these components remained relatively stable in the three years for which actual expenditure is available (i.e. to 2010/11) but ElectraNet estimated an increase of $3.5m for 2011/12.

We do not consider that there is reasonable evidence of the need for a step increase in support and network operations costs; that is, an increase over and above what would result from applying escalation factors (such as scaled asset growth and price escalation) that are the same as ElectraNet has used for its forecast. Therefore we have proposed using actual expenditure as the base for escalation to produce the forecast for these components.

Recommendations:	**Impact:**
We recommend that the AER reduces the proposed support costs and network operations costs by using actual expenditure years as the base years.	$ 13.2m reduction in the "support cost" components of opex $4.3m reduction in the network operations component of opex

FINDING 11: Opex efficiency

Finding:

The NER requires that the forecast expenditures are efficient. ElectraNet has a well-developed continuous improvement regime, which is identifying inefficiencies; however these have not been sufficiently allowed for in the proposed opex.

Review summary:

ElectraNet has advised us of its continuous improvement program, which includes a dedicated resource, a structured framework for identifying and implementing efficiencies and an incentive framework on its service providers. This program represents good industry practice.

ElectraNet advised us of routine maintenance efficiency measures that have been identified and are in the course of implementation, with assessed cost reductions of the order of 5% across a significant portion of routine maintenance, with such gains to be shared with its subcontractors. ElectraNet has also proposed in its RP an allowance ramping up to 2%, for reductions in capex inefficiencies.

As ElectraNet has proposed for capex, so also for opex we consider it is reasonable to assume a continuation of its ongoing removal of inefficiencies over the next RCP, particularly given ElectraNet's established and well-formalised improvement program, and it is a requirement of the NER for these to be included as part of forecasting an efficient level of opex[9].

We confirmed with ElectraNet that its forecast opex is based on current costing and current practices and does not already capture removal of inefficiencies.

We consider that a reasonable level to assume is 2.5%. This is half of the level of benefits that were identified to us for routine maintenance, representing sharing of those benefits, and we would expect similar gains in the remaining opex categories (eg corrective maintenance, refurbishment, compliance etc) where the nature of the work is more akin to field capital projects, for which ElectraNet has already projected ramping to 2% cost reductions. Our experience is that for opex there are greater efficiency improvement opportunities and they are easier to achieve than for capex. Given the existence of an established program, we consider that the benefits will be available from the beginning of the RCP, based on actions already underway, and there is no need in this instance to consider a ramp-up.

Recommendations:	**Impact:**
We recommend that the AER allows for the ongoing removal of opex inefficiencies through pro-rata reductions of 2.5% across all components of controllable opex.	$ 10.6m reduction in controllable opex

[9] NER 6A.6.6(c)(1) requires that the NER must accept the forecast opex if it reflects the ***efficient*** costs of achieving the operating expenditure objectives [emphasis added]

FINDING 12: Asset growth adjustment (to escalated opex components)

Finding:

The asset growth-related factor applied to maintenance has been overstated due to being based on depreciated RAB values, resulting in an overstatement of the "base year extrapolated" opex items (comprising asset management support, maintenance support and corporate support costs and network operations).

Review summary:

The RAB is a financial value that has been depreciated and therefore reduces over time, even for the same quantum of assets. We consider that the growth factor has been overstated by using this as a denominator and that a more appropriate measure of the quantum of assets being maintained is the "un-depreciated" RAB, which can be determined by grossing up for remaining life.

Recommendations:	**Impact:**
We recommend that the AER applies an asset growth formula to "base year extrapolated" components of opex using a "replacement cost" proxy as the denominator, rather than the depreciated RAB value	$ 1.3m reduction in support components of opex and $0.6m reduction in network operations costs

FINDING 13: Contingent projects

Finding:

- One project is compliant with the requirements of the NER relating to contingent projects
- 20 projects do not fully compliant with the requirements of the NER relating to contingent projects.

Review summary:

While it would not be expected that all of the contingent projects will be triggered, it is of interest that the sum of ex ante forecast capex and contingent projects capex for the next RCP alone is 1.7 times the regulatory asset value of the entire asset base of the business and is almost three times ElectraNet's forecast capex. The scale of the total proposed contingent projects suggests that it is significantly greater than could be reasonably expected to be required during the RCP.

While noting that the trigger definition for this project could be improved, we consider that one project - Davenport Reactive Support – meets the requirements of the NER, as presented and is therefore compliant.

Two other projects -Upper North Line Reinforcement and Mid North Connection Point – are likely to be compliant if the trigger is modified.

Some potential contingency is indicated by the proposed Eyre Connection Point and Riverland reinforcement projects. However we consider that neither is compliant, as presented, and that the Riverland project as presented is disproportionate to the identified need.

The remaining projects are not compliant for various reasons including:

- Contingent projects are included that are driven solely by "market benefits". Our interpretation is that it is questionable whether these projects are reasonably required to be undertaken in order to achieve any of the capex objectives set out in the NER;
- Project triggers based on incremental demand growth are considered to be inappropriate as these projects should be managed within a reasonable demand envelope as part of the forecast capex. These projects should be removed from the contingent project list or have compliant triggers identified; and
- Triggers in a number of cases do not appear to justify the associated contingent project. Where the true driver is a large step increase in demand then the trigger should be defined in relation to the realistic prospect of this demand.

Recommendations:	**Impact:**
We recommend that the AER: • Accepts the contingent project proposed as "Davenport reactive support". • Does not accept the other proposed contingent projects	No impact on forecast capex. Compliant project is $42m, compared with total proposed $2,547m.

FINDING 14: STPIS

Finding:

The methodology used by ElectraNet to determine STPIS targets is inappropriate and proposed changes to weightings and adjustments to reflect "significant capital works" are not justified.

Review summary:

- Due to the discrepancies in the data provided by ElectraNet we have been unable to provide alternative STPIS targets to the AER.
- The methodology used by ElectraNet to determine STPIS targets is inappropriate. We have taken this view because of ElectraNet's use of inappropriate distribution curves for:
    - Transmission circuit availability
    - Average outage duration
    - Loss of supply.
- The proposed changes to weightings for Critical Circuit Availability Peak and Average Outage Duration are not justified.
- ElectraNet's proposed adjustments to reflect "significant capital works" are not justified and, in any case, have been miscalculated.

Recommendations:	**Impact:**
We recommend that the AER does not accept the proposed STPIS parameters. STIPS targets should be recalculated by ElectraNet on accurate data using an appropriate methodology.	No impact on forecast capex or opex

2.4.2 Other findings

Cost escalation

41. We consider that ElectraNet's application of cost escalation factors[10] and its proposed capex efficiency allowance are reasonable.

Routine maintenance

42. Although the proposed increase in routine maintenance expenditure has not been fully justified, on balance we consider the proposed expenditure can be considered to be reasonable once allowance is made for on-going efficiencies and provided that the benefits of the more intensive routine work and the condition monitoring are reflected in reduced refurbishment and replacement expenditure, which we have recommended.

Proposed network optimisation capex and opex

43. Expenditure on network optimisation as proposed by ElectraNet should produce economic benefits through the deferral of load driven capex. The approach taken by ElectraNet is appropriate for the network and can be expected to produce efficient outcomes. These benefits should be visible in the subsequent RCP and monitoring and reporting on their achievement should be seen in ElectraNet's revenue proposal for that RCP.

Capex efficiency

44. ElectraNet's proposed capex efficiency adjustment (reaching 2% by end of period, and averaging 1% over the period) is reasonable.

2.5 Consideration of AEMO's assessment of certain network and contingent projects

2.5.1 AEMO's scope and approach

45. AEMO was asked by the SA government in November 2011 to review ElectraNet's revenue proposal, prior to submission.[11] Its review was based on information provided to it by ElectraNet at 26th April 2012. Subsequent changes occurred between the information reviewed by AEMO and components of the capex forecast included in the revenue proposal.

46. AEMO undertook the following in its review:

    a. ensuring the identified need met the jurisdictional planning obligations described in the ETC;

[10] EMCa was not asked to provide an opinion on the escalation factors themselves

[11] AEMO – 2012 ElectraNet Revenue Cap Review – Capital Project Assessment Report

b. assessing the reasonableness of the proposed options and consideration of any alternative options identified by ElectraNet;

c. assessing augmentation timings relative to load forecast information (as at 26 April 2012);

d. Alignment with AEMO's National Transmission Development Plan.

47. AEMO assessed the reasonableness of the contingent projects and the proposed triggers.

48. Further details on AEMO's approach and the projects reviewed are provided in Annex A.

2.5.2 Observations on AEMO's review

49. It would appear that AEMO's involvement had a beneficial impact on ElectraNet's proposal, through its review of technical analysis and options analysis. We understand that a number of changes to ElectraNet's proposal resulted from this involvement. It is also useful to the AER that AEMO has confirmed consistency of ElectraNet's proposal with the NTNDP and that the proposed projects will meet ETC requirements.

50. In other respects, AEMO's findings are of limited relevance to the AER's assessment. Principal reasons for this are:

i. AEMO's findings on augmentation and connection projects are based on ElectraNet's connection point forecast, rather than AEMO's own (much lower) forecast. This largely undermines the findings in relation to "need" and "timing";

ii. AEMO stated that it considered itself not qualified to make findings on all land and easement projects. AEMO also did not address the reasonableness of including land and easements related to possible contingent projects and whether this met the requirements of the NER;

iii. AEMO's findings on contingent projects are that they are sufficient. AEMO appeared not to consider whether each project was "probable" or otherwise fulfilled the requirements of the NER, nor did it consider the interaction (and potential "double dipping") between the proposed contingent projects and the proposed forecast capex;

iv. AEMO undertook only a limited review of certain projects in other categories of proposed expenditure, insufficient to draw conclusions with respect to those proposed expenditures.

51. AEMO also noted that it expected that ElectraNet would in some cases find more prudent options than those proposed.

52. We took account of AEMO's work in our review. However, due to these limitations, it does not provide an independent endorsement of the proposed expenditure.

2.6 Implications of our findings for proposed forecast capex and opex

2.6.1 Indicative capex adjustments

53. The implied adjustments in table 1 show the amounts by which ElectraNet's capex would be adjusted, for each of the recommendations presented for the AER's consideration. The adjustments apply to each adjustment made individually. We also show the implications of making all of the proposed adjustments, in which case we estimate the total adjustment as a reduction of $364m from the capex of $894m that ElectraNet has proposed[12]. This is a reduction of 41%.

54. The dominant adjustments are to replacement capex and, of these, to the proposed pumping station supply replacement expenditure. Our finding is that the level of expenditure, as proposed, is insufficiently justified and the implied adjustment shown here is based on disallowing that expenditure on these grounds. We consider it likely that justification for a level of such expenditure exists but has not been presented to us. Pending resolution of matters that we have raised and presentation of satisfactory evidence to justify the proposed program of works, we consider it likely that at least some of the proposed expenditure will be found to be justified.

55. Similarly, information presented to date is insufficient to support the inclusion of any of the proposed land and easement projects associated with contingent projects. However, we consider that there is likely to be merit in some strategic land and easement acquisition expenditure. This finding and consequent adjustment would need to be reassessed if ElectraNet was to reassess its proposed expenditure, taking account of the matters that we have raised, presenting justification that is satisfactory in terms of NER requirements.

56. The proposed adjustment to refurbishment and replacement capex to account for benefits from the enhanced maintenance regime is likewise based on an estimate that we have made, in the absence of a cost/benefit analysis having been undertaken by ElectraNet. A well-supported cost/benefit analysis would provide useful input to any further assessment of this adjustment.

57. The case for the other adjustments is based on more complete information having been provided to us.

[12] Some adjustments interact with others, so that the aggregate adjustment is less than the sum of all adjustments made individually.

Table 1: Impact of potential capex adjustments

$million (real 2012/13)

	Implied Adjustment	Total Capex
Electranet forecast Capex		**894.1**
Potential adjustments:		
Demand Adjustments		
Connection	-29.8	
Augmentation	-18.4	
Replacement	-57.0	
Portfolio Risk		
0% Replacement & Refurbishment	-16.2	
2.6% Augmentation & Connection	-2.9	
2.6% on all others	-0.5	
Prudency		
Replacement & Refurbishment	-32.0	
Pumping stations supply replacement	-123.4	
Benefits of enhanced maintenance regime		
Replacement & Refurbishment	-50.0	
Strategic Land & Easement acquisitions	-51.4	
Adjusted Capex (if adjustments made individiually)	**-381.6**	
Total cumulative adjustments		**-364.0**
Adjusted controllable capex		**530.1**

Source: EMCa analysis from ElectraNet response ENET076(C)

58. We have presented all potential adjustments in the table above, noting that each should be subject to further review for materiality in regard to the "reasonableness" criteria in the NER.

59. While we have not been asked by the AER to assess price escalators, in the course of reviewing ElectraNet's application of these escalators we have established their sensitivity. We can advise that the overall effect of ElectraNet's proposed price escalators, relative to CPI, has an impact on capex of $43m.

2.6.2 Indicative Opex adjustments

60. The adjustments shown in table 2 imply a reduction of $63m (15%) compared with the opex that ElectraNet has proposed, but which is nevertheless a 21% increase in the (RCP) period-to-period controllable opex. We consider that an adjusted opex of the level proposed here:

a. Would not impinge on ElectraNet's capability to address high-risk situations;

b. Allows for asset growth and the continued implementation of the condition-based maintenance regime, with focus on routine preventative maintenance, asset inspections and focused refurbishment programs to optimise asset lifecycles;

c. Applies a more reasonable interpretation to defect information that is driving forecast corrective maintenance needs; and

d. Allows for efficiency improvements that are similar to those that ElectraNet has proposed (after ramp-up) for capex.

Table 2: Impact of potential opex adjustments

$million (real 2012/13)

	Implied Adjustments	Controllable Opex
ElectraNet forecast opex		**422.8**
Adjustments:		
Corrective maintenance		
Lines	-11.2	
Substations	-8.2	
Operational refurbishment	-14.5	
Asset management support, maintenance support, corporate support	-13.2	
Network operations	-4.3	
OPEX efficiency	-10.6	
Asset growth	-1.9	
Total adjustment (factors applied individually)	**-63.9**	
Total cumulative adjustments		**-63.2**
Adjusted controllable opex		**359.6**

Source: EMCa analysis ElectraNet response ENET071(C)

61. There is relatively little overlap between the adjustments shown above, and the cumulative effect of making all adjustments is $63m, compared with the $64m sum of each of the individual adjustments.

62. We can advise that the overall effect of ElectraNet's proposed price escalators, relative to CPI, has an impact on opex of $21m.

2.7 Implications for proposed contingent projects

63. Our findings result in the following adjustments to the proposed contingent projects list.

Table 3: Summary of EMCa findings on contingent projects

$million (real 2012/13)

No of projects	Contingent project names	Total ($m)
Compliant		
1	Davenport Reactive Support	42
Could be compliant, if trigger is modified		
2	Mid-North Connection Point; Upper North Region Line Reinforcement	121
Some contingent need is evident; a modified or alternative project could be compliant		
2	Riverland Reinforcement; Eyre Peninsula Connection Point	440
Could be compliant, if "market benefits" are accepted as compliant with NER capex objectives		
4	South East to Heywood Interconnection Upgrade; Torrens Island Switchyard Development; Para – Davenport Transmission Upgrade; Upper South East Generation Expansion	248
Not accepted - Within expected demand or technical requirements (new connection points proposed)		
4	Fleurieu Peninsula Reinforcement; Northern Suburbs Reinforcement; Port Pirie System Reinforcement; Western Suburbs Reinforcement	314
Not accepted - Within expected demand or technical requirements (no new connection points proposed)		
2	Lower Eyre Peninsula Reinforcement; Yorke Peninsula Reinforcement	779
Not accepted - Not probable		
6	Upper Eyre Peninsula Reinforcement; Northern Transmission Reinforcement; Southern Suburbs Reinforcement; South East Connection Point Reinforcement; South East Region Augmentation; Lower South East Region Transformer Reinforcement	603
TOTAL of proposed contingent projects		**2,547**

Source: EMCa analysis from ElectraNet information

3 Expenditure in the current Revenue Control Period

3.1 Introduction

64. In this section we review ElectraNet's expenditure in the current RCP (2008/09 to 2012/13). We present the expenditure incurred to date (which comprises the first three years of the RCP) together with ElectraNet's budget estimates for the final two years (2011/12 and 2012/13). From high-level analysis, we identify material variances compared with the forecasts incorporated in the AER's 2008 determination, material step changes and their drivers.

65. The purpose of this aspect of our review is to inform advice relating to ElectraNet's forecasts for the next RCP. It is not within the scope of the NER to determine in relation to current RCP expenditure.

3.2 Approach

66. Our approach is to review and identify material changes to the external environment and changes in ElectraNet's management of the network that have (or may have) influenced the expenditure in this period.

67. We then examine the expenditure pattern and components, with a particular focus on identifying:

    a. Differences between actual and previously-forecast expenditure that may inform judgments regarding the forecasts now being proposed; and

    b. Step changes that occurred in the current RCP, and the extent to which they will be expected to continue or otherwise influence next RCP expenditure.

68. We have assessed next RCP expenditure in relation to current RCP expenditure and our observations from the current section, in the later sections where we review proposed capex and opex (sections 6 and 8).

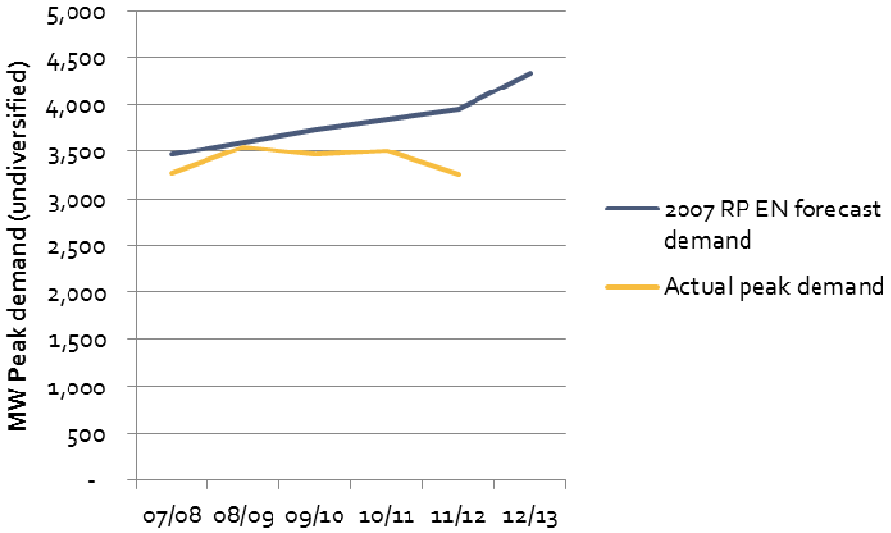
3.3 Influences on the current RCP

3.3.1 External influences on current RCP expenditure

Demand

69. ElectraNet's demand has been somewhat lower than was forecast in its 2007 RP, in spite of the year 2008/09 being what was described to us as a record heat-wave, and ElectraNet's all-time highest demand being reached in 2010/11. While recognising that a temperature-related "probability of exceedance" margin is implicit in ElectraNet's forecast for capex planning purposes, the difference in the outturn of demand is evident and we would expect this to have led to deferral of some previously proposed augmentation and connection point expansion capex.

Figure 1: Current RCP demand forecast and actual demand (ETSA connection points)



Source: EMCa from ElectraNet 2007 RP, and actuals from response ENET063(R)

Contingent projects

70. Two contingent projects were triggered in the current RCP: the line component of an Adelaide Central reinforcement and Munno Para reinforcement. In comparisons covered in this section, these projects are added in as part of the AER's decision for the period, and also included in actual expenditures.

Changes to regulatory requirements

71. Coincident with the start of the current RCP, the ETC was amended such that ElectraNet was required to use "best endeavours" to remedy any breaches of reliability requirements within 12 months of that breach. In the course of the previous determination process, the implementation of enhanced reliability requirements for three connection points was deferred by ESCOSA, such that they commenced within the current RCP. Some expenditure front-loading was accepted by the AER to provide for ElectraNet to meet these requirements.

72. During the current RCP, ESCOSA introduced new vegetation clearance standards. This required additional expenditure. Having met the new clearance requirements,

ElectraNet has confirmed our expectation that ongoing vegetation management workload is not affected.

3.3.2 Management / governance influences on current RCP expenditure

Continuous improvement

73. During the period, ElectraNet has applied a continuous improvement approach to the management of its capex, as stated in its RP. We have been presented with evidence of this program, which we describe further in section 4 and we consider that this program will not only have had a positive influence on ElectraNet's capex expenditure and management of its program in the current RCP, but that these benefits will continue into the next RCP.

74. We also noted a continuous improvement element to ElectraNet's management of its opex program. This too has involved some investment within the current RCP (resource, building into processes and systems) but we were presented with evidence of improvements resulting from this program and which we expect to continue well in to the next RCP.

Maintenance regime and condition-based assessment

75. ElectraNet has implemented an enhanced maintenance regime in the current RCP. During this period, ElectraNet has invested in the development and specification of this regime, has collected a considerable amount of condition data and has developed analytical tools and methods to use this information as a key input driving the maintenance of its assets.

76. The enhanced maintenance regime has involved additional expenditure to develop the regime, to collect condition information and to undertake increased routine maintenance (including increased aerial inspections of lines and more intensive routine maintenance in substations) and for increased corrective maintenance to address some high-risk issues that became evident from the condition information. For the next RCP, ElectraNet proposes work which will effectively cover completion of the implementation of this regime as well as some further proposed maintenance and replacement expenditure that is driven from the condition information. We discuss these implications in more detail in sections 6 (capex) and 8 (opex).

3.4 Current RCP expenditure and its implications

3.4.1 Capex expenditure

Capex profile, components and variances

77. As is shown in table 4, ElectraNet estimates that its total capex in the current RCP will be $15m less than the amount included in the AER 2008 regulatory decision. However capex actual spend (which comprises only the first three years of the current RCP) has been $132m (22%) less to date than the amount accepted by the AER. ElectraNet has estimated a lower spend also in 2011/12, but plans to incur capex in 2012/13 that is $129m higher than was originally accepted by the AER for this year.

The higher spend includes an additional $69m on augmentation and connection projects, an additional $21m on replacement projects, $14m on acquiring land and easements, $18m extra on compliance and $9m extra on IT. The additional expenditure represents 15% of AER's capex decision for the entire 5 years of the current RCP.

Table 4: Total capex in current RCP (comparison with previous AER decision)

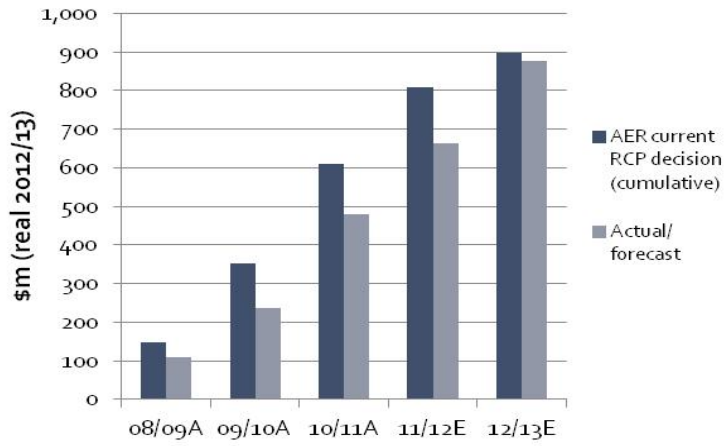
$million (real 2012/13)

	08/09A	09/10A	10/11A	11/12E	12/13E	Total
Decision	148	203	259	199	89	**899**
Actual	**108**	**127**	**243**	**186**	**219**	**883**
Difference ($)	- 40	- 76	- 16	- 13	129	**- 15**
Difference (%)	-27%	-37%	-6%	-7%	144%	**-1.7%**

Source: EMCa from ElectraNet response ENET236(P)

78. Figure 2, below, shows cumulative capex over the period, and shows how ElectraNet estimates that the lower spend initially will be completely absorbed by the higher spend in the final year.

Figure 2: Current RCP capex – Cumulative as incurred/forecast (compared with AER Decision)



Source: EMCa from ElectraNet response ENET236(P)

79. We have reviewed the categories of spending in the current RCP, as shown in the table below.

Table 5: Capex in the current RCP, by category

$million (real 2012/13)

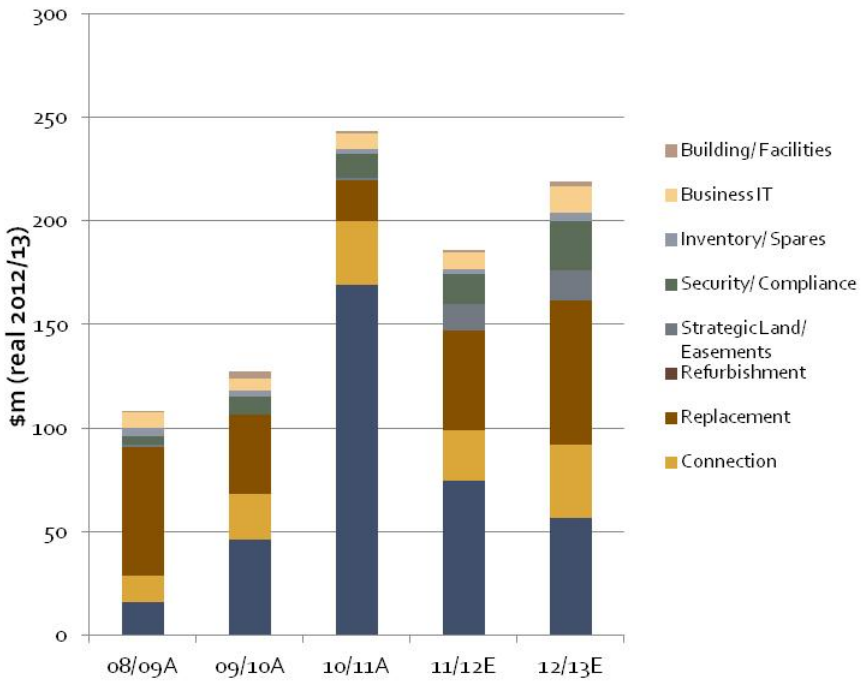
	Current RCP (actual & estimated)			Historical (first 3 years, actual only)		
	AER	Actual / est.	Difference	AER	Actual	Difference
Augmentation	322	362	*40*	255	231	- *24*
Connection	151	126	- *25*	118	66	- *52*
Replacement	283	237	- *46*	136	119	- *17*
Refurbishment	0	0	*0*	-	-	-
Strategic Land/ Easements	17	30	*13*	17	3	- *14*
Security/ Compliance	60	63	*3*	40	24	- *15*
Inventory/ Spares	18	16	- *2*	9	9	*0*
Total Network	**851**	**834**	**- *17***	**575**	**453**	**- *122***
Business IT	33	42	*9*	23	21	- *2*
Building/ Facilities	15	8	- *7*	12	5	- *7*
Total Non-network	**48**	**50**	***2***	**35**	**26**	**- *9***
Total capex	**899**	**883**	**- *15***	**610**	**478**	**- *131***

Source: ElectraNet (from detail provided in response ENET236(P))

80. The data above shows lower expenditure across all categories in the three historical years of the current RCP. Across the whole RCP (including ElectraNet's estimates for the last two years) the main variances are considerably lower expenditure on replacement ($-46m) and connection (-$25m), and higher expenditure on augmentation (+$40m), strategic land and easements (+$13m) and IT (+$9m).

81. The pattern of expenditure over the years is shown in figure as below. Augmentation expenditure is very variable, as we would expect as it relates to specific relatively large projects. Connection capex has increased over the period and we observe a smoothing trend in which replacement expenditure has been highest in years when little augmentation and connection capex has been required, and was scaled back in 2010/11 to allow the business to manage the high augmentation project workload in that year.

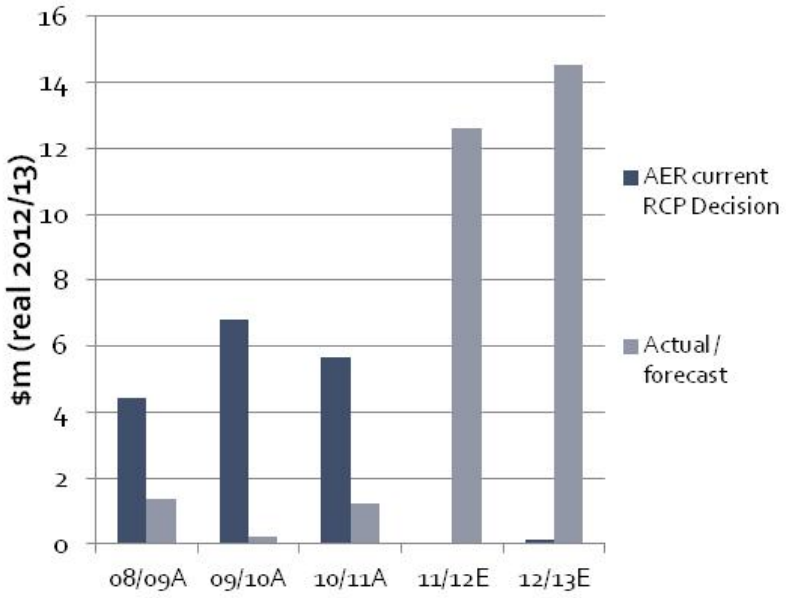
Figure 3: Components of capex in current RCP



Source: EMCa from ElectraNet response ENET100(P)

82. Figure 3, above, shows the land and easement acquisition expenditure over the current RCP. The AER accepted $17.1m ($2012/13 terms) in its 2008 decision. ElectraNet spent $2.8m in the three historical years of the RCP. In the final two years, ElectraNet estimates that it will spend a further $27.2m, for an estimated $30m aggregate expenditure in the period.

Figure 4: Land and easements acquisitions in current RCP



Source: EMCa from ElectraNet response ENET100(P)

Observations and Implications for next RCP forecast

83. We consider it significant that ElectraNet incurred considerably lower capex in the early years of the RCP than the AER accepted in 2008 as being reasonable and required. This raises questions as to whether ElectraNet adequately assessed the timing requirement for these projects when it submitted its previous RP, whether conditions changed and a need that was perhaps reasonably foreseen did not arise, or whether there was a "deliverability / resource" issue which hindered delivery of these projects.

84. We consider it reasonable to infer from the lower spending in the three historical years, that ElectraNet also made some "prudency and efficiency" savings and this is consistent with the claim made in its current RP.

85. In the course of our meetings with ElectraNet, we observed a mind-set that appears to view the capex and opex amounts previously accepted by the AER for revenue-determination purposes, as some form of budgetary expenditure "allowance" - a term that is used frequently in ElectraNet documents, including in the RP[13].

86. While the regulatory framework sets an allowable network revenue level, we consider that good commercial practice is to manage expenditure based on business conditions and business justifications using a commercially-driven governance framework. ElectraNet has such a framework. However, it does appear that this framework may have been over-ridden to an extent in the final two years of the current RCP. As an example, we were given evidence in the course of presentations at ElectraNet of some

[13] There are eighteen instances in the RP where the term "expenditure allowance" is used.

replacement capex (including $6m of pumping station replacement[14]) that was "brought forward" into the current RCP when it was seen that ElectraNet would otherwise incur less capex than was accepted in the previous revenue determination. We also observe some spending (of the order of $4m) on projects that are now being proposed as "contingent" and the expenditure of $27m on land and easement acquisitions.[15]

87. We consider that if ElectraNet had fully complied with its capital governance framework in the final two years of the current RCP, then it would likely have incurred a somewhat lower capex than it is currently forecasting for the current RCP, and materially lower than was accepted by the AER in its previous decision. While not definitive, we consider this to be an indicator of elements of currently-proposed capex that ElectraNet will later find are not required or can be deferred, of the potential for efficiency gains and for more prudent options to be revealed than have been assumed in the RP. In short, our analysis of current RCP expenditure indicates that, as was the case in the current RCP, the capex proposed for the next RCP may be higher than is eventually required.

88. In our review of proposed capex, we have considered ElectraNet's past compliance with its policies and have therefore looked for sufficient evidence of justification, for options assessments and for prudent decision-making consistent with ElectraNet's capex governance framework, such as would adequately support the proposed expenditure.

3.4.2 Opex expenditure

Opex profile, components and variances

89. As with capex, ElectraNet estimates that its controllable opex in the current RCP will almost equal the amount accepted by the AER in its 2008 revenue decision. As with capex, ElectraNet spent less in the three historical years (on average 2.9%), but increased expenditure by $8m (14%) in 2011/12, with a slight decrease of $1m estimated for 2012/13.

Table 6: Controllable opex in current RCP (comparison with previous AER decision)

$million (real 2012/13)

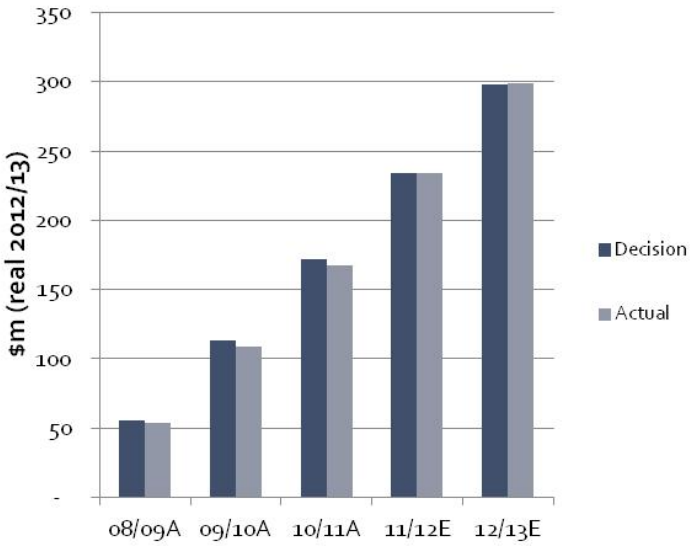
	08/09A	09/10A	10/11A	11/12E	12/13E	Total
Decision	56	57	59	62	64	**298**
Actual	**54**	**55**	**58**	**66**	**65**	**299**
Difference ($)	- 2	- 2	- 1	4	2	**1**
Difference (%)	-3%	-4%	-2%	7%	3%	**0.4%**

Source: EMCa analysis from ElectraNet data in response ENET100(P)

[14] EMCa analysis from ElectraNet data in response ENET150(P)

[15] EMCa analysis from ElectraNet data in response ENET202(C)

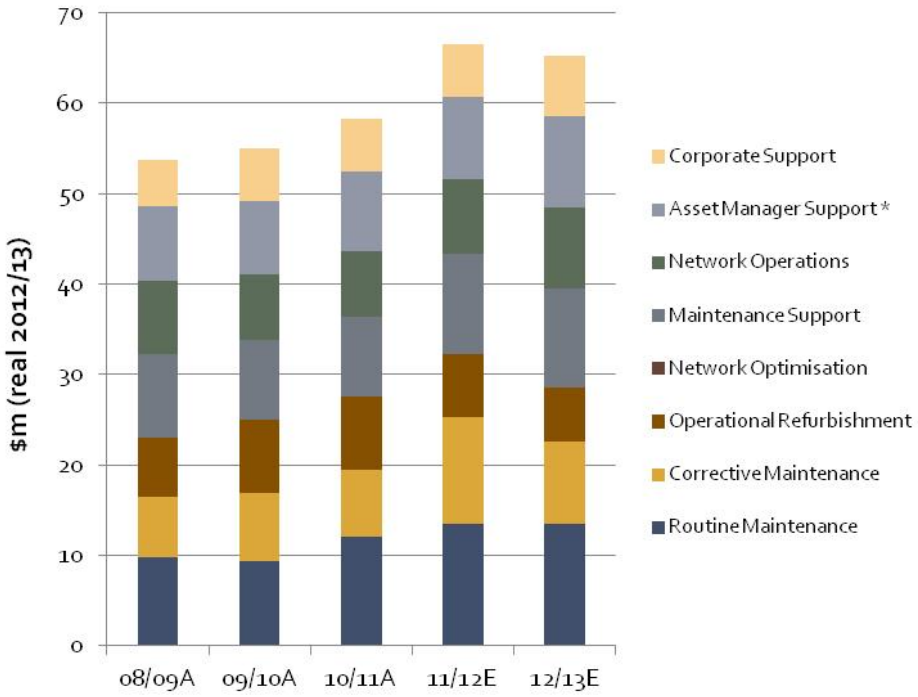
Figure 5: Controllable opex in current RCP (Cumulative, compared with previous AER Decision)



Source: EMCa analysis from ElectraNet data in response ENET100(P)

90. As figure 6 shows below, there was a step increase in routine maintenance costs in 2010/11 and a significant increase in corrective maintenance costs in 2011/12. Corrective maintenance costs were subsequently reduced in 2012/13 but this reduction was largely offset by increases in network operations, asset manager support and maintenance support.

Figure 6: Components of opex in current RCP



Source: EMCa analysis from ElectraNet data in response ENET100(P)

91. At a component level, there are significant variances. We understand that corrective maintenance was increased in 2011/12 in response to defect identification the previous

year, with priority being given to corrective maintenance of lines where fire-start defect risks were identified[16].

Table 7: Components of controllable opex in current RCP

$million (real 2012/13)

	Current RCP (actual & estimated)			Historical (first 3 years, actual only)		
	AER	Actual / est.	Difference	AER	Actual	Difference
Routine Maintenance	52	58	*6*	30	31	*1*
Corrective Maintenance	31	43	*12*	17	22	*4*
Operational Refurbishment	39	36	*-3*	24	23	*-2*
Maintenance Support	50	49	*-1*	29	27	*-2*
Network Operations	12	40	*28*	7	23	*16*
Asset Manager Support *	37	45	*8*	22	25	*4*
Corporate Support	77	29	*-48*	44	17	*-27*
Total Controllable	**298**	**299**	***1***	**172**	**167**	***-5***

Source: EMCa analysis from ElectraNet data in response ENET100(P)

Observations and Implications for next RCP forecast

92. As with capex, we observe the lower level of spending in the three historical years than anticipated. Taken together with evidence of ElectraNet's continuous improvement processes, and the incentives provided by the EBSS under the NER, we consider this to be evidence of efficiencies achieved. In section 8, we present our consideration of the opportunities for ElectraNet's investment in continuous improvement and an enhanced maintenance regime, to achieve further efficiencies.

93. As ElectraNet has noted in its RP, the increase in expenditure mid-period is related to the introduction of a new condition-based maintenance regime, which led to an increase in routine maintenance costs (a greater level of condition-based inspection) and the defects identified from these inspections also revealed a need for some corrective maintenance that had previously not been recognised by the business. This evidence from the current RCP led us to consider the benefits that should arise from the increased routine maintenance and the implications of the new regime for corrective maintenance, refurbishment and replacement, in the short and longer terms.

94. As we have noted in section 3.4.1, we observed a mind-set that ElectraNet should aim to spend to the amount previously accepted by the AER for revenue determination purposes and reference was made to budget discussions of the need to adjust expenditure in the final two years of the RCP to achieve this. We also note that, despite identifying defects which ElectraNet claims require "backlog" maintenance in the next RCP, spending on corrective maintenance was reduced from 2011/12 to 2012/13.

95. As with capex, we find that the argument for considerable increases to opex in the next RCP are less compelling when we observe elements of a "spend-to-the-allowance"

[16] In ENET245(P), ElectraNet provided modified actual opex data of $15m for network operation and $81m for corporate support. This was described as net re-categorisation. However in aggregate these amounts are $28m more than was advised in ENET100(P). Therefore we have relied on the ENET100(P) data originally provided.

approach in the current RCP. We consider that ElectraNet has, in most respects. a strong, principles-based maintenance regime that should allow it to determine and justify appropriate levels of maintenance. Given the above observations on the current RCP, we looked particularly for evidence to be assured as to whether the framework is being properly utilised to produce defensible maintenance cost estimates.

96. We observed a step increase in the sum of support costs (asset manager support, maintenance support and corporate support) and network operations cost, from $30.7m to $34.2m between 2010/11 and 2011/12. ElectraNet has chosen 2011/12 as the "base year" from which it has escalated to produce the forecast opex costs for these four line items. The observed step change led us to examine more closely the justification for using an "estimate" year as the base, rather than a year in which actual audited expenditure was available and in which ElectraNet was incentivised by the current EBSS.

3.5 Summary of our review of current RCP expenditure

97. We reviewed current RCP capex and opex in order to better understand the drivers of the capex and opex proposed by ElectraNet for the next RCP. Our review found expenditure trends and influences that in turn influenced our review of proposed expenditure. Our key observations are as follows:

a. ElectraNet spent less in the three historical years of the RCP[17] than the AER accepted in its previous decision (i.e. in 2008). We consider that this provides evidence that ElectraNet can and does prudently defer or reduce expenditure when it is able to do so, and that the outcome supports ElectraNet's claims (in the RP) that its continuous improvement program is capable of providing opex and capex efficiency improvements.

b. A considerable increase in opex occurred between 2010/11 and 2011/12. The drivers for this include the introduction of a more intensive condition-based maintenance regime and the correction of some high-risk defects that were identified early in the deployment of this regime. This led us to consider the business case for the investment in the new regime and the benefits that we would expect to result from higher levels of routine and corrective maintenance.

c. We observed a step increase in the sum of asset management support, maintenance support, corporate support and network operations between 2010/11 and 2011/12. This led us to review the use of 2011/12 estimated expenditure as the "base year" from which ElectraNet has produced its forecasts for these components.

d. Based on its estimates for the last two years of the current RCP, ElectraNet's capex and opex over the whole of the current RCP will almost equal the amounts in the previous AER determination. We observed a mind-set that strived to achieve this.

[17] Because of its publication timing, actual expenditure is shown in the RP only up to the end of 2010/11

We consider that it does not represent good stewardship of assets, to drive expenditures based on regulatory cycles, particularly given that ElectraNet has espoused what otherwise appears to be a strong lifecycle-based asset management regime. This led us to examine carefully the way in which this regime has been used to produce the proposed forecasts and the justifications for the proposed programs of work.

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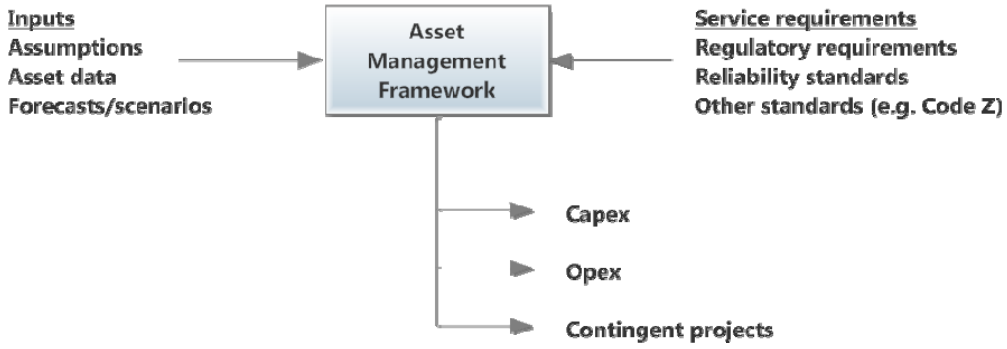
4 Review of ElectraNet's asset management framework

4.1 Introduction

98. We consider the asset management framework to be the 'mechanism' through which an electricity network business converts inputs (asset data, assumptions and forecasts) into capex and opex that are forecast to be required to meet defined outputs (e.g. service and reliability standards. Figure 7 shows a generic high level business model that we use in our approach when assessing the reasonableness of capex, opex and contingent project proposals.

Figure 7: Generic basic asset management model



Source: EMCa

99. This section describes the approach we took to assess ElectraNet's asset management framework and our findings.

4.2 Top-down/bottom-up assessment

100. Our approach for reviewing both capex and opex is based on a top-down/bottom-up assessment which is consistent with advanced asset management structure set out in

the International Infrastructure management Manual[18] and inherent in the PAS 55 asset management standard[19]. Central to this approach is an assessment of ElectraNet's asset management framework through which the capex and opex components of the RP are developed. The top-down review addresses the questions:

a. To what extent can ElectraNet's asset management framework be considered to be aligned with asset management standards and good industry practice?

b. Will the asset management framework produce capex and opex forecasts that are reasonable and prudent?

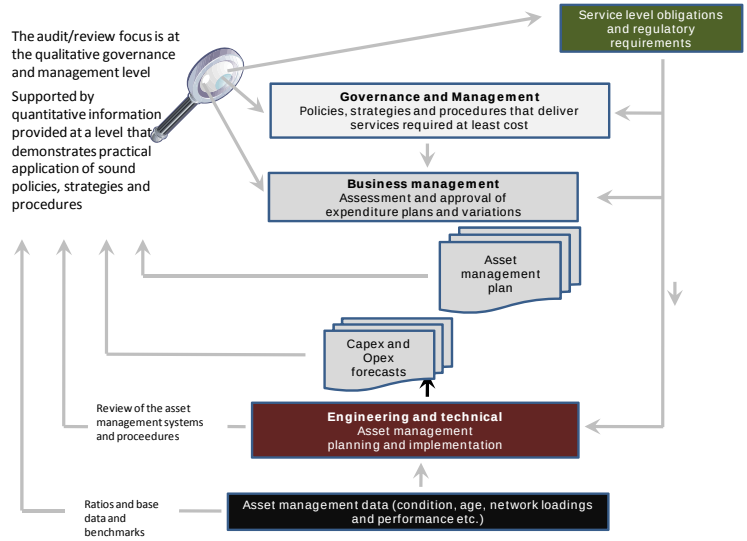
c. What adjustments to forecast expenditure it is reasonable to account for any areas where the asset framework is considered to not meet good practice standards?

101. The bottom-up component of our review approach is used to establish a view on the extent to which ElectraNet has applied its asset governance framework in practice. To do this we undertook a review of a sample of proposed forecast projects and contingent projects.

102. We used an on-site review to inform us of ElectraNet's asset management practices and the impact of the organisational culture on the development of expenditure plans and how these are implemented.

103. The following diagram sets out the conceptual structure for the approach we adopted for this review.

Figure 8: Top-down/bottom-up approach to this assessment



Source: Strata Energy Consulting Limited

[18] International Infrastructure Management Manual is produced through international collaboration led by the National Asset Management Steering Group located in Wellington New Zealand.

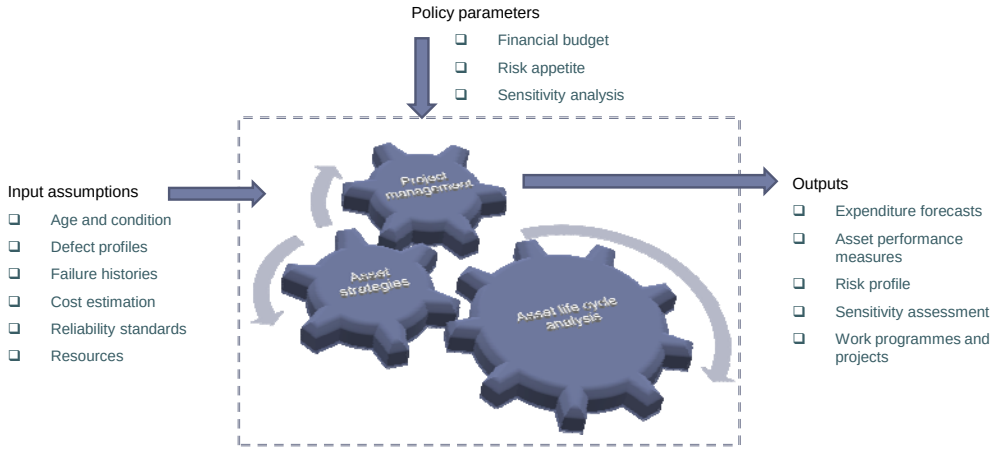
[19] British Standard Institute PAS 55 Asset Management Standard – 2008 is a widely used reference, guide and benchmark for asset management.

104. Throughout the review we questioned, sought further information and assessed how ElectraNet ensured that it was delivering least cost outcomes (taking into account full asset life cycle costs). We also sought information on the methodologies used by ElectraNet to ensure this was occurring.

105. For the top down assessment we applied and assessment criteria based on the requirements of the NER (6A.6.7) and also took into account the requirements of the TOR and additional good industry practice benchmarks[20].

106. The asset management framework can be considered to be a 'gear box' type mechanism through which high level policies and input assumptions are turned into outputs. The figure below provides a view of this concept.

Figure 9: Components of asset management framework



Source: Strata Energy Consulting Limited

107. We consider that an asset management framework that meets good practice standards will deliver reasonable and prudent outputs in the form of forecast capex, opex and contingent projects, for defined service requirements, based on appropriate inputs. Our approach to this review is based on the proposition that, if policy parameters are reasonable, asset management framework is sound and the input assumptions are appropriate, then the outputs are likely to be reasonable and prudent.

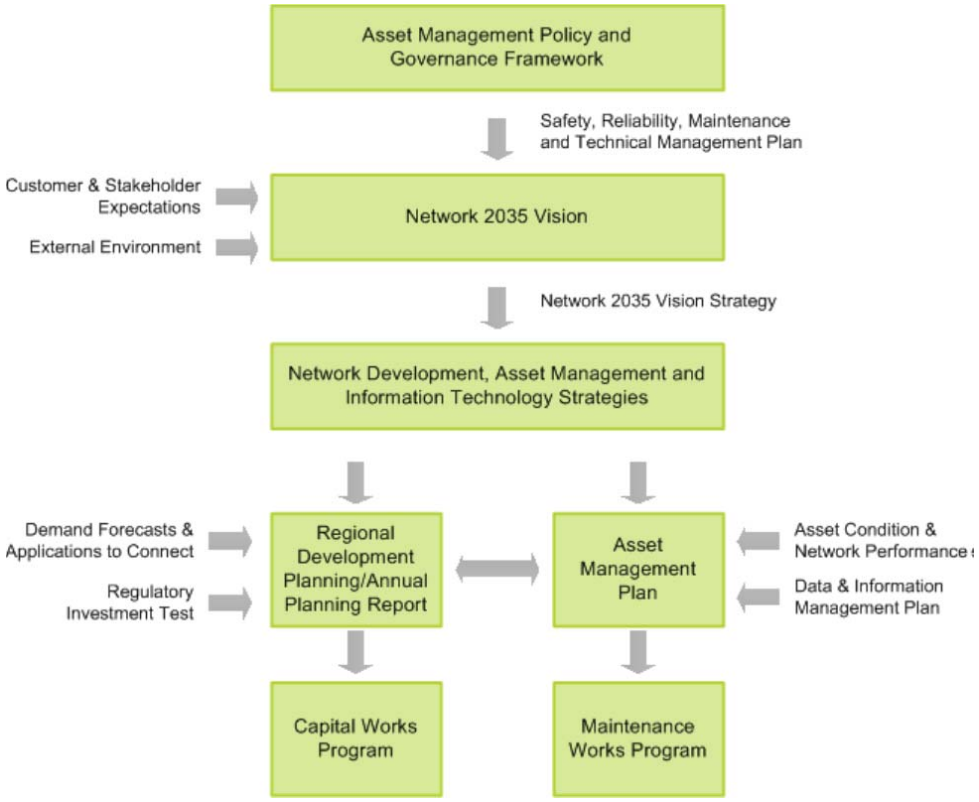
108. The following top-down review of ElectraNet's asset management framework should be considered to be an assessment of how ElectraNet describes how it manages its assets. In subsequent sections we discuss our assessment of the extent to which ElectraNet applies this in practice.

[20] Good industry practice benchmark criteria were developed with reference to PAS 55 Asset Management Standard, AS/NZS ISO 31000:2009 Risk Management/Principles and Guidelines and the New Zealand Asset Management Support Group (NAMS) International Infrastructure Management Manual. See in particular PAS 55 – 2008 4.2

4.3 Overview of the framework

109. At the head of ElectraNet's asset management framework is the Asset Management Policy and Governance Framework. Based on these corporate level policies ElectraNet has developed and implemented its Network 2035 Vision Strategy (2035 Vision) which provides high level direction and guidance to the organisation on how its network will be developed and managed over the longer term. ElectraNet's description of their asset management framework is set out in figure as below.

Figure 10: ElectraNet's Asset Management Framework



Source: ElectraNet 2012 AMP

110. The 2035 Vision establishes guiding principles against which strategic objectives and priorities are developed. The guiding principles for the management of assets are reproduced below.

Table 8: ElectraNet guiding principles for management of asset

Plan	Whole of asset thinking, rather than component level; take a broad view to find the least cost option; maximise synergy between new capacity and renewal of existing plant
Design	Design for high performance and value for money; based on standardised components that maximise plant and easement utilisation and exploit the benefits of modern digital technology and secure digital networks
Construct	Work closely with the local community and use modules assembled off-site to minimise local disturbance and overall cost; where possible avoid the complexity risk of brown-field projects by finding simpler greenfield

	alternatives; buy wisely, leverage common specifications and maximise competitive pressure on suppliers to get best value
Operate	Preserve safety and build security; use remote monitoring and control via secure digital systems for performance and flexibility; identify spare capacity for contingencies
Maintain	Minimise requirements to work on site or take assets out of service

Source: ElectraNet Network 2035 Vision Strategy page 8

111. Guided by the above principles ElectraNet has established the following strategic objectives and priorities:

Table 9: ElectraNet strategic asset management objectives and priorities

Objective	Priority
Ensure safe, secure, reliable supply A safe, secure and reliable network focused on resilience against natural disasters and extreme weather events that assures both community safety and secure electricity supply for South Australia.	Develop an integrated network development and asset management platform, supported by robust data, information and competency management processes to deliver safe, secure and reliable transmission services.
Deliver transmission services at lowest long-run cost Continued delivery of lowest long-run cost network services by intelligent network planning and use of smart grid technology to increase network asset utilisation. ElectraNet will manage input cost pressures and work with others to seek ways to reduce the growing gap between base-load and peak power demand.	Employ smarter network planning, asset management and new technology to increase asset life, network utilisation and performance to deliver services at lowest long-run cost.
Support South Australia's economic development Economically efficient network investment that supports South Australia's development. ElectraNet will align its plans with industry needs and continue to explore opportunities for more interstate interconnection to increase price competition in the local electricity market.	Plan the network to meet industry demand requirements, improve interconnection and actively monitor external developments to support economic development in the State.

Objective	Priority
Support development of lower emission energy sources A network to support the continued development of South Australia's low emission energy resources by providing the link between remote generation sources and major load centres.	Pursue opportunities to maximise the economic capacity and capability of the network through market benefits investments, line rating initiatives and timely connection processes.

Source: ElectraNet Network 2035 Vision Strategy page 8

112. ElectraNet develops the above objectives and priorities in three key documented asset strategies:
   a. Network Development Strategy
   b. Asset Management Strategy
   c. Information Technology Strategy

113. The above asset strategies provide strategic context, implications, priorities and delivery methodologies. The strategies also set out the basis for and the expected benefits to consumers. The network development and asset management strategies take into account the requirements of the reliability and technical planning standards included in the South Australian Electricity Transmission Code (ETC) and the National Electricity Rules (Rules).

114. The expected benefits to consumers are considered in terms of the high level strategic objectives established in the 2035 Vision. Through this structure ElectraNet established strong linkages between outcomes, expenditure, methodologies, priorities and the strategic objectives.

115. Over the last five years, the asset strategies appear to been driving significant changes in ElectraNet's asset management practices. In particular the organisation has made significant investment in an integrated asset management structure and methodology based on condition and risk based total asset like cycle management. The adoption and implementation of the integrated asset management concept has a material impact on subsequent forecast capex.

116. A description of our understanding of the structure and components of ElectraNet's integrated asset management methodology is provided in section 4.4.1.

117. On the basis of the asset strategies, ElectraNet develops and publishes its Regional Development Planning/Annual Planning Report and Asset Management Plans. These are detailed documents setting out ElectraNet's views on the emerging issues for the network and the solutions that have been developed to resolve them.

118. In the following sections, we highlight some key areas of the asset management framework that have led to our key findings.

4.4 Asset management methodologies

4.4.1 Integrated asset management

119. ElectraNet has provided comprehensive documentation and descriptions of its methodologies and in presentations, management described and demonstrated how they are applied in practice. In this section of the report we provide a summary of our understanding of ElectraNet's asset management methodologies.

120. ElectraNet has implemented an integrated asset management methodology that is based on :

a. Comprehensive asset condition intelligence and data

b. Risk assessment driven work prioritisation

c. An optimisation model based on total asset life cycle

121. Central to ElectraNet's implementation of its integrated asset management are three systems/methodologies:

a. Asset condition data acquisition and management (SAP database)

b. System condition and risk (SCAR)

c. Total Asset Life Cycle (TALC)

122. ElectraNet establishes asset condition data through a cyclical on-site inspection program. Inspection data is gathered on a state of the art Field Inspection Tool (Grazer) which, through and interface (Mobile Grazer Terminal (MGT)) to the SAP database, provides daily data updates on asset condition.

SCAR

123. When inspectors find defects in assets, a rating is given based on ElectraNet's SCAR asset risk rating matrix. The rating is based on a weighted likelihood of failure which flows through to produce an average days to fix value. ElectraNet asset managers described the average days to fix rating as a response to the question - how long could we live with this defect?

124. Figure as below provides the SCAR matrix and a table of derived average days to fix values.

Figure 11: SCAR asset risk rating matrix

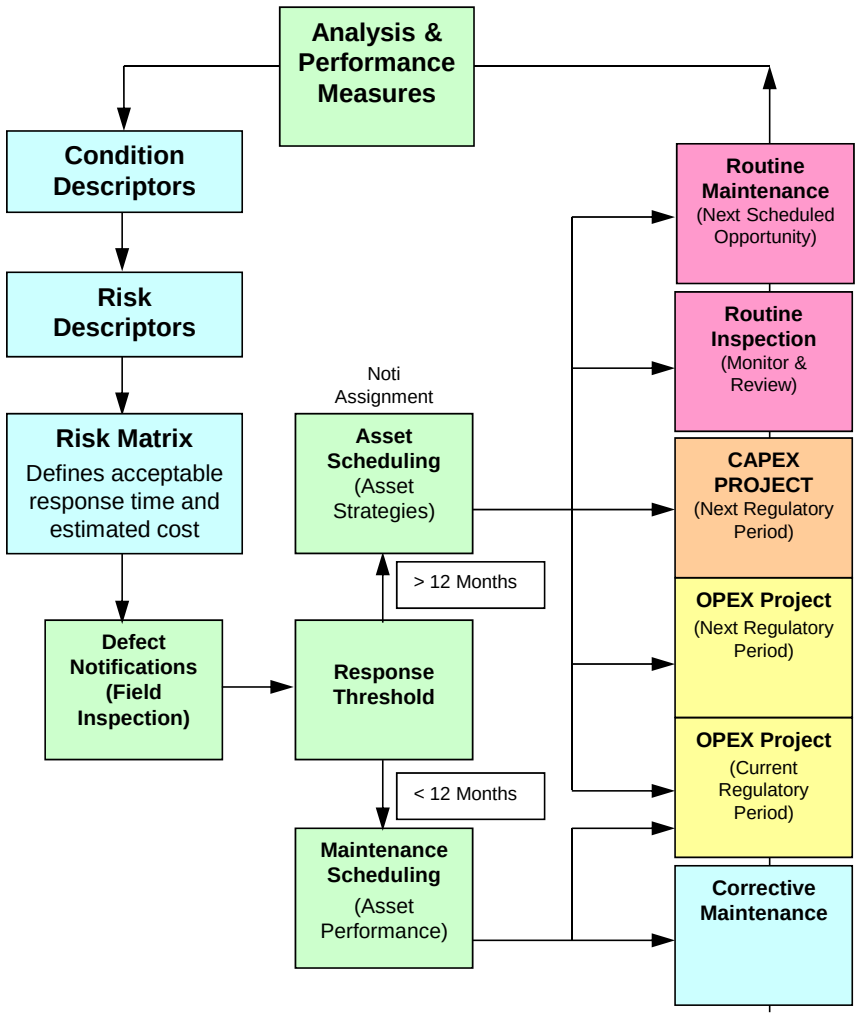
			Consequence				
		Weighting	1	2	5	7	15
			Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Almost Certain	11	11	-	-	-	-
	Likely	7	7	14	-	-	-
	Possible	5	-	10	-	-	-
	Unlikely	2	-	-	10	14	-
	Rare	1	-	-	5	7	-
	Negligible	0.01	-	-	-	-	-

Risk Score	14	13	12	11	10	9	8	7	6	5
ABED (Days to Fix)	4 days	9 days	16 days	23 days	30 days	60 days	100 days	180 days	280 days	396 days

Source: ElectraNet presentation on SCAR Coding and MGT from ElectraNet response ENET115(P)

125. The average days to fix defect values are used to assign the defect to an expenditure category. This process is shown in figure as below. :

Figure 12: Asset Defect & Refurbishment Management



Source: ElectraNet presentation on SCAR Coding and MGT from ElectraNet response ENET115(P)

126. The Asset Defect & Refurbishment Management process assigns defects that have a Days to Fix rating of less than 12 months to maintenance scheduling which in turn allocates the defect to corrective maintenance (less than 30 days to fix) or as an opex project for the current regulatory period. Defects with greater than 12 months Days to Fix ratings are allocated to routine inspection or maintenance or opex projects for the current or next RCP. Defects can also be allocated to capex for the next RCP.

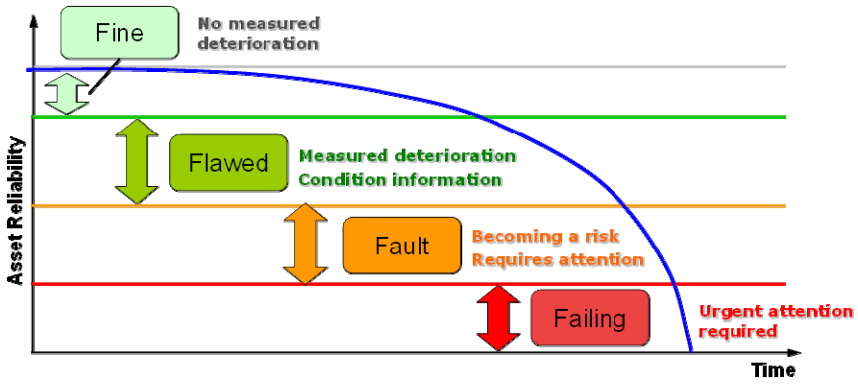
127. Allocation decisions for greater than 12 months defects are guided by total asset life cycle (TALC) asset strategies. The TALC methodology used by ElectraNet is fully described in the 2012 AMP and in the RP Appendix E Asset Management Strategy.

TALC

128. TALC is based on the derivation of a full asset life profile generally referred to as a bathtub curve because it contains early life failures, mid-life reliability and end of life deterioration. The full asset life cycle profile for specific asset types are commonly used in Reliability Centred Maintenance (RCM) to assist asset managers to predict and respond to expected asset condition over the lifetime of the asset. ElectraNet develop

asset profiles based on the condition data they acquire. These asset profiles are used to determine the optimal asset maintenance strategies for asset types and categories. Figure as below shows the typical asset reliability over time curve which is a core tool used in ElectraNet's TALC methodology.

Figure 13: Asset reliability over time curve



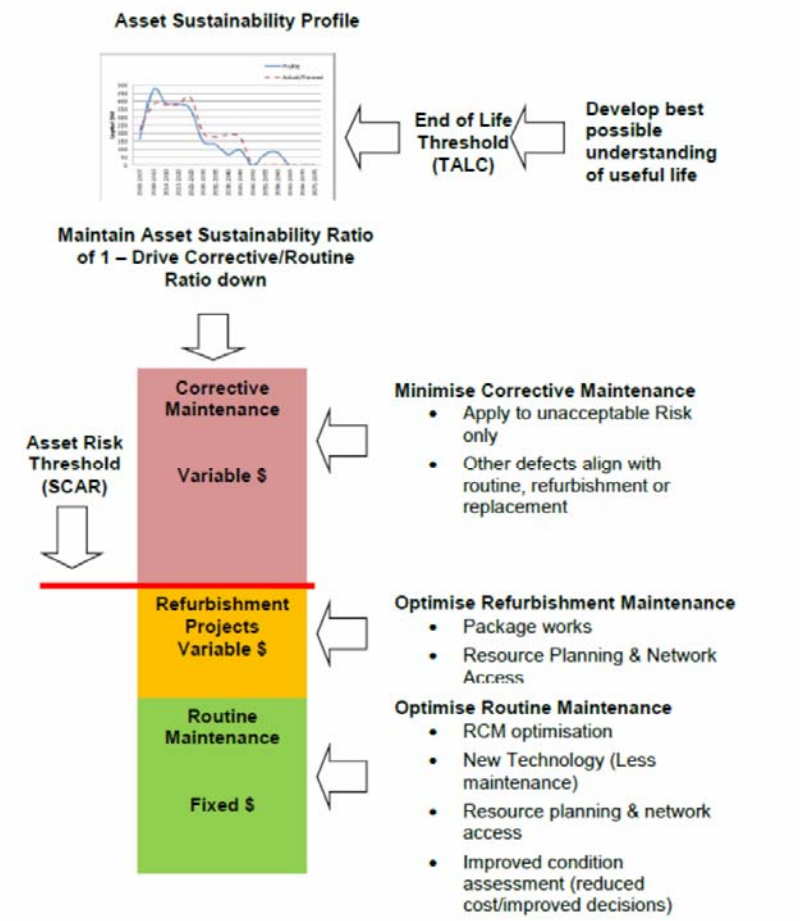
Source: ElectraNet presentation on SCAR Coding and MGT

129. Through the TALC ElectraNet are able to determine appropriate asset management strategies for specific types of assets. For example, the asset reliability over time curve can be changed through application of routine maintenance, refurbishment, replacement, corrective maintenance or replacement on failure. The application of RCM techniques determines the optimum strategy to take for particular assets.

130. In its 2012 AMP ElectraNet sets out the mechanisms incorporated into the asset management plan that are intended to *optimise investment and funding decisions based on whole of life cost, performance and risk*.[21] Figure as below provides an illustration of how this is implemented in the asset management framework.

[21] *ElectraNet 2012 AMP*; page 34; ElectraNet

Figure 14: ElectraNet total asset life cycle management decision framework



Source: ElectraNet 2012 AMP page 34

131. As demonstrated above, the TALC and RCM techniques are tools through which risk/cost trade-offs can be assessed allowing asset managers to establish and communicate the residual risks under varying levels of expenditure budgets. Through this process, risk appetite levels can be determined and the impact of varying asset management strategies and expenditure constraints can be assessed. Accordingly, asset management strategies can be optimised against defined risk profiles.

4.4.2 Project Management Methodology

132. In 2000 ElectraNet introduced a Project Management Methodology (PMM) that has subsequently been developed and improved. The objective established by ElectraNet for the PMM is:

> *to ensure appropriate controls are in place so the organisation achieves optimum outcomes in the delivery of projects* [22]

[22] ENET102_AER - ElectraNet Project Management Methodology (P)

133. ElectraNet has based the PMM on the industry standard Project Management Body of Knowledge (PMBOK) published by the Project Management Institute.

134. As a project progresses through the PMM it moves through the following six phases:

- Phase 0 – Initiate Project
- Phase 1 – Select Project Option
- Phase 2 – Develop Project Scope
- Phase 3 – Plan Project Delivery
- Phase 4 – Manage Project Delivery
- Phase 5 – Finalise Project

135. At the end of each phase each project is subjected to a formal gate review where it must gain endorsement from a panel of key senior management stakeholders before it can process to the next phase. Only when the project gains approval to proceed are funds released for the next phase budget.

136. PMM is currently used for management of network capex, opex, land development, ICT, and facilities projects.

4.5 Innovation and improvement

137. ElectraNet considers that, at a strategic governance level, its strategies *enshrine the introduction 'continuous improvement' in all aspects of network management through their alignment with the Vision and commitment to least cost service delivery and innovation.*[23]

138. In its RP and supporting documentation, ElectraNet provided examples and demonstrated the organisations commitment to and consideration of continuous improvement. In its RP, ElectraNet used the word improvement 51 times, the majority of which are related to asset management processes.

139. It became clear as our review progressed that ElectraNet has focused on and encouraged continuous improvement practices. Numerous examples were provided of where improvements have been identified and implemented.

140. One example that demonstrates how ElectraNet identifies and acts on potential improvements in is the continuous development and improvement of its PMM. The improvements recorded by ElectraNet for the PMM during the 2008-13 Regulatory Period are:

a. Introduction of Phase 0 to provide more formal initiation of the project and structured preliminary planning

[23] RP page 17

b. Introduction of formal Gate Reviews at the end of Phases 0-3 as key governance mechanism

c. Asset Handover moved from Phase 5 to Phase 4 to improve rigour around defect close out, documentation completion, and general transition to operational asset

d. Development of new RIT-T process in Phase 1

e. Development of PMM Process Maps and incorporation into overall ElectraNet Process Map framework

f. Development of specific methodologies for ICT, Land Development, and Facilities/OPEX projects

g. Integration of many PMM processes into ElectraNet's major corporate Project Management System, Microsoft Project Centre, including electronic workflow

h. Upgrade of Project Management System from Microsoft Project Server 2003 to Microsoft Project Centre 2010.[24]

141. Another example of the presence of active cross functional continuous improvement is the introduction of the P4 program for promoting innovation and efficiency in coordination with contractors. The P4 program is based around a Program Leadership Group which is key results focused measured against current position benchmarks. The key result areas set for the P4 Program include:

a. Identification of ideas

b. Number of ideas generated

c. Number of ideas implemented

142. The P4 Program identifies potential gains and considers how, once achieved, the gains can be shared in order to provide incentives for success. Currently the P4 Program is working on a pilot scheme that has identified potential savings of 5%[25] on field maintenance costs that could be achieved over the next RCP. ElectraNet considers that this pilot scheme could be expanded across other areas. The relevance of this potential efficiency gain to the forecast opex is discussed further in section 8.

4.5.1 Benchmarking

143. Benchmarking is a useful tool that provides an indication of how the business is performing relative to others and to monitor progress against internal benchmarks. We found that ElectraNet applies both uses of benchmarks.

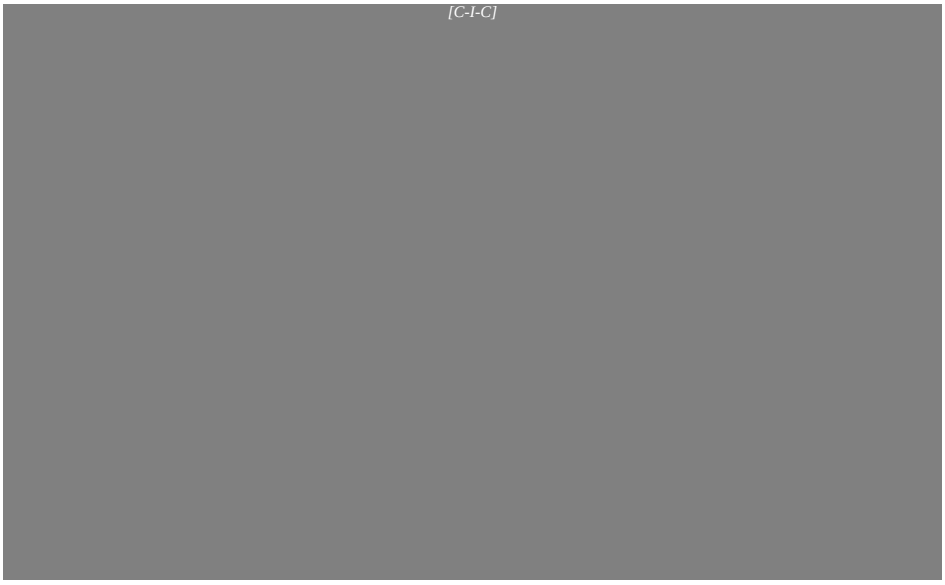
144. External benchmarking used by ElectraNet includes ITOMS and US Cost Success Enterprise user Group. ElectraNet use ITOMS to not only assess their current position but also to set performance targets. An example of ElectraNet's use of ITOMS benchmarks to measure and improve performance can be seen in the transmission line

[24] ENET102_AER -ENet Project Management Methodology(P)

[25] It was noted that ElectraNet has not accounted for this potential gain in the opex forecast.

area. Figure as below sets out ElectraNet's relative performance in ITOMS transmission line maintenance composite benchmark.

Figure 15: Transmission line maintenance composite benchmark



Source: ElectraNet Operating expenditure benchmarking analysis - ENET122(C)

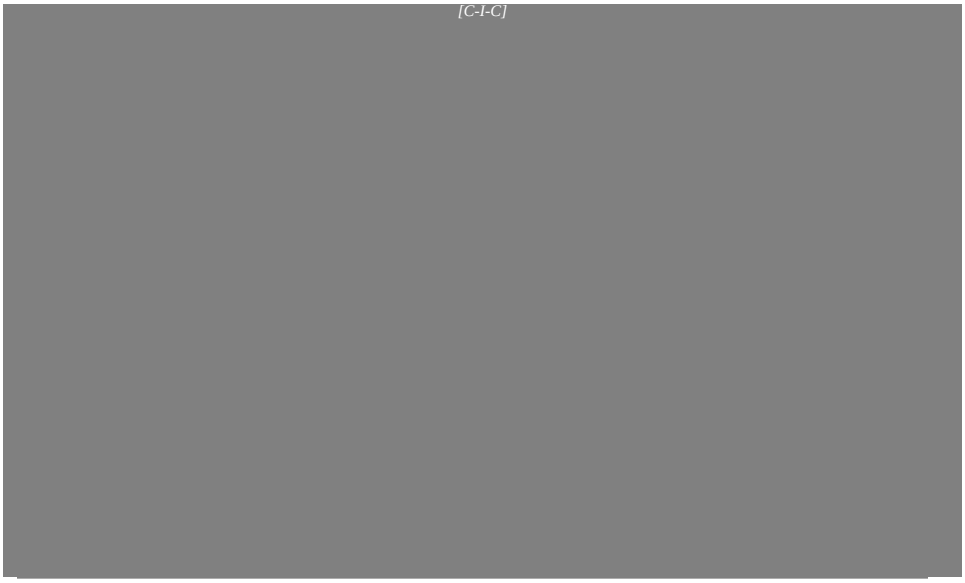
145. Using this benchmark, ElectraNet has established the view that their current performance shows a good fault performance, and relatively low spend on assets. Using the current and relative performance ElectraNet has established performance targets to:

   a. Maintain stable fault performance

   b. push result into top left quadrant (reflecting increasing effort in all maintenance categories)

146. Similar use has been made of ITOMS substation benchmarks.

Figure 16: Substation maintenance composite benchmark – Non-weighted average (2011)



Source: ElectraNet Operating expenditure benchmarking analysis - ENET122(C)

147. ElectraNet considers its current performance to indicate poor fault performance and increasing costs of routine and corrective maintenance effort. It has set its sights on moving to the top right quadrant in this benchmark by:

    a. Improving fault performance

    b. Achieving stable costs that begin to trend down

148. A valuable benchmark used almost unconsciously within ElectraNet is Powerlink. ElectraNet indicated that it sees Powerlink as a good industry benchmark and uses this as a comparison and target for its own performance.

149. Powerlink's ownership stake in ElectraNet brought a strong comparative benchmark to the organisation which adopted many of Powerlink's asset management methodologies and systems. ElectraNet's asset management practices appear to have gained a significant step change improvement from this learning process.

150. At this stage we found clear evidence that ElectraNet has actively built on the base provided by the association with Powerlink and is driving major developments in asset management systems and methodologies. It was clear that ElectraNet is proud of its leadership in asset management systems (SCAR and TALC) particularly when this is recognised by Powerlink (for example, considering adoption of these systems).

151. We identified use of internal benchmarks within ElectraNet. This was particularly evident in the continuous improvement programs and initiatives that included measurable targets.

152. An important benchmark for asset management was seen in the use of the US Cost Success Enterprise system[26]. The system includes feedback loops that monitor and benchmark unit costs. Cost movements against benchmarks are identified and, where appropriate, unit costs (e.g. base planning objects) are adjusted and updated.

4.6 Observations and comments

4.6.1 Asset Management Framework

153. ElectraNet presents its asset management framework as a comprehensive and systematic approach to asset management based on measured asset condition data. Asset strategies and methodologies are derived against strategic objectives and priorities set by the organisation's long term vision for the network.

154. We found the relevant policies to be clear and generally unambiguous. Whilst the documentation could be viewed as repetitive (e.g. SCAR and TALC methods described

[26] US Cost Success Enterprise system is a proprietor tool used internationally by a wide range of organisations. The tool has been adopted by many electricity transmission network businesses. More information can be found at www.uscost.com

in several documents) we consider that this serves to reinforce communication of important and valuable components of ElectraNet's approach to asset management.

155. When compared with the asset management frameworks set out in PAS 55 and the International Infrastructure Management Manual we have found ElectraNet's asset management framework to be well aligned with these standards. In the opinion of the experienced asset managers in our review team. ElectraNet's asset management framework is considered to be at or beyond good industry practice benchmarks.

156. We noted that in several documents and in presentation given during this review, ElectraNet referred to 'Best Industry Practice'. Through discussion, ElectraNet confirmed that its intention was to achieve 'Good Industry Practice'. We consider that it is appropriate for ElectraNet to meet good industry practice levels and that an additional justification would need to be undertaken if the business sought to lift its performance from good to best industry practice.

157. At the time of this review ElectraNet had completed a full cycle of substation asset inspections and expected to complete a full cycle of transmission line inspections during the initial years of the next RCP. As would be expected that initial cycle identifies a relatively high number of defects which would be expected to reduce in subsequent cycles. We consider this further in our review of opex.

158. ElectraNet is progressively implementing its integrated asset management framework. It is clear that whilst a substantial proportion of the framework is in place it is still considered to be work in progress. Importantly, we have observed that development of the mechanisms for asset strategy optimisation is not yet mature and may not be producing fully optimised outputs.

159. Total asset life cycle asset management methods such as those adopted by ElectraNet are intended to provide objective decision making when considering the appropriate actions to take for specific assets. The asset performance/failure curve shown in figure 13 provides an example of how TALC costs can be optimized through consideration of options such as mid-life refurbishment, asset replacement or run to failure. Through informed decisions risk / cost trade-offs and current cost / future cost trade-offs lead to least cost outcomes over the life of an asset.

160. In a mature TALC process we would have expected to see evidence of use of the systems and information when making decisions that had implications for the cost/risk and current cost/future cost tradeoffs inherent in full asset life cycle decisions. In order to gain an understanding of the maturity of the application of the TALC method within ElectraNet we investigated the process through which initial expenditure forecasts were challenged and components culled. ElectraNet did not provide convincing evidence that TALC was used to inform and drive decisions at all levels. We sought to establish the basis on which lines were drawn on expenditure levels and on how the risk implications had been taken into account when making reductions in forecast expenditure. The information provided by ElectraNet demonstrated that whilst asset management planners used TALC methods, this was at a relatively high level. It was not clear from the information sighted that TALC was used to fully inform senior management decisions.

161. The view expressed above is not intended to be a criticism of ElectraNet's integrated asset management but rather an observation of the current 'state of play' of its

implementation. The consequences of this are considered further in our assessment of the proposed opex and replacement capex.

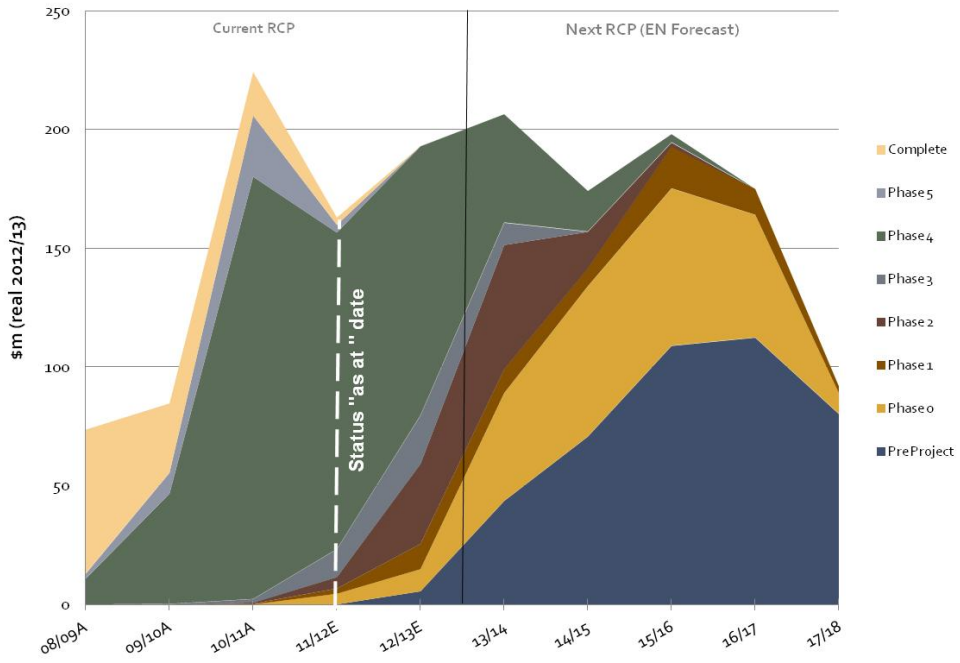
162. Taking the above observations into account we have found that, once fully implemented, ElectraNet's asset management framework can be considered to be at or beyond good industry practice standard. At this point, if input assumptions are reasonable and input data is accurate, the asset management framework would be likely to produce reasonable and prudent capex and opex forecasts. At present the current maturity of the integrated asset management systems need to be taken into account when assessing the output expenditure forecasts.

4.6.2 Project management methodology

163. ElectraNet has confirmed that the PMM incorporates, the fundamentals of the industry standard Project Management Body of Knowledge (PMBOK) published by the Project Management Institute. On this basis and on observation of the PMM operating in practice we consider that PMM is appropriate for an asset based infrastructure business such as ElectraNet.

164. Figure as below shows the Phase status of network capex projects over the current and next RCP.

Figure 17: Expenditure by current project phases



Source: EMCa analysis from ElectraNet data in response ENET155 (P)

165. The status profile over the two year window shows, as would be expected, that projects in the current RCP have progressed through most of the PMM stages. It would also be expected that, as is occurring, into the second year of the next RCP, a majority of the proposed projects are only in the early stages of development.

166. The low level of progress through the initial phases of the PMM for projects in the next RCP presents challenges for our review as projects at this stage are at concept stages with relatively little analysis and documentation having been completed for them. As

projects progress through the phases the accuracy of cost estimates improves considerably. The following information was provided by ElectraNet.

Table 10: Cost estimating uncertainty as a function of PMM phases

Estimate Level	Use	Target accuracy
A	Produced for Project Phase 0 and expenditure forecasting	[C-I-C]
1	Produced for Project Phase 1	[C-I-C]
2	Produced for Project Phase 2	[C-I-C]
3	Produced for Phase 3 (Includes tendered construction costs and agreed cost of free issue primary plant)	[C-I-C]

Source: ElectraNet[27]

167. The challenges arising from the project PMM status and cost estimation accuracy is discussed further in later sections of this report.

4.6.3 Innovation and improvement

168. ElectraNet is an organisation that is achieving, and should continue to achieve, gains and improvements through a continuous improvement focus. We found clear evidence that in most areas of the organisation managers were involved and focused on performance improvement and had established programs to identify and develop improvement opportunities. We found that the commitment to improvement and innovation was driven by senior management and had been actively adopted across the organisation.

169. Benchmarking is used within ElectraNet to set goals and drive performance activities. A key example of this is the use of ITOMS to not only indicate ElectraNet's current performance relative to others but also to set future performance goals.

170. We consider that it is important that ElectraNet continues to quantify and report on its achievements in continuous improvement as this will provide valuable benchmarks for future programs and expenditure forecasts.

[27] Estimating Methodology for Capital Projects ElectraNet presentation 26 June 2012

4.7 Findings on the asset management framework

171. We have found that the design of ElectraNet's asset governance and management framework is generally sound and we consider that its structure and components are consistent with those considered to represent good industry practice.

172. We consider that implementation of the asset management framework is 'work in progress'. In particular, we consider that full development and implementation of sensitivity and economic analysis component of TALC management should be addressed as a priority. In the absence of this the full benefits of the considerable investment made by ElectraNet in SCAR and TALC is unlikely to be realised.

173. Due to our reservations regarding TALC sensitivity and economic analysis, we cannot conclude that the expenditure forecasts for the next RCP are reasonable and prudent.

174. ElectraNet has demonstrated that it has adopted detailed asset management policies and has used these to develop high level strategies for network development and maintenance and detailed asset strategies that guide and inform the business on asset management decisions. ElectraNet has adopted and built on well proven asset management systems and is able to demonstrate that its planning is based on intelligent asset management strategies supported by increasingly reliable data.

175. ElectraNet uses and is continuing to develop benchmarks for driving its continuous improvement programs. We consider that this is likely to reduce costs over time and provide valuable benefits to consumers.

176. We consider that ElectraNet will realise major efficiency and performance gains through its focus on continuous improvement. It is likely that these gains will be seen in the next RCP. We have considered the question of whether an adjustment to the forecast capex and opex would be appropriate to reflect the expected gains. On balance we consider that ElectraNet's proposed efficiency adjustment is appropriate as this provides for the development of savings as programs are implemented and allows ElectraNet to see some benefit if improvements are introduced more rapidly.

5 ElectraNet's proposed capex for the next Revenue Control Period

5.1 Introduction

177. In this section, we summarise ElectraNet's forecast capex for the regulatory control period from 1 July 2013 to 30 June 2018. The forecast capex excludes expenditure related to contingent projects which are discussed in section 9.1.

178. In the RP, ElectraNet states that it considers that the proposed forecast capex '*represents the represents the minimum necessary to ensure ElectraNet can meet its mandated service obligations at the lowest long-run cost.*[28]

179. The proposed capex of $894.1m represents a 1.2% increase on the actual and forecast capex for the current RCP.

5.2 ElectraNet's proposed capex

180. ElectraNet's historical and proposed capex by category is set out in tables as below. It should be noted that for the current RCP the three years 08/09 to 10/11 represent actual capex and the 11/12 and 12/13 years are ElectraNet's predicated outcomes.

[28] ElectraNet RP Section 5.1 page 51

Table 11: ElectraNet total capex: Current RCP and proposed next RCP

$million (real 2012/13)

	Current RCP					Next RCP Forecast				
	08/09A	09/10A	10/11A	11/12E	12/13E	13/14	14/15	15/16	16/17	17/18
Augmentation	15.9	45.9	169.3	74.3	56.4	41.9	35.1	20.8	14.2	5.9
Connection	13.2	22.5	30.2	24.4	35.6	51.8	21.2	34.2	20.4	5.6
Replacement	61.5	37.8	20.1	48.5	69.5	84.8	81.5	81.3	98.6	51.8
Refurbishment	-	-	-	-	0.0	1.2	6.3	29.8	14.8	2.1
Easement/Land	1.3	0.2	1.2	12.6	14.5	11.9	15.3	10.3	12.2	16.1
Security/Compliance	4.1	8.7	11.5	14.5	23.8	10.0	10.8	16.8	11.6	8.1
Inventory/Spares	4.3	2.6	2.3	2.5	4.1	4.7	3.8	4.8	3.0	2.1
Information Technology	7.1	6.3	7.6	7.9	12.7	8.9	10.7	11.4	7.2	5.5
Facilities	1.0	3.1	0.8	1.2	1.9	0.7	1.4	2.1	0.6	0.6
Other	-	-	-	-	-	-	-	-	-	-
Total	**108.4**	**127.1**	**243.0**	**186.0**	**218.7**	**215.9**	**186.2**	**211.4**	**182.7**	**97.9**

Source: RP, Table 5.12, page 76 and ENET100(P) which superseded data in final RP

181. Comparisons between the current and next RCP totals are provided in table as below. It can be seen that augmentation capex is forecast to fall 67.4% below historical levels during the next RCP. Conversely, replacement capex rises by 67.7%. These movements represent a significant shift in focus from growth lead new build to condition driven existing asset replacement.

182. There is also a significant increase in Easement and Land acquisition capex driven by ElectraNet's introduction of a land access strategy.

Table 12: Capex expenditure trends ; current RCP to next RCP

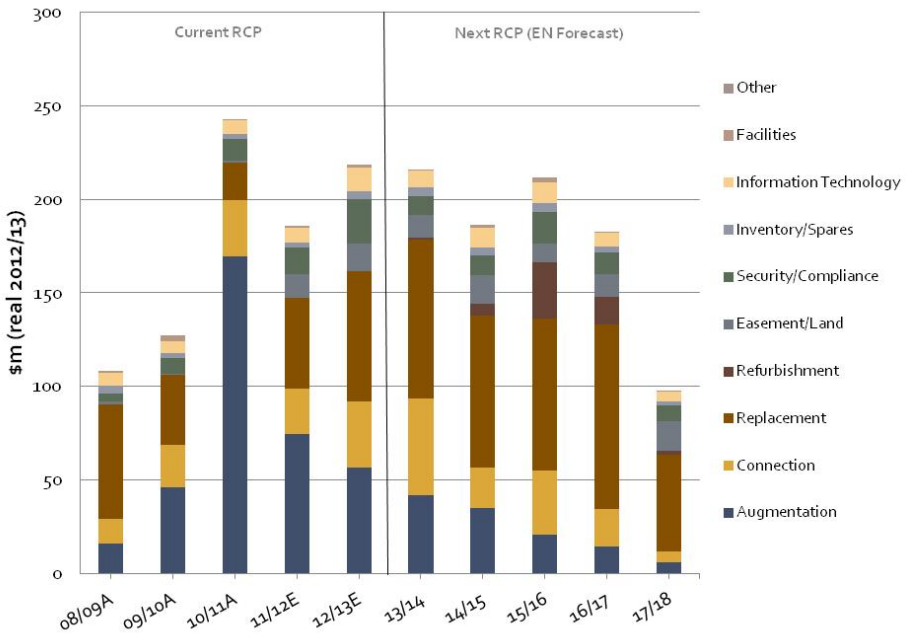
$million (real 2012/13)

	Current RCP Total	Next RCP Total	$ Increase/ (Decrease)	Next RCP/ Current RCP %	Historical Annual Average	Forecast Annual Average
Augmentation	361.8	117.9	-243.9	-67.4%	77.0	35.5
Connection	126.0	133.3	7.3	5.8%	22.0	27.6
Replacement	237.4	398.0	160.7	67.7%	39.8	73.7
Refurbishment	0.0	54.1	54.1	0.0%	-	7.7
Easement/Land	30.0	65.8	35.8	119.6%	0.9	13.3
Security/Compliance	62.7	57.3	-5.3	-8.5%	8.1	13.7
Inventory/Spares	15.8	18.4	2.6	16.3%	3.1	3.6
Information Technology	41.6	43.7	2.1	5.0%	7.0	9.2
Facilities	7.9	5.6	-2.3	-29.4%	1.6	1.2
Other	-	-	0.0	0.0%	-	-
Total	**883.1**	**894.1**	**11.0**	**1.2%**	**159.5**	**185.5**

Source: EMCa analysis from RP, Table 5.12, page 76 and ENET100(P) which superseded data in final RP

183. The above relative changes in capex/category are represented graphically in the chart as below.

Figure 18: Current & Next RCP capex

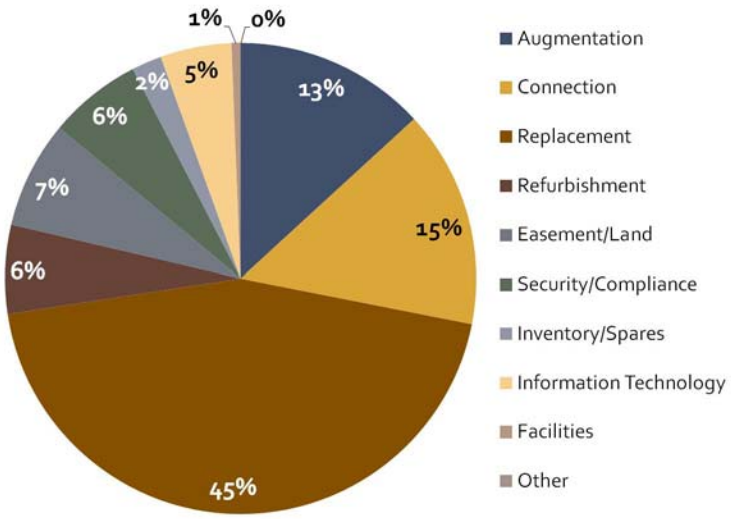


Source: EMCa analysis from RP, Table 5.12, page 76 and ENET100(P) which superseded data in final RP

184. In figure 19, the change of activity from growth driven augmentation capex to asset age and condition driven replacement capex can be clearly seen. The introduction of strategic easement and land policy can be seen with its commencement in the final two years of the current and continuation throughout the next RCP.

185. The relative share that each category contributes to forecast capex can be seen in chart as below which sets out each capex category as a percentage of the total forecast capex for the next RCP.

Figure 19: Components of capex



Source: EMCa analysis from RP, Table 5.12, page 76 and ENET100(P) which superseded data in final RP

186. In the RP ElectraNet provides the following key drivers that it considers are contributing to the levels of forecast capex:

a. continuing growth in peak demand and strengthened ETC delivery requirements, which drive the need for ongoing transmission investment to meet mandated reliability standards;

b. *an increase in the volume of assets nearing the end of their useful lives, which requires increased levels of asset replacement expenditure;*

c. *additional investment required to refurbish and extend the life of transmission lines based on asset condition and risk mitigation;*

d. *an increase in land and easement acquisition requirements in order to secure land and easements in a timely and prudent manner, to meet emerging new transmission line investment needs; and*

e. *real wages growth and related cost pressures caused by a projected strengthening in employment demand in the mining and construction sectors in South Australia.* [29]

5.3 Capex drivers and significant variances

187. 79% of the total forecast capex is made up from four capex categories, augmentation, connection, replacement and easement and land. It is the movement in the relative forecast capex in each of these categories which produces the main variances between expenditure in the current RCP and next RCP. The following sections provide an overview of the forecast capex in each of these four categories.

5.3.1 Augmentation capex

188. A significant reduction of 67.4% in augmentation occurs between the current and next RCP. ElectraNet provides the following explanation for this variation:

> *Decrease from current period reflecting uncertainty in major new loads, and focus on small projects such as capacitor banks and line component refurbishment to defer major augmentations*[30]

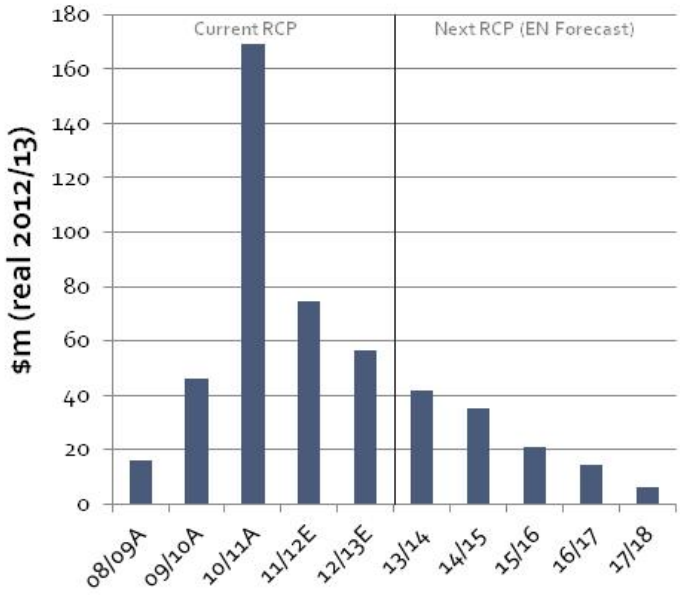
189. ElectraNet has used the contingent project facility to manage uncertainty of its growth driven augmentation capex.

190. A ten years profile of capex is provided in chart as below.

[29] *ElectraNet RP section 5.1*; page 51; ElectraNet

[30] *ElectraNet RP table 5.13*; page 77; ElectraNet

Figure 20: Augmentation



Source: EMCa analysis from RP, Table 5.12, page 76 and ENET100(P) which superseded data in final RP

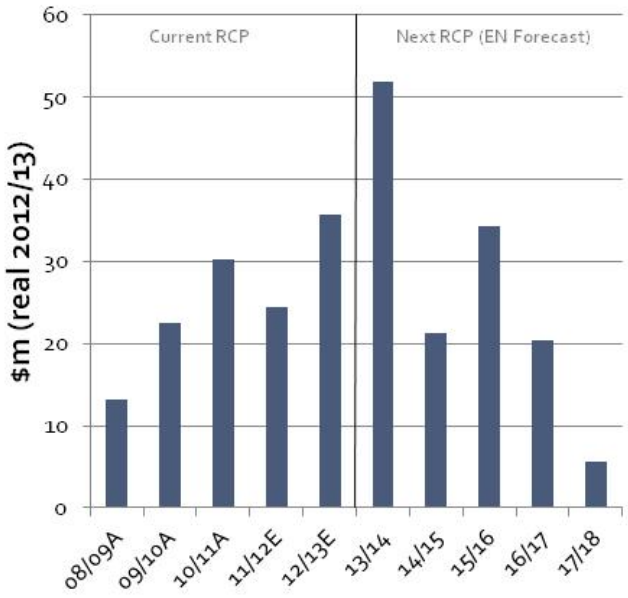
191. It can be seen that as the next RCP progresses the forecast augmentation capex reduces. However, the triggering of a small number of significant contingent projects may bring the capex levels up to and possibly beyond historical levels.

5.3.2 Connection capex

192. Connection forecast capex for the next RCP shows an increase of 5.8% above the current RCP actual and forecast expenditure.

193. Chart as below shows the capex profile over the current and next RCP.

Figure 21: Connection capex



Source: EMCa analysis from RP, Table 5.12, page 76 and ENET100(P) which superseded data in final RP

194. The forecast profile shows expenditure peaking 2013/14. This peak is driven by two substations projects[31]:

   a. Munno Para New 275_66kV Substation [C-I-C] (2013/14) and [C-I-C] (2014/15)

   b. Waterloo Substation Replacement [C-I-C]

195. With these two projects removed the forecast connection capex profile is reasonably aligned with the augmentation profile with expenditure falling towards the end of the next RCP. This is what would be expected as new connections and increased connection capacity would be driven by demand growth and new generation connections.

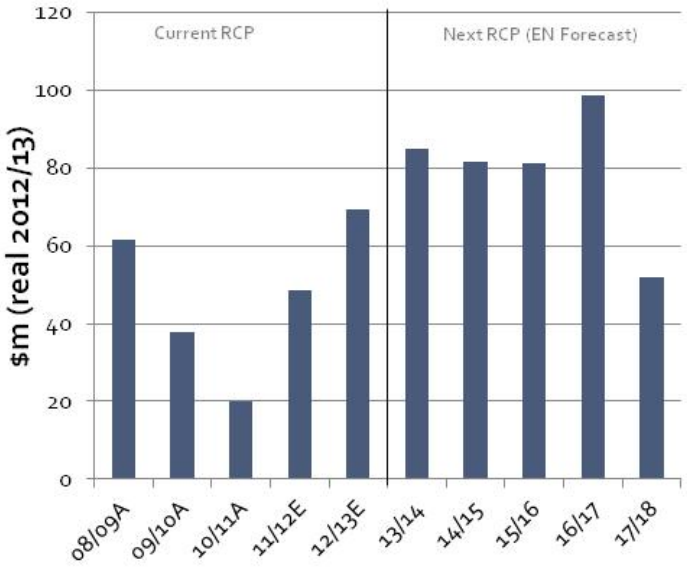
196. As would be expected the connection capex contains new and upgraded existing substation assets. Given the relatively few projects and the variable project values the year to year variability in the capex profile is a logical outcome.

197. Key drivers of connection capex are the reliability standards contained in the ETC and the requirements of ETSA Utilities.

5.3.3 Replacement capex

198. Forecast replacement capex presents the largest variation of all capex categories with a 67.7% increase above the current RCP level. The replacement capex profile over the current and next RCPs is provided in chart as below.

Figure 22: Replacement capex



Source: EMCa analysis from RP, Table 5.12, page 76 and ENET100(P) which superseded data in final RP

[31] EMCa analysis from ElectraNet data in response ENET070(C)

199. In the RP ElectraNet provides the following explanation for the significant variation in replacement capex:

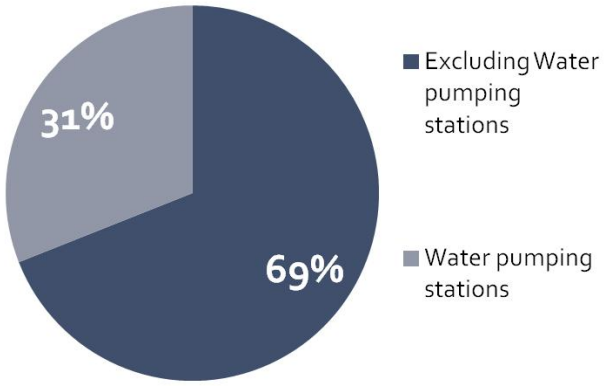
> *Increased expenditure on asset replacement is required to address the increasing number of assets nearing the end of their useful lives. Increased number of medium sized substation replacements (pumping stations and radial sites) telecommunications replacements and continuing projects*[32]

200. The replacement capex category contains 61 projects with 22 projects (over $10m each) accounting for 90% of the replacement forecast capex.

201. A major component of the replacement forecast capex is expenditure for supplies provided to SA Water's water pumping stations. The replacement of water pumping station assets for the next RCP is forecast at $123.4m[33].

202. Viewing the replacement capex, excluding the water pumping station projects reveals an underlying forecast total for the next RCP of $274.6m. Water Pumping station supply replacements of $123.4m make up 31% of the total forecast replacement capex for the next RCP.

Figure 23: Replacement capex



Source: EMCa analysis from ElectraNet data in response ENET150(P)

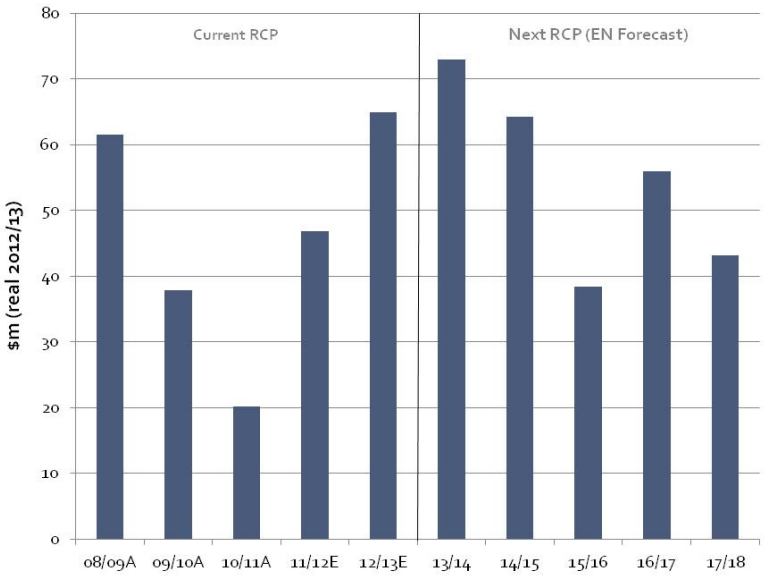
203. The increase in underlying replacement capex for the next RCP is 18.8% above the current RCP (actual and forecast).

204. In figure 24, the replacement capex excluding water pumping station supplies reveals a much more variable profile. The underlying replacement capex profile shows replacement capex at relatively high levels in the first two years of the RCP with reduced levels in the last three years.

[32] *RP table 5.13*; page 77; ElectraNet

[33] $2012/13

Figure 24: Replacement capex excl water pumping station projects



Source: EMCa from ElectraNet data[34]

5.3.4 Easement/land capex

205. ElectraNet has developed and implemented a strategic land and easement policy[35]. The stated objective for the policy is:

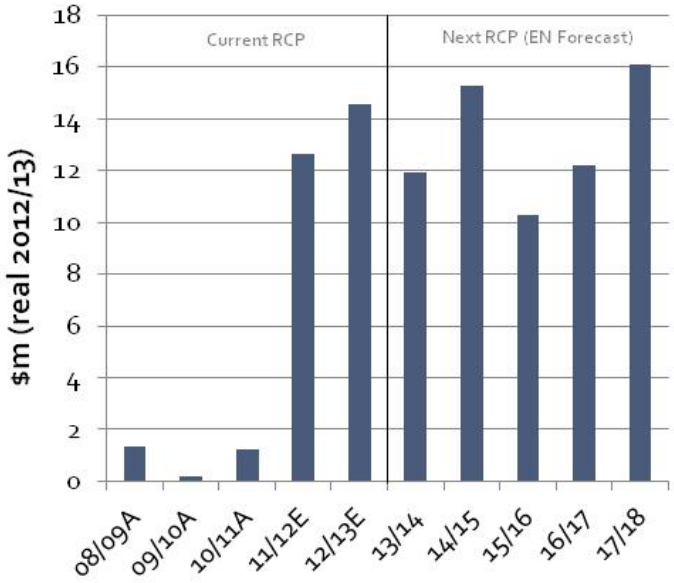
> *Strategic acquisition of land and easements will be undertaken to enable ElectraNet to effectively manage risk and uncertainty in project delivery and to enable timely delivery of future new transmission lines and substations.*

206. Figure as below shows the financial impact of the new policy which has increased from an historical average of actual expenditure of 0.9m to a forecast annual average of $13.3m.

[34] ElectraNet response to ENET150_Response to EMCA027 Pumping Station.pdf(P)

[35] ElectraNet policy number 1-02-OP55 final draft April 2012

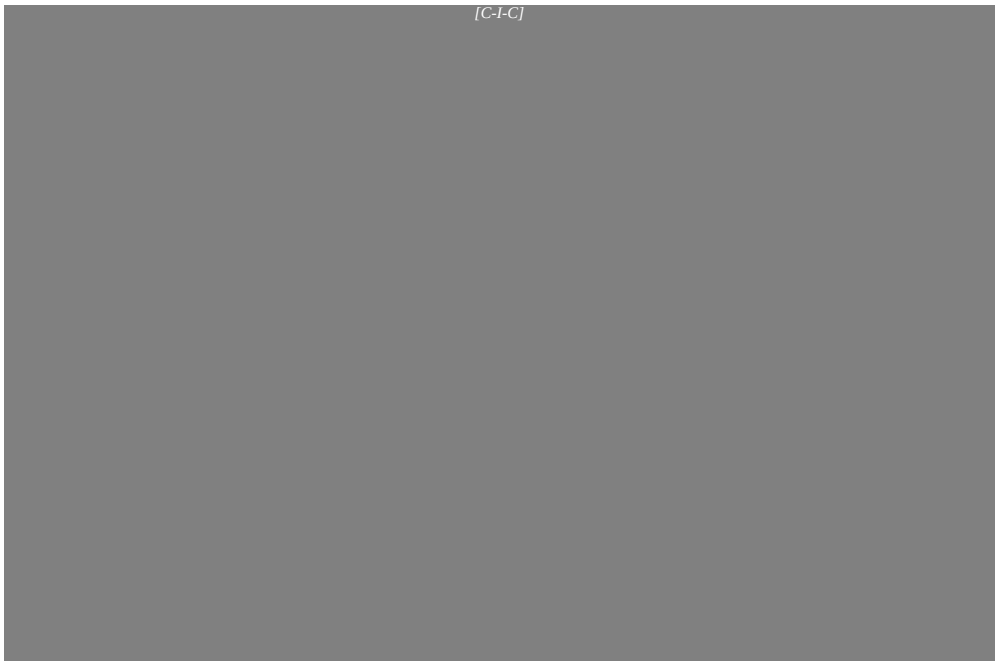
Figure 25: Easement/ Land acquisitions



Source: EMCa analysis from RP, Table 5.12, page 76 and ENET100(P) which superseded data in final RP

207. The total expenditure on land and easements during the next RCP is forecast to be $65.8m from the 20 projects overleaf. The chart below provides a view of the spread of land and easement acquisition projects by value. The three highest cost projects account for 50.6% of the overall land and easements forecast expenditure.

Figure 26: Land & Easements capex project values



Source: EMCa analysis from ElectraNet data in response ENET070(C)

208. In its review of ElectraNet's forecast capex projects AEMO stated support for ElectraNet's proposal to acquire strategic land parcels and easement rights noting that AEMO was not in a position to comment on the longer term projects (i.e. required beyond 20 years) as the economic and land availability issues that drive the early land acquisition fell outside the scope of their review.

209. Most of the land and acquisitions projects are required to support contingent projects which, by definition, are uncertain. The total forecast land and easements capex for the next RCP that is related to contingent projects is $51m out of a proposed total of $66m (see table 13).

5.3.5 Other network capex

210. ElectraNet has proposed expenditure of $75.7m from 26 projects for the following capex categories

a. Security/Compliance

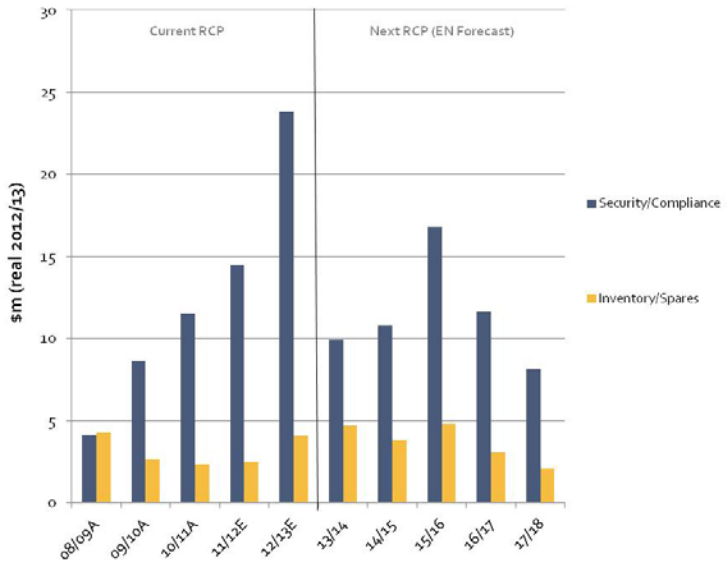
b. Inventory/Spares

211. Whilst there are small variations between historical and forecast expenditure in each of these categories the combined total show that forecast expenditure is the same as historical.

212. Figure 27 shows the profile of other network expenditure for the current and next RCP. The large ramp increases in historical security and compliance expenditure is expected to 'flatten' for the next RCP. This would be expected as the expenditure in this category moves to a steady state.

213. Inventory and spares sees a 16% increase as ElectraNet replenishes stock and purchases a number of strategic spare transformers.

Figure 27: Network capex



Source: EMCa analysis from RP, Table 5.12, page 76 and ENET100(P) which superseded data in final RP

5.3.6 Non network capex

214. ElectraNet has proposed expenditure of $49.3m for the following non network capex categories

a. Information technology

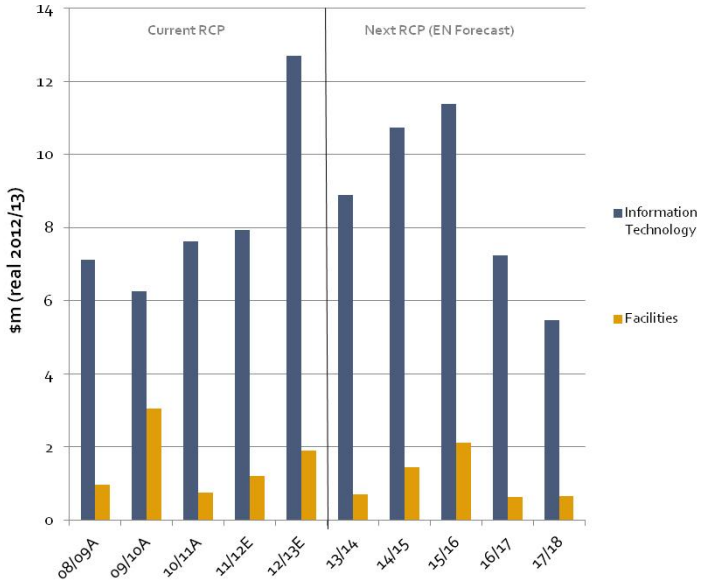
b. Facilities

215. There is immaterial variation between the combined and historical and forecast expenditure in these categories.

216. IT projects for the next RCP include SAP upgrades and data centre expansion. Expenditure in the facilities area is for medium term accommodation.

217. Figure 28 shows the two RCP expenditure profile for the non-network expenditure categories.

Figure 28: Non-network capex



Source: EMCa analysis from RP, Table 5.12, page 76 and ENET100(P) which superseded data in final RP

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6 Review of ElectraNet's proposed capex

6.1 Introduction

218. In this section we review ElectraNet's forecast capex for the regulatory control period from 1 July 2013 to 30 June 2018.

219. The proposed capex covered in this section includes both network and non-network forecast capex to be incurred in the next RCP under the following capex categories:

a. Augmentation;
b. Connection;
c. Replacement;
d. Refurbishment
e. Easements/land
f. Security/compliance;
g. Inventory/spares
h. Information Technology
i. Facilities

6.2 Approach to assessment of forecast capex

220. In section 4 of this report we discussed and set out our findings on ElectraNet's asset management framework. Accordingly the approach we have taken when reviewing forecast capex is to consider how ElectraNet has applied its asset management framework in practice. The assessment includes consideration of key input assumptions and assumptions made on output requirements that are relevant to the forecast capex.

221. We initially identified the methodologies through which ElectraNet had developed specific components of the forecast capex. We assessed the methodologies and identified any issues that could have a material impact on the forecast capex.

222. We identified the key assumptions on which the forecast capex had been based and assessed them for reasonableness. We sought information on the sensitivity of the forecast capex to alternative assumptions (e.g. demand forecast scenarios).

223. We then reviewed a sample of forecast capex projects and assessed the extent to which they demonstrated that ElectraNet applied its asset management framework in practice. We identified any areas where we considered ElectraNet had erred from its asset management framework and assessed the potential impact of these on the forecast capex.

224. Finally, we considered and quantified the implications arising from our findings for the forecast capex. In doing this, we assessed the proposed forecast capex against the capex objectives set out in clause 6A.6.7 (a) of the NER and the capex criteria in clause 6A.6.7 (c).

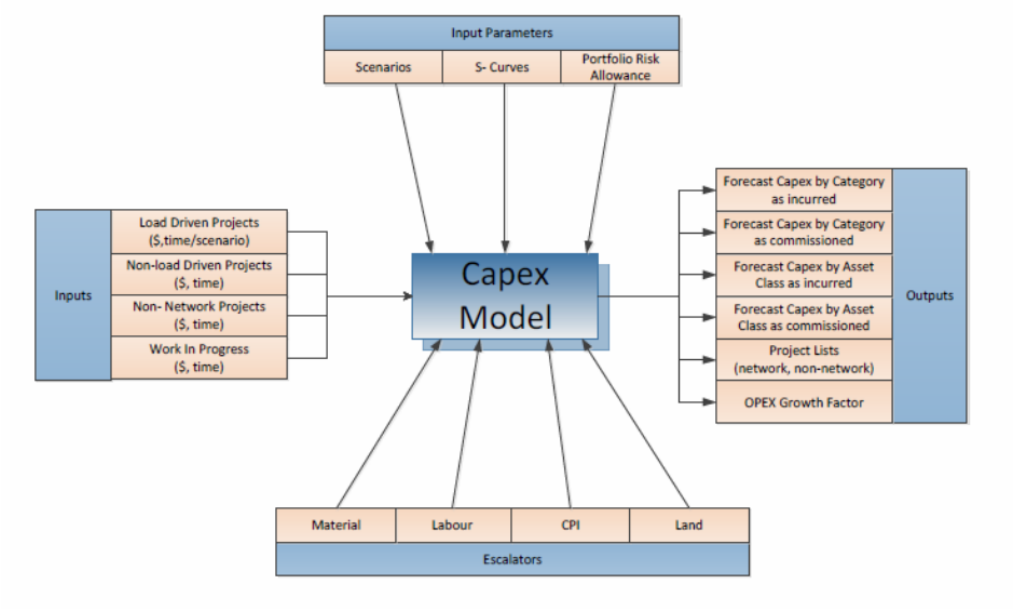
6.3 Assessment of ElectraNet's methodology for forecasting capex

6.3.1 Overview of ElectraNet's capex forecasting methodology

225. ElectraNet describes its capex forecasting methodology in Section 5.7 and Appendix I of the RP. ElectraNet further described its capex forecasting methodology and input sources in presentations to the authors of this report. Against defined input assumptions and data ElectraNet's capex model is used to produce annual forecast capex by asset class and project category. The model also produces the opex growth factor calculations (which feed into the opex model).

226. The capex model structure presented by ElectraNet is reproduced in the figure below and the inputs to that model are as described in the subsequent table.

Figure 30: CAPEX model



Source: ElectraNet[36]

227. Input data sources include:

Load driven projects	The projects are identified through the network planning process.
Non-load driven projects	The projects are identified through the planning process and Asset Management Plan
Non network projects	Are identified through the business planning process
Demand and generation forecasts	Project commissioning dates were derived from the 2012 ETSA Utilities connection point forecast. Probabilistic planning provided by Roam Consulting was undertaken however, as the capex model diagram shows the outputs from this were not used to develop the forecast capex but were used as a cross check.
Project and portfolio estimates	Success Enterprise a proprietary organisational management tool which includes specific tools for asset management. A primary use of the Success Enterprise tool within ElectraNet is for project and work portfolio cost estimation and management. ElectraNet engaged PSC Australia to undertake

[36] *RP Appendix I*; section 3 page 2; ElectraNet

	independent cost estimates for a representative selection of network projects. This was considered to provide a benchmark for ElectraNet's own cost estimates.
Historical and work in progress costs	A SAP database is used for asset related date and work in progress cost estimates.
Cost escalation data	ElectraNet used: • BIS Shrapnel to provide an expert opinion regarding the outlook for labour costs and labour market issues relevant to electricity networks • Competition Economists Group to estimate real escalation rates for aluminium, copper, steel, crude oil and construction • Maloney Field Services to provide land value forecasts • S Curves were established from the average of historical trends of capex in the 2008/09 to 2011/12 period for each project type.
Portfolio Risk Allowance	Based on advice from Evans and Peck, ElectraNet applied a cost estimation risk factor to take into account asymmetric estimation risks that may occur across the project portfolio due to differences between the concept and final stages of individual projects.

228. The capex model allows output forecast capex to be derived against a range of input assumptions.

229. We have assessed the structure of the forecasting methodology as being generally sound and providing a reasonable basis for the forecasting of project and portfolio costs. We have identified some issues with components of the methodology and its application. We set these out in the following sections.

6.3.2 Establishing needs and drivers for capex

230. A key external network capex driver is the ETC which sets out reliability standards that ElectraNet is required to meet. ElectraNet has emphasised that:

continuing growth in peak demand and strengthened ETC delivery requirements, which drive the need for ongoing transmission investment to meet mandated reliability standards.[37]

231. ETC[38] has amended the timing requirements for meeting the relevant standards for each connection point category by requiring reliability projects to be delivered within 12 months of the limitation date where those requirements have been defined in previously agreed forecasts up to 3 years ahead. Previously the requirement was for delivery within 12 months on a best endeavours basis or three years in any event.

232. ElectraNet considers that:

The impact of this change is to reduce timing flexibility and to bring forward the requirement for capital investments to meet ETC standards. This requirement also effectively locks in the reliability driven forecast three years in advance.[39]

233. We are not convinced that the change in the ETC should have made as significant an impact as ElectraNet suggests because "best endeavours" is a very high standard. We would have expected that it would be only in exceptional circumstances that ElectraNet would have not been required to meet the within 12 month requirement. It is difficult to see that ElectraNet could have used timing flexibility and still met the best endeavours requirement.

234. In its final decision on ElectraNet's 2008/13 RP the AER accepted the inclusion of a significant portion of capex to remedy potential breaches of the ETC due to the introduction of the best endeavours requirement[40]. On the basis that the removal of best endeavours will not have a material impact on network planning, as ElectraNet was given a previous allowance for meeting best endeavours a further allowance for the next RCP would appear to be excessive.

235. Also, we do not agree with ElectraNet's suggestion that the ETC requirement 'locks them in' to expenditure as they suggest. We take this view because, the initial step taken by ElectraNet is to agree the forecast with the DNSP, and this agreement only has an implication if the forecast actually eventuates. Our understanding is that if actual demand is less than the agreed forecast and the expenditure is unnecessary, then ElectraNet is not locked on to undertaking the relevant project/s.

236. We consider that, if ElectraNet has brought forward the timing of load driven projects required in the next RCP due to the changes in the ETC, then it follows that it was likely to have been failing to meet the best endeavours requirement previously. Yet if

[37] *RP*; page 51; ElectraNet

[38] Clause 2.11

[39] *RP*; page 55; ElectraNet

[40] AER Final Decision 2008/13 page 53

ElectraNet did have to bring expenditure forward, the AER's previous decision included an allowance for ElectraNet to ensure compliance with the Code.

237. In our review of the sample of ex ante capital projects we did not find a reason to conclude that ElectraNet had brought forward projects earlier than was necessary to meet the new ETC requirement. ElectraNet has directly identified specific costs that are expected to arise due to the revised ETC and we have been unable to identify any capex that has been brought forward in response to the changes. Therefore, we have concluded that the changes to the ETC are unlikely to have had a material impact on the forecast capex for the next RCP.

238. It is also worth considering that ElectraNet's augmentation capex for the next RCP is lower than for the current RCP despite ElectraNet's increased forecast demand and the changes to the ETC.

6.3.3 Project development methodology

239. Peak demand forecasts at a connection point level are provided to ElectraNet each year by ETSA Utilities and the direct-connect customers. These forecasts are aggregated by ElectraNet to produce undiversified demand forecasts that are used for connection point planning and local regional planning.

240. ElectraNet has used the output load driven projects from connection point and local regional planning as inputs to its capex model. In addition, ElectraNet have used a probabilistic scenario analysis methodology to test the robustness of its forecasts. The scenario results were *applied as a sensitivity to test the robustness of the demand driven network project forecast*.[41]

241. It should be noted that ElectraNet has found that the load driven forecast capex is relatively insensitive to demand growth scenarios.

> *The large majority of network projects included in the capex forecast are required to be completed within the forthcoming regulatory period irrespective of whether demand growth follows the high, medium or low demand forecast and irrespective of where new generation sources locate to meet the growth in demand. This demonstrates the robustness of the forecasts to a range of reasonable scenarios.*[42]

242. On the basis of the above we consider that the methodology and outcomes of ElectraNet's probabilistic approaches for determining proposed forecast capex are reasonable. Given that ElectraNet's output load driven capex projects were found to be robust against the probabilistic methodology we consider that the load driven forecast capex is reasonable.

243. On the basis that ElectraNet's load driven capex is consistent with its probabilistic approach, it follows that it is sufficient for the business to meet the reasonably expected

[41] *RP*; page 65; ElectraNet

[42] *ElectraNet Network Development Strategy*; Page 10; ElectraNet

growth driven network expenditure. In other words it is sufficient to cover natural incremental demand growth provided by the demand scenario envelope (e.g. high medium and low growth).

244. We have questioned ElectraNet and ESCOSA on the intention and interpretation of the requirement to meet agreed forecast demand.[43] ElectraNet's practice is to accept ETSA utilities connection point forecast unless it considers that it contains an obvious error. ESCOSA's expectation was that ElectraNet would hold informed discussions with ETSA Utilities and, through these, reach agreement on the forecast levels of demand at the connection points.

245. We consider that the forecasting process could be improved by ElectraNet taking a more proactive role in the establishment of connection point forecasts and providing reconciliation between the aggregated connection point forecasts and the regional demand forecast produced by AEMO.

6.3.4 Project management methodology

246. ElectraNet's PMM includes a formal project status structure based around a six phase project progression process. The PMM is applied to all categories of capex. A feature of the PMM structure is that project scope and costs are only defined in detail once the projects have progressed beyond Phase 0. Also detailed business cases are only completed at the end of Phase 3.

247. ElectraNet's PMM progresses a project through the following six phases[44]:

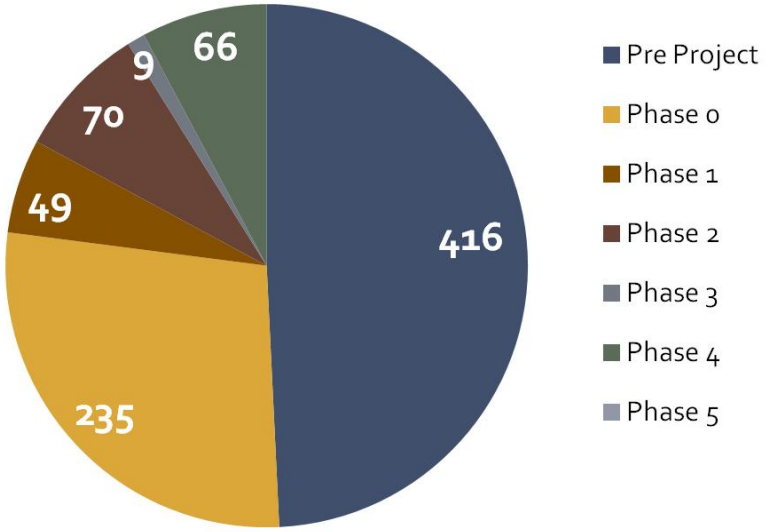
- Phase 0 – Initiate Project
- Phase 1 – Select Project Option
- Phase 2 – Develop Project Scope
- Phase 3 – Plan Project Delivery
- Phase 4 – Manage Project Delivery
- Phase 5 – Finalise Project

248. Whilst the PMM structure is considered to be sound and has appropriate phases it was found that many of the capex projects included in the forecast capex were either not yet registered on the PMM ladder (i.e. pre-phase 0) or at the phase 0 level. Chart as below provides a view of the status of projects included in the RP.

[43] Agreed maximum demand is defined as - the agreed maximum demand forecast for a given year that is agreed with the customer three years prior to when the agreed maximum demand is contracted

[44] ENET102(P)

Figure 31: CAPEX by project status($m)(real2012/13)



Source: EMCa analysis from ElectraNet data in response ENET155(P)

249. The status profile over the two year window shows, as would be expected, that projects in the current RCP have progressed through most of the PMM stages. It would also be expected that, into the second year (next RCP) the proposed projects would be only in the early stages of development.

250. However, the relatively large proportion of projects at the early Pre-project and Phase 0 points makes it difficult to view the proposed capex as reliable. To improve this it would be desirable for as large a number as possible to have progressed as far as practicable through the phases. At the Pre-project Phase zero point very limited analysis has been undertaken and documentation is generally limited to a high level project description, scope and initial cost estimate.

251. This issue is discussed further in relation to our forecast project sample review in Annex B.

6.3.5 Cost projections - general methodology

252. ElectraNet's capex model draws inputs form the SAP data base and through the Success Enterprise system. Both of these proprietary business systems are widely used in infrastructure management businesses and are well regarded.

253. ElectraNet uses the Success Enterprise estimator database facility as a cost library. ElectraNet has described how the cost library, based on components grouped into base planning objects, is revised and updated through:

a. monitoring major plant cost trends and updating cost library as necessary
b. updating primary plant costs in line with period contract agreements from procurement process
c. monitoring market cost trends, investigating and updating cost library as necessary
d. gathering tendered construction costs, compare with library costs, analyse any variance and updating cost library as necessary
e. Monitoring contractors delivery costs and updating cost library as necessary

f. Engagement of independent external consultant to review cost library components

254. We consider that the process is comprehensive and likely to provide component costs that are realistic and based on the most recent experience and information. The cost library updating process draws from a range of sources which are benchmarked against actual procurement and project completion costs.

255. We have found ElectraNet's derivation methodology and application of cost escalators to be sound. It is noted that external experts were engaged to assist ElectraNet in specialist areas and to provide some cost benchmarking.

256. We have reviewed ElectraNet's processes for cost estimation and found that the tools and systems used to be comprehensive, contain sufficient updates and useful benchmarking/feedback loops and be likely to produce reliable and accurate cost estimates

6.3.6 Cost projections - Portfolio risks factor

257. ElectraNet has applied a 4.9% Portfolio Risk Factor adjustment to projects that have not yet progressed to the point at which a detailed bottom-up cost forecast has been developed. It should be noted that the majority of capex projects are at this concept stage (see Project Management methodology below)

258. ElectraNet considers that it is appropriate make an adjustment for portfolio risk effects because of the asymmetric risk that is considered to be inherent in capital project cost estimation. This asymmetry is said to exist because the difference between initial project cost estimates and project outturn costs is considered more likely to be higher than lower.

259. ElectraNet engaged Evans & Peck to:

> *examine the variation between the original cost estimate and actual outturn project cost. For advanced projects, Evans & Peck examined the variation between the original cost estimate and the more detailed bottom-up business case cost estimate prepared closer to implementation. For completeness, the historic variation between business case cost estimates and actual outturn project cost was also examined.*[45]

260. Through statistical modelling Evans and Peck derived a cost estimation risk factor of 4.9%. In its final decision on ElectraNet's 2008/13 RP the AER applied a 2.6% portfolio risk factor.

261. We find it surprising that the significant investment that ElectraNet has recently made in the development and implementation of state of the art cost estimating tools appears not to have been taken into account when considering the cost estimation risk factor. This is especially the case given the impressive Success Enterprise cost library updating facility that ElectraNet has introduced.

[45] *RP*; page 68; ElectraNet

262. Historical project cost data used by Evans and Peck will have been taken from projects that were estimated and run under the previous cost estimating management methodology. The investment made by ElectraNet in developing and implementing the current cost estimation tools and procedures must have been based on the achievement of significant improvements in cost estimation accuracy. Therefore it is logical to expect that these benefits will be seen in the next RCP.

263. We consider ElectraNet's use of unadjusted historical data to be inappropriate because significant investment in ElectraNet's estimating systems (US Cost Success Enterprise, SAP) must have improved estimating accuracy.

264. We were told by ElectraNet that it has continued to improve and develop the cost estimation methodologies and tools that were initially used as a base for its cost estimating. ElectraNet also claimed that, with regards to project cost estimating, it considered Powerlink to be the benchmark which ElectraNet has achieved, and that it has improved on the systems and processes adopted from Powerlink.

265. It is therefore difficult to reach the conclusion that the portfolio risk factor adjustment for ElectraNet (4.9% proposed) should be higher than that applied by the AER for Powerlink (3.0%), and the evidence provided by ElectraNet would support a value lower than Powerlink's.

266. In addition, we consider that the relatively high proportion of replacement capex in ElectraNet's forecast should allow a higher level of estimating certainty than capex programs with high greenfield augmentation programs (e.g. as Powerlink's). We take this view because, as Powerlink argued, greenfield development conditions are far less certain than locations where existing assets have been constructed. For example, the replacement of a substation at, or close to, an existing location is unlikely to experience ground conditions that were unknown at the time of estimating the project costs. Similarly, replacement of or additions to existing transmission lines undertaken in known environments will not face the uncertainties that are faced on new routes.

267. Accordingly we consider it more appropriate to amend the portfolio risk for replacement and refurbishment capex from 4.9% to 0. For augmentation, connection, security/compliance and inventory we consider that a revised portfolio risk adjustment from 4.9% to 2.6% is also more appropriate.

268. These adjustments will lead to a $19.5 million adjustment for portfolio risk factor.

6.3.7 Cost projections – allowance for capex innovation and efficiency

269. ElectraNet has confirmed that:

> *Over the current period ElectraNet has made a number of improvements to its project management processes. This has included measures to improve the governance of*

its capital projects including the implementation of a comprehensive project management methodology based on international standards.[46]

270. On the basis of the above and on expectations of other on-going improvement initiatives, ElectraNet has factored a 1% efficiency saving into its forecast capex.

271. We have found that ElectraNet has introduced an organisational culture which actively seeks out and develops improvements and efficiency initiatives. We have seen several examples where this approach is leading to increased productivity and cost reduction. We therefore agree with ElectraNet that the application of an efficiency factor is appropriate.

272. Given the strong improvement focus that we found at ElectraNet, we consider that the expected 1% gain is conservative and the benefits are likely to be higher. However, given the difficulty in establishing an appropriate alternative adjustment value and recognising that the organisation should see some benefits from the improvements that it implements, we would agree with ElectraNet's 1% efficiency adjustment being applied to capex.

6.4 AEMO's review of ElectraNet's capex forecast

273. The Energy Division of the South Australian Government's Department for Transport, Energy and Infrastructure asked AEMO to undertake an independent review of ElectraNet's RP with a focus on its augmentation plans. Details of the scope and approach taken by AEMO to this review are provided in Annex A.

274. We took account of AEMO's work in our review. However, due to limitations discussed below, we consider that AEMO's review does not provide an independent endorsement of the proposed expenditure as AEMO's Terms of Reference were limited.

6.4.1 AEMO's approach

275. AEMO assessed 10 of the 33 proposed augmentation projects and 5 of the 16 proposed connection projects. These comprised 42% and 58% respectively of the value of the proposed capex.

276. AEMO's approach was to assess load flow, voltage support and other technical analysis on a region by region basis using base data provided by ElectraNet (adjusted where AEMO considered it to be necessary). Through this analysis AEMO established the location and timing of network constraints/limitations and/or breaches in the ETC reliability standards that would be likely to develop.

277. Using the information obtained on the potential network limitations, AEMO considered the extent to which the proposed network development projects would address them including the appropriateness of proposed project timings.

[46] RP page 72

278. Based on observations made during the load flow analysis, AEMO tested potential alternatives to the options proposed by ElectraNet[47].

6.4.2 AEMO's findings on augmentation capex

279. The three findings of the AEMO review that are relevant to augmentation and connection capex are that:[48]

a. *"AEMO was satisfied that taken together, the proposed network development projects address the network limitations that are reasonably expected to emerge over the regulatory period 2013 – 14 to 2017 – 18 for compliance with the South Australia ETC and the National Electricity Rules (NER)"*

b. *"AEMO's assessment confirms the existence and timing of potential future network limitations identified by ElectraNet. AEMO considers that the proposed network solutions were reasonable"* 49*; and that*

c. *"ElectraNet's proposal is considered to be consistent with the NTNDP". 50*

6.4.3 EMCa's views on AEMO's findings on augmentation capex

280. AEMO's findings are of limited relevance to the AER's assessment of ElectraNet's augmentation capex because:

a. AEMO's findings on augmentation and connection projects are based on ElectraNet's connection point forecast, rather than AEMO's own (much lower) forecast. This largely undermines the findings in relation to "need" and "timing";

b. AEMO stated that it considered itself not qualified to make findings on all land and easement projects. AEMO also did not address the reasonableness of including land and easements related to possible contingent projects and whether this met the requirements of the NER;

[47] AEMO's assessment is described on page 5 of its report and includes a three stage approach to load flow studies.

[48] Key Findings from the revenue proposal review – AEMO 2012 ElectraNet Revenue Cap Review, Capital Projects Assessment Report, page iv and page v

[49] AEMO qualified this finding, adding that "in some cases….. a non-network solution or an alternative network solution may be more economical and (that it) would expect that ElectraNet (would) fully investigate these …. during the RIT-T stage."

[50] AEMO noted that "ElectraNet's ex-ante project proposal …does not include any major projects for transmission or sub-transmission line augmentation." Therefore the implication of AEMO's finding is that it accepts that none are required.

6.4.4 AEMO's findings on contingent projects

281. AEMO concluded that it generally supported ElectraNet's contingent project proposal. And found that the proposed contingent projects were:

a. able to cover the range of probable future development scenarios; and

b. required under the specific development scenarios (demand growth, generation growth and identified market benefits)

6.4.5 EMCa's views on AEMO's findings on contingent projects

282. It is not surprising that AEMO reached the conclusion that ElectraNet's contingent project proposal covered a range of demand scenarios as the aggregated contingent project value would more than double ElectraNet's total network value if it were to be constructed. It is surprising that AEMO could conclude that such a program of projects could be 'probable'.

283. AEMO's findings on contingent projects are that they are sufficient. AEMO appeared not to consider whether each project was "probable" or otherwise fulfilled the requirements of the NER, nor did it consider the interaction (and potential "double dipping") between the proposed contingent projects and the proposed forecast capex;

284. We consider that the question AEMO appears to be addressing (are the projects sufficient to cover the range of probable future development scenarios?) is limited in scope and so not relevant to the AER's assessment. Considering the specification and probability of the trigger events and the matching of the proposed projects to those events would have provided alignment with the requirements of the NER.

6.4.6 EMCa's views on AEMO's findings on other expenditure categories

285. AEMO undertook only a limited review of certain projects in other categories of proposed expenditure, insufficient to draw conclusions with respect to those proposed expenditures.

286. AEMO also noted that it expected that ElectraNet would in some cases find more prudent options than those proposed. EMCa agrees with this finding.

6.5 Assessment of augmentation and connection forecast

6.5.1 Proposed augmentation and connection capex

287. ElectraNet has proposed expenditure of $117.9m for augmentation capex and $133.3m for connection capex. Taken together, this comprises 28% of total proposed capex. Forecast augmentation capex is $243.9m less than the amount incurred in the current RCP, a decrease of 67%, while forecast connection capex is $7.3m (6%) up on the current RCP.

288. Within the forecast for the next RCP, ElectraNet forecasts that augmentation capex will decline from $42m in 2013/14 to $6m in 2017/18. Two projects commenced in the current RCP account for $46m of the forecast connection capex, all in the first two years. After accounting for these two projects, the residual forecast connection capex is of the order of $12m each year in the first two years, peaking at $34m in 2015/16 but then declining to $5.6m in 2017/18. The annual connection capex expenditure is broadly in the range of expenditures incurred annually in the current RCP.

6.5.2 Our approach

289. Our review is based on:

a. Consideration of the application of ElectraNet's asset management governance framework to its proposed forecast for augmentation and connection capex, based on a review of a sample of projects;

b. Our demand forecast advice (provided separately);

c. Our review of AEMO's assessment of the proposed augmentation and connection projects; and

d. Consideration of the interaction between demand-driven forecast capex and the proposed contingent projects that ElectraNet has proposed with demand triggers.

290. The initial TOR for our review of the proposed augmentation and connection projects was that we would conduct a high-level review, acknowledging that AEMO had input to ElectraNet's revenue proposal in regard to these projects. For similar reasons, our initial TOR for the demand forecast review was to undertake only a high-level review, on the assumption that ElectraNet would rely on AEMO's demand forecast.

291. In the course of our high-level reviews, we found that ElectraNet had not used AEMO's demand forecast; rather ElectraNet used ETSA's connection point forecasts, and which was higher than the most recent AEMO's forecast then available. Subsequent to ElectraNet's RP being provided, AEMO produced its 2012 demand forecast which was (by 2017/18) 521MW lower than its 2011 forecast. We also found that AEMO's review of the need for the proposed augmentation and connection projects was based on ElectraNet's demand forecast.

292. These high level findings prompted reconsideration by AER of the TOR for our work and we were subsequently asked to undertake further work in order to provide a view on ElectraNet's demand forecast, taking account of the differences between this forecast and AEMO's 2012 forecast, and from this to further assess the implications for the augmentation and connection forecast capex. This therefore involved further assessing the relevance of AEMO's findings on the augmentation and connection capex projects, given this updated demand forecast information.

6.5.3 Our sample review of augmentation and connection projects

293. Details of our project review and are provided in Annex B. The following sections provide a summary of our approach and findings.

Summary of EMCa approach

294. In addition to reviewing AEMO's report, EMCa selected a sample of four augmentation and four connection projects, which comprised 50% and 74% respectively of the value of the proposed capex. We reviewed ElectraNet's documentation for these projects against its governance framework.

EMCa findings from sample review

295. We found that the projects reviewed had been developed in alignment with ElectraNet's asset management framework, including the stages of the PMM. However in many cases information on the projects was limited to high level concept details as many projects had not progressed to the Phase 0 stage.

296. EMCa accepts AEMO's conclusions, based on AEMO's technical / engineering review and its expertise in relation to national transmission development planning, that the combined proposed network projects will address the network limitations that are expected to emerge over the RCP, and will maintain compliance with the ETC and the NER in this regard. Also that no major transmission projects are required and that this is consistent with the NTNDP.

297. Through our review of a sample of ex-ante projects we found opportunities for some prudency gains that are likely to be made as the projects progress through the various phase of the PMM, and which had not been factored into the forecasts. The implications of prudency aspects of the proposed capex are discussed further in section 6.5.3.

298. We consider that there are likely to be further opportunities to defer and/or manage augmentation and connection. This should be possible through more efficient use of peak demand network capacity at times of peak demand which has seen little actual growth in recent years. Opportunities to do this may arise, for example from an increased focus on available demand side contributions to peak demand management. Peak demand management would be expected to be especially valuable given ElectraNet's relatively low load factor.

299. It should also be economic to improve power factors at connection points that are approaching peak time capacity limitations, particularly where there is a need only to meet minor incremental demand growth and a major capacity expansion is not warranted[51]. For most connection points, the power factor requirement is 0.95 or 0.9 depending on the connection voltage. However, under its contractual agreements with its customers, ElectraNet has the right to require a higher level of power factor if the ability to transfer energy is constrained.

[51] See Annex B.4.1 for a discussion on how power factor affects network capacity requirements

300. These findings are consistent with AEMO's finding that other solutions may be more economical; however we consider that this finding is also relevant in forming a view on ElectraNet's forecast capex.

6.5.4 Demand uncertainty and the relationship with contingent projects

NER requirements and their interpretation

301. The NER requires that the TNSP must include the total forecast capital expenditure required to meet the *expected* demand (emphasis added)[52]. The NER also requires that "*proposed contingent project expenditure…is not otherwise provided for (either in part or in whole) in the total of the forecast capital expenditure.*"[53] In other words, only expenditure that is not required to meet expected load growth can be included as a contingent project; if this were not the case then the TNSP could be compensated twice for expenditure required to meet the same event or condition.

302. TNSPs have taken different approaches to determining the capex required to meet expected demand. For example, in its 2011 RP Powerlink used a probabilistic approach in which it proposed a capex forecast that it determined by applying probability weightings to twenty separate capex scenarios, each of which was defined by exogenous parameters including a high, medium or low demand forecast. The AER accepted this approach in its decision. EMCa noted in its report, that the weighted average capex resulting from this process was similar to the capex forecast that could be obtained by considering only the medium forecast[54]. The forecast capex was nevertheless used for revenue determination purposes to apply to a forecast demand range – that is for general load growth that was forecast to be between the low and high demand forecasts, with a median probability denoted by the "medium" forecast.

303. In its APR, ElectraNet presents high, medium and low demand forecasts which recognise the inherent uncertainty in forecasting demand. ElectraNet has used a medium demand forecast to produce a capex forecast as the basis for its RP. Since future demand cannot be known with certainty, this forecast capex must be interpreted as meeting expected demand in a probabilistic sense. That is, the logical interpretation of the word "expected" in the NER is that the TNSP must propose forecast capex that is a probabilistic expectation of its requirements. This is a balanced concept in that a lower-than-expected demand does not give rise to a 'claw-back' from consumers if less

[52] NER6A.6.7(a)(1)

[53] NER6A.8.1(b)(1)

[54] *Forecast capital expenditure and service targets, Report to AER*; page 16, paragraph37; EMCa (6 September 2011)

capex is subsequently required; equally a higher-than-expected demand needs to be met by the TNSP without additional compensation during the RCP in question[55].

304. Our view is that the capex objectives under NER6A.6.7(a) and the contingent project requirements under NER6A.8.1 work together in a way that is complementary. That is, projects that are required for demand growth within the high – low demand forecast range are covered as part of forecast capex, while projects that may be triggered by a specific and objective event such as a step load change, and which can be demonstrated not to be covered within the forecast demand range, may be considered as contingent projects. The approach provides a capex forecast that is expected to enable the business to manage general increases in demand, recognising general demand uncertainty and allows the business to change and substitute projects as business conditions unfold within this demand range over the course of the RCP, without recourse to regulatory "reopeners".

305. AEMO has made the same assumptions about the role of contingent projects in relation to forecast capex projects, stating in its review report that:

> *Contingent projects should be limited to non-load driven augmentations or triggered by significant step changes in load (rather than driven by organic load growth).*[56]

306. ElectraNet provided information from scenario analysis undertaken by ROAM Consulting, and which was similar to that undertaken for Powerlink for its 2012 determination. From the ROAM analysis, ElectraNet developed 18 capex scenarios, which covered high, medium and low demands (along with other scenario factors). As we found with Powerlink, the "medium" demand capex from this analysis was very close to the weighted average capex that we were able to derive from the 18 capex scenarios[57].

307. We therefore consider that ElectraNet's capex forecast meets a reasonable expectation of the range of demand forecasts, consistent with the NER. We refer to this range as a "demand envelope".

Demand sensitivity

308. ElectraNet used the ROAM scenario analysis to test the robustness of its forecasts. We have analysed the range of capex forecasts provided by ElectraNet and which result from the ROAM analysis. This shows that capex would be reduced by $9m (1%) under a "low" demand scenario and would increase by $16m (1.8%) under a high demand

[55] The NER allows for different capex outcomes, by rolling forward the RAB into subsequent RCPs, using actual capex incurred.

[56] *ElectraNet Revenue Cap Review Capital Projects Assessment;* Background section page V AEMO (2012)

[57] Our analysis found a difference of $1m, or 0.11%, between the two methods. We applied the weights assigned to each scenario by ROAM

scenario. We also noted that ElectraNet has tested demand sensitivity with a relatively narrow demand range, which appears to have been approximately +4% / -3%.

309. Nevertheless, insofar as ElectraNet's demand range is considered to be realistic, our analysis of ElectraNet's low and high demand capex forecasts supports its statement that "*the large majority of network projects…..are required….irrespective of whether demand growth follows the high, medium or low demand forecast….. This demonstrates the robustness of the forecasts to a range of reasonable scenarios*…." [58]. ElectraNet's statement also appears to be consistent with our interpretation of the NER (as above) that the forecast capex is intended to cover this demand envelope.

6.5.5 EMCa assessment of proposed demand forecast

310. EMCa has separately reviewed ElectraNet's proposed demand forecast.

311. ElectraNet has stated that it has "relied upon demand forecasts independently provided by AEMO, ETSA Utilities and ElectraNet's direct-connect customers". We consider this to be not entirely correct, as ElectraNet appears not to have relied on AEMO's demand forecast.

312. Following publication of AEMO's 2012 demand forecast, and which is 522 MW (13%) lower than its 2011 forecast, we were asked to undertake further analysis of the demand forecast, taking account of ETSA's connection point forecasts, temperature adjustments, the high / low forecast range and AEMO's 2012 demand forecast, and to provide findings accordingly on ElectraNet's proposed augmentation and connection capex. Our review is described in our Demand Forecast report.

313. In the course of this assessment we found that ETSA and ElectraNet historical data previously provided had been adjusted to largely remove the effects of demand response and distributed generation. We consider these effects to be real and to have a positive impact in reducing transmission requirements, which should not be "adjusted back". We therefore sought further information from ElectraNet, and undertook our analysis using raw (i.e. actual) historical demands.

314. We took account of the increasing level of PV generation in SA, based on AEMO historical data and forecasts, and trended the underlying demand. We then used AEMO analysis to develop a proxy forecast at PoE10% - an accepted long-term transmission planning standard in which the assumed economic cost / supply trade-off aims to ensures that peak demand can be fully met in 90% of years[59]. We took account of connection point diversity to the regional level, consistent with ElectraNet's

[58] RP, page 76

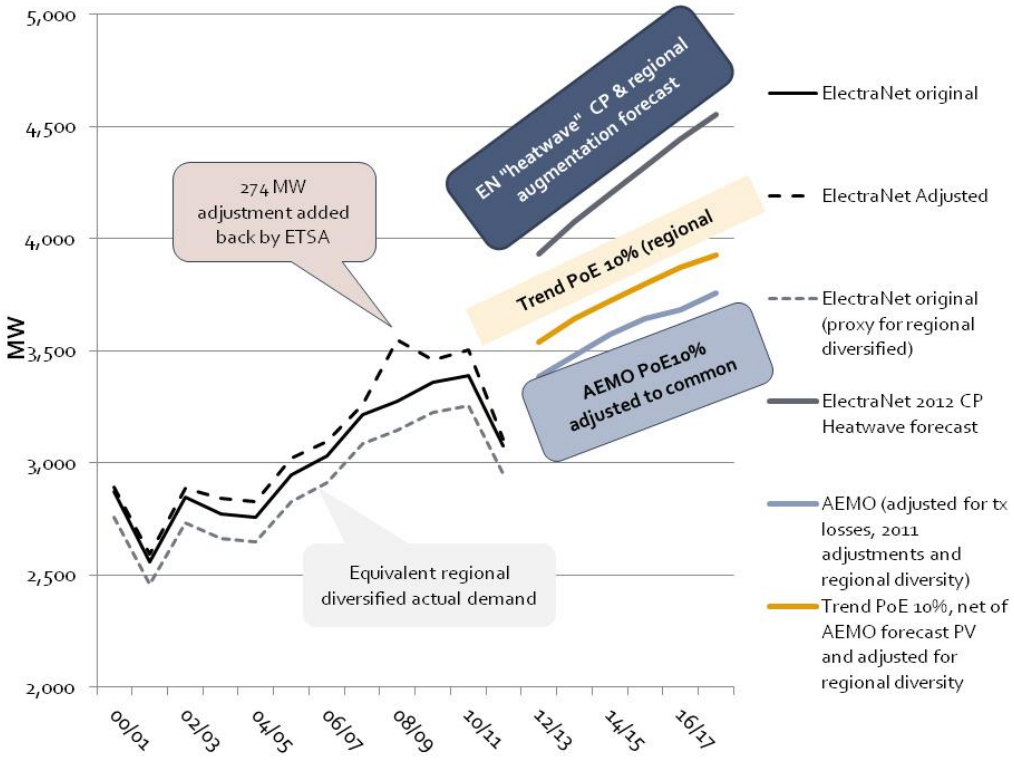
[59] We note that this is a long-term planning standard, which aims to ensure that transmission systems are not over-built for situations that occur only extremely rarely. Within the long-term planning horizon, additional capacity can be added if / as higher demand eventuates. Non-network "demand response" and distributed generation can also assist, particularly with rare and short-term demand events.

augmentation planning requirements, based on diversity that was evident in connection point demand data that ElectraNet provided to us. We used ElectraNet's forecasts for its major direct-connect customers.

315. Our analysis, which should be considered as a "check analysis" rather than a fundamental forecast, led us to the view that the 2012 AEMO demand forecast is a reasonable forecast[60]. The starting point of our PoE10% "trend forecast" is 390 MW below ElectraNet's 2012/13 forecast and has a growth rate of 2.1% p.a., similar to the historical trend growth rate in annual peak demand and well below the 3.0% growth rate projected by ElectraNet. The check forecast that we have produced is 14% less than ElectraNet's forecast, at 2017/18.

316. The figure below compares ElectraNet's demand forecast with AEMO's 2012 demand forecast, and shows our trend-line check forecast. The graph also illustrates how the 2008/09 "heatwave peak" referred to by ElectraNet (and which was the basis for ETSA's demand forecast) was a result of a range of adjustments being "added back' to the actual peak demand. This was not the all-time peak demand, which was somewhat lower, and occurred in 2010/11.

Figure 32: Demand forecast comparison



[60] AEMO's forecast is on a state-diversified "required generation" basis. A number of factors, including diversity, transmission losses and generator own-supply, need to be taken into account in comparing the two forecasts. At the time of writing, we understand that AEMO is producing a reconciliation. Our comparisons below are based on broad-brush adjustment factors derived from ElectraNet's reconciliation of its forecast with AEMO's 2011 forecast.

Source: EMCa analysis from ElectraNet historical and forecast data in a range of responses including ENET063(R), ENET198(R) as amended by ENET244(R); also AEMO 2012 demand forecast

6.5.6 Implications of demand considerations for augmentation and connection capex

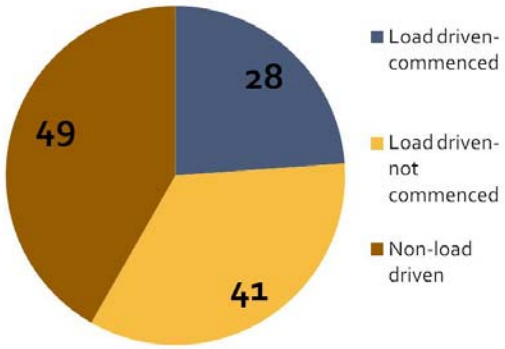
317. On the basis of our further analysis of forecast demand, and our consideration of AEMO's 2012 demand forecast, we do not agree with AEMO's finding from its technical review that "…*the proposed network solutions are reasonable*."[61]

318. At an early stage in our review, the AER asked ElectraNet to produce a connection point forecast consistent with AEMO's 2012 demand forecast, and to advise the augmentation and connection capex that would be consistent with this forecast. ElectraNet declined to provide this information to the AER[62].

319. We have sought to determine an approximation of the amount by which the augmentation and connection capex would be reduced. We did this by reviewing the list of proposed augmentation and connection capex projects to identify load-driven projects and the implications if those were deferred as a result of lower demand growth. We found that $49m of $118m of augmentation projects are not load driven[63].

320. We then assumed that projects that have already commenced, could not be deferred. Accordingly we assumed no adjustment to projects with commissioning dates in 2013 or 2014. This amounts to a further $28m of augmentation projects and $56m of connection projects as shown in the charts below.

Figure 33: Augmentation projects expenditure - next RCP ($m)(real2012/13)



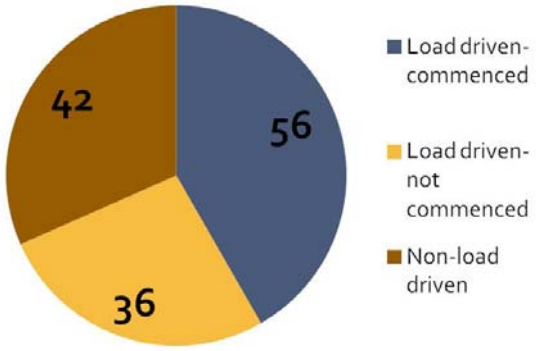
Source: EMCa analysis from ElectraNet data in response ENET070(C)

[61] AEMO capital projects assessment report, page iv

[62] Request AER RP 003, and response ENET082(P)

[63] Most of these are telecommunications projects

Figure 34: Connection projects expenditure - next RCP ($m)(real2012/13)



Source: EMCa analysis from ElectraNet data in response ENET070(C)

321. In principle the 14% lower demand that we have estimated, represents a 4.5 year average deferral, based on the 3.1% p.a. growth rate that ElectraNet assumed. If all projects were subject to this deferral, this would imply that almost no further load-driven augmentation or connection (other than that already commenced) was required within the RCP. In reality, load growth occurs unevenly, and some augmentation and connection is likely to be required. In the absence of more refined information, we assumed that those projects not already commenced could be deferred on average by three years.

322. This analysis implies demand-related adjustment as follows:

a. Augmentation capex reduced by $18m, to $100m

b. Connection capex reduced by $60m, to $73m.

6.6 Assessment of replacement and refurbishment forecast capex

6.6.1 Proposed replacement capex and drivers

323. When establishing the non–load driven capex ElectraNet's asset management framework provides for the forecast replacement capex to be driven through the SCAR and TALC processes. This means that the need for the expenditure is based on asset inspection and condition with risk and total asset life cycle methodologies applied.

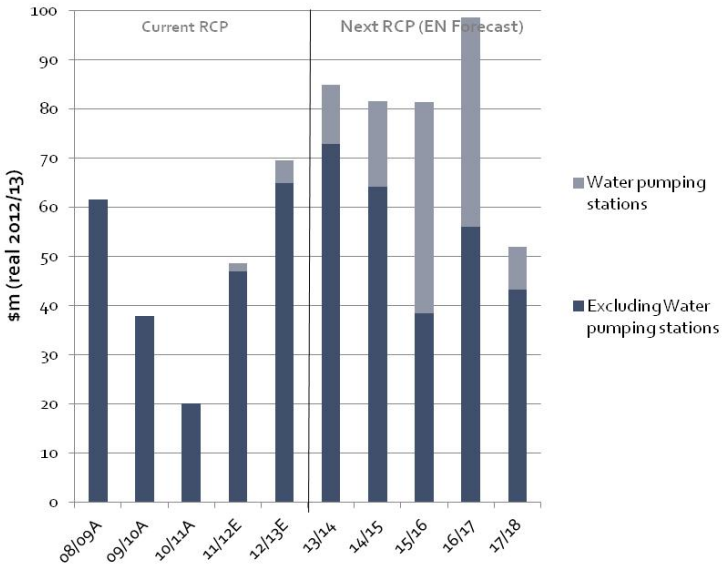
324. Whilst we have found evidence that asset condition assessments and SCAR risk assessment methodologies have been used in the establishment of the replacement capex forecast, we have looked for evidence of a TALC-based assessment that justifies this quantum of replacement work but have not established that this has been completed.

325. As discussed in section 5, forecast replacement capex is forecast to increase from $237.4m in the current RCP to $398m in the next RCP. This represents an increase of 68%. Replacement of assets (primarily substations) for supplying to SA Water's water pumping stations in the next RCP is forecast at $123.4m. Water Pumping station

supply replacements make up 31% of the total forecast replacement capex for the next RCP.

326. As discussed in section 5.3.3 excluding the water pumping station projects reveals an underlying forecast replacement capex total of $274.6m.

Figure 35: Replacement capex including and excluding water pumping supplies



Source: EMCa analysis from ElectraNet data in response ENET150(P)

6.6.2 Replacement of water pumping station supply substations

327. The water pumping station supplies are connection (exit) services and are included in prescribed services under a grandfathering arrangement provided for under Rule 11.6.11 of the NER. Importantly, the works proposed by ElectraNet are to replace the existing assets with those of modern day equivalent and not intended to change the level of service delivered. If this was not the case then the total portfolio of water pumping supplies would fall outside the grandfathering arrangement and be transferred to a negotiated service.

328. The water pumping station replacement program is driven by the age and condition of the assets. For example ElectraNet describes the need for a forecast [C-I-C] investment covering for separate replacement projects at Mannum-Adelaide Pump Stations 1-3 and Millbrook Pump Station Substation as:

> *Based on detailed condition and asset risk assessment, the original plant and equipment in the substations is now well beyond the end of its technical and economic life and requires immediate replacement. Additionally, the switchyards are laid out with electrical clearances that do not meet current standards.*[64]

[64] *RP Appendix P*; section 13; ElectraNet

329. Documentation reviewed for water pumping replacement projects including those discussed above) shows that the projects are at a pre-phase zero stage. This means that only high level concept planning and cost estimation has been completed. The documentation does include condition assessment reports which support ElectraNet's view that the assets are at the end of their life cycle.

330. At the pre-phase 0 stage ElectraNet have concluded that:

> *A substantial rebuilding of the substations including the telecommunications, protection and control equipment represents the only viable solution. It is therefore proposed to rebuild the four substations.*[65]

331. From our review of the project documents provided and information considered during our site visit (including a visit to a water pumping station), we found no reason to disagree with ElectraNet that the assets are approaching the end of their life. We also consider that it is likely to be the case that substation replacement is to be the preferred solution. We have concerns regarding the reasonableness of this significant expenditure in the proposed timeframe and the lack of justification, including options analysis and risk assessment, relative to the level of proposed expenditure.

332. Our concerns are:

a. We have seen no indication that the investment in new electricity supply asset is aligned with similar investments in the water pumping assets. The need for the investment is driven solely from the condition assessment of the electrical assets. The implication is that this would be similar to fitting a new engine in an old car, not necessarily the wrong option but one that would require consideration of the whole car and not just the engine.

b. Replacement of assets on a like for like basis assumes that the required service for water pumping will not have changed for approximately 100 years (55 years to date plus 45 years future). It is considered to be unlikely that the required service will not have changed over this period of time. This does not appear to be a reasonable assumption given the development of water dependant consumers[66] in the region.

c. It is likely that, at some point, water pumps will have been refurbished or replaced and that, at this time, the capacity of the pumps will increase. At the same time, standardisation of transformer types and sizes undertaken as part of the substation replacement program will increase the available capacity of electricity supplies. Replacement and refurbishment on s strictly like for like basis is likely to be impractical. Therefore required and delivered service levels will inevitably be changing yet this does not appear to be explicitly recognised.

[65] *RP Appendix P*; section 13; ElectraNet

[66] For example the Barossa and Clare Valley region wine industry

d. Documents provided by ElectraNet and responses provided to out questions do not provide confidence that stranding risks[67] associated with the water pump replacement program have been fully considered and managed.

e. The current grandfathering arrangement provided for in the NER combined with the transmission pricing structure may be providing perverse incentives leading to suboptimal decisions and potential efficiencies.

333. We consider that a coordinated, combined water and electricity strategic plan should have been developed for the water pumping program. Such a plan would have considered the age and condition of the water pumping assets and potential future changes in water pumping requirements. Through this approach the program could have been optimised across supply and demand.

334. The current grandfathering arrangements and transmission pricing structure appear to present disincentives for the SA Water to notify ElectraNet of any changed service requirements. This is because, if any water pumping connection point requirements are changed, the total grandfathering arrangement would fall away. We understand that this would likely result in a significant increase in charges for supplies to SA Water such that it would bear the full cost of such supplies, and a consequent reduction in charges to other SA electricity consumers who currently cross-subsidise this supply

335. Our view is that significant asset replacement programs supplying specific non-diversified loads (such as the water pumping stations) should be planned strategically. If this approach is not taken, then there is a risk that the investment in replacement assets could be stranded at some point in the future. If regulatory arrangements present barriers to this approach being taken, consideration should be given to changing them.

336. We also consider that a strategic approach would have considered fitting load management systems. Load management systems could optimise pumping and reduce local and system peak demand. We found no evidence in the project documentation that these options had been explored or discussed with S.A. Water. It is possible that the grandfathering arrangements may also present a barrier to consideration of load management as it may be deemed to be a change in service requirement.

337. Given the above concerns we consider that it cannot be concluded that the water pumping replacement capex as presented by ElectraNet represents efficient costs and that they should not be accepted as part of the forecast capex for the next RCP without a fully justified business case.

6.6.3 Underlying replacement capex prudency gains

338. As projects transition through the initial concept stages through to being fully scoped and approved, decisions on alternative options, project scope and delivery approaches

[67] Due to future changes in the requirements for water pumping supplies (e.g. potential reconfiguration of the water system)

will have been made. In making these decisions ElectraNet can be expected to apply a level of prudency to ensure compliance with the required standards at least cost. In our assessment of proposed capex projects we have considered how the application of prudent decisions can be expected to impact on the level of required capex.

339. Accordingly, we consider that gains will be possible through the application of prudent decision making at various points of a projects life cycle.

340. Through our review of a sample of forecast capex projects (see Annex B) we reviewed 25 projects including eight replacement capex projects and 2 refurbishment capex projects. We also identified three capex projects with potential prudency gains and we were able to quantify that potential.

341. We consider that it is not surprising that potential prudency gains have been identified given that the majority of the forecast projects are at Pre Phase and Phase 0 stages. Indeed it is likely that further gains will be made as more detailed analysis is undertaken on the initial concepts and this is consistent with AEMO's findings.

342. We consider that our findings on potential prudency gains from the sample studied are likely to be representative of the gains available across the overall network forecast capex. We take this view because our sample was statistically representative and with the 22 network capex projects assessed (3 projects were non network) covering 13% of the total number of projects and 48% of the proposed network capex.

343. We found that several substation replacement capex projects include relatively large increases in transformer capacity (e.g. Kincraig transformers 25MVA to 60MVA). Improvements in power factor at these connection points may allow economic deferral of the larger transformers for these projects. See Annex B.4.1 for further details on how power factor correction can defer investment in network capacity.

344. The potential gains assessed for the three replacement capex projects discussed above were estimated to be $11.5m which represents 7% of the total replacement and refurbishment capex for those projects. Given our view that this level of efficiency and prudency gain is likely to be achievable across the project portfolio we consider that this level of adjustment should be applied to the total proposed replacement and refurbishment capex.

345. As we discuss in section 6.4.3 we consider that it is likely that the forecast front loaded five year expenditure profile will not be achieved in practice. Some deferral of replacement and refurbishment capex across the RCP is considered to be likely. This is consistent with our findings on ElectraNet's approach to managing expenditure within the current RCP (discussed in section 3). We consider that the likely benefits of this deferral can be seen as a component of the prudency gains adjustment.

346. Accordingly a 7% adjustment is proposed to reflect compliance correction levels. This adjustment results in a downwards movement in forecast replacement and refurbishment capex of $31.64m.

6.6.4 Capex/opex trade-off.

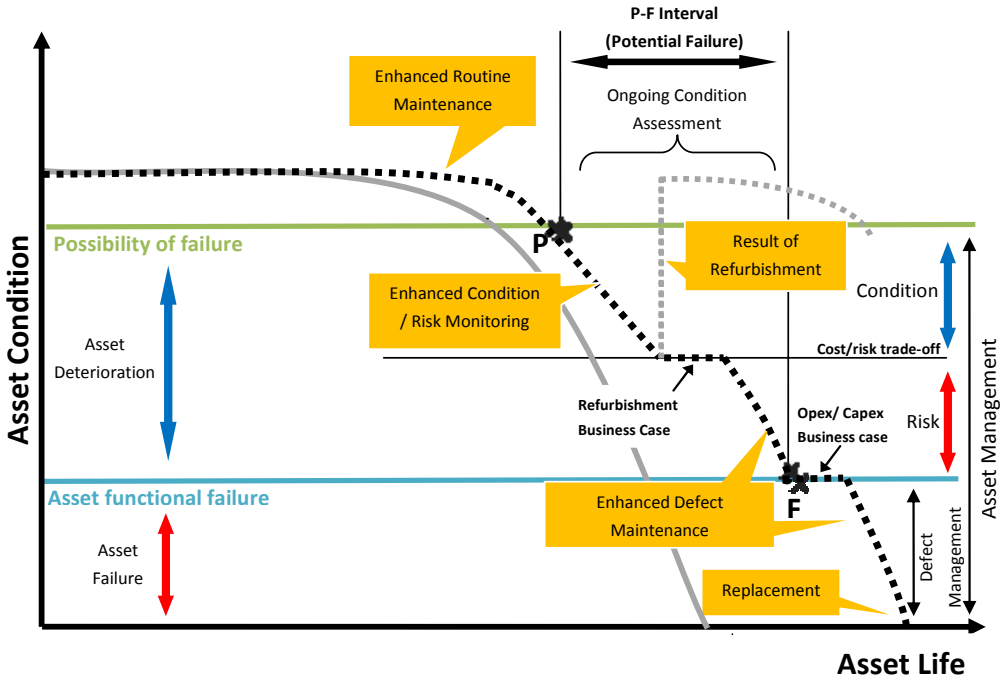
347. Given that ElectraNet has a comprehensive asset management framework, we would have expected to have seen clear evidence of its use in decision making. For example, for consideration of cost/risk trade-offs and how the total asset life cycle economic

optimisation are considered. However, it is possible that this extended use of TALC is being considered for the next phase of the asset management system development.

348. ElectraNet's application of TALC management provides the basis through which the trade-off between opex and capex is realised. Effectively, ElectraNet increases corrective maintenance and operational refurbishment if at least an equivalent reduction is seen in replacement and refurbishment capex. This is the whole of asset life economic optimisation that is implicit in TALC management.

349. Figure 36 is a variation of the asset life cycle optimisation curve (PF curve) used by ElectraNet to demonstrate the theory supporting its TALC methodology. The TALC approach establishes the optimum time in an assets life to deploy a specific expenditure strategy (i.e. routine maintenance, operational refurbishment, corrective maintenance and asset replacement). Essentially the application of each expenditure strategy will change the shape of the PF curve. For example, mid-life asset replacement will extend the curve, operational refurbishment will life asset performance at the point of expenditure.

Figure 36: Asset Management Lifecycle with Enhanced Condition-based Maintenance



Source: EMCa

350. Importantly, TALC management provides a strong linkage between replacement/refurbishment capex and opex. It would be expected that increased levels of opex (e.g. routine maintenance, operational refurbishment and corrective maintenance) would defer the need for replacement/refurbishment capex. TALC decisions are essentially trade-offs where increased expenditure in one category produces a larger decrease in another expenditure category. This will be achieved without increasing failure risk beyond acceptable levels.

351. Through the adoption of TALC ElectraNet should be able to clearly demonstrate how the trade-off decisions have been made and where the gains through optimisation have

been made. In section 8.4 we quantify the investment that ElectraNet has and proposes to make in the establishment of the TALC framework at $50m. This estimate excludes any increases in corrective or other physical work on the assets themselves that may result from application of the regime.

352. For a positive benefit to be derived from the adoption and implementation of SCAR and TALC it would be expected that at least the costs of the framework would be recovered over a reasonable time horizon. Yet in the proposal we are seeing an increase in opex without a realisation of the benefits in replacement/refurbishment capex, which are also increasing. Our view is that this is unreasonable and that replacement/refurbishment capex should be adjusted to reflect at least a breakeven recovery of the investment in the TALC systems

6.7 Assessment of land and easements forecast capex

6.7.1 Policy and drivers for land and easement acquisitions

353. ElectraNet cites the ETC as driving the need for the change in their strategic land and easements acquisition strategy.

> *the ETC now imposes more stringent requirements on ElectraNet to complete early planning approvals to prepare for emerging network limitations by extending these obligations to include design work and land acquisition prior to forecast breaches in reliability standards, again with reference to the strengthened timing requirements driven by forecast agreed maximum demand outlined above:*
>
> > *"A transmission entity must use its best endeavours to complete all necessary design work, obtain all necessary planning approvals and acquire all necessary land and easements on the basis of forecast agreed maximum demand prior to changes in forecast agreed maximum demand causing a breach of the reliability standards specified in this industry code so as to ensure that the transmission entity is in a position to meet its obligations."*
>
> *This clause requires ElectraNet to review longer-term needs and strategically purchase land and easements through a risk-based approach to ensure it will be in a position to meet the requirements of the ETC.*[68]

354. The stated purpose of ElectraNet's Land and Easement Policy (the policy) is to ensure that the strategic acquisition of land and easements is undertaken to enable ElectraNet to effectively manage risk and uncertainty to achieve timely delivery of new transmission lines and substations. This enables ElectraNet to meet its legislative requirements and its service delivery obligations at least long run cost and in a timely manner.

[68] RP page 56

355. The policy recognises a number of specific risk situations ranging from planning, environmental and competing land use issues. In addition, the policy mentions the following rules and provisions which impact ElectraNet:

a. South Australian Electricity Transmission Code, which requires ElectraNet to use its 'best endeavours' to achieve the easements and approvals to be able to meet 'forecast agreed maximum demand'.

b. South Australian Annual Planning Report, which covers a 20 year planning period. This assists preparation of AEMO's National Transmission Network Development Plan, which has a 20 year horizon.

c. Note that neither of the above implies that land should be acquired years in advance of expected construction timeframes. However they do recognise the long lead times associated with transmission system construction.

d. ElectraNet's Network 2035 Vision specifies aims of providing safe, secure and reliable supply at lowest long run cost to customers.

356. ElectraNet's interpretation of these rules in the Policy is that:

a. The purchase of land and easements required to meet customers 'forecast agreed maximum demand' up to 8 years from the start of the regulatory period.

b. Land and easements required for projects within the 20 year cycle should be assessed to determine risk and availability for acquisition. If the risk is high they should be included in the next regulatory period.

These seem to be reasonable interpretations.

357. The policy uses 5 trigger parameters to decide whether to include a project. One or more of these may be sufficient to justify inclusion:

a. Satisfy regulatory obligations

b. Manage project delivery risk

c. Minimize network costs

d. Minimise land costs

e. Secure land availability

358. Projects in the 3-5 year zone tend to be driven by the first of these parameters, whereas those in the longer timeframe tend to be driven by the latter parameters.

359. Our view is that the policy seems generally to be appropriate for identifying when land & easements need to be secured and how risks should be assessed. The policy does not deal with how surplus land is dealt with. It is inevitable that some land & easements will be secured, and then subsequently not be required, especially for longer timeframe projects. When sold, how is this handled needs to be clear for example, is the money credited to the current regulatory period, and what happens about gains/losses on sale?

6.7.2 Sample review of land and easement projects

360. We have reviewed two proposed land and easement projects in detail and a further seven at high level. A summary of our findings are provided below:

EC11630: Eyre Peninsula Reinforcement Land and Easement Acquisition[69]

361. The identified need for this expenditure is uncertain at this point as it is required for a contingent network project triggered by specific resource driven step change load. Given the uncertainty regarding the triggering of the contingent project consideration needs to be given to the appropriateness of purchasing land for contingent projects ahead of that project being triggered.

362. The need for consultation and Environmental Impact Report and referral to Federal Government suggests a long lead time is likely to be appropriate. If future load growth attains some certainty, then the timing of this project is likely to be appropriate.

363. Cost variances evident in the project documentation are concerning. The increase from the initial [C-I-C] in the land & easements schedule, to the [C-I-C] in the Level 1 estimate is significant. In addition, it is questionable whether the easement should be widened to 100m to accommodate a future 500kV line when the need and timing for this is very uncertain.

364. We found that this project had broad compliance with ElectraNet's policy, noting our comments above on the contingent nature of the expenditure, the timing and budget. We consider that policy compliance for the extension for a currently concept level, low probability 500kV line is questionable.

EC11738 Mallala to Para 275kV Double Circuit Land and Easements Acquisition[70]

365. This project covers:

a. [C-I-C]

b. [C-I-C]

c. [C-I-C]

366. This land & easements project is required to support a Contingent Project, E11201 Lower Eyre Peninsula Reinforcement. The inclusion of land and easement costs in the forecast capex forecast is questioned.

367. The need for the expenditure at this time could be mitigated by the establishment of further designated transmission corridors. In a report commissioned by ElectraNet Conner Holmes found that '*Some of these project areas are likely to be subject to*

[69] ENET 186(C)

[70] ENET 187(C)

future rezoning, which could result in a form and intensity of development which is incompatible with the establishment of future transmission infrastructure'[71]

368. Conner Holmes also identified that the 30 Year Plan for Greater Adelaide contained the following policy for infrastructure:

> *Identify and preserve critical infrastructure corridors (including major transmission lines, substations, water and gas pipelines, and new utility corridors) through Structure Plans for new growth areas, transit corridors and transit-oriented developments.*[72]

369. The policy appears to open a clear opportunity for ElectraNet to secure dedicated corridors for future network expansion that would preserve routes and keep them free from competing activities. If this was achieved it should avoid the need to secure land purchases in advance of the need and ensure land can be purchased at reasonable prices. We consider that ElectraNet could more rigorously pursue legislative & regulatory avenues to secure designated transmission corridors now for the future and defer the need to purchase land well in advance of the need.

370. Given that the associated network project may not be required until sometime in the 2020s, it is questionable whether this project is needed now. The basis of the project may be to protect the access from competing land use however; the [C-I-C] price tag for this is a large amount for such speculative expenditure.

371. It would appear that the project could be justified against the policy parameters to minimise land cost and/or secure land availability. However, justification based on these triggers is not clear in the project documentation.

Review of further seven land and easement projects

372. We have undertaken a high level review of the seven additional land and easement projects. These seven projects reviewed are all shown in the Easements Schedule as costing over $5m. However, no detail has been provided beyond that shown in the Easements Schedule. Hence the comments provided are based on a review of high level documentation.

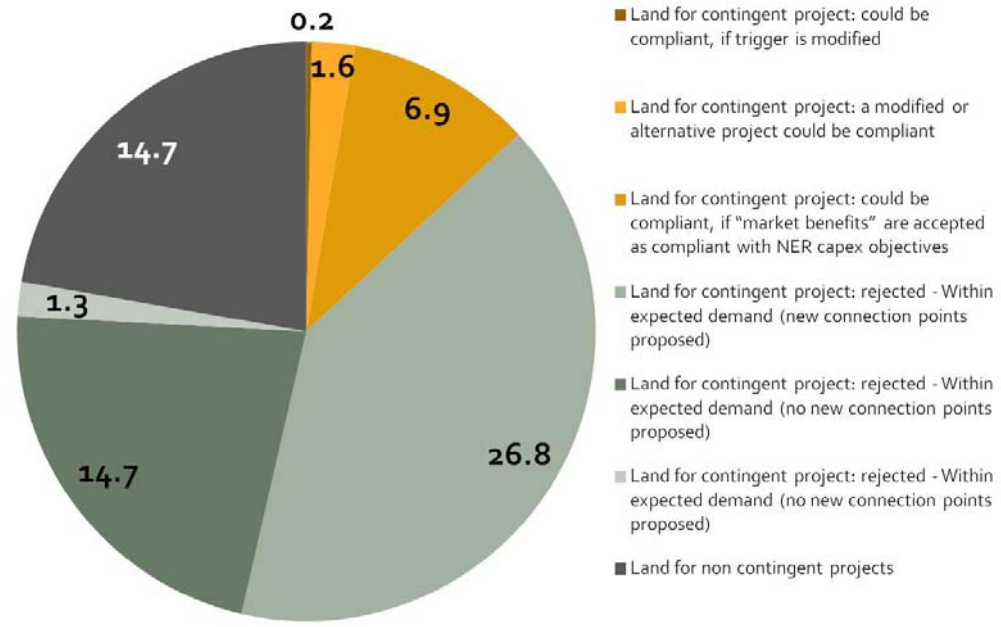
373. The following presents finding from this review.

[71] Conner Holmes Report 4083-005 Executive Summary

[72] ibid

6.7.3 Our assessment of proposed capex for land and easement acquisitions

Figure 37: Analysis of purpose of land and easement projects submitted by ElectraNet



Source: EMCa analysis from ElectraNet ENET070(C), ENET191(R)

374. Our summary categorisation of land and easement projects is shown in the table as below. It can be seen that a sizable proportion is required for contingent projects and the remainder for projects required outside the next RCP.

Table 13: Summary of proposed land and easement projects

[C-I-C]

Source: EMCa analysis from ElectraNet data in response ENET070(C)

375. We consider that land and easements, required for long term strategic reasons, have not been adequately justified against the 5 trigger parameters required in ElectraNet's policy. In particular, the project documentation appears to justify that they are needed

now on the basis of avoidance of future increases in land value and/or securing land access and availability against competing uses.

376. The third capex objective in Clause 6A.6.7 of the NER requires that expenditure incurred to meet demand for a subsequent regulatory period must be required to *'maintain the quality, reliability and security of supply of prescribed transmission services.* Strategic land purchases that are not required to meet the demand for transmission services during the next RCP must meet this capex objective. It is difficult to see how purchase of land for contingent projects that have not and may not be triggered can meet this capex objective. Once a contingent project has triggered or if it is certain to be needed in the subsequent RCP, the expenditure would be likely be allowable.

377. A large proportion of the strategic land purchases are required for contingent projects that are unlikely to trigger in the RCP. We consider that the purchase of land well in advance of a contingent project being triggered is speculative and, on our reading of the NER, appears not to be consistent with the application of the Capital Expenditure Objectives.

378. It is likely that large land purchase activity in one period is likely to drive up land prices and that full consideration needs to be given to how such a situation can be avoided.

379. Given the above findings we would have expected to have found evidence that ElectraNet had rigorously analysed / pursued all the alternative avenues available first, to ensure that dedicated transmission corridors were secured. Throughout our review we have not found indications that ElectraNet is placing focus on a strong political drive to obtain security of future land access for transmission network development. For example, we would have expected that ElectraNet's Strategic Land Acquisition Policy would have required that all avenues available to ElectraNet to secure dedicated transmission corridors that minimise the need to acquire land well ahead of the need to use it. The policy appears to consider early land acquisition as the sole strategic option.

380. We sought documented evidence from ElectraNet that demonstrated the effort that had been placed on securing designated transmission corridors. The information provided was limited to correspondence identifying potential future transmission developments. ElectraNet did not provide evidence that it had rigorously pursued a strategy to secure transmission corridors in advance of land purchases.

381. Further, we found ElectraNet's land and easement policy to be unclear on how long term speculative land investments would be dealt with if requirements changed and gains or losses were made on sale.

382. For land and easements capex we have found that

a. Expenditure that is required for contingent projects should not be allowed as a separate project in the forecast capex;

b. Based on our interpretation of the NER Capital Expenditure Objectives, the expenditure on land acquisition and easements that are not required to be made within the next RCP must be excluded from the forecast capex; and

c. Notwithstanding the above, we consider that there can be merit in some strategic purchases where this can be demonstrated to be in the long term interests of consumers. However, from the project documentation we have reviewed and on the

level of ElectraNet's efforts to secure appropriate designations, the case for such purchases has not been adequately justified.

6.8 Other capex

6.8.1 Introduction

383. Other capex includes the following capex categories:
   a. Non network;
   b. Security and compliance;
   c. Inventory and spares;
   d. IT;
   e. Facilities.

384. Consistent with our approach to reviewing augmentation, connection, replacement and refurbishment capex we have used a review of a sample of projects to identify the extent to which ElectraNet have applied its asset management framework in practice.

385. Given the relatively small number of projects in these categories, and the materiality of the expenditure level to the combined capex proposal, we limited our sample of other capex projects and undertook a high level assessment during our on site visit.

6.8.2 Our assessment of proposed other capex

386. Through our project sample review and during our onsite assessment we found no examples that indicated ElectraNet had failed to implement its asset management framework in practice when developing capex proposals for the other capex categories. We found no indications that the proposed expenditure is unreasonable.

6.9 Assessment of capex program deliverability

6.9.1 Introduction

387. The TOR requires that the technical Consultant provides comment on the deliverability of ElectraNet's proposed capex program having regard to capex delivered in the current regulatory period and ElectraNet's capex delivery framework and policies for the next regulatory control period.

388. We have formed our views on deliverability of the capex program through review of documentation provided by ElectraNet and from information provided in the course of meetings with ElectraNet in Adelaide.

6.9.2 Comment

389. Included in the Project Management Methodology described by ElectraNet[73] is a structured approach to the management of resources required to complete the capex program. The resource management method includes:

a. The introduction of a capital contracting model that guides the management and development of labour based resources;

b. A segmented contracting model that aligns the contracting model with capital works structure;

c. Contract terms ensure alignment of term with capex program (revenue reset cycle)

d. Market cap[ability and capacity research that considers local and broader availability of appropriate resources

e. Market development and security planning that includes a contractor panel and the development of long term contracts for specific activities.

390. We have found that ElectraNet has actively considered the ability to deliver the proposed capex program and has developed and implemented an appropriate strategic approach to securing the required resources.

391. The project management model used by ElectraNet includes six project phases with gate reviews undertaken at the transition point between phases. As projects progress through each gate points the resource requirements become more firm allowing work programs to be developed. This structure allows for the progressive management of internal and contractor resources.

392. The maximum forecast annual capex for the next RCP is $215.9. This compares with a maximum annual capex during the current RCP of $243m which occurred in 2010/11. Given ElectraNet's improved project management methodologies and the development of a more strategic approach to the management of resources, the proposed annual maximum capex for the next RCP should be practically achievable.

393. We have some concerns that the forecast capex for the first and second years of the next RCP includes several projects (including the commencement of major replacement projects) that are still at pre Phase 0 stages. The implication is that these projects must progress rapidly through the PMM phases to achieve Phase 4 status within the next 12 months. However in the absence of evidence that this cannot occur, our conclusion is that the forecast capex program could be delivered.

6.9.3 Findings from our assessment of deliverability of ElectraNet's proposed program

394. We have found that the forecast capex program is likely to be deliverable. However, this is likely to be subject to material levels of project substitution and change due to a

[73] ElectraNet presentation ENET102(P)

significant number of projects not yet being included in PMM process (e.g. not yet obtaining project status in PMM phasing system).

395. The relatively high number of projects that are only at the early stages of the PMM phases raises concerns. When this is considered alongside the underlying replacement capex profile seen in figure 24, and which is front-loaded, it is considered probable that the actual expenditure profile will move to be more end-loaded. This result would be consistent with what happened in the current RCP where expenditure profile can be seen to be end loaded despite being forecast to be front loaded.

396. We have taken the likelihood of potential expenditure deferral benefits within the RCP into account when considering an appropriate level for the prudency adjustment for replacement and refurbishment capex.

397. We found no reason to conclude that ElectraNet could not deliver the forecast levels of capex and a realistic proportion of contingent projects.

6.10 Capex findings and their implications

398. Our findings and associated recommendations on ElectraNet's proposed capex are presented in section 2: (Findings 2 to 7). The implied adjustments in table 14 shows the amounts by which ElectraNet's capex would be adjusted, for each of the capex-related recommendations.

399. A significant adjustment to proposed connection and augmentation capex results from our finding that ElectraNet's demand forecast is overstated, and this leads to our assessment that the proposed augmentation and connection capex is in excess of what is likely to be required. In the course of this review, AER asked ElectraNet to estimate the impact of a reduced load forecast on proposed capex. However ElectraNet stated that it did not wish to provide this information. The indicative adjustment provided below may be able to be refined if further information on capex demand sensitivity was to be provided for assessment.

400. The largest single adjustment would be to replacement capex and, of this, to the proposed pumping station expenditure. This finding is that the level of expenditure as proposed is insufficiently justified and that the implied adjustment shown here is based on disallowing that expenditure on these grounds. We consider it likely that justifications for a level of such expenditure exist but have not been presented to us. Pending resolution of matters that we have raised and presentation of satisfactory evidence to justify the proposed program of works, we consider it likely that at least some of the proposed expenditure will be found to be justified.

401. Similarly, information presented to date is insufficient to support the inclusion of any of the proposed land and easement projects. However we consider that there is likely to be merit in some strategic land and easement acquisition expenditure and this finding and consequent adjustment would need to be reassessed if ElectraNet was to reassess its proposed expenditure taking account of the maters we have raised, presenting justification that is satisfactory in terms of NER requirements.

402. We consider that the case for the other adjustments is likely to remain, while recognising that further information may give cause for further review.

403. All potential adjustments may be subject to review for materiality.

Table 14: Proposed adjustments to capex

$million (real 2012/13)

	Implied Adjustment	Total Capex
Electranet forecast Capex		**894.1**
Potential adjustments:		
Demand Adjustments		
Connection	-29.8	
Augmentation	-18.4	
Replacement	-57.0	
Portfolio Risk		
0% Replacement & Refurbishment	-16.2	
2.6% Augmentation & Connection	-2.9	
2.6% on all others	-0.5	
Prudency		
Replacement & Refurbishment	-32.0	
Pumping stations supply replacement	-123.4	
Benefits of enhanced maintenance regime		
Replacement & Refurbishment	-50.0	
Strategic Land & Easement acquisitions	-51.4	
Adjusted Capex (if adjustments made individiually)	**-381.6**	
Total cumulative adjustments		**-364.0**
Adjusted controllable capex		**530.1**

Source: EMCa from ElectraNet data

7 ElectraNet's proposed opex for the next Revenue Control Period

7.1 Introduction

404. In this section we describe the opex proposed by ElectraNet, and the way that ElectraNet has developed that opex forecast. We summarise the elements of the asset management governance framework that drives the network component of ElectraNet's opex program and describe key elements of that framework including the lifecycle asset management framework, condition assessment, work scoping, works management, budgeting and costing, and the models that ElectraNet has used to develop its opex forecast.

405. The scope of our review covers controllable opex categories. Other opex proposed in ElectraNet's RP comprises self-insurance, network support payments and debt raising costs.

7.2 ElectraNet's proposed opex

406. The opex proposed by ElectraNet in its RP is shown in table as below, together with the trend opex from the current RCP. Table 15 shows a considerable increase in opex from the current to the next RCP.

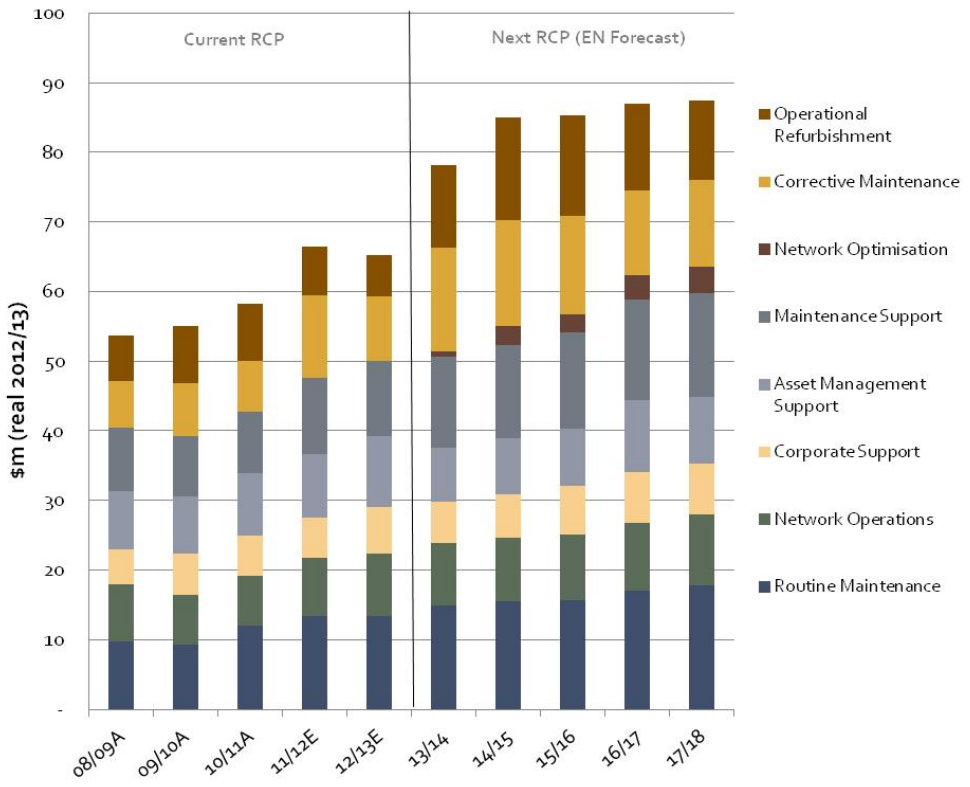
Table 15: ElectraNet total opex: Current RCP and proposed next RCP

$million (real 2012/13)

	Current RCP					Next RCP Forecast					Totals for Period ($m)	
	08/09A	09/10A	10/11A	11/12E	12/13E	13/14	14/15	15/16	16/17	17/18	Current RCP	Next RCP
Routine Maintenance	9.8	9.3	12.0	13.4	13.4	15.0	15.5	15.7	17.0	17.8	57.9	80.9
Corrective Maintenance	6.7	7.6	7.4	11.9	9.2	14.9	15.2	14.1	12.2	12.5	42.8	68.8
Operational Refurbishment	6.5	8.1	8.2	7.0	6.0	11.8	14.7	14.4	12.4	11.5	35.8	64.9
Network Optimisation	-	-	-	-	-	0.8	2.8	2.5	3.5	3.7	-	13.3
Maintenance Support	9.2	8.8	8.8	11.0	10.9	12.9	13.4	13.9	14.5	15.0	48.7	69.8
Network Operations	8.1	7.2	7.2	8.3	8.9	8.9	9.2	9.4	9.8	10.1	39.7	47.4
Asset Management Support	8.3	8.2	8.9	9.1	10.2	7.8	8.0	8.1	10.3	9.5	44.7	43.8
Corporate Support	5.1	5.8	5.8	5.8	6.7	6.0	6.2	7.0	7.3	7.4	29.2	33.8
Total Controllable	**53.7**	**55.0**	**58.3**	**66.5**	**65.3**	**78.1**	**85.0**	**85.2**	**87.0**	**87.5**	**298.8**	**422.8**

Source: RP table 6.21 (NB network optimisation and maintenance support rows transposed in original document, and were subsequently corrected by ElectraNet)

Figure 38: ElectraNet controllable opex: Current RCP and proposed next RCP



Source: RP, table 6.21

7.3 Controllable opex drivers

7.3.1 Definitions and scope

407. ElectraNet controllable opex essentially comprises network-related expenditure together with related support costs. ElectraNet defines field maintenance, comprising the following three categories:

a. Routine maintenance

b. Corrective maintenance

c. Operational refurbishment.

408. ElectraNet proposes expenditure in a category labelled Network Optimisation. This partly involves field work and partly back-office work, with the purpose of reducing network limitations and otherwise driving more from the existing network.

409. ElectraNet defines three categories of support expenditure:

a. Maintenance support is directly involved with the administration and management of field maintenance activities (which are largely out-sourced);

b. Asset manager support determines the asset management strategies and specific programs and projects of asset management work (capex and opex), including data gathering and analysis to support these strategies and programs;

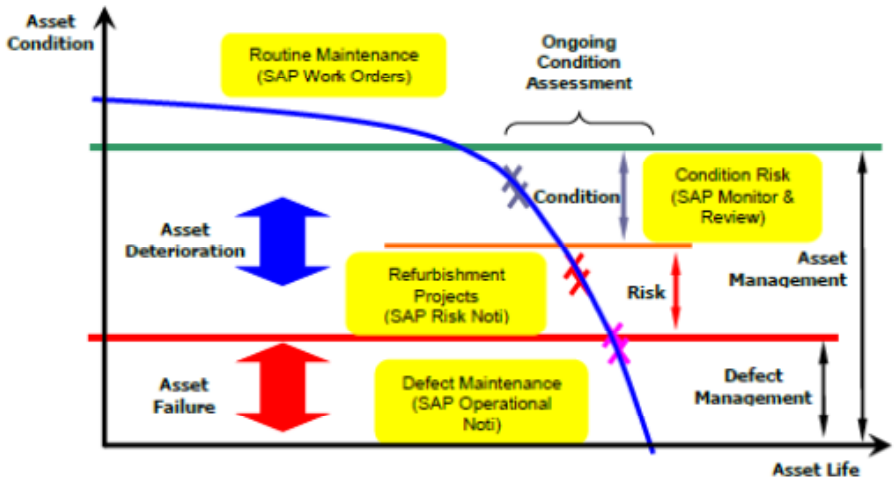
c. Corporate support provides the corporate-level functions including business governance and management and general support including accommodation, HR, IT, financial etc.

410. Finally, ElectraNet defines a category of Network Operations, which comprises real-time asset monitoring and network switching.

7.3.2 Total Asset Lifecycle framework

411. ElectraNet manages routine maintenance, corrective maintenance and operational refurbishment according to a Total Asset Lifecycle framework, as described in section 4. The framework as it applies to network maintenance is illustrated in the following diagram:

Figure 39: Managing the Asset Life Cycle



Source: ElectraNet 2012 Asset Management Plan (figure 4.3) ENET036(R)

412. This diagram illustrates how ElectraNet uses routine maintenance to manage the assets to the point where there is some potential for failure. This involves a structured series of routine maintenance tasks that are asset type-specific, together with condition monitoring that allows ElectraNet to determine and address asset risks.

413. Asset condition data is used to assess the nature of risks according to the defects that are found. These are categorised according to whether they present:

a. environmental risks (including fire-start risks in the case of lines)

b. safety risks

c. operational risks – which may lead to an outage or otherwise limit transmission capability

d. Asset risks – where asset deterioration is leading to an increasing risk of failure of the asset (or asset component) but which does not at that stage present an environmental, safety or operational risk.

414. The objectives that we infer from ElectraNet's asset management framework are to:

a. Undertake appropriate routine maintenance with the objective of "pushing out" the time at which significant defects appear;

b. Through condition assessment, aim to undertake targeted refurbishment programs where these are more cost-effective than ad hoc corrective maintenance work and can further extend the life of the asset;

c. Undertake ad hoc corrective maintenance, based on condition assessments, where risks are present and where a refurbishment program is not warranted and the asset life can be further extended in this way;

d. Undertake asset replacement where the risks are considered unacceptable and cannot be managed in a cost-effective manner by continued corrective maintenance and where replacement is more cost-effective than a refurbishment program.

415. This framework explicitly recognises the trade-offs between routine maintenance, refurbishment and replacement expenditure. ElectraNet presents a hierarchy of preferred regimes, with corrective maintenance the least-preferred maintenance process, as follows[74]:

"Only defects that have high levels of risk and short response timeframes (less than 12 months) are classified as corrective. Defects with lower risk and longer response times are either packaged as refurbishment projects, asset replacement projects or scheduled to align with routine maintenance tasks."

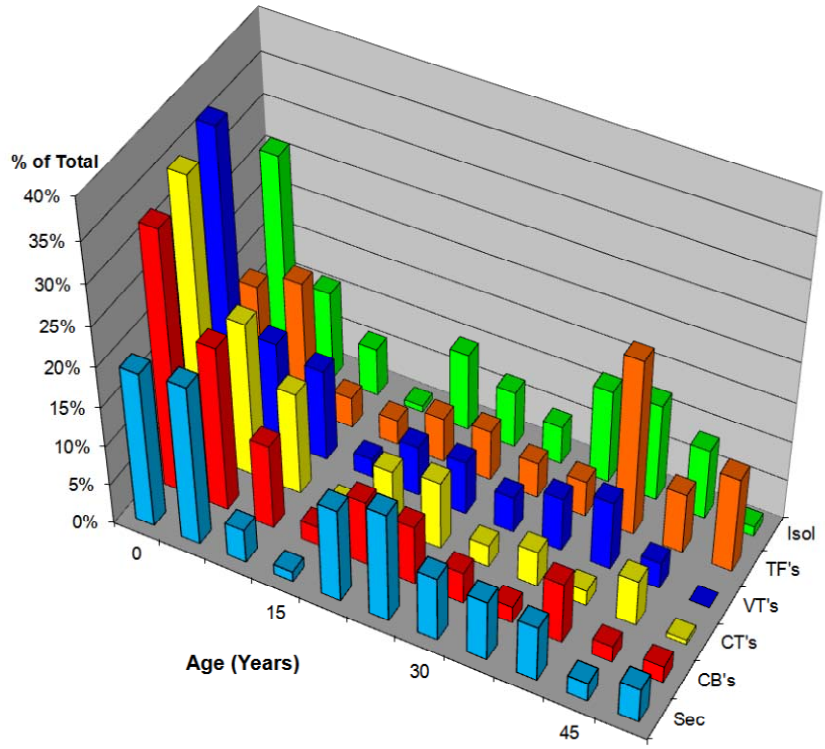
7.3.3 Asset age, condition and risk assessment

416. Asset age and condition can be considered indicators of maintenance requirements.

417. The age profile of substation assets in ElectraNet's system is relatively young (see figure 40, below). ElectraNet has proposed a relatively strong capex program for substations, involving replacement of a number of stations and building a number of new stations. We have calculated that proposed expenditure in the next RCP on substation capex and operational refurbishment represents around 36% of the "replacement cost" value for primary plant and 43% of the replacement cost value for secondary systems. While some older transformers are evident, overall the proposed capex and refurbishments will maintain a young profile for substation assets.

[74] *ElectraNet 2012 Asset Management Plan;* page 33; ElectraNet

Figure 40: Age profile of substation assets

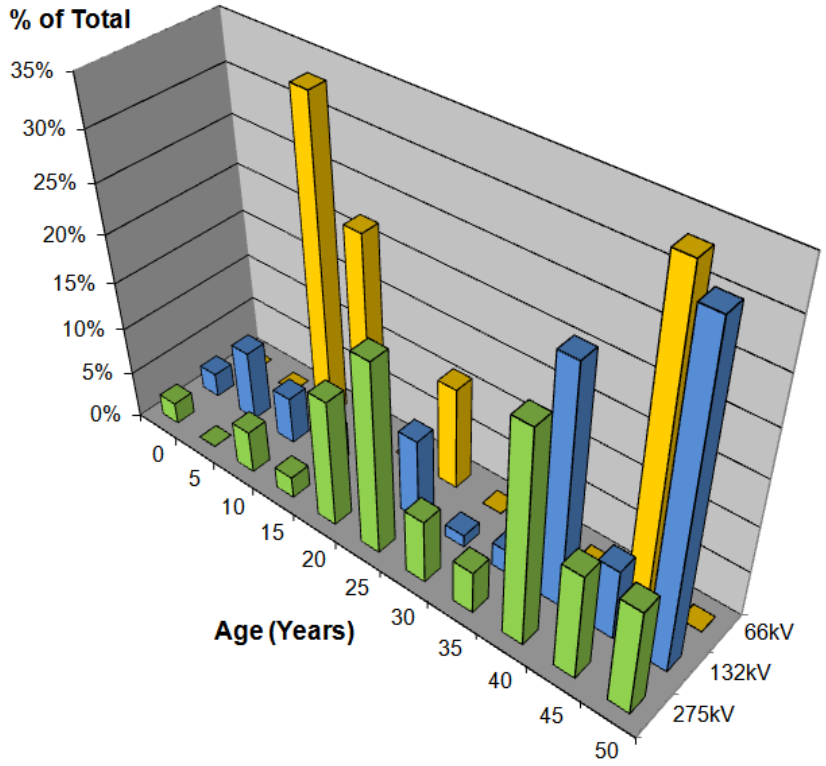


Source: ElectraNet 2012 Asset Management Plan (figure 3.3) ENET036(R)

418. The age profile of ElectraNet's lines shows a considerably larger proportion of aged assets, as is shown in figure 41 below, particularly for 132kV lines. We understand that the majority of these older lines are radial feeders into more remote areas with relatively light loads.

419. From the forecast capex proposed by ElectraNet, we have estimated that its proposed spending on transmission line capex and line refurbishment projects in the next RCP totals around 10% of the replacement value of these lines. With asset lives of around 50 years, this suggests that spending over the next (5-year) RCP will not materially improve the age profile for lines.

Figure 41: Age profile of lines assets



Source: ElectraNet 2012 Asset Management Plan (figure 3.5) ENET036(R)

420. ElectraNet has almost completed its first full cycle of condition assessment of substations and has assessed around 30% of its lines, with priority on those that were considered likely to impose greater risk to the system. This information, as represented by "defect' information, resulting risks and defect rectification costs, is reported in section 8, under "corrective maintenance".

7.4 Opex forecasting process

7.4.1 Overview

421. The methodology that ElectraNet has used to produce its opex forecast is described in Appendix R to the RP. The following descriptions are a high-level summary of the methodology described in that document, supplemented in some cases by additional information provided by ElectraNet and by our review of ElectraNet's opex forecasting model (provided in confidence).

7.4.2 Cost accumulation methodologies and outcomes

422. ElectraNet has built up its forecast costs through a combination of zero-based and "extrapolated base year" methodologies.

423. Routine maintenance costs have been developed from equipment headcounts, the specified routine maintenance tasks required for each asset type in that headcount, an assessment of the work units required for each maintenance task and pricing for those work units based on outsourced contracts.

424. Where work is project-based – such as operational refurbishment and network optimisation projects, ElectraNet has scoped each project and costed it using its costing systems.

425. Corrective maintenance has been costed from analysis of historical costs of maintenance of specific types of defects. In this way each defect type has been allocated a "value".

426. ElectraNet has costed the remainder of controllable opex by escalating from a base year (2011/12). This method has been used for Network Operations costs and for support costs (Asset Manager Support, Maintenance Support and Corporate Support). The escalation involves a scaling for asset growth, including the application of different factors (less than or equal to 100%) against different components of opex.

427. For all opex, price escalation factors have also been applied, differentially for labour and non-labour components.

7.4.3 ElectraNet's opex model

428. ElectraNet has provided a relatively comprehensive model in support of its proposed opex[75]. The methodology diagram in "Appendix A", which is contained within "Appendix R" of the RP provides a good overview of this model. We have reviewed the workings of this model and we find that it essentially works as described in the documentation. As a high-level summary, the model contains a number of explicit inputs, a series of calculation models (essentially one per category of opex expenditure), application of escalation and growth factors and outputs which can be traced to the opex proposed in the RP.

429. We note one difference from the methodology as originally presented: Appendix R (v1.0) indicated that the base year used for "extrapolated" opex was the 2010/11 audited financial statements. ElectraNet subsequently released an amended version of Appendix J (v1.1) which contained a revised methodology diagram showing a base year of 2011/12 and we can confirm that the model uses the 2011/12 projected financial data as its base. Except for Network Operations, the 2011/12 costs that are used for extrapolation purposes are (in real terms) somewhat greater than they were in 2010/11.

7.4.4 Real cost escalators

430. ElectraNet has applied labour cost escalation from 2.0% p.a. increasing to 2.8% p.a. (in real terms) by the end of the RCP, as shown in its Appendix J to the RP (table 5). Non-labour components are escalated at CPI (i.e. held constant in real terms).

[75] Provided in confidence

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8 Review of ElectraNet's proposed opex

8.1 Introduction

431. In this section, we provide our assessment of the reasonableness of proposed opex. We first review the overall cost trend, after which we present our assessment of each component, focusing first on those components where we do not consider the proposed expenditure to be reasonable.

432. Our findings were presented in section 2, along with the quantitative implications of adopting those findings; therefore this section provides the support for those findings.

8.2 Approach to assessment of forecast opex

433. We have assessed ElectraNet's proposed opex by reference to the "TALC" asset management framework that ElectraNet has adopted, and which we described in section 4. We have largely accepted the principles of this framework and so our assessment of the proposed opex focuses on the way in which that framework has been used to develop ElectraNet's opex proposal.

434. Accordingly, our review has focused particularly on:

a. The benefits that ElectraNet is achieving and expects to achieve from this framework;

b. The input data that is being used – especially ("SCAR") data on asset condition / defects – and the way this data is being interpreted and translated into work requirements; and

c. The ways in which ElectraNet is using this lifecycle asset management framework to determine appropriate trade-offs between cost and risk, and between present and future costs.

435. We have also considered the extent to which ElectraNet's opex program is efficiently procured, taking account of opportunities for ongoing innovation and efficiency improvement that we would expect to find in a well-run utility, and its ability to deliver the proposed opex program.

8.3 Observations on overall opex trends

436. The table below shows that ElectraNet proposes an increase in opex of $124m (in real terms), or 42%, from the current RCP to the next. This is an average increase of $25 million / year.

Table 16: Opex expenditure trends ; current RCP to next RCP

$million (real 2012/13)

	Current RCP Total	Next RCP Total	Increase ($)	Increase (%)	Annual Average cost			
					Current RCP	Next RCP	Current RCP Historical (first 3 years)	Current RCP Projected (final 2 years)
Routine Maintenance	58	81	*23*	*40%*	11.6	16.2	10.4	13.4
Corrective Maintenance	43	69	*26*	*61%*	8.6	13.8	7.2	10.6
Operational Refurbishment	36	65	*29*	*81%*	7.2	13.0	7.6	6.5
Network Optimisation	-	13	*13*	*N/A*	-	2.7	-	-
Support	123	147	*25*	*20%*	24.5	29.5	23.0	26.9
Network Operations	40	47	*8*	*19%*	7.9	9.5	7.5	8.6
Total Controllable	**299**	**423**	***124***	***42%***	**59.8**	**84.6**	**55.7**	**65.9**

Source: EMCa analysis from ElectraNet data in response ENET071(C), ENET100(P)

437. As we have noted in section 3, there is a step increase in opex that has already occurred between the three historical years of the current RCP, in which ElectraNet achieved efficiencies of $5m relative to the AER's previous decision, and the projection for the final two years of the current RCP in which ElectraNet projects to overspend relative to that decision by $6m. Its average projected spend in those two years is $66m/year, versus $56m/year for the first three years of that period.

438. The most significant increases arise from operational refurbishment (81% increase) and corrective maintenance (61% increase). This work is driven from the condition-based maintenance regime that ElectraNet has introduced over this period, the defects that have been identified and ElectraNet's view as to the work that it should undertake to address these defects.

439. ElectraNet has also, in this time, implemented a more comprehensive regime for routine maintenance, with a highly-specified asset type-specific set of routine maintenance tasks and task frequencies. This represents an overall increase in routine maintenance.

440. ElectraNet has developed and is in the process of deploying the condition-based maintenance regime and has incurred a cost in doing so. We discuss this in the next subsection.

441. ElectraNet's support costs rose considerably between the historical first three years of the current RCP and the projections for the final two years, and are projected to increase further in the next RCP, representing a total 20% increase between the two RCPs. ElectraNet also proposes a 19% increase in Network Operation costs.

442. A new category of expenditure, "Network Optimisation", is proposed ($13m).

8.4 Development and deployment of condition-based maintenance regime

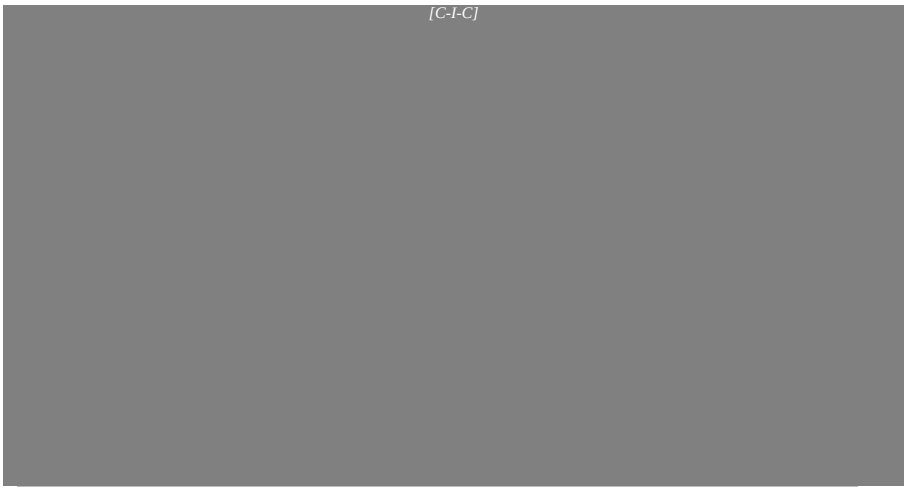
443. The condition-based maintenance regime represents a major strategic initiative by ElectraNet. It was commenced prior to the current RCP, major elements of its implementation have occurred during the current RCP and deployment is proposed to continue through the next RCP with the inclusion of significant additional condition information and associated assessment. While this regime has yet to complete its first full cycle, it has a major influence on the proposed opex.

444. We asked ElectraNet for information on the business case for developing and implementing this asset management framework, together with an implementation program including priorities, timeframe, expected outcomes / targets and external and internal resource costs.

445. ElectraNet replied that the framework developed from an Asset Data and Information Management Plan, developed in 2008. The work required to implement it was approved via annual business unit plans and budgets and Executive Management Team and ElectraNet states that the Board was kept informed via briefing presentations.

446. We have not seen evidence of this framework having been considered as a program, with an all-up estimate of the quantified resources required, the quantified benefits to be achieved and their timing. From information that we understand dates from 2008, we can see that ElectraNet was projecting this program would halt a decline in its reliability and functionality risks (see figure below). However, we have not seen evidence that the benefits of reducing these risks have been assessed against the costs of the program to achieve this goal.

Figure 42: ElectraNet's projection of substation 20 year risk profiles



Source: ElectraNet Asset Management Plan presentation, in response ENET180(R)

447. From information provided by ElectraNet, we estimate that this framework has cost of the order of $17m to date with a further $33m included in the next RCP, for an all-up cost in the vicinity of $50m[76]. This comprises the cost of establishing the framework, including the costs of collecting the condition data (which is included in opex refurbishment costs and is now inherent in routine maintenance tasks), together with some costs for data collection tools, information systems configuration and "asset manager" costs to develop, specify and maintain the regime. For clarity, this cost estimate does not include any corrective or other physical work on the assets themselves that may result from application of the regime.

448. At a principles level, we tend to support condition-based maintenance regimes because they can facilitate lifecycle management of risks in a transparent and cost-effective manner. This framework involves trade-offs between expenditure and risk and it is possible under such a framework to measure and project levels of risk for given levels of expenditure; also to assess the future cost implications of bringing forward or deferring corrective maintenance and refurbishment, using a "net present value" framework.

449. Our concerns with the deployment of this framework by ElectraNet are as follows:

a. Because the all-up cost of implementing this regime does not appear to have been recognised within ElectraNet, so the benefits of the regime have not been calculated and articulated. In the next RCP we can see considerable additional costs yet we cannot see quantified benefits resulting from this investment, either within or beyond the next RCP;

b. We consider the implementation to be weak in regards justification for risk / cost trade-offs and current cost / future cost trade-offs that are inherent in the proposed programs of corrective maintenance, refurbishment and asset replacement. The claim is made that the program is insensitive to risk and that only high-risk conditions are being addressed. However, there is a considerable volume of work proposed whose objective is in principle to halt deterioration of the assets, but for which the economics and risk implications of doing so at this time and in the manner proposed, have not been presented;

c. The asset condition database that is being assembled to support this regime is comprehensive and therefore costly. With full analysis of the costs and options, we consider it likely that greater reliance could have been placed on sampling and asset type-focus such that the majority of the benefits could be achieved with considerably lower deployment cost;

d. We have a concern that the framework has in effect become a "machine" which has been used to develop the forecast of opex requirements. We have concerns regarding the validity of extrapolation of past data (such as incoming defect rates)

[76] The components in our cost assessment include the current and future RCP costs of lines condition assessments, the step increase in routine maintenance costs that ElectraNet has attributed to re-specifying its routine maintenance tasks to include condition-based inspections and data collection, an estimate of costs for additional staff in Asset Management (as noted to us) and some allowance for costs incurred in data management, system configuration, analysis and reporting capability (SAP and hand-held data input devices).

which are important inputs to the machine, and of the "translation" of these defects into a work program as the output from the machine.

450. These concerns drive our assessments of corrective maintenance, operational refurbishment and routine maintenance (in subsequent sections) and also influence our assessment of the proposed capex replacement program, as presented in section 6.

8.5 Assessment of corrective maintenance

8.5.1 Introduction

451. ElectraNet proposes a significant increase in corrective maintenance, with the majority of the additional work being focused on lines, as shown in the following table and graph. The proposed corrective maintenance expenditure over the next RCP is $69m, which comprises 16% of controllable opex.

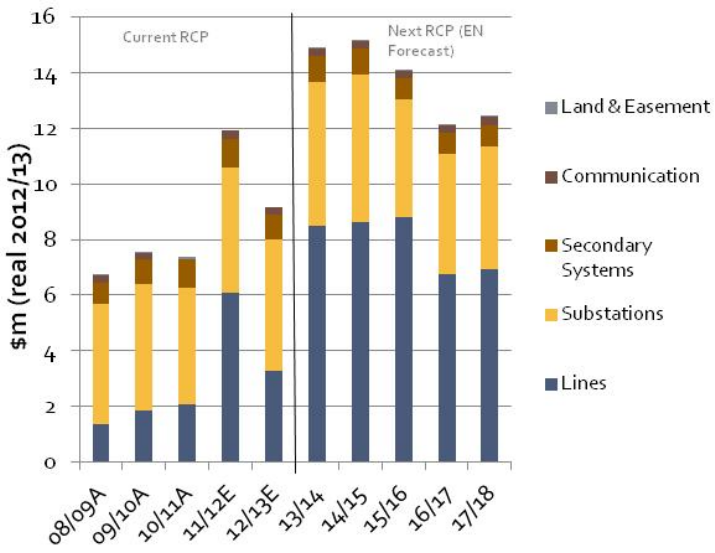
Table 17: Actual and proposed corrective maintenance

$million (real 2012/13)

	Current RCP					Next RCP Forecast					Current RCP Total	Next RCP Total
	08/09A	09/10A	10/11A	11/12E	12/13E	13/14	14/15	15/16	16/17	17/18		
Lines	1.3	1.8	2.1	6.1	3.3	8.5	8.6	8.8	6.8	6.9	14.6	39.6
Substations	4.3	4.6	4.2	4.5	4.8	5.2	5.3	4.2	4.3	4.4	22.3	23.4
Secondary Systems	0.8	0.9	1.0	1.0	0.9	0.9	0.9	0.7	0.8	0.8	4.6	4.2
Communication	0.2	0.2	-	0.3	0.3	0.3	0.3	0.3	0.3	0.3	1.0	1.4
Land & Easement	0.0	0.1	0.1	-	-	0.0	0.0	0.0	0.0	0.0	0.1	0.2
Corrective Maintenance	**6.7**	**7.6**	**7.4**	**11.9**	**9.2**	**14.9**	**15.2**	**14.1**	**12.2**	**12.5**	**42.8**	**68.8**

Source: EMCa, from ElectraNet opex model and ElectraNet response ENET100(P)

Figure 43: Actual and proposed corrective maintenance



Source: EMCa, from ElectraNet opex model and ElectraNet response ENET100(P)

452. ElectraNet has estimated this work in two components:

a. A base level, corresponding to the forecast rate of incoming asset defects, and

b. A backlog component, covering the current "stock" of defects that have been identified but not yet rectified.

453. ElectraNet has proposed corrective maintenance on substations in the first two years of the next RCP of around $5.5m[77], approximately the same as current spend, reducing to $4.5m from year 3.

454. ElectraNet's actual expenditure on lines in the first three years of the current RCP averaged $1.7m. In 2011/12 this was nearly doubled to $3.3m and ElectraNet has budgeted the same amount in 2012/13. ElectraNet proposes to increase expenditure to $8m p.a. for the first 3 years of the next RCP, reducing back to $6m p.a. in the final two years of the next RCP.

8.5.2 Our approach

455. EMCa have analysed the rationale presented by ElectraNet both for its assessment of the longer-term base level of corrective maintenance work, and for the work proposed to address the current backlog of defects. We have also considered the interaction between corrective maintenance, refurbishment and asset replacements, each of which has a role in addressing defects. In observing the increase in proposed expenditure, we have sought to explain the benefit that ElectraNet would obtain from this increased level of work and the implications of maintaining a corrective work program around the current level, noting that this is already considerably higher than historical actual expenditure (in the first three years of the current RCP).

8.5.3 Assessment

Corrective maintenance base level - substations

456. The first cycle of substation condition assessment is now largely complete and will be totally complete by the end of the current RCP. ElectraNet has presented information on the incoming defects rate from the last two years of this assessment but it has used the average rate for the last two years to produce its forecast for corrective maintenance work. We would now expect the incoming rate of defects to reduce as the cycle is progressed because:

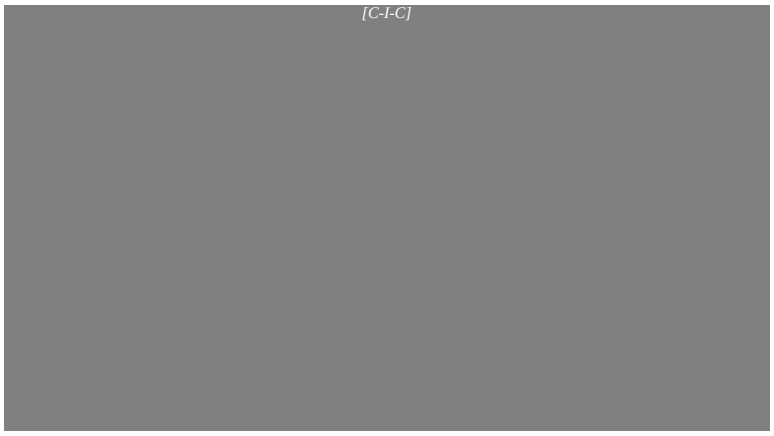
a. ElectraNet has prioritised its condition assessments, to focus first where it expected to find more / higher-risk defects;

b. Around 50% of the defects identified in this first cycle have been classified as "high-risk", to be rectified within 30 days. As these defects are progressively addressed, there will be fewer such new defects arising in subsequent inspection cycles and so we can expect that incoming trend will be towards defects with lower-risk and longer time-frames.

457. Information provided by ElectraNet indicates a slightly declining trend, as shown (in blue) in ElectraNet's diagram below:

[77] Costs in the subsequent part of this section are presented in the same form as the inputs to ElectraNet's opex model, that is, in $2011/12 terms and prior to cost escalation.

Figure 44: Defect notification incoming rates - substations



Source: ElectraNet, from response ENET211(C)

458. ElectraNet's Asset Management Plan also shows, in its long-term maintenance analysis, that it expects a declining trend[78] and ElectraNet has specifically stated that it expects a reduction in substation corrective maintenance effort as a result of the significant number of large substation asset replacement projects[79].

459. Yet, ElectraNet has claimed that this reduction will be offset by higher maintenance requirements on new assets – the so-called "bathtub effect" in which maintenance requirements are assumed to peak when the asset is new, and again towards end-of-life. We do not agree with this claim. We sought further information from ElectraNet on its warranty provisions, which are as we would expect. To the extent that defects may be recorded on new or replaced assets, the cost of corrective maintenance at this stage will tend to be to the account of the plant providers and construction contractors. Furthermore, modern substations tend to be more "modular" with solid state pre-tested componentry that are less likely to fail in the early stages of its life than was traditionally the case.

460. In its Asset Management Plan, ElectraNet provided information on the risk characteristics of incoming defect "notis"[80]. This shows that approximately 45% of defects measured over this period are "high risk", with either operational, safety or environmental risks. The remaining risks are classed as "asset" risks. These present a risk of the asset component failing, but without safety, environmental or operational consequences. We consider these to essentially involve engineering economic trade-offs in which the options are to:

[78] *ElectraNet 2012 Asset Management Plan*, figure 6.10; ElectraNet. If the graph is interpreted as a trend level of [C-I-C] /month as at end of period rather than the [C-I-C] period average as assumed by ElectraNet, then the difference equates to around [C-I-C] worth of fewer defects per annum.

[79] *Response ENET182(C),* figure 5.4 New Substation Commissioning Timing, page 15; ElectraNet

[80] *ElectraNet Asset Management Plan*, Appendix C, table C.1 (confidential appendix); ElectraNet

a. Correct the defect in the near term, as presented (i.e. ad hoc);

b. Address the defect as part of a refurbishment program in the near term;

c. Defer work and monitor the defect to ensure that it can be addressed before becoming an environmental, safety or operational risk.

461. In our meetings with ElectraNet, we questioned what analysis underlies its proposed treatment of defects, i.e. its choices from a menu of options such as we have listed above. We sought information as to how ElectraNet had taken account of the cost/risk and economic trade-offs in determining the optimal course of action to address different types of defects. We were informed that corrective maintenance is assumed to address all defects classified as requiring work within one year", with all other defects not requiring work within one year being allocated to "refurbishment".

462. While acknowledging the concept of cost/risk and economic trade-offs[81], ElectraNet has not presented evidence to us of any analysis aimed at determining the appropriate cut-off points and courses of action. For example, we have not been able to find evidence of lifecycle "correct now" vs. "correct later" engineering/economic options analysis, which would be particularly relevant to "asset-related" defects[82] which comprise 55% of total substation defects identified for corrective maintenance. Such analysis would draw a boundary line through asset-related defects, and which we consider would likely lead to economic deferral of a proportion of this work.

463. We found that ElectraNet routinely undertakes further assessment of corrective maintenance requirements in the process of allocating corrective work tasks to its contractors. This is a logical step and we would expect it to lead to some work that is indicated from its defects management system, being filtered out. In its forecasting, ElectraNet has discounted the assumed corrective maintenance by 20% from that indicated as a direct calculation from its systems, to allow for this rationalisation[83].

464. On balance, we therefore conclude that the proposed "base" level of substation corrective maintenance ($4.5m per year) has been overstated. We consider that a more reasonable level of required effort will be of the order of $1m less than this amount. This lower level is supported by our review of ElectraNet's incoming defects trend information and ElectraNet's assessment of expected maintenance effort trends from it Asset Management Plan. It is also consistent with our view that high-risk defects should reduce by at least 50% following completion of the first cycle of condition assessment and that further analysis of the business case for addressing asset-related defects will establish a boundary line for prudent deferral of a proportion of otherwise-indicated corrective maintenance.

[81] See for example figure 4.3 in 2012 AMP, and which we have reproduced as figure 39

[82] As opposed, for example, to operations-related defects or safety-related defects

[83] See ENET211(C), page 4

Corrective maintenance backlog – substations

465. ElectraNet has proposed corrective maintenance work totalling $2.5m, to address a claimed backlog of work that is assumed to exist at the beginning of the next RCP.

466. We have reviewed ElectraNet's information on the backlog of substation defects that have not been allocated to "refurbishment or replacement" and our analysis indicates a backlog of around four to five months of such work[84]. At an assumed incoming rate of $3.5m (as above) the value of such defects is of the order of $1.5m, which compares with the claimed figure of $2.5m.

467. ElectraNet is currently spending of the order of $5.6m per year on substation corrective maintenance (in 2011/12 and 2012/13). Given our assessment of an incoming rate of (currently) $4.5m p.a. but declining to $3.5m p.a. by the end of the current RCP, we consider that ElectraNet will have exhausted this backlog by the beginning of the next RCP. So, we consider that the proposed allowance for backlog substation maintenance is not reasonable and should be disallowed.

Corrective maintenance base level - Lines

468. The formal "first cycle" transmission line condition assessment information gathering commenced in 2009 and is currently 30% complete, with ElectraNet estimating 45% completion by the end of the current RCP[85]. ElectraNet has stated that this work will be completed within the next RCP. To the extent that this work is warranted on a risk basis, then it is logical that it should be completed promptly. From our inspection of the proposed work program and from the completion profile above, we would expect the first cycle to be largely if not fully complete by the end of the third year of the next RCP, which will already be six to seven years after it commenced.

469. ElectraNet has already focused to date on the highest-risk defects (category "Z"), namely those presenting a risk of conductor-drop with consequent fire and safety hazard and ElectraNet has focused lines corrective maintenance effort on these defects, with what now is essentially a zero backlog. This is evident in the doubling of lines defect maintenance that occurred in 2011/12, and that higher level has been continued into 2012/13.

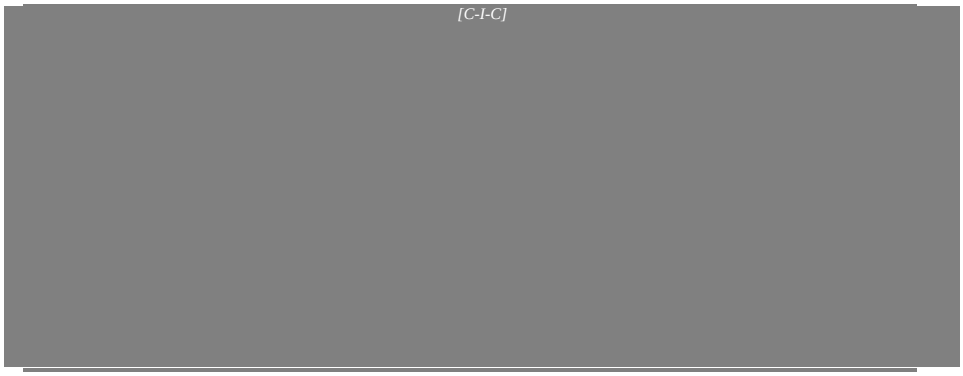
470. ElectraNet has estimated that at the current rate of incoming lines defects that are allocated to corrective maintenance (i.e. requiring rectification within one year) is $6.9m

[84] This is primarily drawn from analysis of figure 5.1 in ENET182(C), System Condition and Risk: A Framework for Understanding Asset Risk in the Transmission Network. The diagram shows a backlog as at 01/04/12 of the order of [C-I-C] defects and an incoming rate of [C-I-C] / month, i.e. the backlog represents 4.5 months of incoming defects.

[85] ENET211(C), page 6

p.a.[86] and has set this "conservatively" at $6.0m base expenditure requirement. Its raw incoming defects cost data is shown below

Figure 45: Defect notification incoming rates - lines



Source: ElectraNet, from response ENET211(C)

471. Because the condition assessment cycle for lines is at an earlier stage, ElectraNet's time trend for incoming defects does not yet show a downward trend. The proposed level of $6.0m, while less than the incoming rate, does not (after excluding defects allocated to refurbishment and replacement) appear to have been discounted by the same factor as for substations (i.e. 0.8 x $6.9m = $5.5m). Further, while 40% of these defects (by value) have been categorised as presenting an operational risk, the remaining 60% have been categorised as "asset-related", and do not therefore have and immediate operational risk. Almost no lines defects in the data presented in the asset management plan have safety or environmental risks. On the information presented, ElectraNet's statement in the asset management plan that

> *"The current annual expenditure is adequate to deal with incoming Operational, Safety and Environment (urgent high risk defect notifications) only"*

appears to be correct. The corollary to this is that a reduction in corrective maintenance would not appear to have a direct or immediate effect on operational reliability, safety or the environmental (including fire-start hazard).

472. As with our assessment for substations, this leaves open the question as to what level of asset risk-related corrective maintenance is appropriate and we have not been presented with evidence of lifecycle engineering/economic options analysis, which would clearly establish this. We consider this significant, since this proposed expenditure represents 60% of the value of lines defects and, as with substations, we consider it likely on balance that such analysis would indicate that economic deferral of a proportion of this work is a more appropriate course.

473. In the absence of further evidence justifying the asset risk-related defects expenditure, our assessment is that this could be halved – that is, from around $4m p.a. to $2m p.a.

[86] This is the sum of the R, O, S and Z category defects presented in table C.2 of the 2012 Asset Management Plan (confidential Appendix C). The "all defects" figure of $8.3m in this table includes defects that are allocated to refurbishment and replacement.

We would tend to apply this reduction to the $6.9m of incoming defects; that is, it would effectively incorporate the "discounting" of incoming defect work that will result from the further assessment of corrective maintenance requirements in the process of allocating corrective work tasks to its contractors. That is, we consider that a more reasonable indication is for a base level of lines defect maintenance in the first three years of the next RCP, at $4.9m rather than the proposed $6.9m.

474. Once the first cycle is complete then, as with substations, we consider it likely that the incoming rate of "<120-day" defects will reduce considerably as these more urgent defects will have already been addressed. In the absence of further information, we consider it reasonable to assume that this component, which currently represents 55% of all defects, will halve, leaving a requirement for $3.5m p.a. of corrective maintenance for lines in the final two years of the next RCP. This is nevertheless more than ElectraNet is currently spending and considerably more than appears to be required to cover high-risk defects.

Corrective maintenance backlog – lines

475. From information provided by ElectraNet, there appears to be a backlog of around 10 months of lines-related corrective maintenance. At the incoming defects level assumed by ElectraNet, this equates to around $6m (the figure proposed by ElectraNet)[87]. If the value of defects that are justified as requiring corrective maintenance is assumed to be $4.9m, then the equivalent backlog value is around $4.2m.

476. The current level of spending will reduce the backlog and we consider it reasonable, as ElectraNet has proposed, to allow for a level of backlog spending in the next RCP. The assessed backlog above equates to spend of $1.4m p.a. for the first three years of the next RCP, and zero thereafter.

477. In aggregate, therefore, we consider that a reasonable estimate is for spending of $4.9m + $1.4m = $6.3m p.a. for the first three years of the RCP (being almost double the current level), then reducing to $3.5m p.a..

8.6 Assessment of operational refurbishment

8.6.1 Introduction

478. ElectraNet proposes to approximately double its expenditure on operational refurbishment, with the work approximately evenly split between lines and substations, and minimal expenditure on other assets. The proposed refurbishment expenditure over the period is $65m, which comprises 15% of controllable opex.

[87] ENET182(C), [C-I-C], i.e. the backlog represents 10 months of incoming defects.

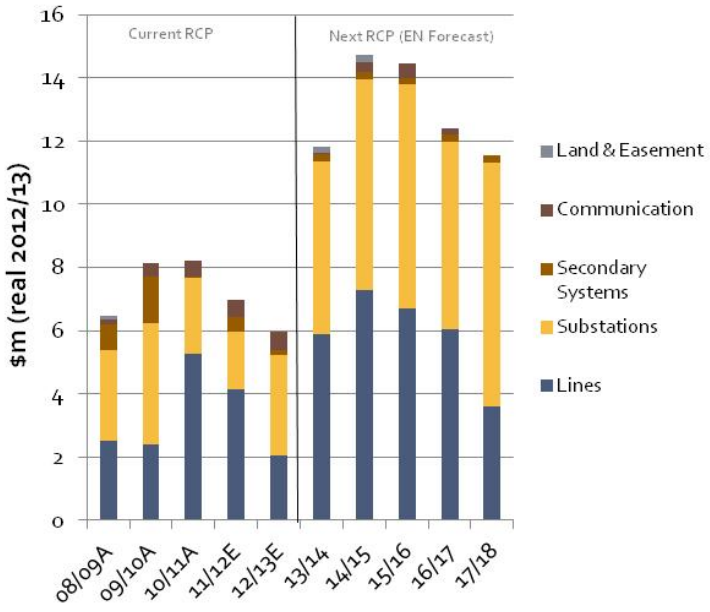
Table 18: Actual and proposed operational refurbishment expenditure

$million (real 2012/13)

	Current RCP					Next RCP Forecast					Current RCP Total	Next RCP Total
	08/09A	09/10A	10/11A	11/12E	12/13E	13/14	14/15	15/16	16/17	17/18		
Lines	2.5	2.4	5.2	4.1	2.0	5.9	7.3	6.7	6.0	3.6	16.3	29.5
Substations	2.9	3.8	2.4	1.8	3.2	5.5	6.7	7.1	5.9	7.7	14.1	32.9
Secondary Systems	0.8	1.5	0.0	0.5	0.1	0.2	0.2	0.2	0.2	0.2	3.0	1.0
Communication	0.1	0.4	0.5	0.6	0.6	0.1	0.3	0.5	0.2	-	2.2	1.1
Land & Easement	0.1	-	-	-	-	0.2	0.2	-	-	-	0.1	0.4
Operational Refurbishment	**6.5**	**8.1**	**8.2**	**7.0**	**6.0**	**11.8**	**14.7**	**14.4**	**12.4**	**11.5**	**35.8**	**64.9**

Source: EMCa, from ElectraNet opex model and ElectraNet response ENET100(P)

Figure 46: Actual and proposed operational refurbishment expenditure



Source: EMCa, from ElectraNet opex model and ElectraNet response ENET100(P)

479. The forecast cost is "zero-based" in that ElectraNet has built it up from a series of projects.

8.6.2 Our approach

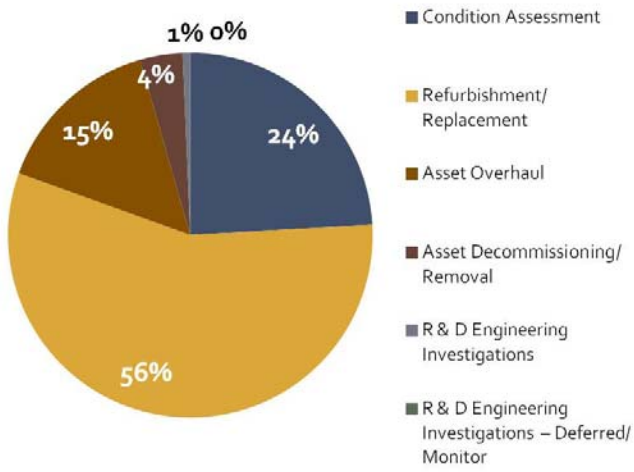
480. We sought information on the nature of the proposed work, the drivers for it and on the process by which ElectraNet had determined the cut-off point for projects to be included. We assessed these aspects by consideration of the risk-based asset management framework that ElectraNet has adopted.

8.6.3 Assessment

Nature of the proposed work

481. The figure below shows the nature of the proposed operational refurbishment expenditure.

Figure 47: Operational refurbishment by category



Source: EMCa from ElectraNet response ENET201(C)

482. Approximately $15m of the proposed expenditure is for condition assessment, almost all being for lines, and continuing the deployment of the condition-based maintenance regime. It is not clear to us why this work has been characterised as asset refurbishment, particular since ElectraNet defines its maintenance support category as including "asset condition monitoring and analysis".

483. Of greater concern is the level of expenditure given the lack of an explicit business case (as described in section 8.4) for the condition-based maintenance regime, and which would have clearly articulated the objectives, costs and benefits of this program. We stress that we are favourably disposed towards condition-based maintenance framework, however it is difficult to accept as reasonable the levels of proposed further spending (of which this is a part) without clearly identified cost savings and their timing, or reasonable and projected improvements to other aspects of risk (including operational reliability).

ElectraNet's assessment process

484. ElectraNet described a process whereby an initial set of expenditure forecasts was put forward to the executive team and a series of round-tables was held to review and critically assess the program and the criticality of the initially-proposed projects and programs of work. ElectraNet informed us that in excess of [C-I-C][88] was originally considered, and it was decided to place around [C-I-C] of this potential work, comprising "medium and low risk" projects, under a "defer and monitor" regime[89]. Additional opex refurbishment projects comprising around $54m were also considered, but were

[88] Figures quoted here are understood to be $2011/12, prior to escalation, and therefore do not reconcile exactly with the RP figures. However they are considered adequate to indicate the movements that occured.

[89] EMCa analysis from information provided by ElectraNet in response ENET201: OPEX Program Sensitivity Analysis – Additional Information(C)

subsequently considered to be of a capital nature and comprise the proposed refurbishment capex[90] (see section 6).

485. We sought information from ElectraNet on the relationship between risk and proposed costs, and the sensitivity of this relationship. ElectraNet advised that it considered that all of the proposed operational refurbishment work was "high risk" but that, if required to reduce its budget, it would likely reduce the proposed transmission lines condition assessment work[91].

486. Beyond this point, ElectraNet stated that it considered all remaining projects to be of equal (high) risk. So, we have compared these projects with those proposed as being "high risk" in ElectraNet's 2012 Asset Management Plan[92] and whilst the projects are consistent between the two documents, the proposed risk status is not always specified in the Asset Management Plan.

487. ElectraNet has presented what appears to be a strong risk-based asset management decision-making framework supported by a considerable investment in tools, systems, procedures and data. However, EMCa considers that this asset management framework should make it possible to provide greater definition of the risk implications of a range of maintenance expenditure scenarios, rather than the broad brush cut-off of proposing all high-risk projects and deferring all medium and low risk projects. EMCa notes, for example, that from graphs such as that reproduced on the next page (from ElectraNet's Asset Management Plan) showing asset functionality as a function of what we understand to be a scenario of maintenance expenditure; also analysis presented to us of measures of "asset health" resulting from maintenance regimes.

488. This graph shows that ElectraNet's analysis expects maintenance effort to fall from a relative level of 2.6 to 1.8, over the ten-year period from the beginning of the current RCP (end of period 1) to the end of the next RCP (end of period 3).

[90] From ElectraNet response ENET168: Capex and Opex RP budget process(P)

[91] ENET185(C) in response to request EMCa026, and ENET213(C) in response to EMCa048,

[92] See for example tables f.5 and f.6 in ElectraNet's AMP. Projects for other categories are spread in a number of similar tables.

Figure 48: Asset 20 year risk profile[93]

Source: ElectraNet Asset Management Plan, figure 6.10, ENET036(R)

Drivers and conclusions on reasonableness

489. The refurbishment program is understood to be driven by needs identified through condition assessment. ElectraNet was able to identify approximately [C-I-C] of currently-identified defects which had been allocated to refurbishment or replacement. Given the approximations in such a value, and that ElectraNet is only 30% of the way through its cycle of lines condition assessment, this seems to broadly justify a refurbishment program (excluding condition assessment itself) in excess of this figure.

490. The condition assessment program for all ElectraNet's substations has almost completed its first full cycle, and ElectraNet has told us that its lines assessment program, while being only 30% complete, has focused on higher risk assets. Nevertheless, ElectraNet has chosen to reduce its opex refurbishment expenditure in the final two years of the current RCP. We would not expect the prudent management of network assets to be driven by the regulatory cycle.

491. In the absence of more granular and more compelling evidence as to how ElectraNet has set the criteria for inclusion of particular projects and the exclusion of others, and given the lack of a business case for the condition assessment component of this work, but considering the needs evident from the condition data now coming available, we consider that a more reasonable estimate of the required increase is of the order of 50% of that proposed by ElectraNet. This equates to an increase of $14.5m on the current RCP expenditure of 35.8m, and (with rounding) is a similar amount less than the $64.9m that ElectraNet has proposed.

[93] The "start" point on this graph is the beginning of ElectraNet's first RCP. The current RCP is the second period, therefore the end of the third period corresponds to the end of the next RCP.

8.7 Assessment of routine maintenance

8.7.1 Introduction

492. ElectraNet proposes a 40% increase in its routine maintenance expenditure, from $58m in the current RCP (an average $11.6m p.a.) to $81m in the next RCP ($16.2m p.a.). The current RCP expenditure increased significantly, from $9.8m in the first year to $13.4m forecast for 2012/13 and ElectraNet's proposed expenditure also increases strongly over the next RCP, starting at the higher level of $15.0m and increasing to $17.8m at the end of the next RCP. The majority of this increase is for substations and secondary systems.

493. ElectraNet's routine maintenance forecast is "zero-based", in that it is driven from a tightly-specified maintenance regime involving asset type-specific maintenance tasks, specified maintenance intervals for such tasks and contracted costings for each task based on standardised "work units". ElectraNet calculates the routine maintenance forecast by applying these task-based maintenance costs to the projected headcount of each asset type. Costs are escalated using ElectraNet's cost escalation assumptions.

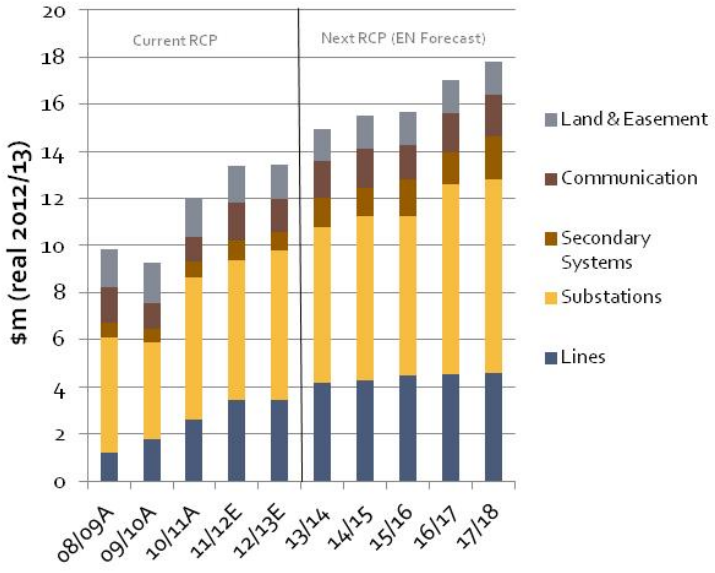
Table 19: Actual and proposed routine maintenance expenditure

$million (real 2012/13)

	Current RCP					Next RCP Forecast					Current RCP Total	Next RCP Total
	08/09A	09/10A	10/11A	11/12E	12/13E	13/14	14/15	15/16	16/17	17/18		
Lines	1.2	1.8	2.6	3.4	3.4	4.2	4.3	4.5	4.5	4.6	12.4	22.0
Substations	4.9	4.1	6.0	5.9	6.4	6.6	7.0	6.8	8.1	8.2	27.3	36.6
Secondary Systems	0.6	0.6	0.7	0.8	0.8	1.3	1.2	1.5	1.4	1.8	3.5	7.2
Communication	1.5	1.1	1.1	1.6	1.4	1.5	1.7	1.5	1.6	1.8	6.7	8.1
Land & Easement	1.6	1.7	1.6	1.6	1.5	1.4	1.4	1.4	1.4	1.4	8.0	6.9
Routine Maintenance	**9.8**	**9.3**	**12.0**	**13.4**	**13.4**	**15.0**	**15.5**	**15.7**	**17.0**	**17.8**	**57.9**	**80.9**

Source: EMCa, from ElectraNet opex model and ElectraNet response ENET100(P)

Figure 49: Actual and proposed routine maintenance expenditure



Source: EMCa, from ElectraNet opex model and ElectraNet response ENET100(P)

8.7.2 Our approach

494. We have reviewed routine maintenance examining its components and the primary drivers that ElectraNet has used, as described in section 8.7.1 above.

8.7.3 Assessment

495. As discussed in section 3, there were significant increases in routine maintenance costs between 2009/10 and 2010/11 and again to 2011/12. This was driven by the implementation of an enhanced routine maintenance regime involving more comprehensive inspections and condition assessments. This increased expenditure was effectively part of the implementation of the condition-based maintenance regime and the enhanced regime is the basis on which future routine maintenance costs have been projected.

496. As discussed in section 8.4, we are concerned that a business case is not evident for the development and implementation of this regime. Relative to routine maintenance expenditure costs before this new regime (i.e. prior to 2010/11) we estimate that approximately $9m of additional routine maintenance expenditure was incurred in the current RCP and approximately $15m of the $23m increase in the next RCP also appears to be attributable to this new regime.

497. We have calculated that ElectraNet's price growth assumptions account for around $3m of the increase, and we can broadly attribute the remainder (approximately $5m) to the increase in the actual number of assets over the period (in particular, substation assets).

498. The increase due to additional asset headcount is logical and we have not been asked to form a view on price escalation assumptions. We have considered further the justification for the more intensive routine maintenance regime that drives the majority of the increase.

499. Although business case justification is not evident, the new routine maintenance regime is now in place and is now a fundamental component of ElectraNet's overall asset management framework. We consider that routine maintenance has a pre-eminent role in that framework: a strong routine maintenance program informed by condition data and analysis can (a) defer the onset of condition-based risks, (b) provide better quality and more timely condition data to inform asset management decisions and (c) provide greater opportunity to undertake minor maintenance more cost-effectively (i.e. as part of the routine maintenance regime) rather than on an ad hoc basis.

500. To reduce routine maintenance expenditure at this stage in the implementation of the condition-based maintenance regime would effectively require a re-write of ElectraNet's routine maintenance procedures and reconsideration of maintenance intervals. Although not presented with a business case, we were presented with evidence of what appears to be a relatively thorough consideration of routine maintenance requirements and a comprehensive regime that has resulted. We consider that ElectraNet should be encouraged to document the business case for the new regime, and in particular the financial and non-financial benefits that it expects from it. However, on balance we consider that the additional routine maintenance expenditure

(comprising around $15m or $3m per year) is likely to be justifiable and is considered reasonable.

501. We have noted evidence of innovation and efficiency improvements resulting from ElectraNet's continuous improvement programs. These apply in part to routine maintenance, as discussed in section 8.9.

8.8 Assessment of network optimisation

8.8.1 Introduction

502. ElectraNet have implemented a Network Optimisation and Risk Management (NORM) as part of their asset management strategy. The structure and content of NORM is described in section 6.1 of ElectraNet's AMP[94]

503. ElectraNet has included Network Optimisation, a new opex category for the next RCP. The forecast expenditure for this category is $13.3m. Also included in NORM expenditure is capex of $6.8m relating to equipment and systems that support NORM initiatives.

Table 20: Categorisation of Network proposed optimisation projects

$million (real 2012/13)

Project	Capex	Opex
Automation of network control system	0.8	-
Improve management of network power flow	3.6	-
Improve network asset utilisation	0.4	3.0
Improve transmission line asset utilisation	2.0	10.3
Total	**6.8**	**13.3**

Source: EMCa, from data in ElectraNet Asset Management Plan (ENET036(R) – Table 6.2)

8.8.2 Our approach

504. We have reviewed ElectraNet's justification for the establishment of this new opex category and the proposed scope and level of expenditure for the next RCP.

8.8.3 Assessment

Establishment of new opex category

505. The new opex category relates to expenditure that is expected to deliver outcomes that meet ElectraNet's objective of improving the capability of the transmission network in order to release additional capacity and defer the need for capital investment. A primary benefit ElectraNet expects to be obtained from Network Optimisation is the delivery of reliable transmission services at lowest long-run cost.

[94] RP Appendix S - Asset Management Plan 2013 - 2018

506. We consider it desirable that expenditure on activities such as research and development are given a level of transparency that allows identification of those activities and performance against expected benefits. Network Optimisation can be considered to be a research and development initiative.

507. We consider that it is appropriate that ElectraNet has established Network Optimisation as a new opex category.

Scope and level of Network Optimisation expenditure

508. The new opex category relates to expenditure that is expected to deliver outcomes that meet ElectraNet's objective of improving the capability of the transmission ElectraNet has identified that the changes to the external operating environment (e.g. availability of new technology) that is leading to the increased level of operating expenditure will result in efficiencies that defer capital investment. We agree with ElectraNet that a properly managed Network Optimisation program will lead to improved overall efficiency gains and is a desirable component of a god industry practice asset management framework.

509. The description of the activities that ElectraNet proposes to undertake under Network Optimisation appears to be appropriate for the network and gives priority to the 'low hanging fruit'. The focus on opportunities to optimise power flows and increase automation of network control appears to be appropriate given the advances in technology in these areas.

510. We consider that the scope and level of proposed Network Optimisation expenditure is appropriate. Given that detailed business cases for the components of Network Optimisation have yet been produced, it will be important that expected benefits are quantified and the performance of programs monitored.

511. It would be desirable that performance, in terms of delivery of expected benefits for network optimisation programs, should be reported by ElectraNet in their RP for the subsequent RCP.

8.9 Assessment of support costs and network operations

8.9.1 Introduction

512. ElectraNet has forecast four components of opex by extrapolating from a base year (2011/12). These are:

a. Maintenance support;

b. Asset management support;

c. Corporate support; and

d. Network operations.

513. ElectraNet's proposed support costs total $148m, up by $25m (20%) compared with the current RCP. Almost all of this increase is in maintenance support – up $21m from $49m in the current RCP to $70m proposed in the next RCP.

514. Proposed costs for network operations are $47m, up from $40m in the current RCP.

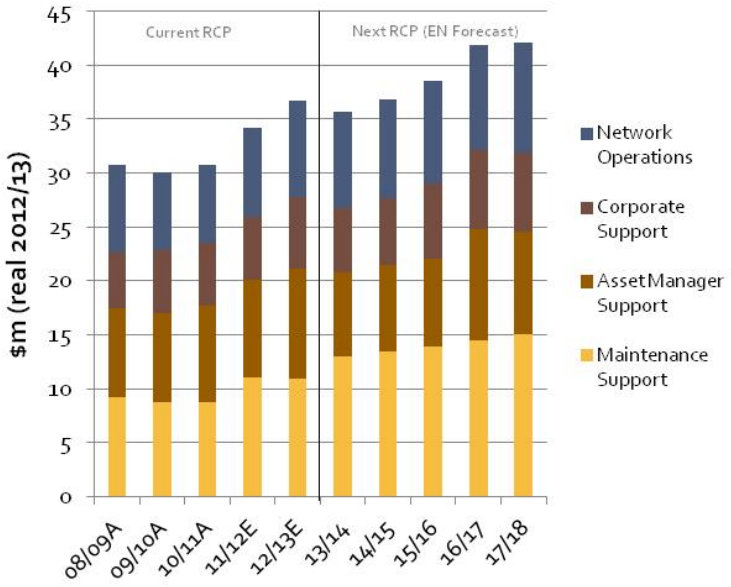
Table 21: Actual and proposed support and network operations costs

$million (real 2012/13)

	Current RCP					Next RCP Forecast					Current RCP Total	Next RCP Total
	08/09A	09/10A	10/11A	11/12E	12/13E	13/14	14/15	15/16	16/17	17/18		
Maintenance Support	9.2	8.8	8.8	11.0	10.9	12.9	13.4	13.9	14.5	15.0	48.7	69.8
Asset Manager Support	8.3	8.2	8.9	9.1	10.2	7.8	8.0	8.1	10.3	9.5	44.7	43.8
Corporate Support	5.1	5.8	5.8	5.8	6.7	6.0	6.2	7.0	7.3	7.4	29.2	33.8
Total Support	**22.6**	**22.8**	**23.5**	**25.9**	**27.8**	**26.8**	**27.6**	**29.0**	**32.1**	**31.9**	**122.6**	**147.4**
Network Operations	**8.1**	**7.2**	**7.2**	**8.3**	**8.9**	**8.9**	**9.2**	**9.4**	**9.8**	**10.1**	**39.7**	**47.4**

Source: EMCa from ElectraNet opex model and ElectraNet response ENET100(P)

Figure 50: Actual and proposed support and network operations costs



Source: EMCa from ElectraNet opex model and ElectraNet response ENET100(P)

8.9.2 Our approach

515. We have reviewed proposed support and network operations costs by examining the forecasting methodology that ElectraNet has used. Specifically, we have reviewed the choice of base year, and the asset growth escalation factors that have been applied.

8.9.3 Assessment

Choice of base year

516. We consider that the proposed expenditure is biased upwards by the choice of 2011/12 forecast expenditure as a "base year". Maintenance support expenditure, which was steady at around or just under $9m p.a. for the first three years of the current RCP, increased to $11m in 2011/12. Network operations expenditure, which was $7.2m in 2009/10 and 2010/11, increased to $8.3m in 2011/12.

517. We consider it preferable to use a base year that is "actual" expenditure as opposed to an estimate, and for which expenditure has been audited. In this regard, we rely on the audited regulatory financial information to verify matters such as cost allocation between regulated and non-regulated activities and the appropriate treatment of joint

and common costs. We also consider it relevant that, under the Efficiency Benefits Sharing Scheme (EBSS), efficiency incentives applied to this year. By contrast, we were presented with some evidence that, having achieved initial efficiencies, ElectraNet "took the brakes off" expenditure in the final two years of the current RCP, with a mind-set to spend up to the level of aggregate opex per the AER's previous decision (and which ElectraNet estimates will be almost exactly the outcome).

518. We have therefore come to the view that a more appropriate base year would be 2010/11. This would reduce the starting point by $3.5m and therefore (ignoring escalation and growth impacts on this reduction as second-order effects) would reduce the forecast expenditure by $17.5m.

Asset growth and price growth relationships

519. The other components of ElectraNet's forecast are the asset growth relationship and price growth.

520. ElectraNet has applied an asset growth relationship with two components:

a. A relationship between the existing assets and the new assets being added over the period. That is, as more assets are added, they need to be maintained and operated and this involves additional activity, including support activities;

b. A scaling factor which recognises that the additional activities do not necessarily increase in direct proportion to the additional assets, as economies of scale materialise.

521. We have some minor issue with the way in which ElectraNet has calculated the asset growth relationship, in that it assumes that the quantum of assets increases by the extent to which capex (excluding replacement) adds to the Regulatory Asset Base (RAB). However the accumulated depreciation inherent in the RAB is an asset lifecycle accounting construct, which does not reflect any reduction in the quantum of physical assets that need to be maintained and operated. This understates the denominator in the growth ratio, as a measure of the supposed quantum of existing assets relative to the quantum of new assets being added, and thereby overstates the growth ratio. A more appropriate ratio would be obtained by using an un-depreciated "replacement cost" value as the denominator. We have estimated the impact of this, by "grossing up" the RAB to an equivalent replacement cost value. However we find that this has a relatively small effect largely because of the scaling factors which reduce its impact, and because it applies only to certain components of opex. We have nevertheless reported this impact in our table of overall implications (in section 8.10).

522. We have reviewed the scaling factors used in calculating the asset growth relationship of different components of expenditure. For example, for Network Operations, a factor of 40% has been applied[95]. For maintenance support, asset management support and corporate support a range of factors is used for different line items. Many of these

[95] That is, for a 10% growth in the quantum of assets, a 4% increase in expenditure is assumed. Similarly with a scaling factor of 10%, 10% asset growth is assumed to require a 1% increase in support expenditure.

scaling factors are at levels of between 10% and 25%. We consider these appropriate values, which recognise strong economies of scale in support functions. We consider the scaling factors used are reasonable.

523. We have assessed and reported on the impact of ElectraNet's price escalation assumptions, but a view on this is not within the scope of the current work.

8.10 Assessment of opex allowance for innovation and efficiency

8.10.1 Introduction

524. The NER requires that the AER assess (inter alia) whether the operating expenditure reasonably reflects "the efficient costs of achieving the operating expenditure objectives[96]." ElectraNet has claimed in its RP that "its operating expenditure is both efficient and prudent and that it meets the required expenditure objectives set out in the Rules[97]."

8.10.2 Our approach

525. To test the overall efficiency of the proposed expenditure, we sought and reviewed information on:

a. ElectraNet's processes for scoping and managing work;

b. Its procurement processes and outcomes;

c. Any "continuous improvement" processes; and

d. Its efficiency incentives and any evident outcomes.

8.10.3 Assessment

Scoping and managing work

526. The majority of opex involves maintenance activities of some form, and the planning and management of such activities through "asset management" and "maintenance management" support functions. We were presented with information at on-site sessions as to how ElectraNet structures and manages such work. Overall we find a tight and formal structure exists for prioritising work, scoping work requirements, allocating work to service providers and confirming that work has been undertaken to an acceptable standard. ElectraNet appears to make good use of technology to provide field and office access to information to support these functions and to manage and monitor the maintenance workload.

[96] NER 6A.6.6(c)

[97] *RP*, page 84; ElectraNet

527. Our view is that these meet good industry practice.

Procurement processes and outcomes

528. We were provided with overviews and documentation relating to ElectraNet's procurement processes and outcomes. Most opex is labour–related and ElectraNet outsources the provision of its field maintenance, with almost all such work being provided by ETSA Utilities under a three-year agreement, with optional renewal terms. Materials are procured by ElectraNet using competitive tendering processes and a separate tender was let for vegetation management.

529. In addition to information on these arrangements presented to us directly by ElectraNet staff, we reviewed a report prepared for ElectraNet by Evans and Peck[98]. From these sources of information, we have formed the view that:

a. ElectraNet's procurement of maintenance services provides it with the expertise, resource and geographical reach required to effectively provide those services;

b. The commercial terms appear reasonable, providing what appear to be competitive costs for those services, including for overheads and margins;

c. The arrangements appear to be structured so as to allow the services to be efficiently provided and with appropriate levels of ElectraNet governance and control.

Continuous improvement and innovation

530. ElectraNet has recognised the scope for innovation and continuous improvement through identification of inefficiencies and the deployment of solutions to reduce such inefficiencies. ElectraNet and ETSA have each appointed a dedicated resource to achieve these outcomes. These arrangements also allow for forward maintenance works to be scheduled in conjunction with capital works, for works in remote areas to be co-ordinated to reduce travel time and for defects to be fixed "on the spot" where this can be done within the time already allocated for inspection and routine work.

531. In presentation, ElectraNet identified efficiency savings for routine maintenance of the order of 5% that were described as covering the majority of routine maintenance expenditure. They were described as having already been identified and it was stated that planning for implementation was underway to realise these efficiencies.

532. ElectraNet has seperately claimed that the gains that its continuous improvement and innovation processes and personnel have identified remain only "aspirational" and they are not currently included in its opex proposal. ElectraNet has claimed that the gains are unproven and untested and that factoring them into the forecasts for the next RCP would weaken the incentive properties of the (incentive-based) regulatory regime.

[98] ENET094: *Assessment of Commercial Arrangements; Transmission Asset Maintenance Services.* Evans and Peck (18 March 2012) (C)

533. We do not accept these arguments. The NER opex objectives require assessment that the costs are efficient and prudent. It is part of that assessment to consider how efficiency is likely to improve over time, taking a reasonable and prudent view. ElectraNet presented identification of inefficiencies identified above, with solutions being prepared for implementation under its formalised improvement and innovation program. This program is part of ElectraNet's cost structure and is factored into ETSA's contracted costs for services and could be expected to achieve its objectives, in order to warrant this investment. We would fully expect ElectraNet and ETSA to identify further inefficiencies over time and to be capable of implementing solutions to address these within the next RCP.

534. ElectraNet has proposed a generalised allowance for efficiency improvement in its proposed capex.

Efficiency incentives and outcomes

535. Efficiency incentives under the NER provide a commercial incentive to regulated network entities to improve efficiency[99]. ElectraNet achieved operating efficiencies of 2.9% relative to the AER determination for the current RCP, in the three years of "actual expenditure"[100]. ElectraNet has claimed that allowing for the removal of inefficiencies in the regulatory forecasts would weaken these incentive properties of the regulatory regime[101].

536. We do not agree with this contention. The incentive regime under the EBSS operates on variances in controllable opex relative to the level assessed for regulatory purposes. The incentive is not affected by the level at which controllable opex was assessed and we disagree with ElectraNet's suggestion.

Allowance for efficiency

537. Recognising that the identified efficiency measures for routine maintenance have yet to be implemented and that they apply to "a large part" of expenditure but not to all, we propose that an efficiency allowance of 2.5% of proposed routine expenditure should be included in ElectraNet's opex expenditure. Since ElectraNet already has a continuous improvement framework and certain measures have already been identified, with others likely to follow, we believe that this could be applied from the beginning of the next RCP.

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[99] The Efficiency Benefit Sharing Scheme (EBSS)

[100] ElectraNet has forecast an increase in opex in the final two years of the RCP as "increased asset management requirements have emerged" (RP, page 84) such that its controllable opex over the whole of the current RCP would be essentially as per the AER's previous decision. As noted earlier in our report, however, we were also informed that work had been "brought forward" into the current RCP with an implied view that it would be commercially prudent for ElectraNet to spend up to the "allowance" contained within the AER's previous decision.

[101] ENET193 response(C)

538. We also consider that an allowance for the benefits of the continuous improvement program should be factored into forecasts for other field work and for support functions. Other field work (i.e. corrective maintenance and operational refurbishment) is similar in nature to capex, in that it involves defined “projects”, albeit typically smaller. ElectraNet has proposed an allowance for capex efficiencies which ramps up to 2%. In the experience of our team members, opex efficiencies are more readily available than capex efficiencies and opportunities will continually present for rationalisation of opex field work, including through integration between capex and opex projects, refining work scope and improvements to work practices.

539. We considered the investment that ElectraNet has made in asset management and maintenance management support technology, including proprietary technology for scoping and allocating maintenance tasks, and the field force automation technologies that have been deployed. This technology appears to have been already well-deployed, with strong supporting procedures definition and training of ElectraNet and contractor personnel. We would expect ElectraNet to be able to utilise this technology to achieve on-going improvements in the way that it undertakes support functions.

540. Given the existing continuous improvement mind-set, the structured improvement program and the commercial incentives that exist, we consider it reasonable to assume a 2.5% efficiency allowance across all opex, and that this will occur from the beginning of the next RCP.

8.11 Opex findings and their implications

541. Our findings and associated recommendations on ElectraNet’s proposed opex are presented in section 2 (findings 8 to 12). The implied adjustments in the table below show the amounts by which ElectraNet’s opex would be adjusted, for each of the opex-related recommendations.

542. In table 22, we show our estimation of the impact on total controllable opex of the adjustments proposed in this section. If all such adjustments were applied, then the opex would be reduced from $423m to $360m. This would be an increase of $61m compared with the current RCP, representing approximately a $6m per year increase from the levels that ElectraNet is currently spending (in 2011/12 and 2012/13). We consider that this is reasonable to cover the factors that ElectraNet has highlighted, namely:

a. The growing asset base;

b. Continued implementation of a best practice asset management framework, including addressing the remaining backlog of defects identified from implementation of this framework;

c. Investing to drive improvements in asset utilisation, maximising network performance and capability; and

d. Allowing for real wages growth.

543. We have been unable to identify additional scope changes or new regulatory obligations with any material impact on opex, other than those included above.

Table 22: Proposed adjustments to opex

$million (real 2012/13)

	Implied Adjustments	Controllable Opex
ElectraNet forecast opex		**422.8**
Adjustments:		
Corrective maintenance		
Lines	-11.2	
Substations	-8.2	
Operational refurbishment	-14.5	
Asset management support, maintenance support, corporate support	-13.2	
Network operations	-4.3	
OPEX efficiency	-10.6	
Asset growth	-1.9	
Total adjustment (factors applied individually)	**-63.9**	
Total cumulative adjustments		**-63.2**
Adjusted controllable opex		**359.6**

Source: EMCa

544. For reference, we have also calculated that the price escalation assumptions that ElectraNet has made have an impact of $21m. That is, approximately $21m of the proposed increase is attributable to price escalation.

9 Contingent projects

9.1 Introduction

545. The concept of "contingent projects" is defined in the NER[102], and allows for the TNSP to submit projects, as part of a RP, that can be triggered by an event or condition that is defined at the time of the regulatory revenue determination. Once triggered, there is then a further review and regulatory approval process for project costs, in which the AER may approve an amendment to the revenue determination.

546. The NER requires that contingent projects must meet at least one of the "capex objectives"[103], which relate to meeting expected demand, complying with regulatory obligations and requirements and maintaining the quality, reliability and security of supply. The reference to these objectives also makes clear that the contingent project must provide a "prescribed service".

547. Amongst other requirements, the contingent project expenditure must not be otherwise provided for in the total forecast capex. Requirements for the triggers are defined and include that they should be "probable" during the RCP, "reasonably specific and capable of objective verification", generate costs that "relate to a specific location" rather than a "condition or event that affects the transmission network as a whole" and should be "all that is required" – that is, not conditional on other events not mentioned in the trigger.

[102] NER 6A.8

[103] NER 6A.7(c)

9.2 ElectraNet's proposed contingent projects

548. ElectraNet has proposed 21 contingent projects, which are listed in table 5.14 of its RP and described in further detail in Appendix Q of that proposal. For reference, the proposed projects are listed in the table below.

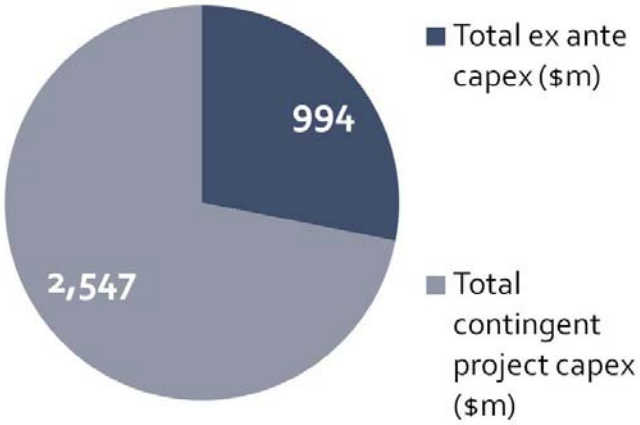
Table 23: Proposed contingent projects

No	Project Name	Indicative cost ($m Nominal)
1	Eyre Penisula Connection Point	33
2	Lower Eyre Peninsula Reinforcement	588
3	Upper Eyre Peninsula Reinforcement	113
4	Riverland Reinforcement	407
5	Fleurieu Peninsula Reinforcement	210
6	Yorke Peninsula Reinforcement	191
7	Para-Brinkworth/ Bungama - Davenport 275kV Transmission Upgrade	50
8	South East to Heywood Interconnection Upgrade	96
9	Northen Transmission Reinforcement - Load	247
10	Davenport Reactive Support	42
11	Upper South East Generation Expansion	48
12	Western Suburbs Reinforcement	20
13	Southern Suburbs Reinforcement	171
14	Northen Suburbs Reinforcement	48
15	Torrens Island Switchyard Development	54
16	Mid North Connection Point	59
17	Port Pirie System Reinforcement	36
18	South East Connection Point Reinforcement	25
19	South East Region Augmentation	28
20	Lower South East Region Transformer Reinforcement	19
21	Upper North Region Line Reinforcement	62
		2,547

Source: RP

549. As described in section 5, ElectraNet has proposed $894m of capex (in $2012/13 real terms) to meet its demand and other obligations and requirements, in accordance with the NER capex objectives. This is equivalent to $994m in nominal terms (as estimated by ElectraNet). By comparison ElectraNet is proposing that a further $2,547m of projects are also accepted by the AER, subject to the defined trigger events occurring. The relative magnitudes of these amounts are shown below.

Figure 51: Contingent projects capex compared with forecast capex ($nominal)



Source: EMCa from ElectraNet response ENET040(P), ENET077(P)

550. While it would not be expected that all of the contingent projects will be triggered, it is of interest that the sum of ex ante forecast capex and contingent projects capex for the next RCP alone is 1.7 times the regulatory asset value of the entire asset base of the business.

9.3 Findings in relation to each proposed project

551. Our assessment of the proposed contingent projects leads to the following findings for each project.

552. We consider that one project - Davenport Reactive Support – fully meets the requirements of the NER, as presented and that two other projects – Upper North Line Reinforcement and Mid North Connection Point – are likely to be compliant if the trigger is modified.

553. We consider that some potential contingency is indicated by the proposed Eyre Connection Point and Riverland reinforcement projects. However we consider that neither is compliant, as presented, and that the Riverland project as presented is disproportionate to the identified need.

554. We consider that the remaining projects are not compliant and should not be accepted.

Table 24: Summary of EMCa findings on contingent projects

No	Name	Finding	Cost ($m)	Cost Totals ($m)
Compliant				
10	Davenport Reactive Support	Compliant	42	
				42
Could be compliant, if trigger is modified				
21	Upper North Region Line Reinforcement	Trigger needs to be specific to intended circuits and of a scale that would warrant consideration of this project.	62	
16	Mid-North Connection Point	Trigger needs to be specific to underlying need - for example load commitment from a mining operation of a size that would warrant consideration of this project.	59	
				121
Some contingent need is evident; a modified or alternative project could be compliant				
4	Riverland Reinforcement	Demand component of proposed trigger does not appear probable. Interconnector "network support" appears to be a potential trigger event for some action, but does not appear to warrant a project of this scale.	407	
1	Eyre Peninsula Connection Point	Project is not technically feasible as proposed, as it assumes another project (Lower Eyre) has been triggered. Needs to be re-specified to be "all that is required", consistent with NER 6A.8.1(c)(4)	33	
				440
Could be compliant, if "market benefits" are accepted as compliant with NER capex objectives				
8	South East to Heywood Interconnection Upgrade	Projects triggered by providing "market benefits" could be considered not to meet the "capital expenditure objectives" in the NER, which relate to meeting expected demand, quality, reliability and security of supply and compliance with regulatory requirements (for prescribed services).	96	
15	Torrens Island Switchyard Development	As above	54	
7	Para – Davenport Transmission Upgrade	As above	50	
11	Upper South East Generation Expansion	As above	48	
				248
Not accepted - Within expected demand (new connection points proposed)				
5	Fleurieu Peninsula Reinforcement	The distributor and ElectraNet are each required under the NER to include forecast capex to meet expected demand. This project is presented as being within this demand range.	210	
14	Northern Suburbs Reinforcement	As above	48	
17	Port Pirie System Reinforcement	As above	36	
12	Western Suburbs Reinforcement	As above	20	
				314
Not accepted - Within expected demand (no new connection points proposed)				
2	Lower Eyre Peninsula Reinforcement	ElectraNet is required under the NER to include forecast capex to meet expected demand. ElectraNet's demand forecast shows that this project is within its demand reange and is therefore not subject to a "contingent' event or condition.	588	
6	Yorke Peninsula Reinforcement	As above	191	
				779
Not accepted - Not probable				
3	Upper Eyre Peninsula Reinforcement	Following the deferral of Olympic Dam expansion, no further trigger was proposed that would warrant this project at the scale proposed.	113	
9	Northern Transmission Reinforcement	As above	247	
13	Southern Suburbs Reinforcement	Analysis indicates that proposed trigger is well above ElectraNet's high demand forecast. No demand-based contingent event specified.	171	
18	South East Connection Point Reinforcement	Not required - APR shows a requirement in 2022. No demand-related contingent event specified.	25	
19	South East Region Augmentation	Analysis indicates that proposed trigger is well above ElectraNet's high demand forecast. No demand-based contingent event specified.	28	
20	Lower South East Region Transformer Reinforcement	Not required - APR shows a requirement in 2022. No demand-related contingent event specified.	19	
				603
TOTAL of proposed contingent projects				**2,547**

Source: EMCa analysis from ElectraNet information

9.4 Assessment

9.4.1 Main factors identified from high-level assessment

555. From an initial high-level review of the proposed contingent projects, we identified a series of common themes in ElectraNet's proposed contingent project triggers. We further refined these and have used them to categorise the projects and to assess their compliance, as follows:

a. Projects proposed with demand triggers, including those for which the proposed trigger is a request from the DNSP for a new connection point (which is assumed to be triggered by load growth). This is relevant on account of NER6A.8.1(b)(1) which refers to the capex objectives for forecast capex in NER 6A.6.7(a)), and NER

6A.6.8.1(b)(2)(i) which requires that the expenditure is not otherwise provided under the ex ante forecast; and

b. Projects for which a "market benefits" trigger is proposed. This too is informed by reference to the capex objectives in the contingent project definition.

556. In the course of our assessment, we found reason to consider the probability of some projects (in relation to NER 6A.8.1(c)(5) and the scale of some projects in relation to the proposed triggers (relevant to NER6A.6.8.1(c)(2).

557. We discuss each of these factors in the next sections, along with our assessment of each of the proposed projects to which they relate.

9.4.2 Projects with proposed demand triggers

Relationship between general demand growth and contingent project triggers

558. In section 6 we discussed the relationship between demand forecasts and ex ante (forecast) capex. The NER requires that the TNSP must put forward forecast capex to meet expected demand. We conclude that a reasonable interpretation of this, given that all forecasts have a range of uncertainty, is that the forecast capex should meet the expected demand on a probabilistic basis. That is, there is a more-or-less equal chance that a greater or lesser capex is required, depending on demand and other uncertainties. This has been the accepted interpretation in previous AER Decisions, such as in regards to Powerlink in 2012[104]. This interpretation applies whether a probabilistic approach is used explicitly to determine the forecast capex or whether a "medium" forecast capex is used.

559. We referred to the range of demand forecasts that the forecast capex relates to as the "demand envelope", encompassing the range from low to high forecast demand where that range is based on underlying uncertainties, but excluding the effect of identifiable and specific events. We note that ROAM consulting similarly excluded a range of uncommitted mining loads, totalling 1,400 MW, from the range of demand forecasts included in its scenario analysis, and conducted separate sensitivity analysis for these possible additional possible loads. ROAM's scenario analysis, and the resultant ElectraNet probabilistic capex analysis that we have reviewed, was therefore based on general demand uncertainties and not uncertainties relating to specific major loads.

560. AEMO has made similar assumptions about the role of contingent projects in relation to forecast capex projects, stating in its review report that:

> *Contingent projects should be limited to non-load driven augmentations or triggered by significant step changes in load (rather than driven by organic load growth).*[105]

[104] Powerlink transmission decision (2012/13 –2016/17) - ENET061(P)

[105] Background section page V AEMO 2012 ElectraNet Revenue Cap Review Capital Projects Assessment (P)

561. In summary, the criteria that we apply are that a demand-related trigger for a contingent project must be a demand which is not otherwise covered within the expected demand envelope. It should be a specific and identifiable load such that a specific trigger event can be defined from it, and which is essentially recognisable as a "step change".

ElectraNet's framework for the use of demand-related contingent projects

562. The following extracts from the RP provide information on ElectraNet's use of contingent projects to manage the potential for step changes in demand for transmission services through, for example, the connection of new mining loads, noting that such loads are not included in the demand forecast that is used as the basis for the forecast capex:

> *It should be noted that neither the forecast capital expenditure nor the forecast energy consumption used in these calculations include the effects of potential new mining loads. Whilst those loads would trigger further transmission development (contingent projects), they would also lead to large increases in energy consumption.*[106]
>
> *The focus of the Board-approved network development strategy is on meeting customer demand for transmission services and delivering net market benefits in the most cost effective manner, while meeting prescribed reliability and quality of supply standards. This includes consideration of non-network solution options and the use of contingent projects to manage uncertainty (e.g. in relation to the cost and timing of augmentations to serve potential new large loads).*[107]
>
> *In situations where there is uncertainty regarding large network augmentation requirements (e.g. for potential new mining loads), ElectraNet has sought to manage this risk through the framework for contingent projects. This enables the deferral of decisions to commit expenditure until the need for, and the timing and scope of, such investment can be evaluated with a higher degree of certainty.*[108]

563. This framework appears consistent with our interpretation of the NER. Under this approach, we would not expect to see contingent projects that were triggered on natural growth in demand for transmission services, where this is within the forecast demand envelope.

Framework for assessing projects triggered by DNSP request for new connection point

564. For four of the proposed contingent projects, ElectraNet has proposed that they would be triggered by a DNSP request for a new connection point. ElectraNet has explained that this would result from a process in which the DNSP would (with assistance from

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[106] *RP;* page 9; ElectraNet

[107] *RP;* page 33; ElectraNet

[108] *RP;* page 51; ElectraNet

ElectraNet) analyse the relative technical and economic merits of augmenting the distribution network from an existing transmission connection point, versus augmenting the transmission network in order to provide a new connection point. The underlying trigger for such a request would be an increase in demand that would otherwise lead to either unacceptable limitation on the distribution network or breach reliability standards on the transmission network.

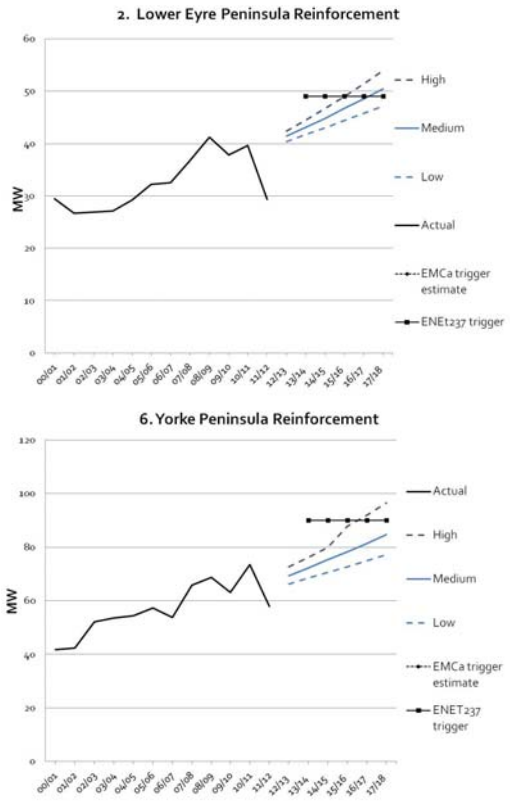
565. The DNSP is subject to a similar regulatory regime as ElectraNet, though without the facility of contingent projects. Under the NER, the DNSP must include in its regulatory proposal the forecast total capex that it considers is required to meet or manage its expected demand. It follows that, if demand is within the demand envelope projected by the DNSP, then capex to meet that demand was already included in its current revenue allowance. Further, ElectraNet's connection point demand forecasts have been provided by ETSA. To allow the possibility of a transmission contingent project that effectively relieves the DNSP of the need to incur investment that is already included in its revenue determination appears to lead to a cost double-up to consumers, who would thereby pay for the same service to be provided by ElectraNet.

566. Our assessment framework for these projects is therefore the same as for demand-related contingent projects generally. That is, we looked for evidence of a possible specific step increase in demand over and above the demand envelope of expected growth. On the basis that capex required to meet expected load growth must be included in the DNSP and TNSP's respective regulatory proposals, we consider that a need for a new transmission connection point should not in itself be considered a contingent event.

Assessment of demand-triggered contingent projects

567. For each contingent project proposed with a demand-related trigger, we analysed ElectraNet's forecast demand for the connection point(s) in relation to the proposed trigger. We consider that the Lower Eyre Peninsula Reinforcement and Yorke Peninsula Reinforcement projects should be rejected, as they could be triggered within ElectraNet's expectation of natural demand growth.

Figure 52: Not accepted - Within expected demand (no new connection points proposed)

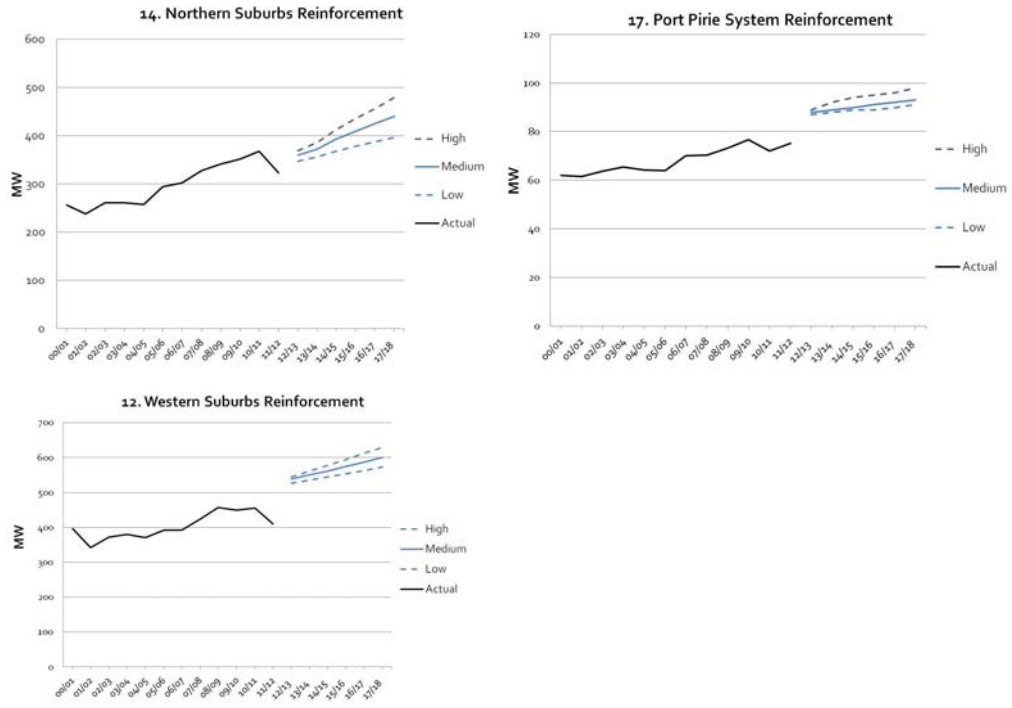


Source: APR 2011, APR 2012, ENET198(P), ENET237(P)

568. The Lower Eyre reinforcement is proposed as a $588m project, to meet a demand trigger of a few MW. In presentation, ElectraNet referred to the possibility of loads significantly in excess of this trigger that may arise if the reinforcement was to proceed; however evidence of such step loads was not provided. If such loads may fit the NER criteria, then an appropriate trigger could be specified that would encompass those loads. Alternatively, if the demand forecast is considered realistic and the project is not required to meet other much larger loads, then a considerably scaled-down project could be considered. We draw attention to NER 6A.8.1(c)(2), which requires that the trigger event should make the proposed project reasonably **necessary** (emphasis added). We consider that this clause indicates a need to make a reasonable attempt at matching the scale of the proposed project to the proposed trigger event.

569. The following three projects were proposed with the primary trigger being a request for a new connection point. It can be seen that ElectraNet's demand forecast range for each connection point is essentially a trend growth forecast and no evidence of a step demand increase was provided to us. We propose rejecting one further project, Fleurieu Peninsula, on the same grounds, noting that, while a demand forecast was not provided for this area, ElectraNet's commentary indicates that ETSA's demand forecast takes account of any step load increases on the distribution side and no evidence of further step load increases was provided.

Figure 53: Not accepted - Within expected demand (new connection points proposed)



Source: APR 2011, APR 2012, ENET198(P)

570. For the five projects[109] illustrated below, we reviewed the proposed triggers in relation to the demand forecasts.

571. For the Northern Transmission and Upper Eyre Peninsula reinforcements, the trigger events were essentially described as assuming BHP's Olympic Dam expansion would proceed. With the indefinite deferral of this project, neither network project as scoped appears probable. We note that, while ElectraNet's Northern Transmission demand forecast appears to lead to this being triggered, we were informed[110] (and we would expect) that if demand growth rose only to the level shown in this forecast, it would not warrant a network reinforcement of the scale envisaged by the proposed contingent project and, in all likelihood, would not warrant a network solution at all – in other words, a non-network solution would likely be the most economic solution.

572. For the remaining proposed projects in figure 54, our analysis indicates that the triggers are not probable under the demand forecasts provided by ElectraNet.

573. Moreover, our review of ElectraNet's demand forecast led us to a view that they were overstated on average by around 14%. We also note the material decreases or levelling off in demand in 2011/12, and which is evident from all of the demand graphs.

[109] Project 19: South East Region Augmentation is proposed with three separate triggers and we have represented each with a separate graph.

[110] Conference call with ElectraNet, 22nd August 2012

574. We do not accept assertions made in meetings with ElectraNet that the term “probable” under the NER should be interpreted as a probability greater than zero. Equally, we have not sought to place a metric on the term ‘probable” since we consider that, if this was the intention of the NER then the metric would have been specified. However we consider that triggers that are well above ElectraNet’s high forecast, which would typically be considered as a “10th percentile” probability, are unlikely to qualify.

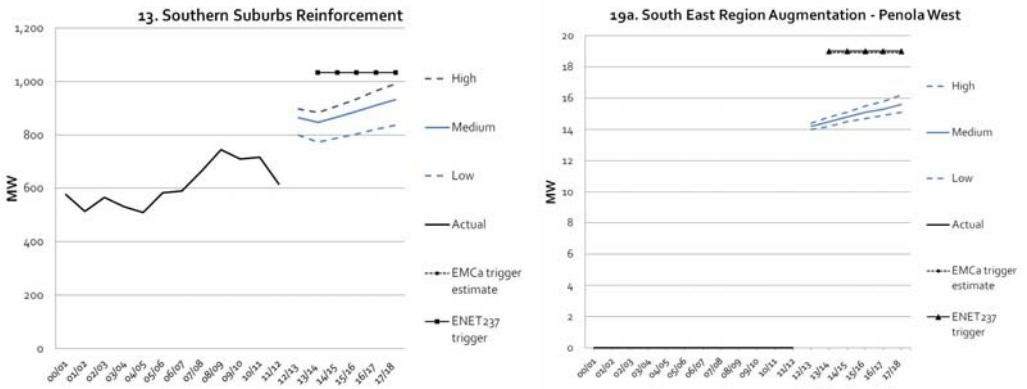
Figure 54: Not probable

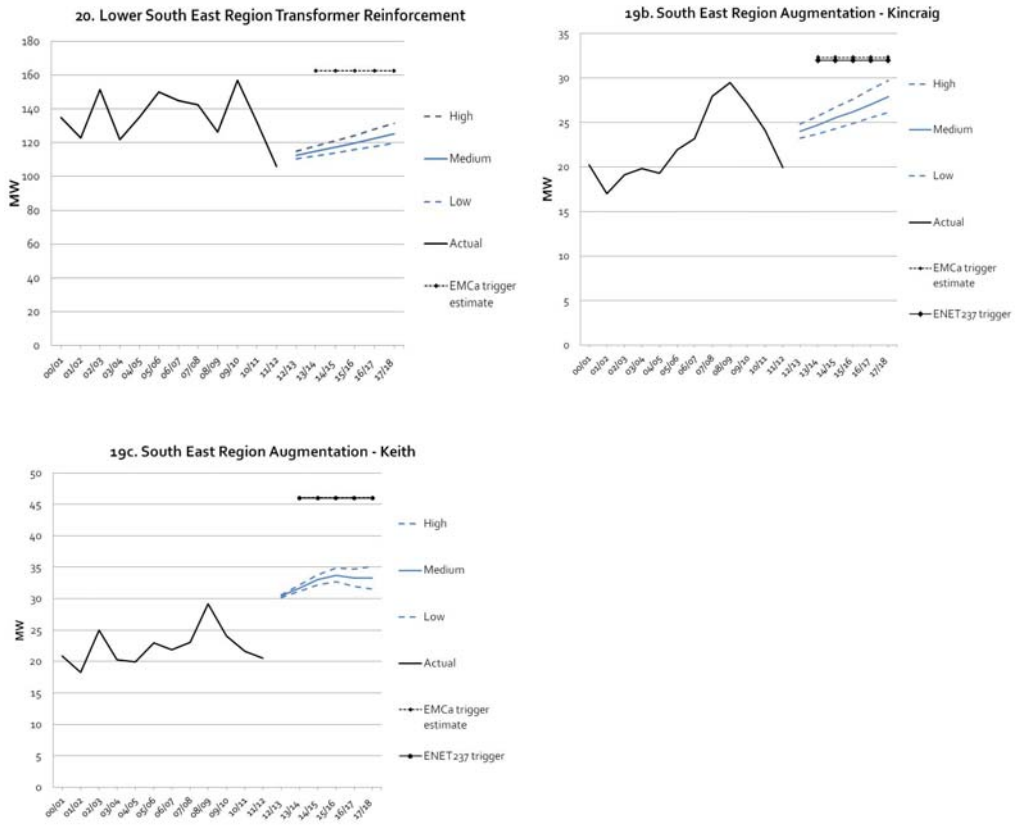
[C-I-C]

Source: APR 2011, APR 2012, ENET237(R), ENET244(C)

[C-I-C]

Source: APR 2011, APR 2012, ENET198(R), ENET237(R)





Source: APR 2011, APR 2012, ENET198(P), ENET237(P)

9.4.3 Market benefit triggers

575. Four contingent projects have triggers based on the projects' ability to deliver net market benefits.

576. An example of such a project is the Upper South East Generation Expansion project which has an estimated cost of $48m and a trigger that requires the "*successful completion of the RIT-T demonstrating positive net market benefits".* This trigger is effectively based on the establishment of major generation in the Upper South East. ElectraNet considers that, whilst the magnitude of market benefit arising from the projects is uncertain, it would "*deliver net market benefits and would be reasonably required to meet the Rules capital expenditure objectives to efficiently meet expected demand for prescribed transmission services*."[111]

577. EMCa questions the validity of having Market Benefit projects which do not appear to fit into any of the capex objectives set out in NER 6A.6.7 which requires forecast capex to meet any one of the following four criteria:

(1) meet the expected demand for prescribed transmission services over that period;

[111] *ElectraNet Transmission Network RP*, Appendix R – Proposed Contingent Projects section 11.4; ElectraNet

(2) comply with all applicable regulatory obligations or requirements associated with the provision of prescribed transmission services;

(3) maintain the quality, reliability and security of supply of prescribed transmission services; and

(4) maintain the reliability, safety and security of the transmission system through the supply of prescribed transmission services.[112]

578. Our interpretation of the NER is that compliant projects are to meet demand for prescribed transmission services and, while the projects themselves should do so efficiently[113], it is debatable whether this definition more generally encompasses matters relating to wider market efficiency, or market benefits, in regards to meeting that demand.

579. NER 6A.8.1 (b) requires that when a proposed project is a contingent project, the AER must find that the proposed contingent project is reasonably required to be undertaken in order to achieve any of the capex objectives. The proposed projects with market benefits triggers that we have reviewed appear to be based on speculative assumptions by ElectraNet regarding possible and not probable locations of future generation. For these projects to qualify as contingent projects we would have expected to see some evidence of generator commitment or a reasonable probability of such commitment by a specific generator.

580. If the above interpretation of the NER is accepted then the proposed contingent projects with Market Benefit triggers cannot be defined as contingent projects by the AER and would therefore be considered non-compliant.

9.4.4 Contingent need evident, but project requires rework

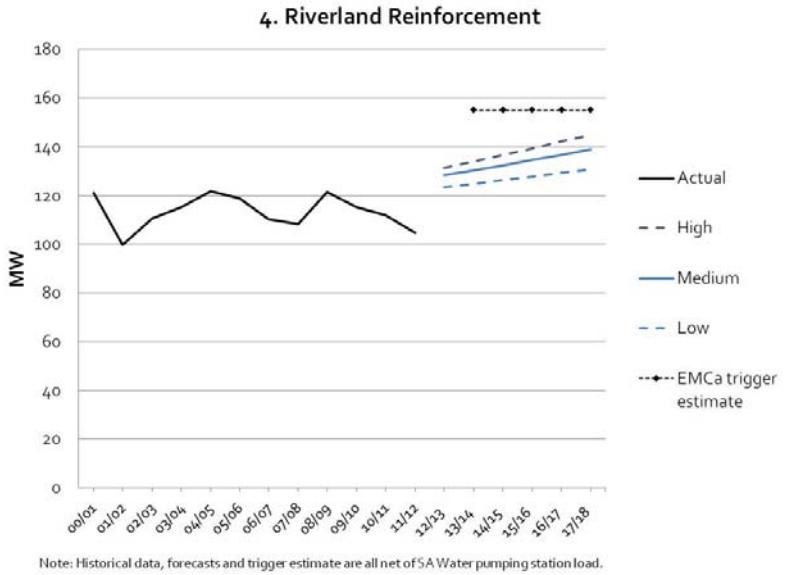
581. We consider that ElectraNet's presentation of two projects - Riverland Reinforcement and Eyre Peninsula Connection Point – indicates that a possible contingent project need exists, but that both require some re-specification.

582. The proposed trigger for the Riverland project involves two considerations: one demand-related and the other involving a possible need for additional network support in the event that AEMO limits interconnector flows. We consider that the demand component of the trigger is not probable, as indicated in figure as below.

[112] NER 6A.6.7

[113] NER 6A.6.7(c)(1)

Figure 55: Riverland reinforcement – demand and proposed trigger



Source: APR 2011, APR 2012, ENET198(P), ENET237(P)

583. We acknowledge the logic in ElectraNet's presentation of the risk that, if AEMO was to limit interconnector flows, then ElectraNet would be unable to supply the region to the reliability level required under the ETC. However, we consider it most unlikely that the appropriate contingent project would involve expenditure of $407m on a network solution, and we propose that ElectraNet is asked to re-work the project to propose a solution – albeit indicative – that is more likely to be warranted.

584. We find that the Eyre Peninsula connection point project is not technically feasible as proposed, since it implicitly assumes that the Lower Eyre Peninsula reinforcement precedes it. As currently presented, it therefore fails to comply with NER 6A.8.1(c)(4) that the trigger is "all that is required" for the revenue determination to be amended. From information presented by ElectraNet, there is evidence that step load increases could require a connection point at this location, with sufficient probability to warrant inclusion as a contingent project. We consider that the project could be compliant if re-specified or if the trigger is amended: for example, it could be re-specified to include transmission lines which ElectraNet has currently included with the Lower Eyre contingent project, providing supply to the connection point within the scope of the contingent project. Alternatively, if ElectraNet considers that it would be unlikely to proceed with the connection point unless the Lower Eyre reinforcement was committed, then this could be specified as one of the triggers.

9.4.5 Trigger definitions

585. Clause 6A.8.1 of the NER sets out the requirements that the AER must consider when determining if a proposed contingent project should be accepted in its revenue determination. The sections of Clause 6A.8.1 that are relevant to the consideration of contingent project triggers are reproduced below.

586. The AER must be satisfied that:

(6A.8.1 (b)(4))

the trigger events in relation to the proposed contingent project which are proposed by the Transmission Network Service Provider in its RP are appropriate.

(6A.8.1 (c))

In determining whether a trigger event in relation to a proposed contingent project is appropriate for the purposes of subparagraph (b)(4), the AER must have regard to the need for:

- *a trigger event to be reasonably specific and capable of objective verification;*
- *a trigger event to be a condition or event, which, if it occurs, makes the undertaking of the proposed contingent project reasonably necessary in order to achieve any of the capex objectives;*
- *a trigger event to be a condition or event that generates increased costs or categories of costs that relate to a specific location rather than a condition or event that affects the transmission network as a whole;*
- *a trigger event to be described in such terms that the occurrence of that event or condition is all that is required for the revenue determination to be amended under clause 6A.8.2; and*
- *a trigger event to be an event or condition, the occurrence of which is probable during the regulatory control period, but the inclusion of capex in relation to it under clause 6A.6.7 is not appropriate because:*
  - *i. it is not sufficiently certain that the event or condition will occur during the regulatory control period or if it may occur after that regulatory control period or not at all; or*
  - *ii. subject to the requirement to satisfy clause 6A.8.1(b)(2)(iii), the costs associated with the event or condition are not sufficiently certain.*

Completion of the RIT-T showing transmission investment is justified

587. For a number of contingent projects ElectraNet have proposed that the successful completion of the RIT-T showing transmission investment is justified. We consider that the successful completion of a RIT-T or RIT-D is not a trigger event as defined in clause 6A.8.1 as it is not a condition or event that makes the undertaking of the contingent project reasonably necessary. The completion of a regulatory investment test is a step in a process necessary to gain approval for commitment to spend but it is not, in itself, driving the need for the expenditure.

588. An appropriate trigger would be based on the root cause of the process that leads to a RIT-T being undertaken. The completion of a RIT-T does not in itself generate *increased costs or categories of costs* related to a specific location. It is the trigger condition or event that drives the need for additional expenditure, not the process that determines if the trigger has been met.

589. It is our view that completion of a RIT-T or RIT-D is a necessary procedural step to be taken, once a contingent project has triggered. Completion of a RIT-T or RIT-D in itself should not be considered to be a trigger or a component of a trigger.

Formal request for a new regulated connection point from the DNSP;

590. Several proposed contingent projects, included a trigger defined as receipt by ElectraNet, from a DNSP, of a formal request for a new regulated connection point.

Such a trigger is not appropriate because it is not in itself *a condition or event, which, if it occurs, makes the undertaking of the proposed contingent project reasonably necessary in order to achieve any of the capital expenditure objectives*. It is our opinion that it is the underlying condition or event that gives rise to the DNSP request that should be specified as the contingent project trigger.

591. In the absence of a defined condition or event, it is not possible for the AER to determine if the contingent project expenditure is not otherwise provided for, is because the event or condition that led to the DNSP's request may well fall within the demand forecast envelope that is covered within the forecast capex.

592. We also found that, for several new connection point contingent projects, the transmission investment was to be an alternative to a distribution network solution. This would require the completion of a RIT-D that demonstrated the transmission was more efficient than the distribution solution. Again, as discussed earlier, for these projects we consider that the completion of a RIT-D is a component of the project approval process and not an appropriate contingent project trigger. The underlying condition that leads to the need to complete a RIT-D should be defined as the trigger. We do not accept ElectraNet's assertion that they cannot see beyond the transmission/distribution interface in order to define a trigger and must therefore accept, without question, the DNSP's request for a contingent project to be established. We consider that for the DNSP request for the establishment of a contingent project must be accompanied with a suitable trigger before it is accepted by ElectraNet.

593. As discussed earlier, for contingent projects that are distribution network alternatives, it is important to establish that the distribution expenditure to be replaced by the transmission expenditure has not been included in the DNSP's RP. Otherwise the expenditure would have been allowed for twice when setting the TNSP and DNSP revenue allowances. It is probable that this will not be the case if the trigger for the contingent project is driven by a step change in demand that falls outside the DNSP forecast used for setting its revenue allowance. It is this step change that should form the basis for the contingent project trigger.

Low demand driving large expenditure;

594. For a number of contingent projects in ElectraNet's RCP, the proposed trigger is set at a level which is unlikely to justify the scope and cost of the proposed project. While it can be argued that the trigger simply provides a mechanism for examining future loads and the options to supply them, we consider it to be more meaningful and more in alignment with the NER and RIT processes, for the trigger to describe the circumstances that are likely to justify a project broadly of the nature of that proposed.

595. Whilst, in a 'tight' network small demand changes can trigger large augmentation projects, we would have expected that contingent project triggers would have some relationship to the project scope and expenditure levels.

596. In discussions with ElectraNet we were told that if a contingent project triggered on a small increment in demand it would be likely that the scope of the project be scaled back. It is probable that this scaling would be necessary to ensure that the project passed the requirements of a RIT-T.

597. For such projects, we would expect to see significant emphasis placed on consideration of alternative transmission and non-transmission solutions prior to the contingent project trigger being activated. ElectraNet's view that the project scaling would be undertaken following the trigger activation is, in our view, putting the cart before the horse. The alternatives for dealing with small incremental changes should be exhausted prior to the contingent project being triggered.

598. We consider that it would be appropriate to include the completion of a comprehensive assessment of all alternatives to the contingent project solution, as a prerequisite component of the trigger.

General comments on triggers

599. We found that general improvement in the specification of contingent project triggers could be made. ElectraNet has, in many cases, specified triggers by reference to forecast load increases above a certain level or above previously forecast loads. It is considered that specific triggers should be referenced to forecast demand at a certain time exceeding defined thermal or voltage limitations vis-à-vis the current position.

600. As discussed previously, for contingent projects the triggers should be sufficiently specific to ensure that the trigger demand point is beyond that which would be expected, to be included in the demand forecast envelope on which the capex forecast is made.

10 Service target performance incentive scheme (STPIS) parameters

10.1 Introduction

601. This section provides our assessment of the values proposed for the next RCP by ElectraNet for the Service Component of the Service Target Performance Incentive Scheme (STPIS). Our assessment addresses the questions posed within TOR for the Technical Consultant.

602. We also provide an assessment of ElectraNet's methodologies and procedures for monitoring and reporting against STPIS parameters.

603. During the final stages of the review ElectraNet advised the AER that the data it had provided was incorrect. The result of this was that four out of five data points were changed. Because of the data issue it is not appropriate for EMCa to include the results of the STIPS review in terms of revised targets and weightings. However, we have included our assessment of the methodology used by ElectraNet to develop its proposed targets as this may provide guidance on issues to be addressed when the targets are recalculated on correct data.

10.2 ElectraNet's proposal with regards the (STPIS)

604. Within its RP, ElectraNet has submitted proposed targets for STPIS. The STPIS provides ElectraNet with an incentive or penalty of 1% of MAR under the Service Component. For the Service Component, the scheme measures performance against six parameters, as follows:

a. Transmission Circuit Availability;

    i. Transmission circuit availability;

ii. Critical circuit availability peak;

iii. Critical circuit availability non-peak.

b. Loss of Supply Events Frequency

i. Events greater than 0.2 system minutes;

ii. Events greater than 0.05 system minutes.

c. Average Outage Duration.

605. A Section 10 and Appendix Y of the RP contain ElectraNet's proposed targets, caps, collars and weightings for the above parameters. A summary of ElectraNet's current and proposed STPIS performance targets is provided in table as below.

Table 25: ElectraNet's current and proposed performance targets

	Performance Target		Cap (Upper Limit)		Collar (Lower Limit)		Weighting (% MAR)	
	Current	Proposed	Current	Proposed	Current	Proposed	Current	Proposed
Transmission Circuit Availability								
Transmission Circuit Availability (%)	[C-I-C]	99.5	[C-I-C]	99.76	[C-I-C]	98.98	0.3	0.3
Critical Circuit Availability Peak (%)		99.13		99.95		97.47	0.2	0.1
Critical Circuit Availability Non-Peak (%)		99.62		99.81		99.25	0	0
Loss of Supply Event Frequency								
Events > 0.2 System Minutes		2		1		4	0.2	0.2
Events > 0.05 System Minutes		7		4		9	0.1	0.1
Average Outage								
Duration (minutes)		202.6		80.73		324.47	0.2	0.3

Source: RP, ENET260(C)

606. ElectraNet[114] engaged Parsons Brinckerhoff to develop and apply a sound methodology for calculating the averages, caps and collars for the STPIS parameters. A detailed description of the methodology used by Parsons Brinckerhoff for establishing the parameter values was provided by ElectraNet in Appendix Z of the RP.

607. We understand that Parsons Brinckerhoff will have been given the incorrect data by ElectraNet.

10.3 Review scope, approach and assumptions

608. The TOR required the STPIS review to cover the following:

a. an assessment of the service target performance incentive scheme values proposed by ElectraNet under the service component of the scheme;

b. an opinion and detailed reasons on whether the proposed performance targets, caps, collars and weighting are consistent with the principles in clause 6A.7.4 of the NER and the AER's service target performance incentive scheme;

c. where disagreement is found with any aspect of the proposed values and weightings, provide a substitute together with detailed reasons for why the substitute is consistent with the principles in the NER and service target performance incentive scheme and indicate the methodologies and assumptions used to derive the substitute value;

d. review the recording and reporting systems and processes used by ElectraNet to record performance against the service target performance incentive scheme.

609. As ElectraNet used the methodology recommended by Parsons Brinkerhoff to establish its proposed service target values completion of the assessment of proposed values and compliance with NER and AER requirements was based on an assessment of the Parsons Brinkerhoff methodology.

610. Our assessment approach can be considered to be a progression through the following four steps:

a. assess the methodology through which the proposed measures were derived and the appropriateness of the proposed values;

b. if found necessary, propose adjustments or an alternative methodology;

c. derive substitute values using the alternative methodology;

d. consider the appropriateness of the derived measures against historical performance and the future capex and opex work programs; and

e. assess ElectraNet's STPIS data recording and reporting systems.

[114] *RP*; section 10.3.2; ElectraNet

10.4 Assessment

10.4.1 Assessment of the methodology used by ElectraNet

611. For the methodology assessment we were assisted by the New Zealand Institute of Economic Research (NZIER) for the provision of specialist statistical assessment and analysis. The following assessments and the proposed alternative methodology draw from NZIER's advice.

612. An assessment of the Parsons Brinckerhoff report included in the RP as Appendix Z was undertaken. Overall, we consider the methodology does not meet the requirements of the AER's Service Target Performance Incentive Scheme because it is not sound and is unlikely to produce appropriate performance values.

613. Our reasons for reaching this view are:

a. the distributions used for setting the Availability and Loss of Supply performance parameters are not appropriate; and

b. the distribution used for setting the Average Outage Duration parameter is probably sound (though we find it can be improved upon).

614. Our assessment of the application of the proposed methodology to each of the STPIS parameters is set out below.

10.4.2 Assessment of Transmission Circuit Availability parameters

615. Fitting a normal distribution (symmetrical) to the availability parameters data, as was done by ElectraNet has the implication that values of greater than 100% are likely with non-trivial probability; e.g. there is a 1 in 20 chance (a 5% probability) that critical peak availability will exceed 100%. However, this is physically impossible.

616. This physical impossibility could be adjusted for (albeit in a subjective fashion) but using the normal distribution would still present practical problems because it does not account for the fact that the distribution of availability is skewed to one-side, due to the absolute bound on availability at 100%.

617. We understand that it is the skewing of the distribution of availability that led ElectraNet to propose an asymmetric cap and collar but within a symmetric distribution. The logic and reasoning in identifying the need for an asymmetric cap and collar appears to be sound, however, the methodology using symmetrical distribution is inappropriate.

10.4.3 Assessment of Frequency of Loss of Supply parameters

618. To derive loss of supply parameters ElectraNet has used a process that fits continuous distributions to discrete events.

619. Whether or not it is reasonable to fit continuous distributions to discrete events is context dependent, however, while strictly incorrect, it can provide useful

approximation. In this case, it is not appropriate because of the very small frequency of the events of supply events.

620. The fact that there are very few data points available to conduct the distribution fitting also commends the fitting of discrete distribution with few parameters, such as the Poisson distribution. Yet it appears, from the analytical figures (11 and 12) in the Parsons Brinkerhoff report, that neither this nor any other discrete distribution was considered.

10.4.4 Assessment of Average Outage Duration parameters

621. To derive availability and outage event measures, ElectraNet has fitted actual data to a selected theoretical probability distribution. Implicit in this approach, is the assumption that the data is being generated from a process which can reasonably be expected to produce that theoretical distribution (if the process was left to repeat itself enough times). However, if the theoretical distribution admits values that are impossible for the actual data generation process to achieve; then that distribution is, for the most part, not valid.

622. In our opinion, it is impossible that the availability and outage event measures come from the distributions suggested in the Parsons Brinkerhoff report because:

a. the suggested normal distribution includes values greater than 100%, whilst availability parameters cannot rise above 100%; and

b. the suggested logistic distribution is a continuous distribution, while loss of supply events are discrete events.

623. It is reasonable to make approximations but these must be conceptually reasonable and appropriate given the data or processes in question. In our opinion, the approximations and methodology adopted by Parsons Brinkerhoff do not produce valid outputs.

10.4.5 Performance Targets

624. Clause 3.3(g) of the STPIS Guideline sets out the basic requirement that proposed performance targets for the service component must be equal to the TNSP's average performance history over the most recent five years.

625. ElectraNet elected to use the arithmetic mean as the average; which would be a reasonable and correct selection for a normal (symmetrical) distribution. The term average in statistical techniques, however, can be used as a term to describe the mean, median, mode or 50th percentile as the average of a selected distribution.

626. For one-tailed (asymmetric) distributions we consider the appropriate and correct choice for the average is the average of the distribution, the 50th percentile: it is the measure of a mid-point which is directly related to the collars and caps. The arithmetic average is not necessarily directly related to the collars and caps, if the collars and caps are calculated from a theoretical distribution. This is the average we have selected for our alternative proposed performance targets.

627. We consider this to be the correct application of Clause 3.3(g) of the STPIS Guideline based on the methodology applied: it is also consistent with Clause 3.3(j) based on the

commentary provided by ElectraNet: 'operating at or near 'best practice' levels for a network with its particular characteristics'.

628. For Caps and Collars, as the application of the use of Standard Deviations is not applicable to asymmetric distributions, we used the percentiles that equate to the approximate same capture of data as that with the use of Standard Deviations: that is we used the 5th and 95th percentiles for the availability and Outage Duration parameters, and the 15th and 85th percentiles for the Loss of Supply Event parameters.

10.4.6 Availability Target Adjustment

629. Under Clause 3.3(k) of the STPIS Guideline ElectraNet is proposing adjustments to the Availability Targets relating to changes in the volume and composition of its forecast capital works.

630. ElectraNet is identifying that the RP contains proposals to undertake a significant program of works in the 2013-14 to 2017-18 RCP: and identify that there is an increase in both volume and complexity of network projects. Although the volume increase is identified by ElectraNet, it provides no identification or justification of the level of increased complexity. ElectraNet is identifying that these works will require a higher level of transmission line circuit outages than has been required during the current regulatory period.

631. ElectraNet's proposed adjustments are developed from a top-down methodology.

632. In summary, ElectraNet identifies the methodology employed maps the dollar amounts of capex in defined categories of projects in the current period to the dollar amounts of capex projects in the next period on a consistent basis. The actual outage hours associated with those categories of project in the current period are then scaled according to the capex increase to arrive at the proposed adjustments for the availability parameters for the next period.

633. The performance target is thereby adjusted for the increase in the volume of capital works planned during the regulatory control period compared with the volume of capital works undertaken during the current period. This is achieved by applying an outage hour per $ of capex ratio to the additional outage related capex in the next period.

634. This approach develops the adjustment based on an average capital intensity or density per outage hour across all relevant capital works in the current period.

635. Categories of capital works requiring outages can vary significantly in the capital intensity or density for outage hours, e.g.

a. the capital intensity for the replacement of a circuit breaker we would expect to generally be significantly less than for that of a transformer; and

b. works that require occasional proximity outages for safety during the project as opposed to those that require an outage for the whole project will have very different capital intensities.

636. On the above basis, unless the content of works for the two periods can substantially be demonstrated to be of approximately the same 'mix', then the methodology is somewhat coarse and can produce erroneous results.

637. A more accurate and acceptable top-down methodology would be to map each of the categories of work across individually rather than to use a composite average.

638. We requested that ElectraNet identify the capital intensity for each category for the current period. In their response to our request, ElectraNet identified that, [C-I-C] We would suggest that as the ElectraNet methodology requires identifying all the relevant network projects involving outages during the historic target setting period, it is possible to categorise these by project categories and map over accordingly.

639. We suggest that no adjustment is allowed at all, until this more refined methodology is employed to demonstrate the case and need.

10.4.7 Weightings for service component parameters

640. ElectraNet currently proposes to make adjustments to the weightings for two of the service component sub-parameters for the RCP. They noted that the performance for average outage duration has been subject to an increased number of low probability, high impact outages in the radial network during the historic period.

641. The average outage duration parameter as defined in the STPIS guideline for ElectraNet applies solely to outages resulting in customer loss of load. Due to the relatively low number of connection point outages resulting in lost load, performance is quite variable from year to year. A few relatively long duration outages are likely to drive the parameter markedly higher while a large number of short duration outages are likely to drive the parameter lower.

642. ElectraNet is proposing to increase the weighting on the average outage duration sub parameter from 0.2 to 0.3 and proposes an equivalent reduction in the weighting of the critical circuit availability peak sub parameter. ElectraNet has provided the following reasoning for these proposed movements in weighting:

a. that there is merit in increasing the weighting of the average outage duration sub parameter by 50% to address the concerns that the historic performance may raise with stakeholders; and

b. that the introduction of the MIP provides a direct incentive to reduce the impacts of critical circuit availability peak sub parameter and that a slight reduction of the weighting for this parameter is now appropriate.

643. Whilst a simplistic assessment of the proposal to increase the weighting of the Average Outage Duration sub parameter may appear to be appropriate, we have found no evidence, in terms of the capex or opex proposals directly related to improving the performance of the radial network, which would merit an increased award incentive.

644. As the historic performance of the outage duration sub parameter has deteriorated, due to an increased number of low probability high impact outages in the radial network, then statistically there is a strong probability that this sub parameter will 'self-correct' in the next period and, as a result, ElectraNet would receive an increased award incentive for no direct or indirect action to improve the performance at all.

645. If the condition and performance of the radial network is in fact deteriorating a lower target will result in the award penalty being considerably 'softened'. This is because of

the recent poor performance, and increased target to collar position, and due to the long 'tail' for the next RCP compared to the historic position; The long tailed distribution provides a larger target to collar position. This means that a significantly decreased performance would be needed to get the full weight of the collar penalty. In practice this would result in plenty of 'carrot' being available for a statistically expected improvement with no action and no further deterioration of the radial feeders, yet not as much 'stick' if performance actually deteriorates further.

646. We consider the proposal to increase the weighting on the Average Outage Duration sub parameter from 0.2 to 0.3 should be declined.

647. We do agree with the view expressed by ElectraNet with regard to the Critical Circuit Availability Peak parameter and the interaction with the Market Impact Parameter and that a slight reduction in the Critical Circuit Availability Peak parameter is now appropriate.

648. In considering the roles of transmission networks, the principles in Clause 6A.7.4 of the NER and the AER's STPIS, and reviewing and taking into account the current targets, current performance and identified network weaknesses to be addressed by the capex and opex proposals: we are of the view that the weight of effort, to be reflected in the service parameters should be on managing total unplanned unavailability and reducing unplanned service interruptions.

10.5 Our assessment of STPIS data recording and reporting

649. ElectraNet maintains electronic recording systems which provide inputs to the performance data maintenance system, the events database.

650. We reviewed, in conjunction with ElectraNet, the STPIS related recording and reporting systems and processes. It appears that data collection systems are 'mechanical' in nature, and have been well explored, described, examined and audited by previous consultants (PB March 2009 & SKM March 2007). ElectraNet identified that the events database has not changed materially since the Parsons Brinkerhoff and SKM audits. For this reason, we considered that replicating the system description in this report was unnecessary.

651. The AER annually reviews and approves ElectraNet's performance against the STPIS. Independent audits, as identified above, are also conducted on a periodic basis by external experts appointed by the AER.

652. In all instances, the annual review process has involved vertical sampling of the performance data including the supporting systems.

653. From the review, we conclude that the ElectraNet's system for recording, processing and reporting of service standards continues to be a robust and reliable system free from material errors.

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Glossary

AER	Australian Energy Regulator
AEMO	Australian Energy Market Operator
AMP	Asset Management Plan
EMCa	Energy Market Consulting associates
ESCOSA	Essential Services Commission of South Australia
ETC	Electricity Transmission Code (South Australia)
ICT	Information Communication and Technology
NER	National Electricity Rules
PMBOK	Project Management Body of Knowledge
PMM	Project Management Methodology
RCM	Reliability Centred Maintenance
RCP	Regulatory Control Period
RIT-T	Regulatory Investment Test for Transmission
SCAR	System condition and risk
STPIS	Service Target Performance Incentive Scheme
Strata	Strata Energy Consulting Limited
TALC	Total Asset Life Cycle

Annexures

Annexure A: AEMO review of network projects

A.1 Scope of AEMO review

654. AEMO's review[1] was based on information provided to it by ElectraNet (as at 26th April 2012). Subsequent changes occurred between the information reviewed by AEMO and components of the capex forecast included in the revenue proposal.

655. AEMO's review covered the following capex categories:

a. Augmentation;

b. Connection;

c. Replacement[2];

d. Security/compliance;

e. Strategic Land and Easements.

656. AEMO undertook the following in its review:

a. ensuring the identified need met the jurisdictional planning obligations described in the ETC;

b. assessing the reasonableness of the proposed options and consideration of any alternative options identified by ElectraNet;

c. assessing augmentation timings relative to load forecast information (as at 26 April 2012;

d. Alignment with AEMO's National Transmission Network Development Plan (NTNDP).

657. For contingent projects AEMO assessed the reasonableness of the project and the proposed trigger.

658. AEMO conducted its assessment of augmentation requirements by reference to ETSA's 2012 connection point forecasts and did not use AEMO's own, considerably lower, demand forecast.

A.2 AEMO's approach

659. AEMO's approach was to assess load flow, voltage support and other technical analysis on a region by region basis using base data provided by ElectraNet (adjusted where AEMO considered it to be necessary). Through this analysis AEMO established the location and timing of network constraints/limitations and/or breaches in the ETC reliability standards that would be likely to develop.

[1] *2012 ElectraNet Revenue Cap Review – Capital Projects Assessment Report;* AEMO publication (provided 5th June 2012 under letter from Mr David Swift to AER: Mr Warwick Anderson)

[2] AEMO's review of replacement projects was limited to identifying synergies between asset replacements and network augmentations and only covered a very small proportion of proposed replacement capex.

660. Using the information obtained on the potential network limitations, AEMO considered the extent to which the proposed network development projects would address them including the appropriateness of proposed project timings.

661. Based on observations made during the load flow analysis, AEMO tested potential alternatives to the proposed option[3].

A.3 Projects reviewed by AEMO

662. Table A.1 below provides details of the coverage of the AEMO review relative to the projects included in ElectraNet's RP.

Table A.1: AEMO Review

AEMO Review	Number			Value		
	No. Reviewed	Total	%	$m Reviewed	Total	%
Augmentation	10	33	30%	50	118	42%
Connection	5	16	31%	78	133	58%
Easement/Land	6	26	23%	27	66	41%
Security compliance	6	19	32%	24	57	42%
Inventory/Spares	-	7	0%	-	18	0%
Refurbishment	-	6	0%	-	54	0%
Replacement	4	61	7%	75	398	19%
Total $m	**31**	**168**	**18%**	**253**	**844**	**30%**

Source: AEMO and ElectraNet

663. The above table covers the twenty-five network capex projects and the six land and easement projects assessed by AEMO that were included in the Revenue Proposal. It can be seen that the 31 projects reviewed by AEMO covered 30% of the total proposed network capex.

A.4 AEMO's findings

664. The three findings of the AEMO review that are relevant to augmentation and connection capex are that:

i. *"AEMO was satisfied that taken together, the proposed network development projects address the network limitations that are reasonably expected to emerge over the regulatory period 2013 – 14 to 2017 – 18 for compliance with the South Australia ETC and the National Electricity Rules (NER)";*

ii. *"AEMO's assessment confirms the existence and timing of potential future network limitations identified by ElectraNet. AEMO considers that the proposed network solutions were reasonable";* and that

iii. *"ElectraNet's proposal is considered to be consistent with the NTNDP".*

665. For contingent projects, AEMO concluded that it generally supported ElectraNet's project proposal and that the proposed contingent projects were:

[3] AEMO's assessment is described on page 5 of its report and includes a three stage approach to load flow studies.

a. able to cover the range of probable future development scenarios; and

b. required under the specific development scenarios (demand growth, generation growth and identified market benefits).

Annexure B: EMCa sample review of network projects

B.1 Assessment methodology

666. Our approach to this review has been to first undertake a governance-based assessment of ElectraNet's asset management framework including its systems and processes for the development of its capex and opex forecasts. The second stage of our approach is to assess the extent to which the business has applied its asset management framework in practice when estimating the expenditure forecasts submitted in the RP.

667. Our approach to this second stage is to review a representative sample of projects and through this, to determine the extent to which ElectraNet has applied its asset management framework in practice. The second stage review also provides information on the level of prudency that has been applied when making decisions on the scope and cost of the proposed projects that form the expenditure forecasts. Our findings are provided in section 6.6.3 of this report.

668. In addition, the TOR requires EMCa to undertake a high level assessment of those areas of ElectraNet's capex that have been subject to review by AEMO and to undertake a more detailed review of aspects that AEMO did not cover in detail. This requirement was taken into consideration when selecting and assessing the projects selected for review and the focus areas.

B.2 Selection of projects for review

669. Projects for review were selected on the following basis:

a. A statistically representative sample weighted for higher cost projects was derived;

b. The sample was reviewed to ensure that the majority of high cost projects had been covered;

c. The sample was further weighted towards replacement capex as this was not reviewed in detail by AEMO.

670. Twenty-two network projects were selected for assessment out of a total of 168. In addition three non-network capex projects were sampled to provide an indication of the level of ElectraNet's application of its asset governance and management framework in these areas. Table B.1 below sets out the coverage of the project sample relative to the projects included in ElectraNet's RP and the full list of reviewed projects is in table B.2.

Table B.1: EMCa Review

EMCa Review	Number			Value		
	No. Reviewed	Total	%	$m Reviewed	Total	%
Augmentation	4	33	12%	59	118	50%
Connection	4	16	25%	99	133	74%
Easement/Land	2	26	8%	24	66	36%
Security compliance	1	19	5%	4	57	6%
Inventory/Spares	1	7	14%	5	18	28%
Refurbishment	2	6	33%	40	54	74%
Replacement	8	61	13%	172	398	43%
Total $m	**22**	**168**	**13%**	**401**	**844**	**48%**
Non Network	3	88	3%	9	49	18%

Source: EMCa analysis from ElectraNet data in response ENET070(C)

B.3 EMCa assessment of the projects reviewed

B.3.1 Augmentation, connection and security and compliance projects

671. AEMO's conclusion was that:

a. *the combined proposed network development projects address the network limitations that are reasonably expected to emerge over the regulatory period 2013 – 14 to 2017 – 18 for compliance with the South Australia ETC and the National Electricity Rules*[1]*; and*

b. *the proposed network solutions are reasonable.* [2]

672. For augmentation, connection and security and compliance projects we are in agreement with AEMO that the proposed projects would be reasonable and likely to be required during the next RCP, if the demand forecast was as proposed by ElectraNet. As we have reported, we consider that ElectraNet's demand forecast is overstated and therefore that not all augmentation and connection projects are required at the times indicated in ElectraNet's proposal.

673. In other respects, our analysis of the sample projects provided confidence that ElectraNet had developed projects in accordance with its capital governance framework and was managing their progress through a well-developed PMM.

B.3.2 Replacement and refurbishment projects

674. In the replacement and refurbishment capex categories AEMO only reviewed four projects which were considered to have load growth implications. We have found, through our broader review of replacement and refurbishment capex, indications that a prudency adjustment to this component of capex is likely to be warranted.

675. Our findings on two of the replacement capex projects reviewed by AEMO and a broader unit asset replacement program are discussed below.

10019 Kincraig Substation Replacement and Transformer Upgrade - Rev 8 LU46

676. This project is in the early concept stages and has not yet progressed to "Phase 0" under ElectraNet's PMM. The Pre-Phase 0 documents have been provided by ElectraNet and reviewed. These documents were:

a. Asset life assessment;

b. Project scope;

c. Cost estimate summary;

d. Project summary.

[1] AEMO report page 20

[2] AEMO report page iv

677. At the Pre-Phase 0 stage, the project documentation is at a high level providing summary information only. The asset life cycle assessment report provides adequate justification for the inclusion of replacement project expenditure based on the age and inspected condition of the assets.

678. This project as proposed by ElectraNet is to replace the existing two 25 MVA 132/33 kV transformers at Kincraig substation with two new 60 MVA transformers and to refurbish the two 25 MVA units and place them into spares inventory. The estimated cost of this project is $41m.

679. As the existing transformers are being refurbished we would have expected to see consideration of an option to retain at least one refurbished transformer and install one new 25MVA unit. ElectraNet documents state that the existing T1 could have a life extension of 15 years if refurbished. T2 is only 6 years old and could be reused with an oil change. It would seem possible to utilise the refurbished transformers and add a single new 25MVA unit if necessary.

680. Given that the load forecast by ETSA for this connection point only reaches 28MW at 2018, 2 x 60MVA units seem to provide excess capacity for several years. Also ETSA forecast a power factor of 0.9 for the Kincraig connection point. Lifting the power factor to 0,95 or unity at peak times is likely to optimise capacity and could delay the need the need for the investment or allow the use of 25MW transformers for longer. The documents provided by ElectraNet do not indicate that consideration has been given to how power factor improvement could provide for efficient investment deferral.

681. It is our understanding that ElectraNet can impose changed power factor requirements through its contractual arrangements with ETSA Utilities if energy transmission is being impeded.

682. We consider that the use of at least one of the refurbished existing transformers could lead to an estimated potential saving of $5m and that power factor improvement should be considered.

11005 Kanmantoo Substation Upgrade - Rev 7 LU46

683. As with the previous project this project is in the early concept stages and has not yet progressed to Phase 0. Pre-Phase 0 documents that covered asset life assessment, project scope, cost estimate summary and project summary were provided by ElectraNet and reviewed.

684. The existing substation at Kanmantoo supplies mining load, a fertiliser factory, pumping and a small community. The documents indicate that a load growth driven substation upgrade is required by 2022 but condition assessment reports are driving early replacement of the substation. However, ElectraNet did not provide a detailed condition assessment report (as it had with some other projects) nor analysis to support its view that the circuit breakers are in need of urgent replacement.

685. The substation loading of under 4MW is relatively small therefore the $14m expenditure is high in terms of $/MWh. This means that full consideration of non-transmission alternatives would be expected to be seen prior to this investment proceeding.

686. The project as proposed by ElectraNet will increase transformer capacity from 1 x 10 MVA to 2 X 10 MVA yet the ETSA forecast load for the connection point only goes beyond 5MW in 2023/24. The project scope states that the capacity increase is only

required by 2022 which raises questions as to why the second transformers are being installed now. ElectraNet documentation states that the decision to include the costs of a second transformer was based on reduced costs of unserved energy in high level PV analysis. The relevance of such an assessment is questionable, since ESCOSA has already assessed and determined security requirements for every connection point. Not only would we expect ESCOSA to have used a similar methodology (and appears to have come to a different conclusion) but the ETC requirements are what ElectraNet is required to meet, not some other standard determined by ElectraNet.

687. AEMO considered that this project was appropriate on the assumption that the connection point ETC category would be changed to category 2[3]. However, the connection point category has not been changed from category 1 in the ETC for 2013. Category 1 does not support two transformers on this single line. Therefore the second transformer is not required to meet the ETC.

688. We also noted that the forecast power factor of 0.9 (2012 APR ETSA medium forecast) could be improved by ETSA which could provide economic deferral of the requirement for a future increase in transformer capacity. We suggest that consideration of improved power factor requirements at peak demand times may prove to be valuable.

689. We have concluded that the estimated costs of $14m for this project are likely to fall by at least $5m when prudent adjustments are made to bring this project into alignment with ETC requirements.

11890 Unit Asset replacement rev 5 LU46

690. This project covers the replacement of several in situ unit assets covering circuit breakers, voltage transformers, current transformers and protection relay sets. The assets identified are said by ElectraNet to be

> *predominately assets that are unreliable or at the end of their technical and/or economic lives and are located where the asset won't be replaced as part of an augmentation project or substation rebuild project during the 2013 – 2018 regulatory period.*[4]

691. The nominated assets are situated at a variety of locations on ElectraNet's network.

692. Basic Pre Phase 0 documents have been provided to support the estimated $35.3m expenditure. No evidence that the asset replacements have been identified through the Asset Management Framework has been provided. In addition the cost estimate documentation provided is at a very high level containing no details of how the $35.3m costs have been derived. This is of particular concern given that network expenditure on the unit asset replacement programme is scheduled to start in 2013/14.

693. We would have expected that the work schedules etc. for these replacements would have been derived from SAP / SCAR data and analysis. We found no evidence of this in the basic documents provided.

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[3] Table a 3 summary of capital network projects assessed by AEMO (replacement) AEMO 2012 ElectraNet Cap Review

[4] ElectraNet scope document for project 11890 Unit Asset Replacements 2013 - 2018

694. The scope document provided by ElectraNet recognises that the replacement programme is likely to change as it develops through the RP.

> *Due to the significant number of assets on the project list, there is scope for flexibility in the timing of each asset replacement. …… Some of the listed assets for replacement are in substations on the contingent project list. If these projects are activated then the assets associated with that substation and the remote ends are to be removed from the unit asset replacement project.*[5]

695. Based on the documentation provided by ElectraNet we have formed the view that this asset replacement project has been developed at a high level and is likely to change significantly through the RCP. We consider that prudency gains in the order of at least 5% (representing $1.5m) are likely to be achievable through prioritisation and scope and cost firming.

B.4 Other issues

B.4.1 Power factor management

696. We consider that there are likely to be opportunities to defer and/or manage augmentation and connection. This should be possible through more efficient use of peak demand network capacity at times of peak demand that can be achieved, for example, from an increased focus on available demand side contributions to peak demand management. It should also be economic to improve power factors at connection points that are approaching peak time capacity limitations. For most connection points the power factor requirement is 0.95 or 0.9 depending on the connection voltage. However, ElectraNet has the right to require a higher level of power factor if the ability to transfer energy is constrained.

697. Power factor is a ratio of the active energy that is used to meet the energy demand and the reactive energy which is energy that flows in alternating current systems that is not consumed at the point of use. A common metaphor used to describe the effect of static reactive energy in electricity networks is a beer glass where the volume capacity of the glass is required to hold the beer to be drunk and the foamy head. Therefore the capacity of the glass has to be greater than the quantity of beer purchased.

698. Similarly, the existence of reactive energy in electricity networks during periods of peak demand means that the capacity of network assets must be sufficient to carry both the active and reactive energy components. Reducing power factor levels closer to unity reduces the presence of reactive energy flowing in networks and therefore makes more efficient use of capacity and allowing for the deferral of the need for network investment.

699. Given that several augmentation capex projects have relatively large investment required to meet relatively small changes in peak demand, we would expect there to be an a priori case for improvements in power factor in order to defer the very significant proposed investments.

[5] ibid

B.4.2 Replacement capex

700. Under ElectraNet's asset governance and management framework replacement capex is driven on an asset inspection and condition assessment basis with risk and total asset life cycle assessment[6]. We have concerns regarding ElectraNet's application of the SCAR and TALC procedures when setting the aggregated replacement and refurbishment capex and these are discussed in detail in the main body of this report.

701. In addition, we have concerns regarding the proposed inclusion of capex for the water pumping station substation replacement programme. As these expenditure items were not reviewed by AEMO we cover them in the body of this report.

B.4.3 Basis for prudency adjustment recommendation

702. As discussed in the sections above we found that for three replacement capex projects an estimated $11.5m gain could be expected as projects were developed further and ElectraNet's application of prudent decisions. The expected gain was derived from the following project reviews

a. 10019 Kincraig Substation Replacement and Transformer Upgrade - Rev 8 LU46 = $5m

b. 11005 Kanmantoo Substation Upgrade - Rev 7 LU46 = $5m

c. 11890 Unit Asset replacement rev 5 LU46 = $1.5m

703. The $11.5m was calculated to be 7% of the total $171.5m for the reviewed sample of replacement capex.

704. We consider that similar prudency gains can be expected to be achieved across the overall replacement and refurbishment capex forecast as projects progress through the phases of ElectraNet's PMM. Therefore, we consider that a 7% adjustment to the total replacement and refurbishment capex forecast is appropriate.

[6] This framework will be described further in our main Technical Review report. The key acronyms used by ElectraNet for this framework are SCAR (System Condition and Risk) and TALC (Total Asset Lifecycle)

Table B.2: Ex-Ante capex project sample

[C-I-C]

Source: EMCa analysis from ElectraNet data in response ENET070(C)

Annexure C: Resumes of authors

Paul Sell

Paul Sell is an energy economist, specialising in energy markets and market reforms. He has over 30 years' experience, which includes providing major advice on restructuring, on deregulation, on the design and implementation of electricity and gas markets and on network regulatory arrangements in Australasia. He has worked extensively with energy utilities, governments, energy regulators and energy market agencies.

Career summary

- Managing Director of Energy Market Consulting associates (EMCa), Sydney, NSW
- Vice President of Cap Gemini Ernst & Young, Global Services Unit (GSU), Sydney, NSW
- Partner of Ernst & Young Consulting, based in Sydney, NSW
- Consultant/Manager/Senior Manager/Principal of Ernst & Young Consulting , Wellington, New Zealand
- Economist in NZ Ministry of Energy, Planning and Forecasting Division Wellington, New Zealand

Expertise

- Electricity and gas utility network pricing, regulation and associated cost analysis
- Energy utility analyses including investment decisions and investment justification processes, energy forecasting and planning studies, and business modelling
- Electricity and gas wholesale markets design and operations
- Energy utility sector reform, restructuring and deregulation policies
- Retail competition in energy markets

Bill Heaps

Bill Heaps is Managing Director of Strata Energy Consulting and Director of Energy Impact and the Sustainable Capital Company. He has over 30 years' experience in electricity utility engineering, management and consulting roles.

Bill is an electrical engineer with senior management experience in energy utilisation, distribution, retail, transmission and power generation. He has recently held three advisory group chairmanship roles for the New Zealand Electricity Commission and currently chairs the Investment Advisory Group. Bill has also been Director of Orion Group Limited, one of New Zealand's largest electricity distribution businesses.

Career summary

- Managing director of Strata Energy Consulting
- General Manager (Commercial Services) at Transpower, New Zealand's electricity transmission and system operating company
- General Manager (Geothermal) of the Electricity Corporation of New Zealand (ECNZ)

Expertise

- **Wholesale electricity market** – Expertise in the design, governance, regulation and operation of electricity markets
- **Electricity Generation** – experienced in power generation plant management and investment planning
- **Electricity transmission networks** – experienced in the provision of transmission services, including pricing and revenue, contracts, asset management systems and performance
- **Electricity distribution** – Experienced in distribution company governance, strategy and policy development and distribution business processes
- **Retail electricity markets** – Expertise in retail market design and operation, including market processes, price risk management, metering, reconciliation and information systems regulation, rules and governance
- **Electricity Utilisation –** experienced in the use of load management techniques in major industrial manufacturing plants and commercial buildings

Stephen Lewis

Stephen Lewis is an electrical engineer who has over 30 years of electricity supply industry experience. His previous career with National Grid plc spanned the UK, the USA, Australia and South America.

Stephen is currently a Director of MainPower New Zealand Ltd., and a Trustee and Chair of Community Energy Action.

Up until August 2006, Stephen was the Commercial Director for National Grid Australia during the final stages of the Basslink HVDC interconnector project between Tasmania and Victoria. Prior to this, Stephen was a Vice President of National Grid USA and headed the transmission business covering the New England and New York states.

Career summary

- Associate consultant with Strata Energy Consulting
- Director of MainPower New Zealand Ltd
- Trustee and Chair of Community Energy Action
- Commercial Director for National Grid Australia
- Vice President of National Grid USA

Expertise

- **Electricity transmission** – Experienced in transmission governance, business management systems and operations, mergers and acquisitions, asset management and integration of processes and systems
- **Electricity distribution** – Experienced in distribution company governance, strategy and policy development and distribution business processes

Dave Frow

Dave Frow is a former Chief Executive Officer of the Electricity Corporation of New Zealand (ECNZ), with seven years' experience in this role which included responsibility for electricity transmission. Dave steered the company through the period of industry structural and market reform, to the creation of the separate transmission company and competitive electricity generation companies. Dave is former Chairman of Transpower (New Zealand's national electricity transmission company), a former Director of Unison Networks Ltd (an electricity distribution company) and former Director of ETEL Ltd (providing electrical transformers).

Dave has provided international strategic management consulting advice in a range of industries, including postal, harbours, electricity and manufacturing.

Dave holds a degree in engineering from the University of Natal South Africa and is a graduate of the Harvard Business School Advanced Management Programme. He is a fellow of the Institute of Professional Engineers (IPENZ).

Career summary

- Chief Executive Officer of the Electricity Corporation of New Zealand (ECNZ)
- Chairman of Transpower
- Director of Unison Networks Ltd
- Director of ETEL Ltd

Expertise

- International strategic management consulting advice in a range of industries, including postal, harbours, electricity and manufacturing.

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Annexure D: Addendum - Implications arising from additional engagement with ElectraNet

D.1 Introduction

D.1.1 Scope of Engagement Process

705. After providing a penultimate draft of the Technical Review and Demand Forecast review reports to the AER on 6th September, the AER began an engagement process with ElectraNet. AER staff met with ElectraNet on 13th September and presented the main findings from EMCa's reports. Subsequently AER arranged for a meeting between AER, ElectraNet and EMCa which was held on 3rd October 2012 in Melbourne (with video links to other AER offices) and a follow-up meeting on contingent projects was held in Adelaide on 4th October.

706. The objective of the engagement process was to describe to ElectraNet our key findings and our evidence in support of those findings, to seek additional information which might have a bearing on our findings, and to assist us in determining whether there was any misunderstanding or misinterpretation of information previously provided to us by ElectraNet. .

707. A meeting was also to have been held with EMCa, AER, ElectraNet and SA Water on 5th October, however SA Water eventually chose not to accept this meeting invitation.

D.1.2 Content of this Addendum

708. This addendum report provides EMCa's perspective on the engagement with ElectraNet, including feedback, information and discussion that took place at the meetings or which has been provided by ElectraNet subsequently (up until 11th October). The material in this addendum presents matters that EMCa considers relevant to our findings, and which arose from the engagement process. It should not be read as a record of the meetings held, nor does it purport to represent ElectraNet's views or argument presented during those meetings.

709. In the next section of this addendum report (section D.2) we provide, for each of the topics discussed, our commentary on additional information provided by ElectraNet, the basis for any modifications or refinements to the assessments provided in the main body of this report (sections 3 to 9), together with information which we consider to further confirm those assessments.

710. Our findings in section 2, including the quantified implications of these findings, reflect the updated information and assessments presented in this addendum. This addendum may modify information or assessments in other sections of this report and we have not updated the whole of this report to fully reflect the additional information provided. To the extent that there may be differences, the information and assessments in this addendum prevail.

711. We note that, while there was discussion of STPIS at the meeting on 3rd October, this was largely between ElectraNet and the AER. As EMCa has not been asked to review the corrected information that was provided by ElectraNet nor to advise further on the STPIS parameters, we have not included STPIS within the scope of this addendum.

712. Appendix E contains the AER's presentation to ElectraNet, as used at the 3rd October consultation meeting, while Annex F contains the agenda that was provided to SA Water listing the matters on which we were seeking clarification at the proposed meeting scheduled for 5th October.

D.2 Additional information and assessment

D.2.1 Demand forecast and its implications

713. Following discussion at the meeting on 3rd October, EMCa reaffirms its view that the ETC does not require ElectraNet to unequivocally plan over the course of the next RCP to meet a load forecast provided by SA Power Networks (SAPN)[1]. Our main points are that:

a. The ETC requires ElectraNet to agree any forecast (it need not simply accept SAPN's forecast),

b. the Forecast Agreed Maximum Demand is a three year forecast (which covers only the first two years of the next RCP), and

c. the significance of this forecast in relation to the operative clause in the ETC (clause 2.11) lies in the time allowed subsequent to a breach caused by actual demand exceeding the equivalent capacity, for ElectraNet to remedy that breach and does not directly require ElectraNet to build capacity to meet the SAPN forecast.

714. We reaffirm our view that good practice industry standard is to plan to an explicit planning margin (such as one-in-ten years, or PoE10%). Also, that ElectraNet's forecast demand growth rate (of 3.0% p.a.) is excessive and that a more realistic growth rate would be nearer to the historic growth rate and the undiversified connection point growth rate implied by the AEMO forecast, both of which are in the vicinity of 2.0% p.a.[2]. We also reaffirm our assessment that there is some diversity at the regional level that should be taken into account in planning regional network augmentation.

715. We were presented with information that ElectraNet is giving further consideration to the interpretation of its requirements under the ETC, also the PoE planning margin concept and the proposed demand growth rate (given the significantly lower AEMO forecast).

716. From information presented by ElectraNet, we confirm the broad quantum of the difference that we had estimated, with the AEMO forecast for 2017/18 being around 800MW lower than the ElectraNet demand forecast (when converted to an equivalent basis). We consider that the AEMO demand forecast may have some bias towards under-estimating demand and that a trend forecast such as we have provided, and which lies between the ElectraNet and AEMO forecasts (though much closer to the AEMO forecast) may provide a more valid representation of future demand.

717. We have further considered the implications for capex of a lower demand forecast. ElectraNet provided information that two connection point projects (Baroota and

[1] ETSA Utilities changed its name to South Australia Power Networks on 2nd September 2012.

[2] The "headline" AEMO 2012 state-wide diversified generation-level forecast growth rate is 1.0%. We have estimated the equivalent undiversified connection point growth rate of 2.1% after adjusting the AEMO forecast to an equivalent basis, using the adjustment factors in ElectraNet's 2011 reconciliation report. (See EMCa / NZIER report *Review of Demand Forecast Proposed by ElectraNet,* paragraphs 62 & 96, 97.)

Dalrymple) are required to meet more onerous ETC reliability standards, and are therefore not load growth related[3]. We have accepted this information and have removed deferral of these projects in our assessment of a demand-related adjustment. This reduces the adjustment previously advised for connection capex, by $30m.

718. We also reviewed information provided by ElectraNet on the capex implications for specific projects, of a "low demand growth scenario"[4]. This information showed that three projects classified by ElectraNet as "replacement" are load-driven and would be deferred by 2 to 3 years under a "low load growth" scenario. While noting that ElectraNet's low load growth forecast is only 6% lower than its medium forecast[5], in the absence of further information we have used ElectraNet's resulting replacement capex reduction as a (conservative) estimate of the impact on replacement capex of the lower demand growth that we have proposed (i.e. a 14% lower demand). This results in a $57m demand-related reduction in replacement capex[6], increasing the overall adjustment by this amount.

D.2.2 Asset management framework, enhanced maintenance regime and capex/opex trade-offs

719. We remain of the view that the design, structure and components of ElectraNet's asset management framework are at or beyond good industry practice. However we reaffirm our concerns with the application of the regime in practice: specifically that there is insufficient analysis to conclude that the proposed expenditures reflect optimal cost/risk, capex/opex and current/future cost economic trade-offs.

720. In section 8.4 we stated that we estimate that the more comprehensive condition-based maintenance regime that ElectraNet has deployed has cost of the order of $50m. We have updated this estimate, as shown in table A.1 below, and we presented the components of this cost estimate to ElectraNet at the meeting. In summary this comprises:

a. An incremental step increase in routine maintenance costs, of the order of $3m per year, that commenced in 2010/11[7];

b. Historical and projected detailed condition assessment costs (identified by ElectraNet within operational refurbishment)[8];

c. Additional asset manager support and capex IT costs[9].

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[3] ENET263(P)

[4] ENET238(P)

[5] In 2017/18

[6] This is in addition to other adjustments to replacement capex

[7] ENET100 and explanation in the RP section 4.4

[8] ENET214

[9] EMCa estimate from reported additional staffing, any modifications to SAP and deployment of field data devices and related comms and interface requirements

Table A.1: Estimate of incremental cost of deploying enhanced condition-based maintenance regime

$million (real 2012/13)

Cost category	2008-13	2013-18	Total
Routine Maintenance	9.0	15.0	24.0
Operational Refurbishment	4.9	15.0	19.9
Asset Manager Support	2.4	5.4	7.8
Total opex	**16.3**	**35.4**	**51.7**
Capex (IT)	1.0	-	1.0
Total expenditure	**17.3**	**35.4**	**52.7**

Source: EMCa estimate from ElectraNet information

721. This is an incremental cost estimate – that is, it reflects the costs that ElectraNet appears to have incurred (or will incur) in designing and implementing the current regime, relative to what it would have incurred, and was incurring, prior to implementing this regime. While our revised estimate is $52.7m, we have conservatively rounded this down to $50m for the purposes of considering what minimum expected benefits should result from this investment. We have also conservatively not taken into account the time value of money.

722. We also discussed with ElectraNet our view that there was insufficient evidence of "threshold" analysis of cost/risk and economic trade-offs. For the purpose of illustration, we used figure 36 (section 6.6.4) of the current report.

723. ElectraNet has presented a response to matters raised at the meeting[10]. That response employs the same concept of trade-off thresholds that we have in mind, and at a conceptual level we consider that there is no difference of substance between EMCa and ElectraNet's views. However the response does not satisfy our significant concerns. We note the following:

a. In section 3.5[11] the asset replacement threshold is described without reference to what we would consider to be a significant, if not primary, economic cost trade-off (NPV of maintenance costs versus replacement cost).

b. In section 3.6 it is suggested that only defects with safety / environment or reliability/availability impacts are considered for corrective maintenance. However ElectraNet's corrective maintenance information (and which is referenced in section 8.5 of the current report) indicates that a significant number of defects are "asset-related" and do not have such impacts.

c. In section 3.7 it is noted that only "high-risk" refurbishment projects have been proposed and which we have already observed in the current report (see section 8.6). Our concern is in the justification of this cut-off and ElectraNet has not yet satisfactorily answered what is the implication (in terms of risk or lifecycle economics) of not doing all "high-risk" projects or (conversely) what are the asset

[10] ENET271

[11] This and following references are to ENET271, unless stated otherwise

life cycle and risk implications of not undertaking any medium or low risk projects (as it proposes).

d. In section 3.5 ElectraNet claims that the introduction of the TALC-base maintenance regime has allowed it to defer in excess of $3.5bn of replacements that would otherwise have been required over two regulatory periods. We consider that this estimate is implausible. It is considerably greater than the total asset value of the network and nearly fifteen times the current RCP actual replacement expenditure level of $237m and nine times ElectraNet's proposed replacement capex of $398m in the next RCP. ElectraNet's claim would warrant considerably greater scrutiny of supporting evidence.

724. In summary therefore we consider that the cost/risk and economic trade-off analyses, that should be being used to define the "balance points" for relevant thresholds, appear not to have been properly specified yet and/or have not been satisfactorily applied.

725. In our discussions in our first meetings with ElectraNet in Adelaide we likened ElectraNet's regime to a machine with dials that could be turned up or down. We consider the machine to be capable of what's required of it, but the "calibration" of the dials is what is now required in order to set appropriate levels of maintenance effort, of the appropriate type, to achieve defined risk positions. Our view remains that justification, in terms of quantified and realistic benefits, is required for the levels of increased maintenance and replacement that have been proposed, and this has not been provided. This would not only assist the regulator, but we consider it would also be a matter of good governance to undertake such a "mid-implementation review" in order to confirm the direction that ElectraNet is taking and to set objective and measurable benefit targets.

D.2.3 Replacement capex - SA Water pumping station supply replacements

726. In our report we have expressed significant concerns about the lack of strategic alignment between ElectraNet's proposed expenditure to replace its supplies to SA Water, at a cost of $123m, and the associated stranding risk for consumers.

727. ElectraNet stated that it has had a number of meetings with SA Water on these matters. We sought and were not provided with any substantive evidence of commercial discussions of the scale and nature that we would expect before embarking on such a large program of work on such closely-related assets and it would appear that such documentation may not exist.

728. AER sought a meeting with SA Water, scheduled for 5th October in Adelaide, and which would likely have clarified many of the uncertainties that we have raised. An agenda was sent on 28th September[12]. On 4th October SA Water advised the AER that it did not wish to proceed with the meeting but would respond in writing.

729. No further evidence has been provided to us by ElectraNet that would address the issues that we have raised. We are further concerned by a broad assessment that indicates that the cost of supply, based on fully replaced assets costing $123m, would be of the order of [C-I-C] per year, compared with [C-I-C] per year that we have been

[12] Appendix F

advised is the current level of charges to SA water. Such a discrepancy raises the risk that a continued service is being asked for without sufficient commercial commitment with regards to the need, with the result that the proposed program of comprehensive replacement of the substation assets within the next RCP may not be the best option to address the issue of deteriorated supply assets.

730. Correspondence from SA Water to the AER[13] provides confirmation that SA Water is aware of the current grandfathering regime and the implications if the required service at any connection point changes. Our concerns remain that the grandfathering arrangements appear to be providing financial incentives that provide a barrier to efficient long term investment in the total water and electricity assets. Due to the cancelation of the scheduled meeting with SA Water we have been unable to draw conclusions on the extent to which this may be happening in practice.

731. Unless or until satisfactory evidence to address our concerns is provided, we maintain the finding as presented in the body of this report.

D.2.4 Replacement capex - prudency

732. In the meeting we explained the basis for our assessment that the replacement capex forecast should include a prudency adjustment of 7%. As is described in section 6.6.3, we made this assessment after reviewing documentation for a sample of projects that comprised 48% of the total proposed network capex and 47% of the total proposed replacement and refurbishment capex. We described to ElectraNet the specifics of the prudency issues that we found, as described in the current report (Annex B).

733. In our view these issues were identified because the projects reviewed (as with most of the projects proposed in the RP) are at an early stage, where their justifications and scope has not been subject to the rigour that will be applied in later stages. We reviewed the projects in much the same way that we expect ElectraNet itself will, as the projects are progressed through the “gates” in its project management methodology, and we expect that ElectraNet’s own project management methodology will produce similar changes over the early RP budget estimates, to the prudency adjustment that we propose.

734. We clarified in the meeting that the prudency adjustments that we found represent 7% of the value of the relevant sample of replacement and refurbishment capex projects. We consider that this is a sufficient sample (47%) to justify the extrapolation that we have done, to apply to all replacement and refurbishment capex projects.

735. We were not presented information that would lead us to alter our finding on this adjustment.

D.2.5 Capex - Portfolio risk factor

736. In the meeting, we presented our rationale for the portfolio risk factor adjustment.

737. It was suggested to us that this risk factor should apply to replacement capex, as ElectraNet proposes in its RP. ElectraNet suggested that replacement capex on known

[13] 12 October 2012 letter from SA Water to the AER (SA Water reference 12/05586)

sites presented a higher estimation risk than constructing new assets on greenfield sites. Our view is that the reasoning for this risk factor, as presented in ElectraNet's proposal (and in the associated Evans and Peck report[14]) is that it is the asymmetric estimation risk due to unknowns, such as unexpected ground conditions. Whilst we accept that variations between estimates and actual costs for replacement works will exist, these will be both under- and over-variations and should not have the asymmetric risk claimed for large Greenfield developments with significant unknown factors. Therefore we continue to hold the view that there is no valid basis for applying this risk factor to replacement capex, for the reasons described in section 6.3.6.

738. We were not presented information that would lead us to alter our finding on this adjustment.

D.2.6 Replacement and refurbishment capex – resulting implications

739. There are a number of adjustments that we have proposed making to replacement and refurbishment capex. The adjustments originally proposed in the current report were:

a. Removal of the proposed SA water pumping station supply replacements ($123m);

b. Removal of the portfolio risk factor of 4.9% that ElectraNet proposed;

c. A prudency adjustment (7% reduction) to replacement and refurbishment capex;

d. An adjustment recognising the benefits of deferral of replacement and refurbishment capex that should result from the more intensive maintenance regime, (replacement capex reduction of $45m and refurbishment capex reduction of $5m).

740. We reaffirm these adjustments, as previously advised.

741. In addition, we have now recognised the deferral of three replacement projects, as advised by ElectraNet, consistent with our lower demand forecast, and as described in section D.2.1 of this annex. This reduces replacement capex by a further $57m.

D.2.7 Capex for strategic land acquisitions

742. In the meeting, we discussed our view that ElectraNet appeared not to have rigorously pursued alternatives to securing land and easements primarily by purchasing it, for example by making greater efforts to secure transmission corridors. Also that we considered that it was not consistent with the NER to allow (in the forecast capex allowance) for the purchase of land and easements for contingent projects that may or may not be triggered. Also that we were not presented with evidence of NPV or similar analysis to support the propositions that there was a lower cost for ElectraNet to purchase the proposed land and easements now rather than nearer to the time that it is required.

743. There was some discussion on the above points and on our assessment of the processes that ElectraNet has followed.

[14] RP, Appendix M

744. Information was provided that some corridors had been designated but had later been resumed by the state government for forestry use. While it was noted that some designated corridors have been proscribed, we confirmed our understanding that for the most part the proposed expenditure is to purchase land and easements where the land has not been designated for transmission use. No further information was provided to us that would indicate that strong and effective use is being made of land planning processes for designation purposes, to minimise land and easement acquisition costs.

745. Similarly, we were not presented with further information on the use of NPV analysis to support the claim that it is more cost-effective to make the proposed acquisitions within the next RCP rather than nearer to the time that they might be required. Given the strategic nature of the proposed acquisitions, we would expect such analysis to address risks and uncertainties including regarding need, timing, and land price escalation assumptions amongst other factors.

746. The lower demand forecast that we have proposed is also likely to affect the merits of the strategic land and easement acquisition program that ElectraNet has proposed. In effect it represents a five-year deferral of growth relative to ElectraNet's assumption and such deferral would also increase the likelihood that alternative transmission solutions will eventuate over the implied 10- to 20-year timeframe. This strengthens the case for disallowing land and easements for contingent projects where the trigger is largely a matter of timing. This may also be considered to diminish the case for acquiring land and easements for non-contingent projects that ElectraNet considers are likely in the subsequent RCP.

747. We were not presented with information that would lead us to alter our finding on land and easements and on balance we consider that the proposed adjustment will result in a reasonable substitute forecast.

D.2.8 Opex - Corrective maintenance

748. We presented our rationale for the corrective maintenance adjustment, as described in section 8.5 of the current report. We were not presented information that would lead us to alter our finding on this adjustment.

D.2.9 Opex support costs and network operations – Choice of base year

749. We presented our rationale for the adjustment of the base year, for those components of opex that are projected in this way (as described in section 8.9 of the current report). We were not presented information that would lead us to alter our finding on this adjustment.

D.2.10 Opex efficiency

750. We presented our rationale for an opex efficiency adjustment, as described in section 8.10 of the current report).

751. ElectraNet reiterated claims made previously[15], that the proposed adjustment would weaken the efficiency incentive properties of the regulatory regime. For the reasons stated in section 8.10.3, we do not accept this argument and we were not presented with additional information that would lead us to alter our finding on this adjustment.

D.2.11 Proposed network optimisation expenditure

752. We presented our views on ElectraNet's proposed network optimisation expenditure category. We are in agreement with ElectraNet that network optimisation projects should produce economic benefits through the deferral of load driven capex (as described in section 8.8 of the current report). Our view remains that the separate identification of this expenditure should ensure that the benefits achieved are visible in the subsequent RCP and monitoring and reporting on their achievement should be seen in ElectraNet's revenue proposal for that RCP.

D.2.12 Contingent projects

Scope and process

753. At the meeting on 3rd October we introduced the concepts that we have applied in grouping the proposed contingent projects for the purpose of our findings (see figure 52 of the current report). Discussion on the rationale for these groupings was continued at a further meeting with ElectraNet in Adelaide on 4th October. At the 4th October meeting we further discussed interpretation of relevant clauses of the NER, and also discussed our understanding of the situations presented to us for each contingent project and the proposed triggers. We sought to confirm that we had a correct understanding of the nature and drivers of the proposed projects, of ElectraNet's reasoning for presenting them as contingent projects and for its proposed trigger definitions.

Our interpretation of the NER

754. A number of NER clauses are of particular relevance in driving our findings on the compliance of the contingent projects. Some of these define trigger requirements, and we consider that these are also relevant in defining the suitability of the projects to be considered as contingent projects, in that a contingent project is only acceptable if compliant trigger events can be specified. The key clauses and our interpretation are as follows:

a. The NER requires that TNSPs propose forecast capital expenditure (i.e. non-contingent expenditure) that meets expected demand[16] and that contingent projects are not otherwise provided for in the forecast capital expenditure[17]. It follows from this that projects should not be defined as contingent where they are required to meet expected demand[18]. As we describe in section 9.4.2, we consider that forecast capital expenditure needs to be a proxy for a range of capex that meets the needs of general demand growth, other than step load. This arises because of the

[15] ENET193

[16] NER 6A.6.7(a)(1)

[17] NER 6A.8.1(b)(2)(i)

[18] Except see point f below

reality that future demand is never known with certainty, and is consistent with the fact that TNSPs (under the NER) are allowed to substitute projects as they operate their business (once the revenue allowance is determined) and are not required to implement all or only those projects that were included by the regulator for revenue determination purposes. In this way the NER provides TNSPs with the flexibility to respond to actual demand as it unfolds (or to the extent that it can be more accurately forecast nearer the time). This concept is also consistent with consideration of step load increases rather than general load growth as drivers of contingent projects.

b. The trigger events must be reasonably specific and capable of objective verification[19]. We consider that this requirement is best met if the triggers describe the root cause requirement. In this regard, we consider that triggers such as a "request from a distributor" to undertake works, or a finding in a RIT-T or RIT-D process, are not sufficient in themselves and should be combined with wording which describes the originating driver – such as a demand growth increase, cost options comparison or other cause, that would lead to such a request or finding. We note also that RITs are in effect steps in a process, and do not have an independent "approval" mechanism; in this sense we consider that they are not "objective" and are therefore not sufficient as the main triggers relied on, and the triggers should also reference root cause events.

c. The triggers must "make the undertaking of the proposed contingent project reasonably necessary[20]". This defines a level of causality between the trigger and the project and our interpretation is that this also implies a sense of proportionality between the trigger event and the proposed project. In other words, that if the trigger event occurs, then a project of broadly the nature and size proposed will reasonably be required. This interpretation drives our finding on a number of projects that ElectraNet has proposed, in which the trigger that ElectraNet has proposed represents (for example) a load increase that is very small relative to the proposed project[21]. While recognising that both the need and the likely solution will be better known when the trigger event occurs, we consider that the contingent project process is best served by a reasonable attempt to propose contingent projects that are of a scale and type such that they satisfy the causal driver that is defined by the trigger. Conversely, the triggers should reasonably be expected to warrant the building of the specified contingent project.

d. The triggers should not relate to a "condition or event that affects the network as a whole[22]." We consider that general mass market load growth affects the network as a whole hence our view (consistent with AEMO, as reported in section 9.4.2) that appropriate triggers should involve specific users with committed or reasonably expected step load increases, rather than general load growth.

[19] NER 6A.8.1(c)(1)

[20] NER 6A.8.1(c)(2)

[21] An example is the Lower Eyre peninsula project, where the proposed trigger is 1.5MW below the expected 2017/18 demand forecast yet ElectraNet proposes a contingent project with a cost of $588m.

[22] NER 6A.8.1(c)(3)

e. The trigger event must be "all that is required[23]." We interpret this as applying in aggregate – in other words, where there are multiple triggers, then in aggregate they must describe all precursors to the proposed project. This is relevant, for example, in regards to the proposed Eyre Peninsula connection point project, as we describe in section 9.4.4.

f. A project may meet the capital expenditure objectives in clause 6A.6.7, i.e. for inclusion as forecast capital expenditure, but can instead be proposed as a contingent project if the causal event or condition is not sufficiently certain or if the cost of the project is not sufficiently certain[24]. We consider that this is relevant, for example, with regards to contingent projects involving new connection points or where the scope of the project is sufficiently uncertain such that its inclusion could materially bias the determination.

755. In discussion with ElectraNet on these interpretations of the NER, we were not presented with information that would lead us to reassess the groupings that we have applied to the proposed contingent projects. In essence therefore, we consider that the majority of the projects are either:

a. not compliant as they are not probable; or

b. are not compliant because compliant triggers have not been specified. For some of these, we consider that this is because the projects are not inherently capable of being presented as compliant projects, while in other cases we consider that the project may be able to be re-presented as compliant by re-specifying the trigger or re-specifying the project.

756. We have further considered the grouping of projects providing market benefits. As we state in section 9.4.3, we consider it debatable whether the capital expenditure objectives in the NER allow for prescribed transmission projects where the primary objective is to provide a market benefit, as opposed to meeting demand, reliability or other specifically-listed requirement of the NER, while noting that their inclusion could be considered consistent with the National Electricity Objective (NEO). As Technical Advisers we have highlighted those projects that are driven by such benefits, and we commend this clause to the AER for regulatory legal interpretation.

Matters relevant to specific projects

757. In the 4th October meeting we discussed all projects one-by-one. The following records some relevant information that arose in the course of discussions.

758. We understand that the Heywood interconnector project is at a relatively advanced stage and is likely to proceed. In this regard evidence seems to be accumulating that this project has already been triggered. However we understand that it is unclear at this stage whether the RIT-T will be completed before or after commencement of the next RCP. As this project is driven by market benefits, our comments above apply. However we understand that there is considerable uncertainty regarding the scope and cost of the solution, therefore if market benefit projects are generically considered to be compliant with the capital expenditure objective, then clause 6.8.1(c)(5)(ii) seems to allow it to be a contingent project on the basis of cost uncertainty. If this is the case,

[23] NER 6A.8.1(c)(4)

[24] NER 6A.8.1(c)(5)

then we would expect the relevant trigger to be some event or condition that removes that uncertainty.

759. We have further considered the Davenport reactive support project. This was the only project that we considered to be compliant, and we maintain that view. However arising from the discussions at the 4th October meeting, we consider that the triggers could be better specified and we draw attention to some generic commentary on triggers, below.

760. The technical infeasibility of the Eyre Peninsula connection point project was discussed, and the options of re-specifying the project and/or re-specifying the triggers to make it compliant with clause 6.8.1(c)(4) were discussed with ElectraNet.

761. The issues that we raise in section 9.4.2, of a potential double-charging to consumers through inclusion in the DNSP and the TNSP's allowable revenue, were discussed in relation to the Fleurieu Peninsular connection point. In this case, the DNSP is responsible for meeting a distribution-level demand but may seek a transmission-level solution. The potential for over-recovery from consumers if projects are "passed between" the DNSP and the TNSP may be a weakness in the NER that the AER may wish to explore further and, if necessary, seek to remedy.

762. Any future change to the NER is not relevant to consideration of ElectraNet's proposals for the current determination. Nevertheless if ElectraNet seeks to trigger this project then we consider that it will be relevant and helpful for ElectraNet to clarify the extent to which this may in effect produce a double-up against a cost that the DNSP has in effect already recovered from consumers. In supporting the case for a new transmission supply point, we would expect that the DNSP would assist ElectraNet with such information and this may assist the AER if it seeks a rule change.

763. We discussed the proposed trigger definition for the Upper North connection point, and noted that a literal interpretation of the trigger (loads greater than 10MW at a distance of 10kM or more from Davenport) could incorporate most of the state. We suggested re-specifying the trigger to relate to loads along the relevant circuit.

764. The issues that we raise in section 9.4.4 regarding the proposed Riverland project were discussed and we noted the two component triggers being demand growth and interconnector limitations. We suggested that the demand growth trigger appeared unlikely on the information provided, and that the scale of the solution proposed in the event of AEMO imposing a limitation on the interconnector appeared to be disproportionate. ElectraNet explained the circumstances which may lead to such limitations, and which accorded with our understanding. Our view is reinforced that there is a need for a contingent project for circumstances that ElectraNet has described but that the project and/or triggers need to be re-specified, as we have described in section 9.4.4.

765. Discussion on other projects did not reveal other information relevant to our findings.

General observations on contingent project triggers

766. At and following the meeting we considered draft information being prepared by the AER in relation to triggers. We provided specific feedback on this information. Our general points are that:

a. Notwithstanding requirements and guidelines in the RIT-T process, there is merit both for the AER and for TNSPs in strengthening triggers to stress the need for full and pro-active consideration of alternatives.

b. The triggers should where possible describe root cause events or conditions. In this regard, we view the RIT-T as part of a process and while it may be proposed as one of several triggers, it is not an appropriate primary condition or event that can be relied on.

c. Since RIT-T's do not have an explicit approval mechanism, there is merit in the AER undertaking a process by which it would formally accept the outcomes from RIT-Ts in approving the relevant contingent projects. It is less clear to us whether this should be part of a trigger definition, or whether it is already allowed for in the AER's approval of a triggered contingent project.

d. There is merit in requiring TNSP Board endorsement as part of the required trigger. We consider that Board-level governance processes will ensure that the requisite challenge on (e.g.) project costs and assessment of alternatives will have taken place, providing greater confidence to the AER.

767. While the above may be desirable and may assist with compliance, our interpretation of the NER is that triggers proposed by a TNSP may nevertheless be compliant without necessarily including all or any of the factors above. In this regard, the NER requires the AER to make compliance judgments in regards to what is proposed by the TNSP.

768. We also flag challenges for the AER in re-specifying ElectraNet's currently proposed contingent projects and related triggers such that they would unequivocally comply with the NER. Given the deficiencies we have identified in almost all of the contingent projects as proposed by ElectraNet, our suggestion is that resolution will be assisted by the AER providing clear and specific guidance to assist ElectraNet if it wishes to submit a revised proposal. We note that at the meeting on 4th October ElectraNet staff offered to provide further information by 9th October, to assist with re-specifying projects or triggers, but has now advised that this is not possible. We consider that it is reasonable to allow time for this process and we are hopeful that the meeting on the 4th October will have allowed ElectraNet to begin further assessment, which will be further assisted by eventual release to ElectraNet of the draft decision and our report.

Annexure E: AER/ EMCa meeting presentation

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AUSTRALIAN ENERGY REGULATOR

ElectraNet consultation meeting

1 July 2013 to 30 June 2018 South Australia transmission determination

Wednesday 3rd October 2012

Introduction

- Purpose
- Process under the rules
- Limited response
- Open discussion

Current RCP

- EMCa recommendations influenced by current RCP findings:
  - ability to prudently defer/reduce expenditure, capacity to achieve efficiency improvements
  - increased opex in 2010/11-12, the investment in the new regime and resultant benefits
  - regulatory allowance as ‘budgetary expenditure allowance’– last 2 years spend –good capital governance framework over-ridden
  - Step change in ‘base year’ opex in 2011/12

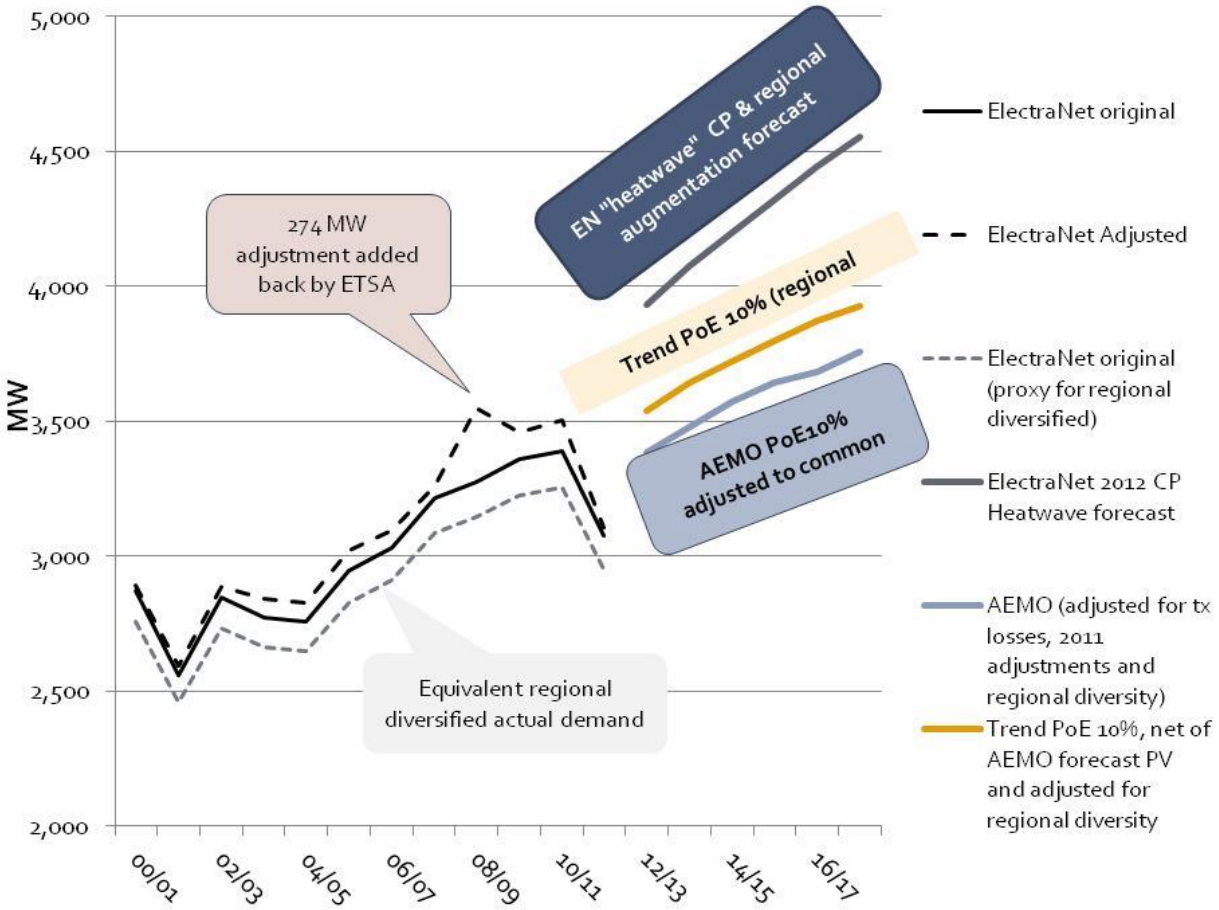
DEMAND FORECAST

- Demand forecast
- Implications for growth capex and connection point capex

Demand

- Key issues:
  - ETSA demand forecasting methodology
  - ElectraNet's use of ETSA forecasts
    - Diversity
    - Requirements of ETC
  - Top down reconciliation to AEMO 2012
- Alternative forecast
  - EMCa is 14% lower at 2017/18
- Potential for ElectraNet to quantify?

Demand 'check analysis'



Augmentation/connection capex

- Lower demand and its impact on capex
- Potential for ElectraNet to quantify
- EMCa's demand will impact capex significantly
- EMCa estimated impact
  - Augmentation capex reduce by $18m
  - Connection capex reduced by $60m
- No other specific issue

OTHER CAPEX

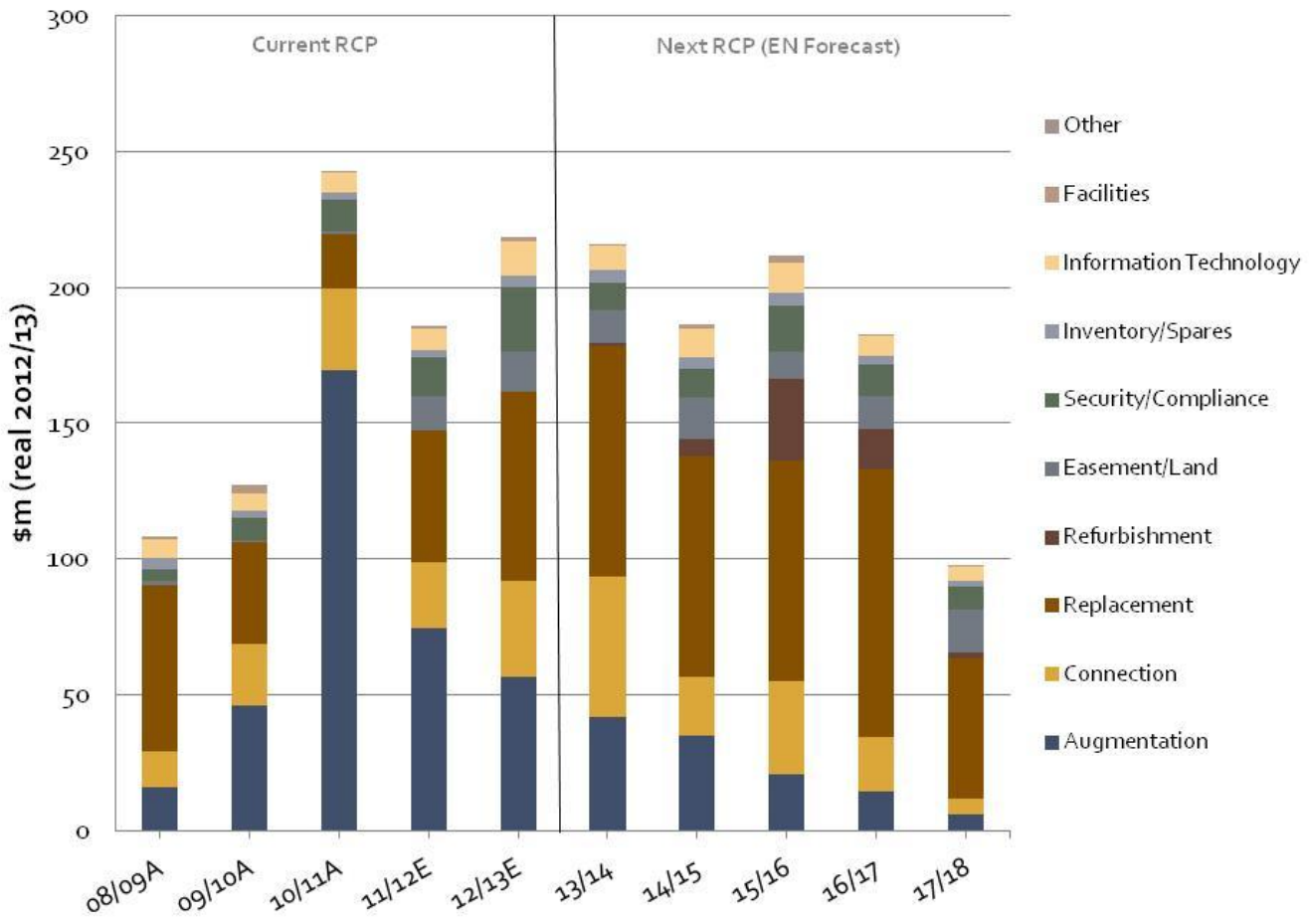
- SA water pumping station supplies
- Strategic land acquisitions
- Capex prudency and other replacement capex
- Portfolio risk factor

Proposed capex

$million (real 2012/13)

	Current RCP					Next RCP Forecast				
	08/09A	09/10A	10/11A	11/12E	12/13E	13/14	14/15	15/16	16/17	17/18
Augmentation	15.9	45.9	169.3	74.3	56.4	41.9	35.1	20.8	14.2	5.9
Connection	13.2	22.5	30.2	24.4	35.6	51.8	21.2	34.2	20.4	5.6
Replacement	61.5	37.8	20.1	48.5	69.5	84.8	81.5	81.3	98.6	51.8
Refurbishment	-	-	-	-	0.0	1.2	6.3	29.8	14.8	2.1
Easement/Land	1.3	0.2	1.2	12.6	14.5	11.9	15.3	10.3	12.2	16.1
Security/Compliance	4.1	8.7	11.5	14.5	23.8	10.0	10.8	16.8	11.6	8.1
Inventory/Spares	4.3	2.6	2.3	2.5	4.1	4.7	3.8	4.8	3.0	2.1
Information Technology	7.1	6.3	7.6	7.9	12.7	8.9	10.7	11.4	7.2	5.5
Facilities	1.0	3.1	0.8	1.2	1.9	0.7	1.4	2.1	0.6	0.6
Other	-	-	-	-	-	-	-	-	-	-
Total	**108.4**	**127.1**	**243.0**	**186.0**	**218.7**	**215.9**	**186.2**	**211.4**	**182.7**	**97.9**

Proposed capex



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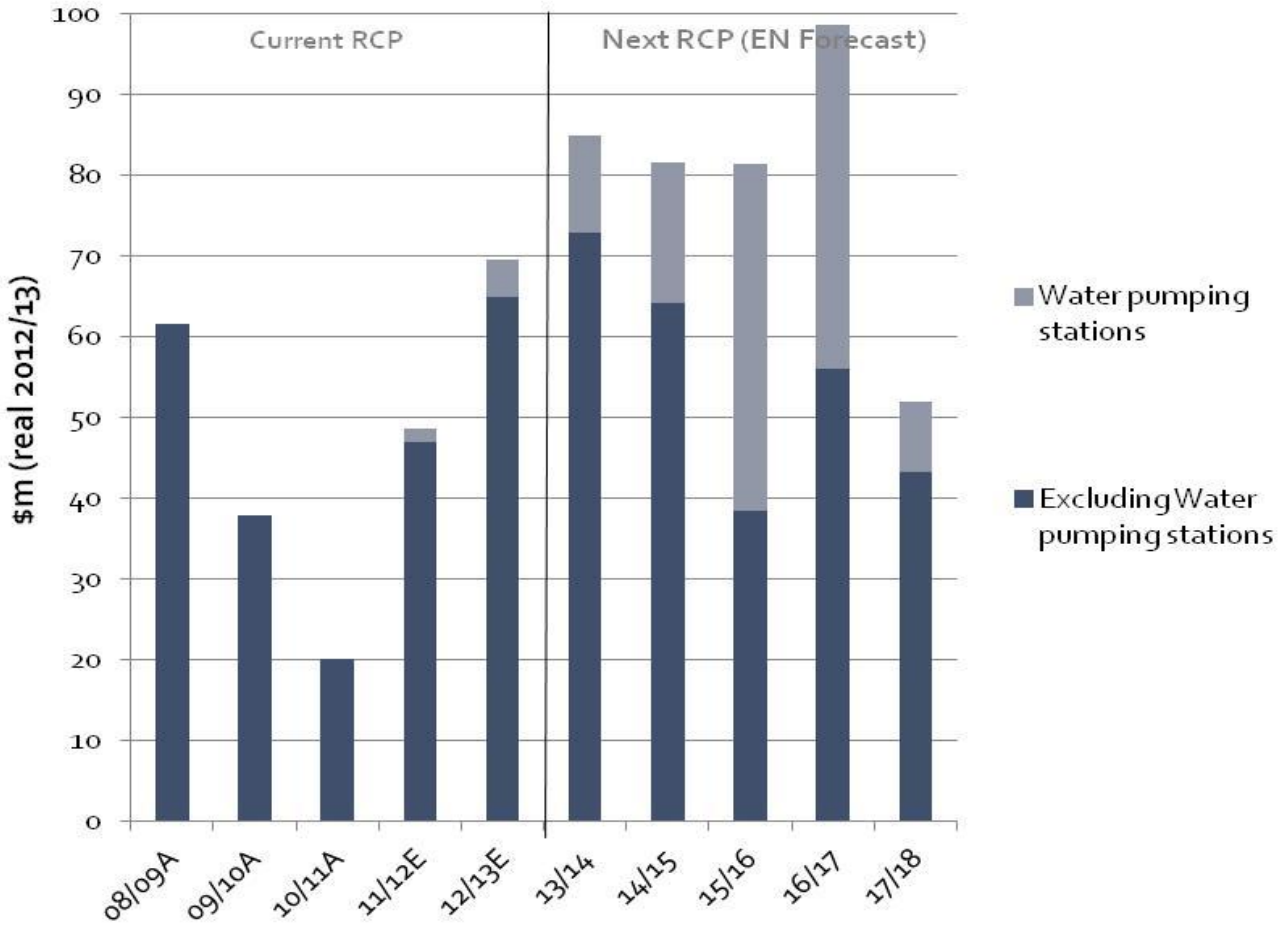
SA Water replacement

- Uncertainty about not changing service level
- Projects at pre-phase zero level
- NER clause 11.6.11 – grandfathering arrangement
- Is like for like practical – not have changed for 100 years?
- Alignment between electrical and water components – optimise supply & demand
- Load management issues
- Pricing if negotiated service –significance?

Replacement capex



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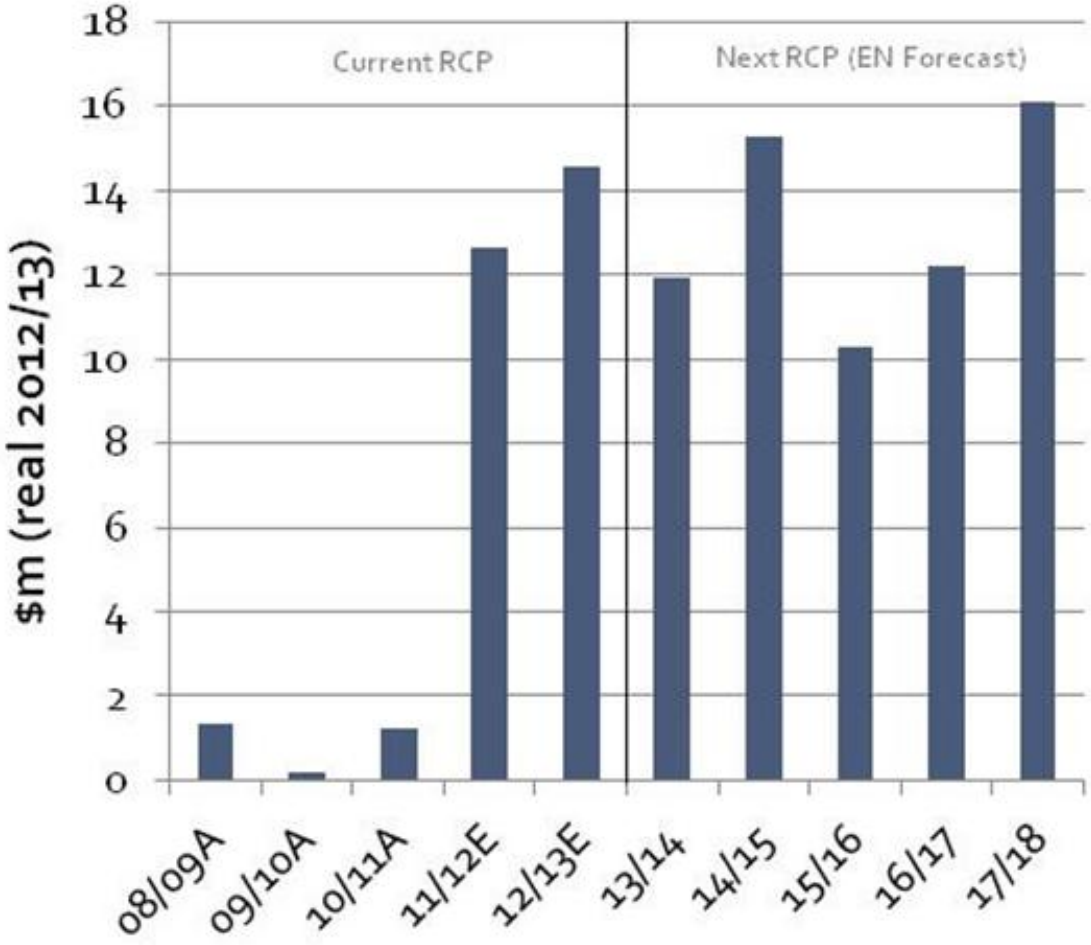
Strategic land and easements

- Justification for strategic purchases
- Land and easements capex associated with contingent projects
- Other strategic options – transmission corridors
- The national electricity objective (NEO)
- EMCa accepts only $15m

Land and easements



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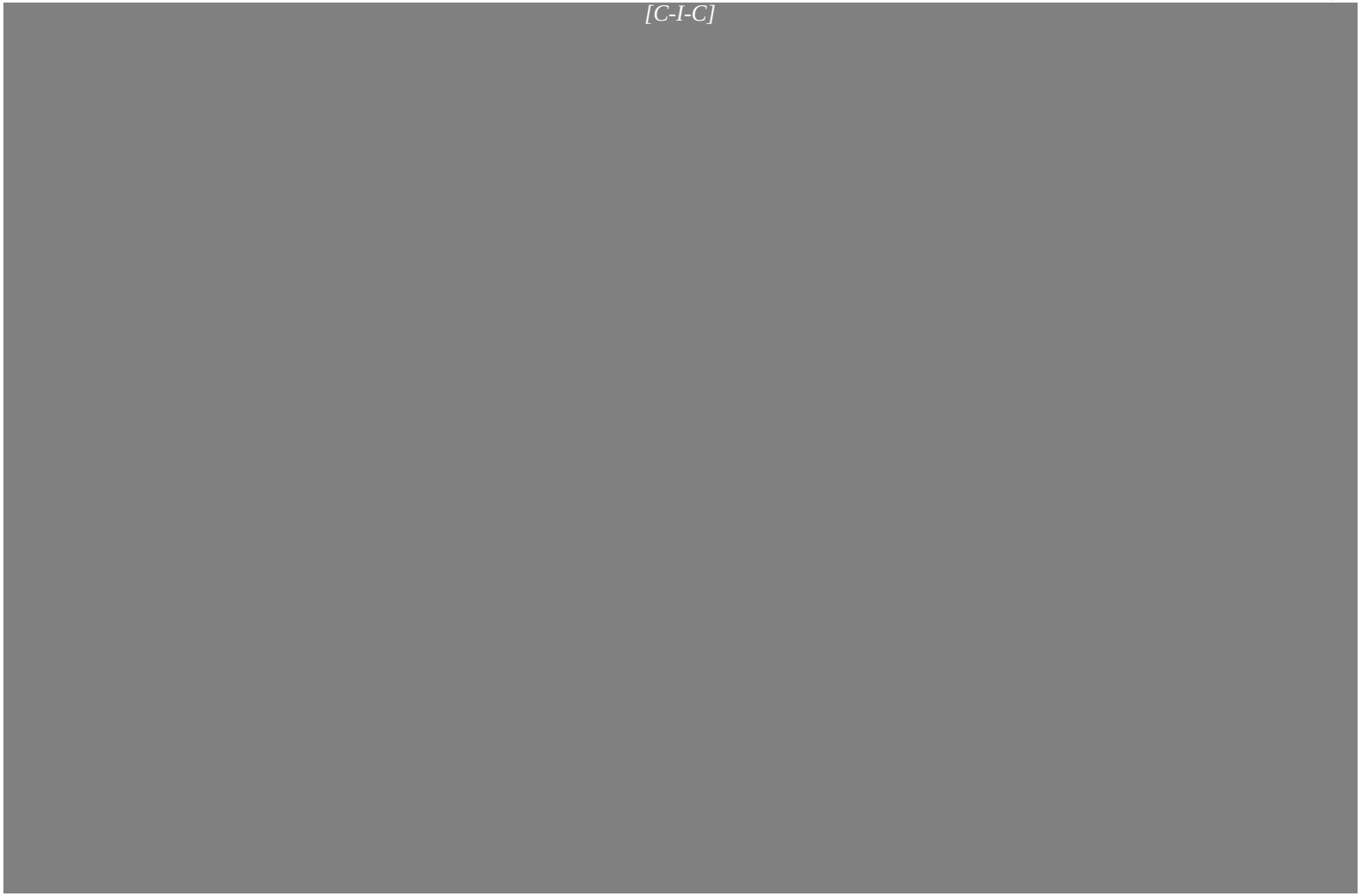
Land and easements classification



Prudency gains

- Based on EMCa's sample projects review
- Potential for large transformer capacity increase deferral – power factor improvements
- Gains possible as projects progress thru phases of PMM
- Current RCP findings influence
- Potential gains for the 3 replacement projects reviewed is 7% – sample representative
- 7% applied only to replacement/refurbishment

Portfolio risk

- Is this the right value?
- Evans & Peck historical data
- ElectraNet now has good estimating tools/processes
- Should it be above the current 2.6% or Powerlink 3.0%
- Is there a risk in the replacement portfolio?

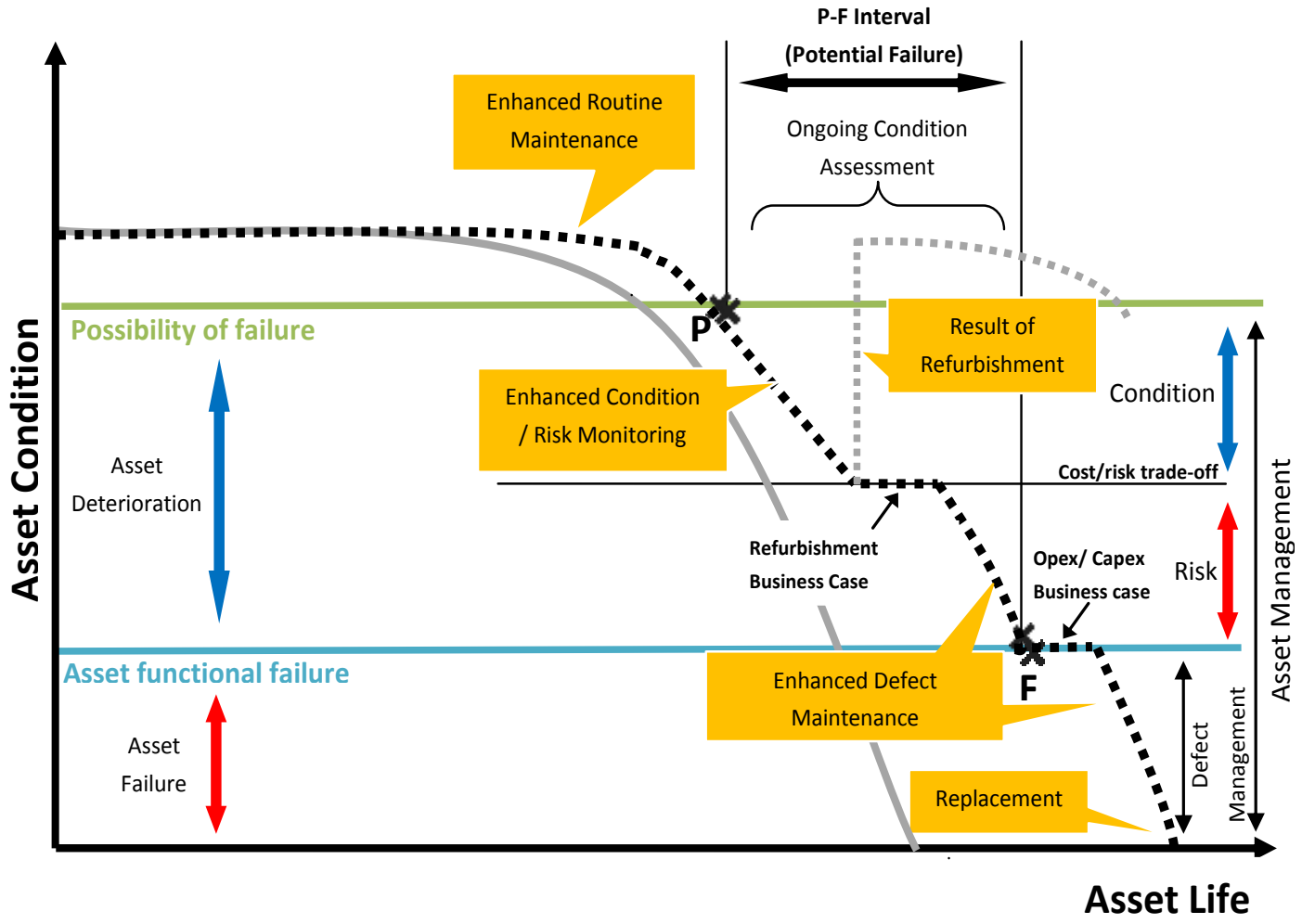
CAPEX / OPEX TRADEOFF

- TALC / replacement / capex and opex refurbishment

Capex/opex trade off

- Is the increased opex and replacement capex reasonable?
- Where are the benefits of TALC?
- Trade-off between increased opex (corrective and refurbish) and reduced capex (replacement/refurbishment) implicit in TALC
- The gains from TALC are not demonstrated
- Cost of regime estimated at $50m
- Trade –off is estimated based on recovering at least the investment in the next RCP.

Capex / opex trade-off



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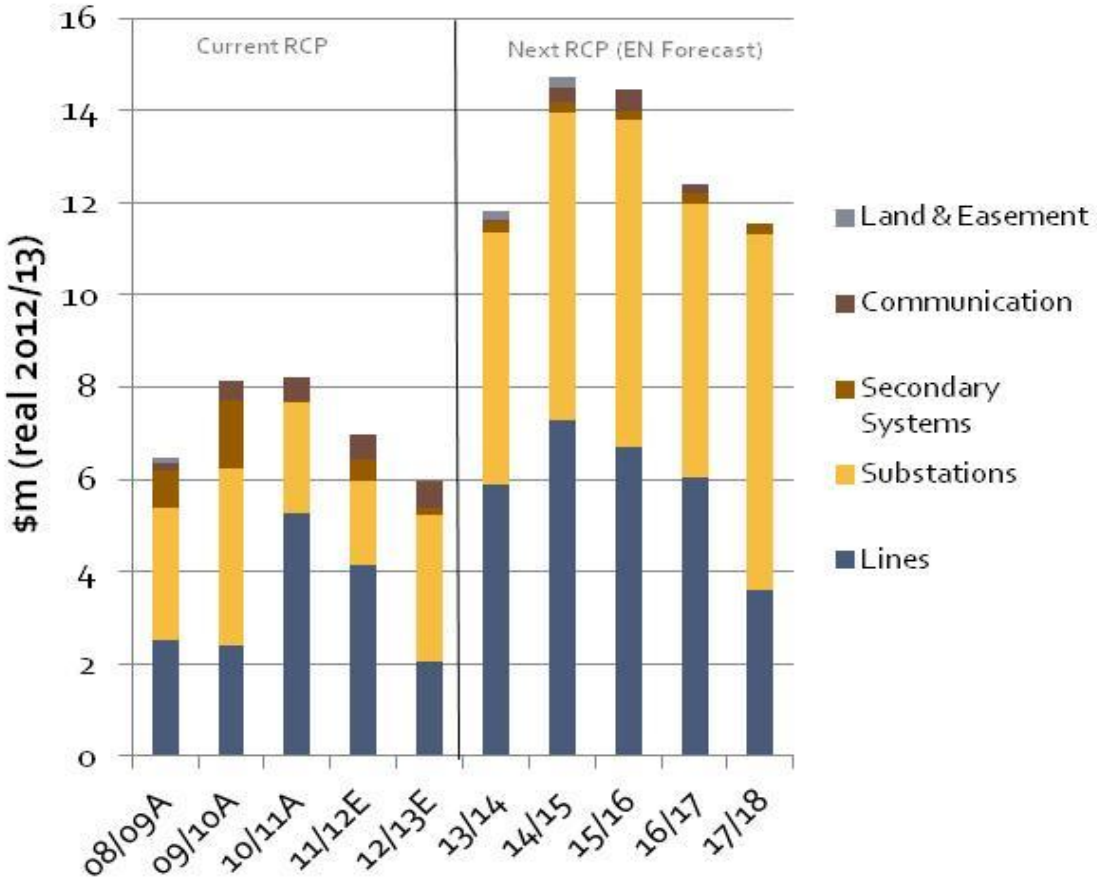
Opex refurbishment



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Asset 20 year risk profile

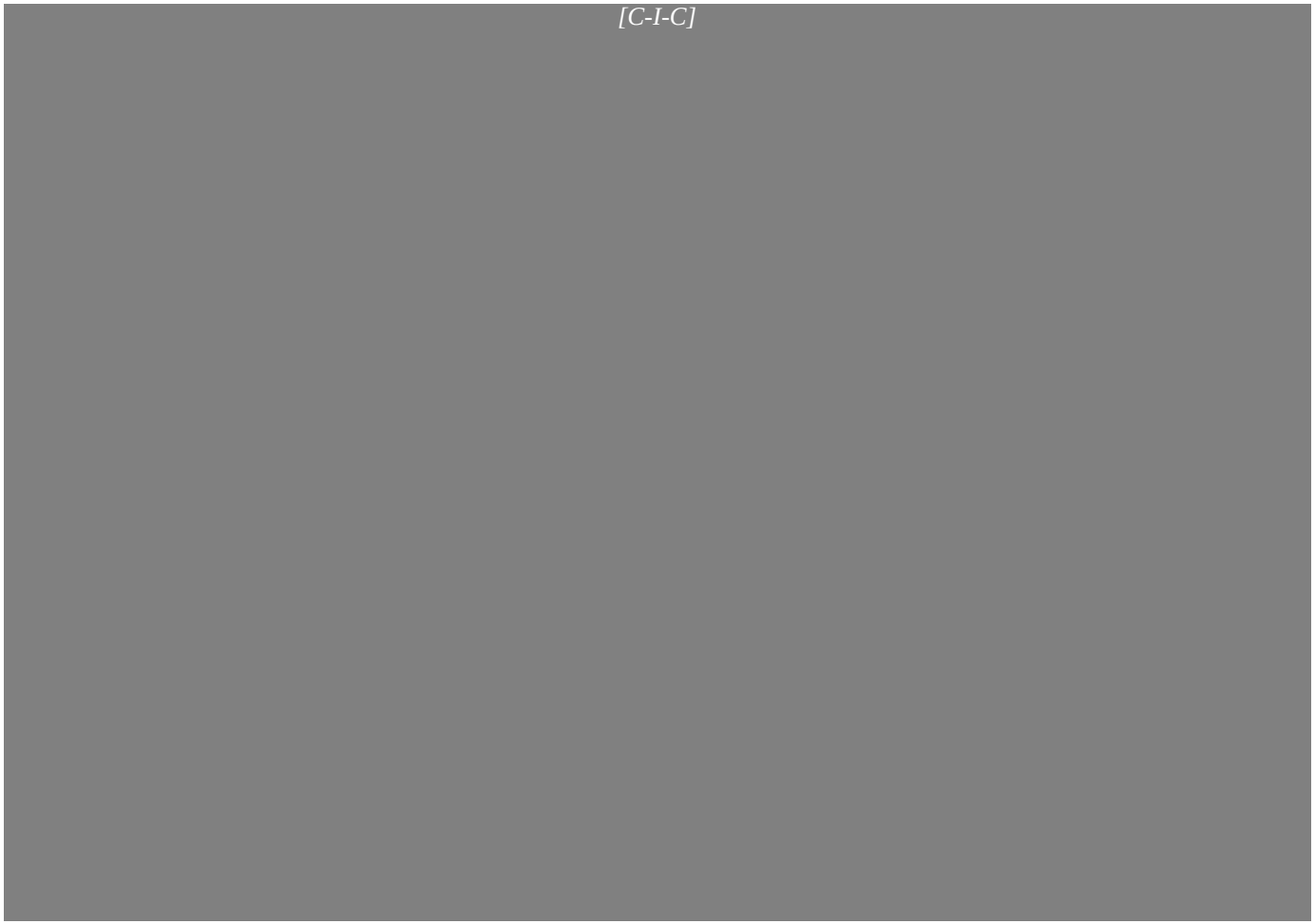


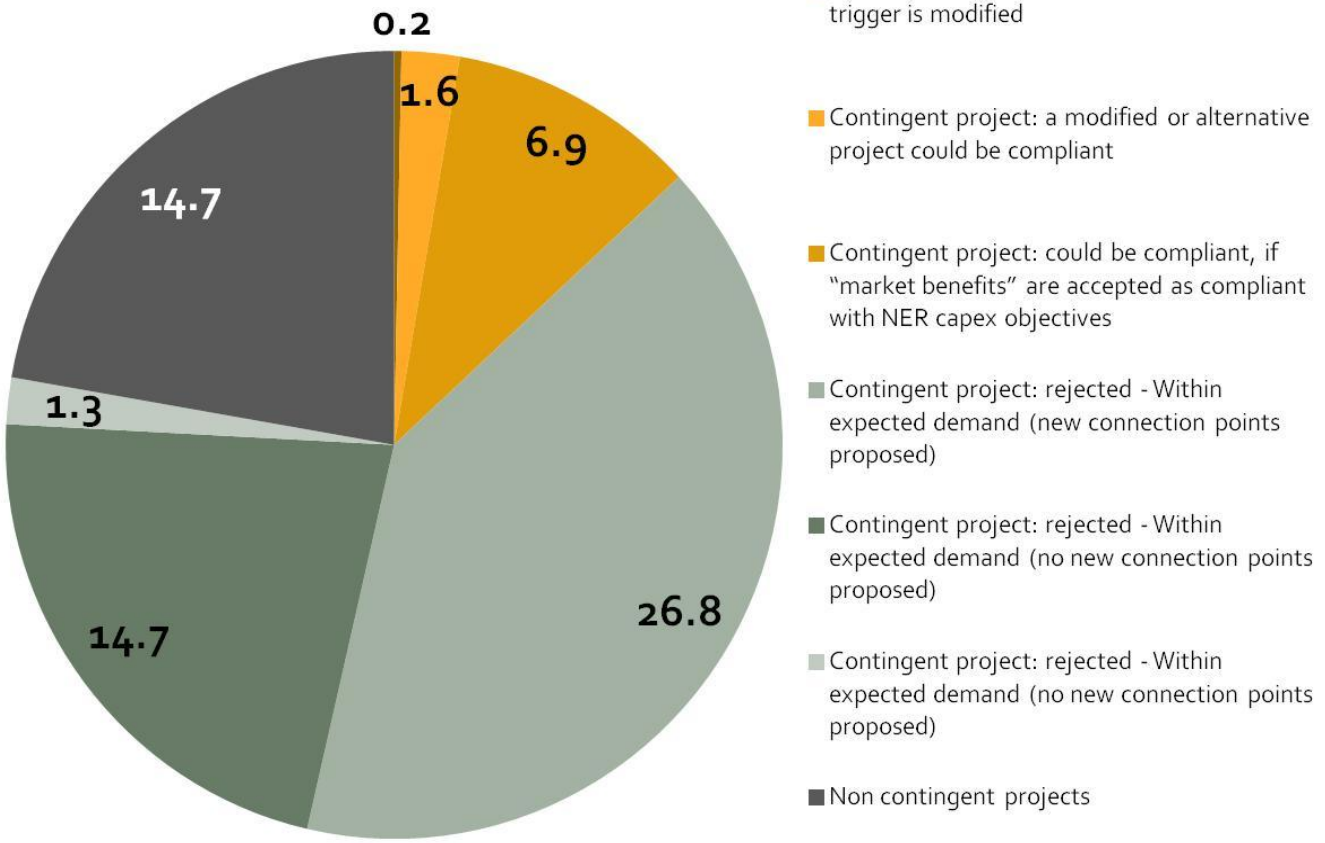
Figure 6.10: Asset 20 Year Risk Profile

CONTINGENT PROJECTS

Contingent projects

- EMCa considers only 1 is fully compliant
- Trigger event is a demand increase which sits within the 2013-18 demand forecast
- Trigger events where demand increase is not substantiated
- Staff have not finalised their view on market benefits project
- Concerned that Heywood project is already triggered
- Room to refine triggers and discuss further

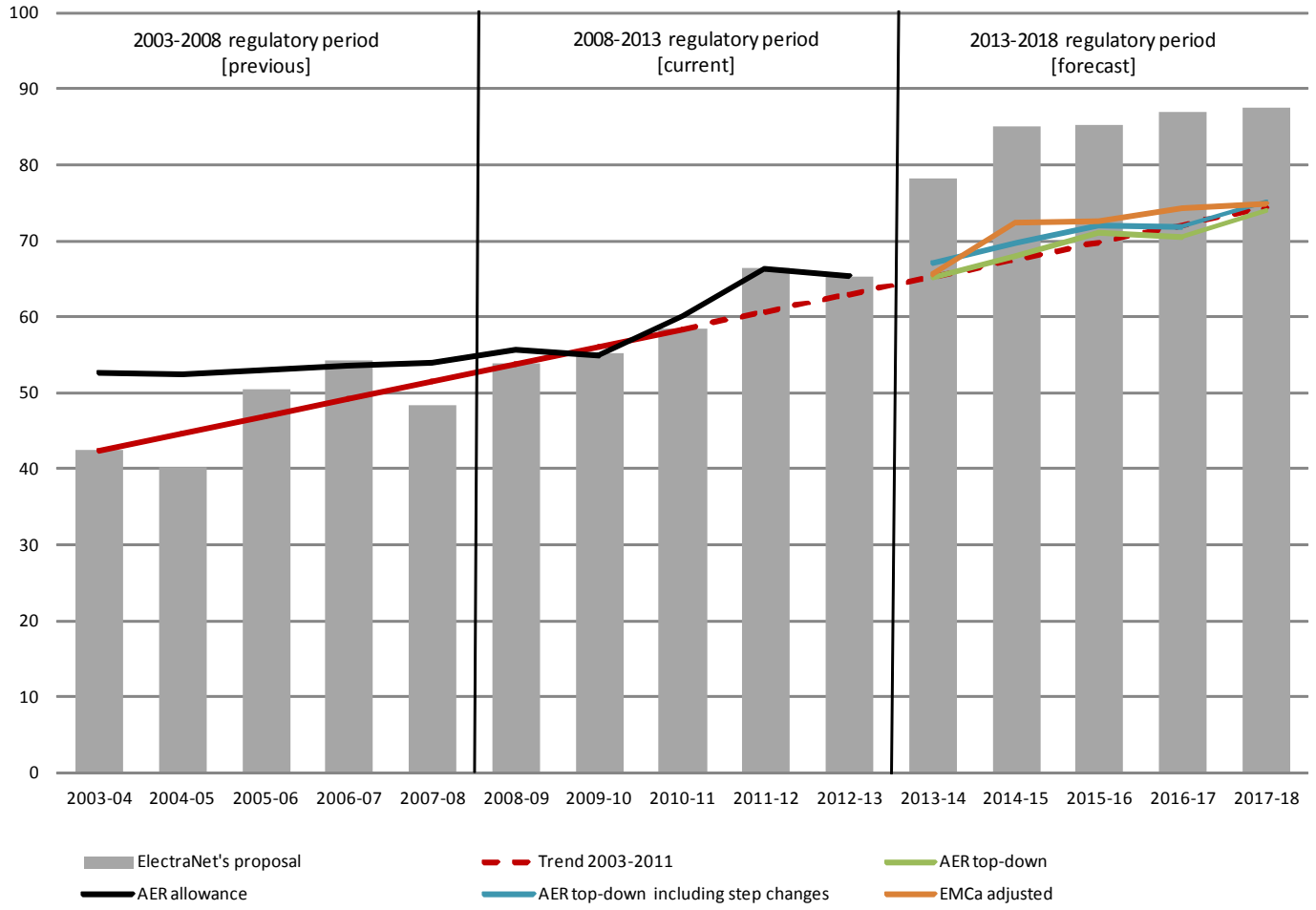
Contingent projects classification



OPEX

- Corrective maintenance
- Base year
- Opex efficiency

Opex



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Opex – key issues

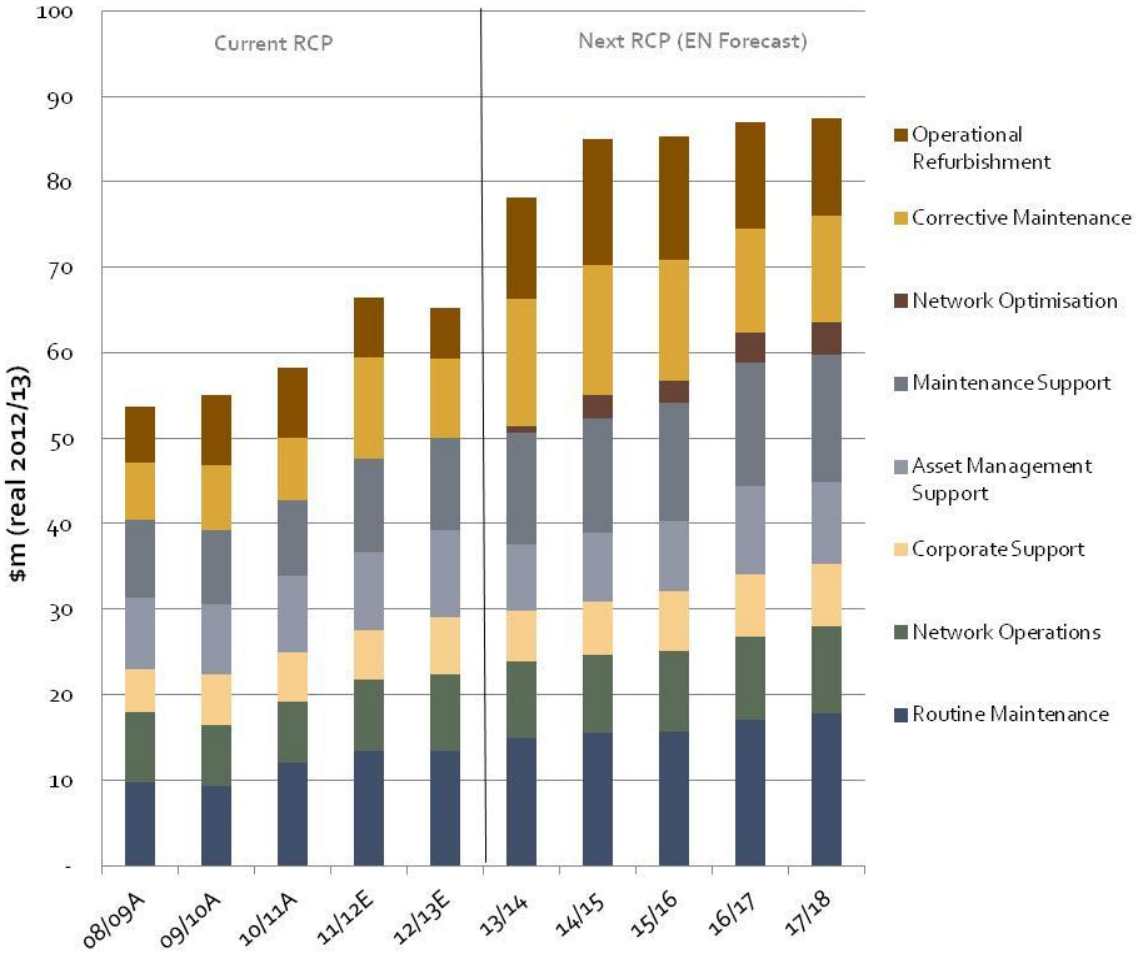
- Asset management framework
- Economic justification for TALC program
- Proposed base-year
- Network optimisation and step-changes
- Efficiencies
- Asset growth/escalation

Proposed Opex

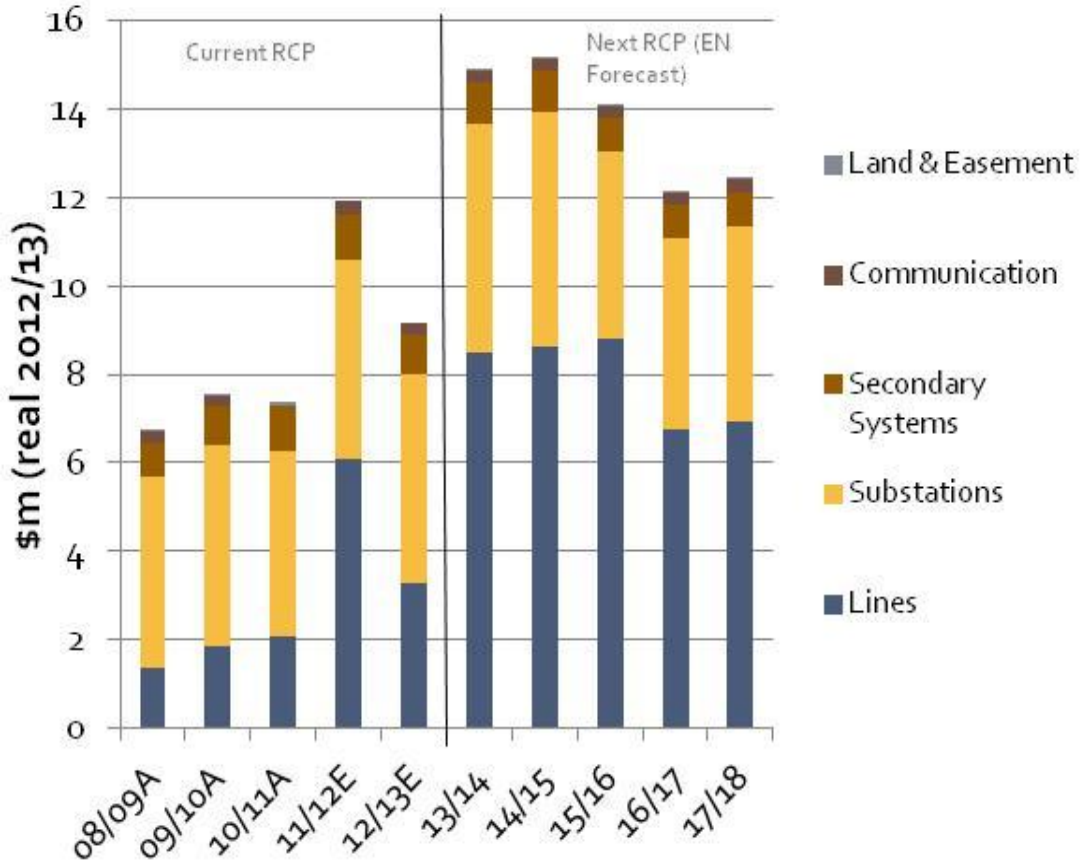
$million (real 2012/13)

	Current RCP					Next RCP Forecast					Totals for Period ($m)	
	08/09A	09/10A	10/11A	11/12E	12/13E	13/14	14/15	15/16	16/17	17/18	Current RCP	Next RCP
Routine Maintenance	9.8	9.3	12.0	13.4	13.4	15.0	15.5	15.7	17.0	17.8	57.9	80.9
Corrective Maintenance	6.7	7.6	7.4	11.9	9.2	14.9	15.2	14.1	12.2	12.5	42.8	68.8
Operational Refurbishment	6.5	8.1	8.2	7.0	6.0	11.8	14.7	14.4	12.4	11.5	35.8	64.9
Network Optimisation	-	-	-	-	-	0.8	2.8	2.5	3.5	3.7	-	13.3
Maintenance Support	9.2	8.8	8.8	11.0	10.9	12.9	13.4	13.9	14.5	15.0	48.7	69.8
Network Operations	8.1	7.2	7.2	8.3	8.9	8.9	9.2	9.4	9.8	10.1	39.7	47.4
Asset Management Support	8.3	8.2	8.9	9.1	10.2	7.8	8.0	8.1	10.3	9.5	44.7	43.8
Corporate Support	5.1	5.8	5.8	5.8	6.7	6.0	6.2	7.0	7.3	7.4	29.2	33.8
Total Controllable	**53.7**	**55.0**	**58.3**	**66.5**	**65.3**	**78.1**	**85.0**	**85.2**	**87.0**	**87.5**	**298.8**	**422.8**

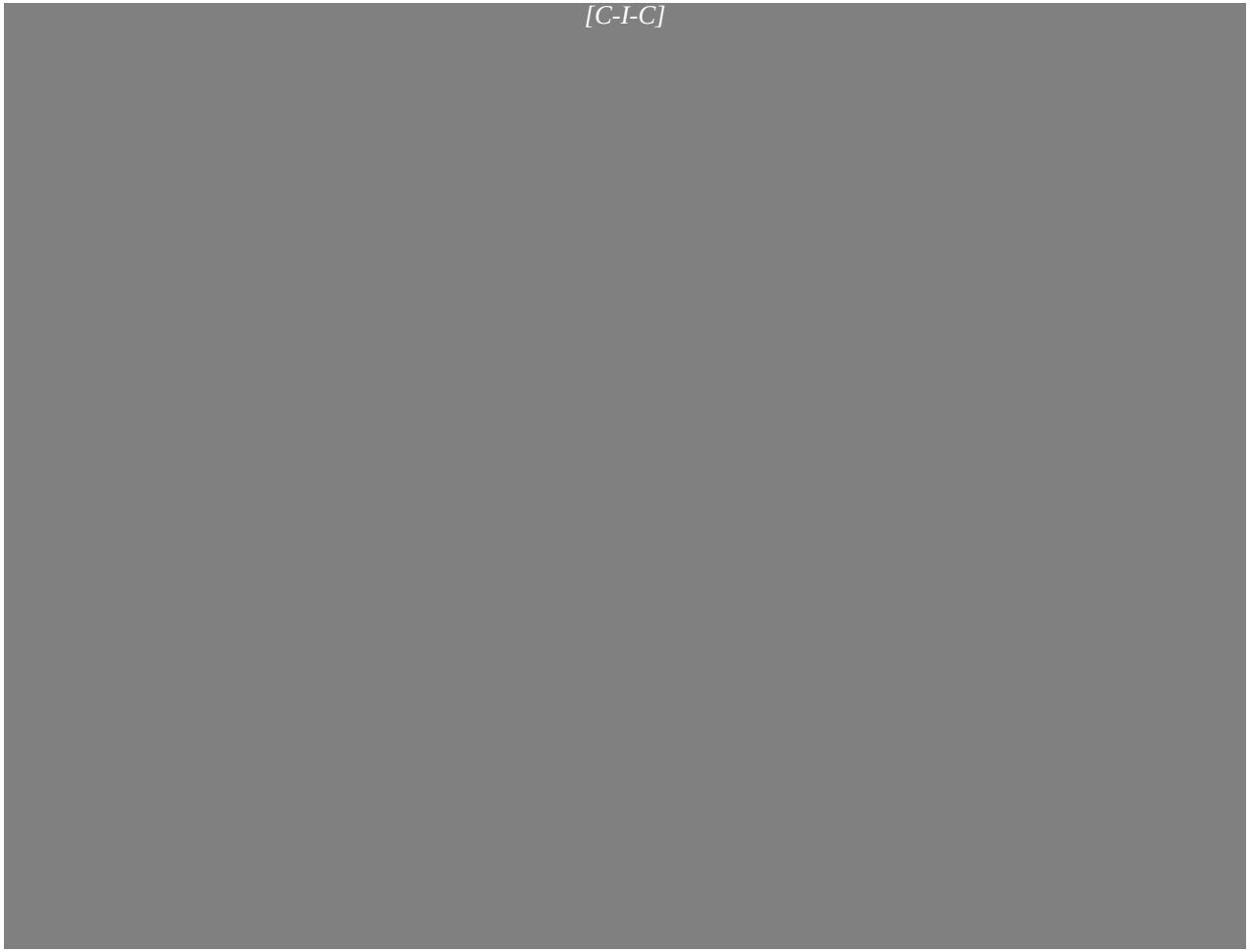
Proposed Opex



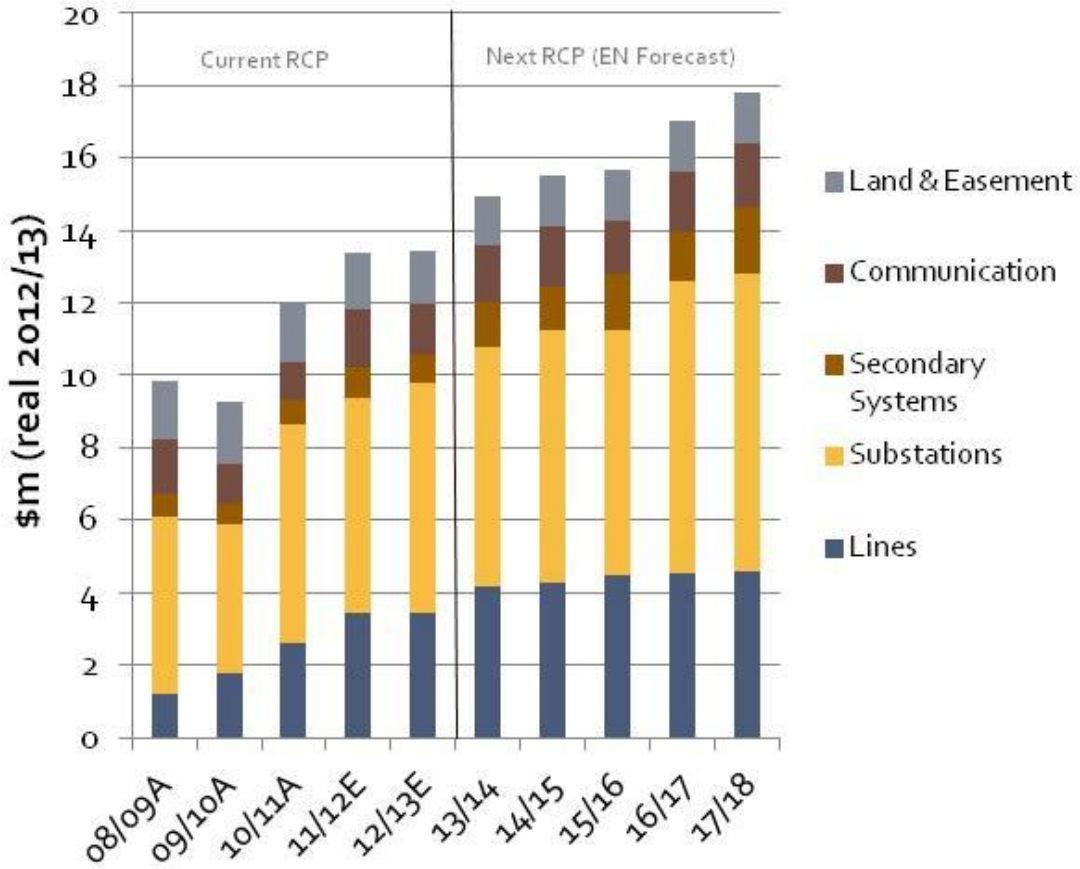
Corrective maintenance



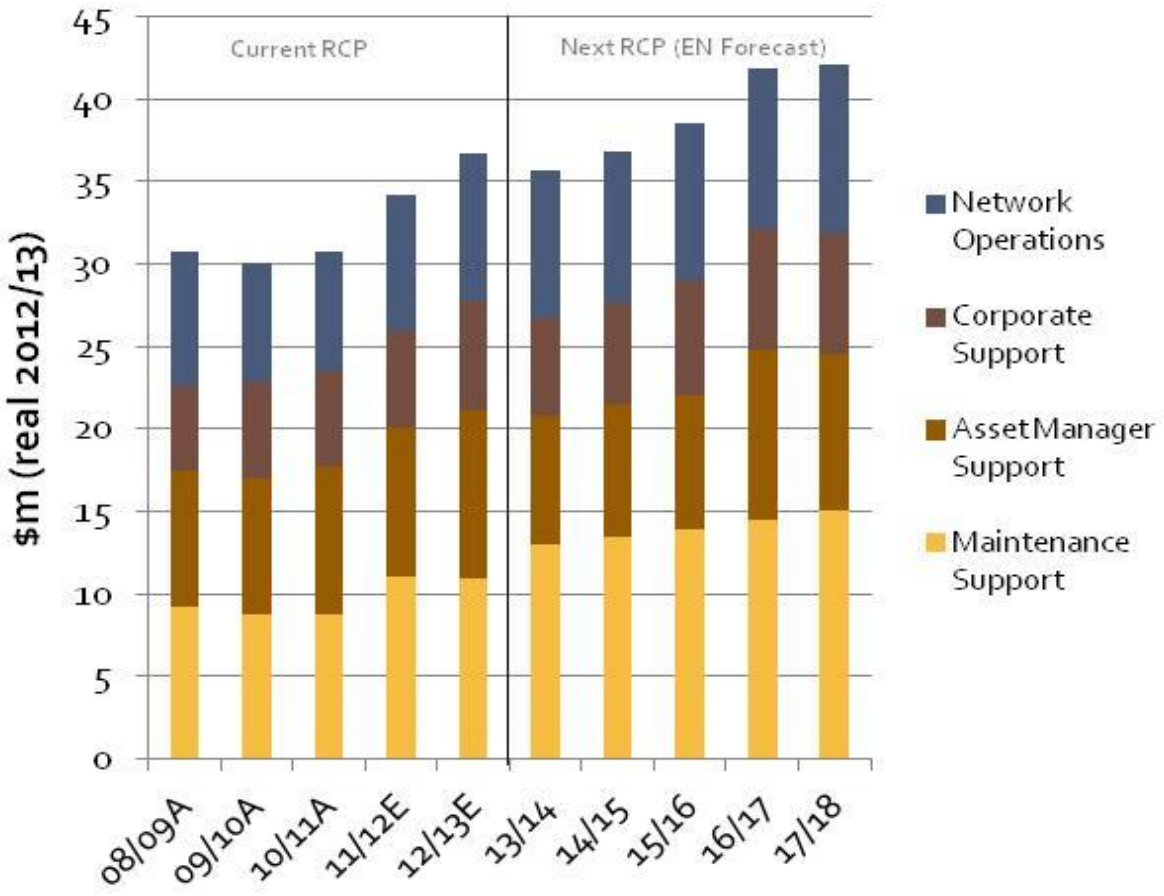
Defects trend - subs



Routine maintenance



Support costs



STPIS

STPIS

- Performance target method (average vs EMCa's 50th percentile method)
- Increase in weighting for AOD parameter
- Adjustment for capital works
- Proposal to exclude contingent project outage effects
- Distributions used to calculate caps and collars
- Cap and collar values
- market impact parameter target (slight adjustment)

Annexure F: Meeting agenda with SA Water

DRAFT AGENDA for meeting: AER, EMCa (consultants to AER) and ElectraNet, with SA Water. Friday 5th October, 9:30 – 11am, Adelaide

Meeting objective:
To provide information that will assist with the AER's consideration of the reasonableness of ElectraNet's proposed replacement of electricity assets supplying water pumping stations. Main considerations are the prudency and efficiency of the proposed program, taking into account the longer term service requirements of SA Water and the risk allocation of the proposed investment.

Agenda Topics:

1. Brief overview of the water pumping system including
    a. Original needs identified for the installation of water pumping stations (e.g. water demand and/or consumption; supply security, water storage);
    b. Overview of the water pumping station assets
        i. Location
        ii. Age and condition
        iii. Electrical peak capacity requirements (e.g. peak demand over time)
        iv. Asset management
    c. How the need has changed over time (e.g. changes in demand and/or consumption);
    d. Expectations of how the water pumping needs will change over the next 50 years.
2. SA Water's asset management strategy relevant to the water pumping stations
    a. Expected changes to water pumping demand over the next 50 years
    b. How SA water is responding to expected changes in demand for water pumping over the next 50 years.
    c. Key sensitivities to water pumping station electricity service requirements
    d. How risks associated with future changes to water pumping requirements are assessed and taken into account in asset management planning.
3. Engagement with ElectraNet on the electricity substation refurbishment program
    a. SA Water's outline of the engagement and consultation undertaken by ElectraNet;
    b. Information requested by and provided to ElectraNet;
    c. Any joint papers, reports and/or communications issued jointly between SA Water and ElectraNet regarding the proposed project.