The Australian Energy Regulator

Review of Proposed Expenditure of ACT & NSW Electricity DNSPs

Volume 3 – Integral Energy

Final

October 2008

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Engineering and Management Consultants
Advisers and Valuers

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Reply to: Auckland Office
Our ref: 0803
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21 November, 2008

Mr M Buckley,
General Manager,
Network Regulation North Branch
The Australian Energy Regulator
Marcus Clarke Street
CANBERRA ACT 2601

Dear Mr Buckley

REVIEW OF PROPOSED EXPENDITURE OF ACT & NSW ELECTRICITY DNSPS: VOLUME 3 – INTEGRAL ENERGY

In response to your instructions, we have pleasure in presenting our assessment of the proposed expenditure of the ACT and NSW electricity distribution network service providers for your consideration as part of the revenue determination to be applied to their services from 1 July 2009 to 30 June 2014.

This volume covers the assessment of Integral Energy's expenditure and is to be read in conjunction with volume 1, which deals with general and methodological matters relating to the work common to all DNSPs.

In summary, the key issues and conclusions from our review are as follows.

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(a) Integral Energy expects to spend a little more than its capex allowance in the current period and a little less than its opex allowance. It under-spent on opex against the determination in the first three years (by a considerable margin in the first two) and expects to over-spend in the last two. The expenditure profile is said to be due primarily to the longer-than-expected period required to ramp up its maintenance programme.

(b) Integral Energy's proposed capex and opex from 1 July 2009 to 30 June 2014 are both substantially above the levels projected for the current period. The reasons for the increases are real escalation in the cost of labour and materials and an increased scope of work to be performed.

(c) In respect of capex, the increase in the scope of work is driven by three principal factors: growth, the need to comply with the licence conditions for supply security and reliability and the need to increase the rate of replacement of ageing network assets. We have concluded that the capex programme

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proposed is reasonable in both scope and cost, apart from some relatively minor issues for which adjustments are recommended.

(d) The increase in the scope of opex is driven partly by increases in maintenance costs resulting from an increase in the volume of assets in service and their continued aging and some additional compliance work. Integral Energy has allowed for compounding productivity improvements of 2% p.a. that largely offset the real labour cost increases. We found some minor adjustments that could be made and would reduce the proposed opex but concluded that the proposed opex should be accepted without adjustment on the ground that the identified adjustments are minor, the business has adopted aggressive productivity improvement assumptions of its own volition and its reductions in maintenance expenditure from replacement capex may have been over-estimated.

Our opinion is summarised in section 11 of the report.

In conclusion, we acknowledge with thanks the assistance and cooperation of the AER and Integral Energy in the preparation of this report.

Yours faithfully,

Wilson Cook & Co Limited

Encl.

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Volume 3 – Integral Energy

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Prepared for the Australian Energy Regulator

By Wilson Cook & Co Limited

Enquiries to Mr J W Wilson

Our reference 0803

October 2008

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Disclosure

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1 Introduction

1.1 Scope of this Volume

In this volume of our report, volume 3, we review the proposed expenditure of Integral Energy for the AER's consideration as part of the revenue determination to be applied to the services provided by ACT and NSW electricity distribution network service providers from 1 July 2009 to 30 June 2014. The volume is presented in eleven main sections:

Section 1	Introduction (this section)
Section 2	Background
Section 3	Capex in Current Period
Section 4	Capex in Next Period
Section 5	Growth Capex
Section 6	Replacement Capex
Section 7	System Capex
Section 8	Non-System Capex
Section 9	Opex
Section 10	Other Matters
Section 11	Conclusion and Recommendations.

1.2 Basis of the Review

Unless noted otherwise, the review is based on the proposals and submissions presented by Integral Energy to the AER and on supplementary information prepared by Integral Energy and submitted to the AER and us.

1.3 Particular Issues Considered

Particular issues considered in the review included identification of the basis of the forecasts in each expenditure category, consideration of the main expenditure drivers, identification of the impact of external factors, review of the impact of cost escalation and the treatment of forecast future real increases in costs, review of the efficiency of the estimated costs (and of unit costs where relevant) and consideration of the adequacy, efficiency and application of the DNSP's policies and procedures.

The tests applied were the tests required by the transitional Rules, as explained in volume 1 of this report.

1.4 Report to be Read in Conjunction with Volume 1

This volume of the report is to be read in conjunction with volume 1 of our report, which deals with general and methodological matters relating to the work and with matters that are common to all DNSPs.

The abbreviations and terms used are those in volume 1.

Unless noted otherwise, all sums are stated in real 2009 dollars.

Tables adjusted to 2009 dollars have all been adjusted using the Australian Bureau of Statistics' annual consumer price index (CPI) data for all Australian capital cities for the years ending 30 June.

1.5 Terms, Conditions and Disclaimers

This volume of the report is subject to the terms, conditions and disclaimers set out in section 11.3 below.

1.6 Acknowledgement

We acknowledge with thanks the assistance and cooperation of Integral Energy and the AER in the preparation of this volume of the report.

2 Background

2.1 Business Profile

Integral Energy owns, manages and operates a distribution network in greater western Sydney, the Blue Mountains, the Illawarra and the NSW southern highlands. It was formed in the electricity sector restructuring in NSW in the 1990s by a merger of Prospect Electricity, based in Blacktown, and Illawarra Electricity, based in Wollongong. There have been no changes to Integral Energy's composition since that time.

2.2 Network Features

Before proceeding to identify and review the proposed expenditure, we first considered the network characteristics most relevant to our work and noted the following points. [1]

(a) The network takes its supply at 132 kV and 66 kV from the transmission grid through 20 TransGrid bulk supply points.
(b) Distribution is at 11 kV, 22 kV, 12.7 kV and low voltage.
(c) The key load centres served are at Parramatta, Penrith, Wollongong, Campbelltown, Blacktown and Liverpool.
(d) Designs at each voltage level appear to be conventional.
(e) The physical condition of the network is understood to be commensurate with age.

The key network statistics are shown in Table 2.1.

Table 2.1: Key Network Statistics

Service area (sq km)	25,000
HV system length (km)	14,385
LV system length (km)	15,009
Pct of network underground	31%
Transmission substations	20
Zone substations	153
Switching substations	12
Distribution substations	28,310
Poles	312,656
Customers (northern region)	371,865
Customers (central region)	295,622
Customers (southern region)	174,429
Total customers	841,916
Maximum peak demand (MW)	3,454

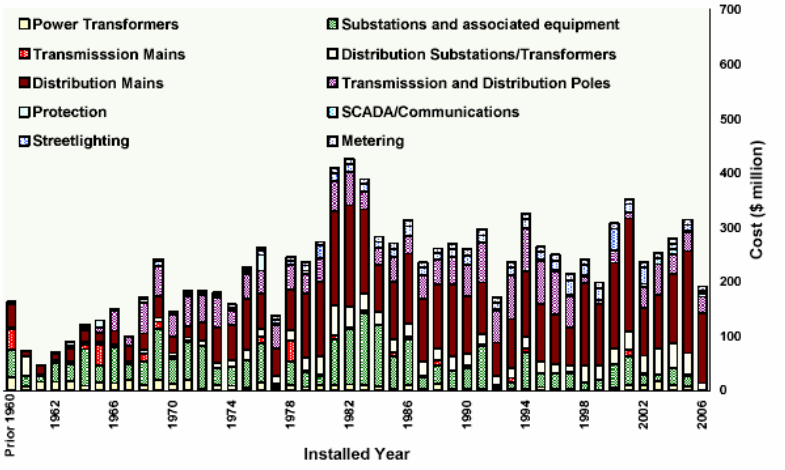
Source: Integral Energy.

[1] A description of the network can be found in the company's documents.

Age Profile

An indicative profile of the age of the assets is shown in the graph of asset replacement cost *vs*. year in Figure 2.1. [2] The figure shows that in total, the age of the assets is spread with reasonable uniformity.

Figure 2.1: Indicative Age Profile of the Assets



However, Table 2.2, which shows the age of assets in the main categories, and Figure 2.2, which illustrates the age profile of the six asset categories accounting for over 80% of the replacement capex in the next period, show that Integral Energy's zone substations, power transformers protection relays and transmission circuits are ageing, suggesting that high levels of replacement capex in these areas should be anticipated. The weighted average age of the network is predicted to keep increasing, albeit at a lower rate over the next period.

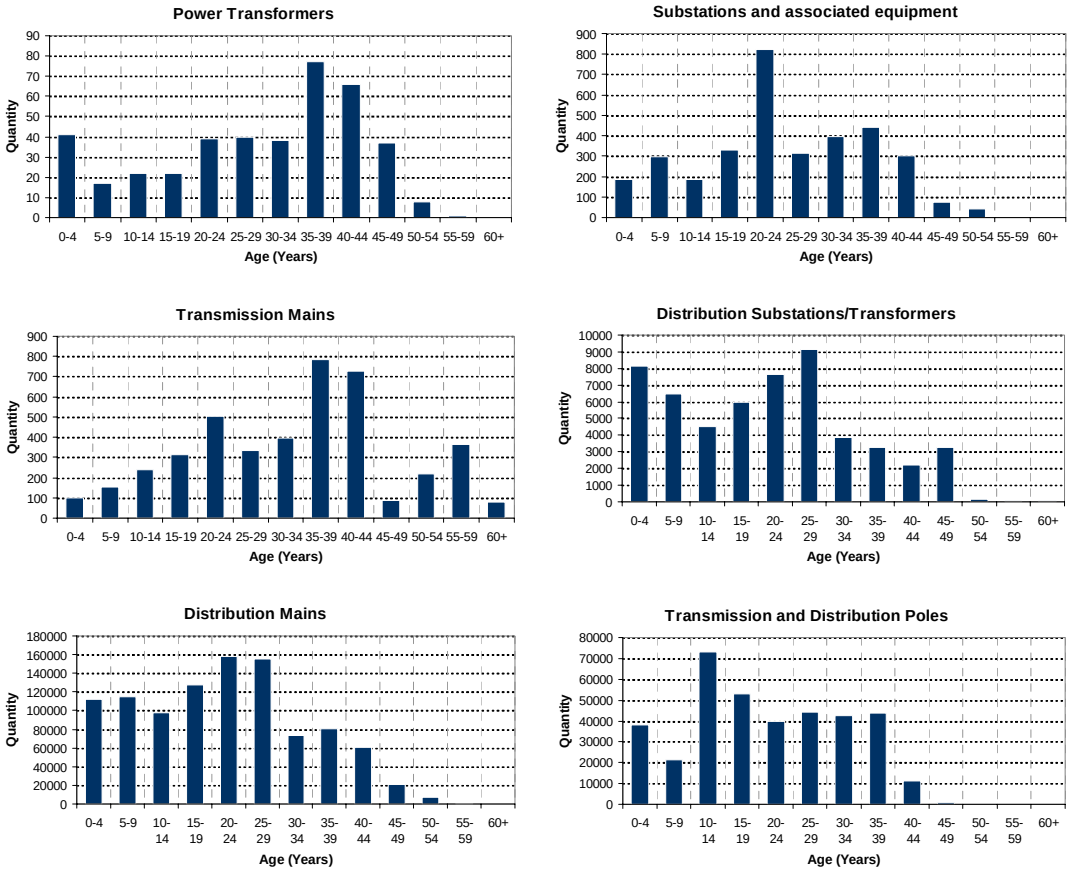
Table 2.2: Age of Main Asset Categories

Asset Category	Standard Life a/ (years)	Age as pct of Life
Power transformers	50	57
Substations and associated equipment	45	58
Sub-transmission circuits	52	60
Distribution substations/ transformers	44	47
Distribution mains (overhead and underground)	48	43
Sub-transmission and distribution poles	55	44
Protection equipment	39	69
SCADA/ communications	11	50
Public lighting	30	54
Metering	33	51

Source: Integral Energy.
a/ Standard life as used by Integral Energy.

[2] Source: Integral Energy. Integral Energy use the term "transmission" to refer to sub-transmission assets. Therefore in this figure, some other figures and tables and references to them in this section of the report, "Substations and associated equipment" refers to transmission and zone substations, *viz.* 132/66/33 kV to 22/11 kV (zone) and 132 or 66 kV to 66 or 33 kV (transmission) substations. "Transmission mains" refers to 132, 66 or 33 kV sub-transmission circuits.

Figure 2.2: Age Profile of Main Asset Categories



Network Performance

Reliability

Network reliability in terms of SAIDI is shown in Table 2.3. The table shows that overall unplanned SAIDI has decreased over the period FY 2003-07. Integral Energy attributes the improvement in reliability to a combination of targeted maintenance, improved response and capital initiatives.

Table 2.3: Network Reliability

YE 30 June	2003	2004	2005	2006	2007
Unplanned SAIDI a/	121	126	93	99	94

Source: Integral Energy.
a/ Normalised using Beta method to exclude major event days.

Details of the network's performance are given in Appendix F to Integral Energy's proposal, from which we noted that in FY 2006 and 2007, urban and short-rural feeder average SAIDI levels were within the standard set by the licence conditions. [3]

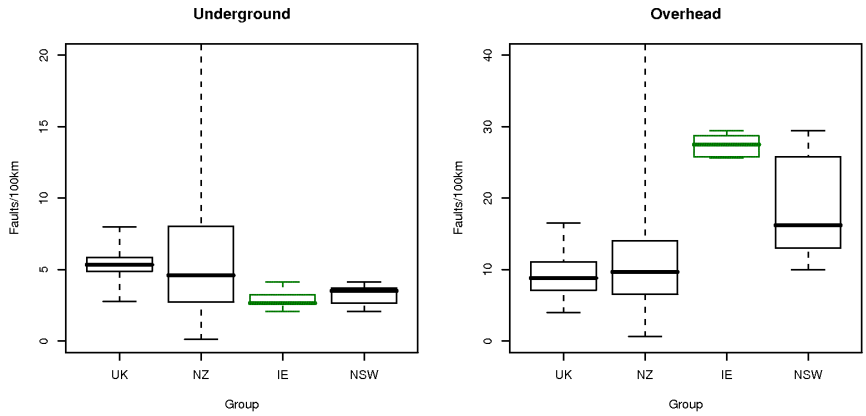
Integral Energy says that improving reliability performance has been one of the key drivers of its expenditure in the current period and it has arrested the deterioration in reliability that was experienced from FY 2000 to FY 2004.

[3] The NSW licence conditions for reliability and security of supply, as amended in December 2007.

Fault Rates (HV Distribution Mains)

Network performance in terms of fault rates per circuit-km p.a. for Integral Energy's high voltage distribution mains is shown in Figure 2.3. [4] [5] [6] The figure shows (within the limits of such analysis) that Integral Energy's fault rate for underground circuits compares well to New Zealand, UK and other NSW DNSPs but the performance of its overhead circuits is worse than reported in the New Zealand and UK top quartiles and above the median for the NSW DNSPs.

Figure 2.3: HV Distribution Mains Faults in Comparison with Other DNSPs



If fault classifications other than "condition" are removed, Integral Energy's position is as shown in Table 2.4. The table shows mixed results for underground mains but a generally rising trend for overhead mains.

Table 2.4: HV Distribution Mains Fault Rates Attributable to Condition

YE 30 June	2004	2005	2006	2007	2008
HV underground mains	35	19	31	39	27
HV overhead mains	446	670	839	957	878

Source: Integral Energy.

The implied poor condition of the overhead mains, judged by the comparatively high susceptibility to faults and the generally rising fault trend attributable to condition, suggests that expenditure directed at overhead high voltage mains is to be expected.

2.3 Summary of Expenditure Proposed

Table 2.5 summarises the expenditure proposed in the next period. Integral Energy has proposed capex and opex of $2,953 m and $1,477 m respectively. This represents an increase

[4] Sources: published data from the Office of Electricity and Gas Markets in the UK for the period 2002 to 2006; published data in respect of New Zealand lines businesses for 11 kV distribution circuits for the period 1998 to 2007 (may include 22 kV and 6.6 kV distribution circuits); and data from the NSW DNSPs supplied for the purpose of this review. The boxes show the upper and lower quartiles about the marked median value. The wide range of the data in the New Zealand case reflects the large number of companies involved (around 30) compared with the small number of companies in the UK.

[5] The statistics are for faults from all causes.

[6] We prefer the analysis of fault rates when considering the robustness of replacement expenditure projections, as they are more indicative of condition than customer performance indices such as SAIDI, which are affected by other factors and disguised to a degree by the removal of adverse weather events, the withstanding of which are a normal requirement of networks. (It is admitted that fault rates are also influenced by factors other than condition, e.g. by vegetation management and motor vehicle accidents, but in respect of storm damage they do reflect the robustness of the circuits and implicitly their general condition.)

of approximately $980 m or 50% over the current period for capex and an increase of $345 m or 30% over the current period for opex.

Table 2.5: Expenditure Proposed ($m 2009)

Period (FYs)	2005-09 a/	2010-14
Capex a/	1,973	2,953
Opex b/	1,132	1,477

Source: Integral Energy.
a/ Excluding expenditure funded by customer capital contributions.
b/ FY 2010-14 opex includes $46 m of debt raising, equity raising and self-insurance costs.

These proposed expenditures are analysed in the following sections of the report, after first briefly reviewing Integral Energy's capex in the current period against the determination.

3 Capex in Current Period

3.1 Summary of Expenditure

Table 3.1 summarises Integral Energy's capex in the current period and compares it with the expenditure in the determination plus pass-through expenditure agreed to date.

Table 3.1: Capex in Current Period *vs.* Determination ($ m nominal) a/

	Actual			Estimated		Total
YE 30 June	2005	2006	2007	2008	2009	
Determination	285	304	282	291	258	1,419
Pass-through expenditure	(41)	04	94	100	215	372
Capex in current period	247	325	367	395	535	1,868
Over-run / (under-run)	**2**	**18**	**(9)**	**5**	**62**	**77**
Over-run / (under-run) (%)	1%	6%	(2%)	1%	13%	4%

Source: Integral Energy.
a/ Net of work funded by customer capital contributions.

The table shows that Integral Energy's capex is projected to be 4% over the level allowed by IPART but Integral Energy said that its system capex is expected to be 7% below that allowed. It said that the higher-than-forecast non-system capex was primarily due to the development of regional depots as part of its strategy to locate field staff within an hour's reach of most parts of the network to respond to outages in a timely manner. It also said that an increased requirement for motor vehicles resulted from a change in policy to acquire rather than hire vehicles during the current period.

We did not review Integral Energy's capex in the current period further, given the marginal differences between its actual and allowed levels and given a review of its prudence was not required.

4 Capex in Next Period

4.1 Summary of Proposed Expenditure

Table 4.1 summarises the capex proposed in the next period in comparison with that in the current period.

Table 4.1: Current and Forecast Capex ($ m 2009) a/

	Actual			Estimated		Proposed					Total in	Pct of
YE 30 June	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	'10-14	Total
System assets:												
Asset renewal/replacement	77	91	143	112	131	139	153	151	155	187	784	27%
Growth (demand related) a/	147	143	182	105	223	215	288	288	295	260	1,346	46%
Reliability and quality of service enhancement	2	12	11	10	9	14	14	14	15	15	73	2%
Environmental, safety, statutory obligations	1	20	1	105	81	131	112	83	52	24	403	14%
Other	0	0	0	1	1	2	2	2	2	3	11	0%
	227	**267**	**336**	**333**	**444**	**501**	**569**	**539**	**520**	**488**	2,617	89%
Non-system assets	55	90	58	73	90	73	72	72	63	57	336	11%
	281	**356**	**394**	**406**	**535**	**574**	**642**	**610**	**583**	**544**	2,953	100%

Source: Integral Energy.
a/ Net of work funded by customer capital contributions.

The total expenditure proposed, including non-system assets, is $2,953 m, compared with an estimated $1,972 m in the current period, an increase of 50%. The increases are spread across all categories except system "other" which is not a material category in comparison with the total.

The main system expenditure categories in the next period are growth (51% of system capex) and replacement (30%) and these are discussed in sections 5 and 6 of this report respectively. The other major system expenditure category is the category that includes statutory obligations (15%). It is discussed in section 7 along with the other remaining categories, which make up the balance of 4%, before we conclude our review of system capex in the next period as a whole. Non-system capex is reviewed in section 8.

Table 4.2 shows the same expenditure but allocated by asset type for system assets (a similar table is given in section 8 of the report for non-system assets). The table shows an overall allocation of capex of around two thirds to sub-transmission (transmission and zone substations and sub-transmission circuits) and a third to distribution that is consistent with the age profiles of the assets, growth and the impact of the licence conditions.

Table 4.2: Current and Forecast System Capex by Asset Type ($ m 2009) a/

	Actual			Estimated		Proposed					Total in	Pct of
YE 30 June	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	'10-14	Total
Substations (trans and zone)	70	90	107	171	269	298	331	302	263	237	1,431	55%
Sub-transmission circuits	9	21	32	29	46	42	48	29	39	53	210	8%
HV dist. lines and cables	41	46	46	64	66	88	106	129	125	137	584	22%
LV dist. lines and cables	22	17	14	17	17	21	21	21	21	22	105	4%
Distribution transformers	27	32	35	31	20	28	43	40	53	24	188	7%
Cust. metering & load control	4	6	5	6	8	13	13	15	15	11	65	2%
Communications	5	5	2	4	4	2	3	2	2	2	12	0%
Land	12	8	10	9	13	7	3	0	0	0	11	0%
Other system assets	37	43	84	1	1	2	2	2	2	3	11	0%
	226	**267**	**336**	**333**	**444**	**501**	**569**	**539**	**520**	**488**	2,617	100%

Source: Integral Energy.
a/ Net of work funded by customer capital contributions.

4.2 Basis of Expenditure Forecasts

The basis of the expenditure forecasts is set out in Integral Energy's strategic asset management plan. [7] The plan identifies three key factors that drive capex in the next period:

- the need to comply with the licence conditions for reliability and security of supply, [8]
- rapid load growth, including new developments planned for the areas to the north-west and south-west of Sydney that Integral Energy says are each the size of Canberra, compounded by the effects of further air conditioning penetration, and
- the replacement of aging assets.

The planning methodology and explanations for most of the forecast expenditure are summarised in the plan.

Integral Energy has noted that its system load factor is deteriorating and that although demand management has assisted in meeting the demands imposed by customers on the network, a significant supply-side response is required over the next period.

It has stated that its capex forecasts are based on identified projects and programmes. It has said that the growth capex component includes major projects to increase the capacity of existing substations, construct new substations, augment existing feeders, install new ones and make new customer connections. It said that the renewal capex component reflects its ageing asset base and that the compliance and reliability component is principally needed to meet the requirements of the licence conditions.

Integral Energy has also noted that the level of capex proposed reflects higher input costs and that its assumptions in respect of future costs have been determined or reviewed by independent experts. [9] It noted that approximately 75% of its capex inputs are sourced competitively, ensuring that its costs reflect market prices. [10]

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7 See appendix J1 to the proposal.

8 Whilst Integral Energy's network planning standards generally required an (n-1) level of security of supply at the zone substation level, a degree of probabilistic planning in the past allowed some sub-transmission works to be deferred. However, the licence conditions now require an (n-1) level to be attained by FY 2014.

9 Integral Energy stated that it has used input cost escalators to develop capex forecasts consistent with the AER's recent regulatory decisions for SP AusNet and ElectraNet SA but we have not verified the statement.

10 It said that major civil works are contracted out and that equipment and materials are procured competitively with the balance provided by its own resources.

5 Growth Capex

5.1 Summary of Proposed Expenditure

Table 5.1 summarises the growth capex proposed in the next period in comparison with that in the current period. Expenditure under this heading constitutes 46% of the total capex proposed.

Table 5.1: Current and Forecast Growth Capex ($ m 2009) *a/*

	Actual			Estimated		Proposed					Total in	Pct of
YE 30 June	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	'10-14	Total
Major projects (ex land)	85	90	103	46	164	158	214	221	213	175	980	73%
Major projects (land)	0	0	19	9	13	8	3	0	0	0	11	1%
Dist. works programme	6	0	1	0	0	0	21	15	28	30	93	7%
Asset relocations	3	3	3	1	1	3	3	3	3	3	13	1%
Indust. and commercial conns	12	15	19	14	14	15	16	17	17	18	82	6%
Non-urban extensions	3	4	5	3	3	5	5	5	5	6	26	2%
U'ground res. development	12	13	9	10	7	11	11	11	11	12	55	4%
Low voltage development	17	19	23	17	17	15	15	15	15	15	74	5%
Metering	3	3	2	2	2	2	2	2	2	2	10	1%
	141	**148**	**183**	**102**	**222**	**215**	**288**	**288**	**295**	**260**	1,346	100%

Source: Integral Energy.
a/ Net of work funded by customer capital contributions.
b/ There is a discrepency of $3 m between total FY 2005-09 capex and capex for the same period in the RIN template. This was not considered material to our analysis.

The total expenditure proposed is $1,346 m, compared with an estimated $799 m in the current period, an increase of 68%. The main increases are in major projects (where expenditure is projected to double in the next period) and in distribution works where an increase of more than ten times is evidenced. Essentially, expenditure in these two categories relates to ensuring the network remains in compliance with the licence conditions.

The table shows that 73% of the proposed expenditure is on major projects, 7% is on the distribution works programme and the remaining 20% is related to normal distribution activity that is projected to continue at much the same level as in the current period.

5.2 Expenditure Drivers

Demand Forecast

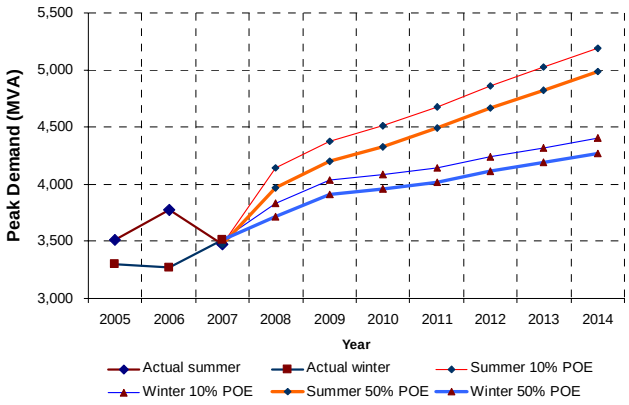
Increasing demand is normally the primary determinant of capex under the heading of growth. We noted that Integral Energy had produced its own demand forecast for the next period and had it verified by Charles River Associates. A review of the forecast was outside our terms of reference but we noted that it exhibited continued growth, as shown in Figure 5.1. [11]

We noted that the maximum system demand is forecast to grow at an annual rate of 3.6% over the next period and that the network is predominantly summer peaking, being affected by high ambient temperatures.

[11] Material subsequently provided by Integral Energy indicated that no revision is needed in the capex proposals as a result of the independent review of its demand forecast.

We also noted that Integral Energy's capex programme is based on a "50% probability-of-exceedance" forecast. [12]

Figure 5.1: Forecast Growth in Maximum Demand



Security of Supply Criteria

Secondary determinants of demand- driven capex are the security of supply criteria assumed. In NSW, these are mandated by the licence conditions. In essence, the licence conditions require an (n-1) security level to be attained at all zone substations serving demands over certain thresholds set out in the conditions and feeder loads not to exceed a certain percentage of their rated capacity. [13]

Plant Ratings

Plant ratings are a further determinant of demand-driven capex. We were satisfied that Integral Energy calculates its plant ratings for transformers and cables in accordance with accepted international standards and that the underlying assumptions made were reasonable.[14]

We noted that cyclic plant ratings are used in parallel with the 50% probability-of-exceedance demand forecast and considered that combination reasonable for planning purposes.

5.3 Review by Category

Major Projects and Programmes

Integral Energy provided a list of major projects and programmes in its RIN template and we noted that the totals in the list in the growth category could be reconciled with the totals by sub-category in Table 5.1 above.

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[12] Our expenditure review assumes in essence that the forecasting methodology was sound, the forecast had been developed from feeder load data assuming a normal weather year, adjustments had been made to remove the effects of inter-feeder load transfers, large load additions had been considered in parallel with the determination of growth trends, the effects of any newly-installed power factor correction equipment had been taken into account along with any other relevant factors and thus that the forecast was suitable for use for network planning purposes.

[13] The planning design criteria stipulate an (n-1) design for urban 11 kV networks, which is extrapolated in the notes to the criteria as an average feeder utilisation target of 80% by FY 2014, reducing to 75% by FY 2019. Reference should be made to the conditions themselves for the full wording of all requirements.

[14] These were reviewed by Meritec at the time of the last determination and we understand they have not been changed materially since then.

The major projects identified in Integral Energy's proposal were those at Liverpool, Abbotsbury, Parramatta, Doonside and Cheriton Avenue. The Liverpool transmission substation establishment and associated works include ten projects on the list, totalling $140 m over the next period. The Liverpool CBD and surrounding areas are experiencing increasing demand for electricity, driven primarily by commercial and high-density residential activity, requiring strengthening of the transmission and zone substations and the sub-transmission system supplying the area. A request was issued to identify opportunities to reduce peak demand and this and other customer negotiations are to be used as part of the planning process to develop long-term solutions for the area. The project scope is based on establishing a transmission substation near the CBD and a new zone substation at North Liverpool. Work in the wider area includes new zone substations at Collimore, Chipping Norton, Anzac Village, Holsworthy and Casula.

Construction of Abbotsbury zone substation is required to serve substantial growth in the residential sector at Abbotsbury and Cecil Hills (where new land has been released) and infill development at Bonnyrigg and Edenson Park. The new zone substation will supply the expanded residential area and offload the adjoining Bonnyrigg and Bossley Park zone substations. The cost of the main components is $37 m.

The Parramatta CBD is undergoing a major transformation because of changes to height restrictions for buildings. The Council has unveiled plans for major redevelopment to introduce additional commercial space and high-density residential development. Preliminary studies have shown that substantial future investment is necessary to ensure capacity and reliability. Surveys have been conducted into energy efficiency options in conjunction with the Government's greenhouse building rating scheme. The project scope includes establishing a Parramatta CBD West zone substation and a second substation in the area later. The cost of the work is around $74 m in the next period.

The Blacktown commercial, industrial and residential areas are experiencing significant growth. Further, a new residential area adjacent to the Western Sydney regional parklands is being developed. A zone substation site has been identified within the development that will allow this new load to be served, as well as allowing Integral Energy to reduce load at risk on the existing Doonside network. Work includes the establishment of a new zone substation at Doonside and upgrading of sub-transmission lines in the area. The cost of the work is around $52 m in the next period.

The Cheriton Avenue zone substation project is driven by continuing development in the Castle Hill residential and commercial area. In particular, proposed development of the Castle Towers shopping centre and the Castle Hill RSL club will add significant new demand to Castle Hill zone substation. This area is currently supplied by both Castle Hill and West Castle Hill zone substations but the forecast demand in the area requires additional capacity. The project involves the establishment of Cheriton Avenue zone substation. The site for the zone substation was purchased in 2005. The cost of the work is around $41 m in the next period.

Major projects that we identified and reviewed with Integral Energy staff based on their significance in the network regardless of whether the major driver was growth included a proposed new bulk supply point at Macarthur and various projects to be undertaken in conjunction with it, the Liverpool, Parramatta CBD and related work discussed above, work at Rouse Hill and Mungeree Park in the north-west area in parallel with the work at Cheriton Avenue and work at Schofields, Box Hill, North Glendening and Kenthurst. With two exceptions, the new zone substation at Edmondson Park and the conversion of the Riverstone zone substation to 132 kV, which we did not examine, the projects listed above comprise all the largest items in the programme.

Assessment of Major Projects and Programmes

Area Plans and Project Justifications

We noted that sub-transmission network planning in a large network is generally carried out by area and that Integral Energy had developed its plans in that way, with separate justifications for major expenditure items prepared in a manner consistent with the wider plans. It provided us copies of the plans and project justifications that we requested for review. We reviewed the documents only at a high level, considering them reasonable in terms of concept but noting that other than in cases already committed to construction or shortly to be committed, the plans remained subject to final design and approval in accordance with normal distribution engineering practice.

Plans Part of an Integrated Programme

We noted that the plans for separate works in each area formed part of an integrated whole, driven principally by the load forecast but matched also to local development imperatives and, where known, major developments. Therefore, it was not possible for us (and we did not contemplate) suggesting modifications to individual elements of the plans or to their overall timing but sought only to determine whether, taken overall, the plans constituted reasonable options for network development.

Conclusion

We noted that options had been considered and Integral Energy's planners were able to answer our questions satisfactorily when we discussed the plans with them.

We did not consider that demand management alternatives would allow a material deferral of the work.

We noted that PB had been engaged by Integral Energy to review amongst other things its growth-related capex and that it had concluded that the "documentation reviewed by [it] is of a consistently high quality and demonstrates a systematic approach to the determination of network investment requirements for both compliance and growth related drivers." It also stated that "[Integral Energy's] processes should result in the development of prudent and efficient capital forecasts for growth and compliance" and concluded, "Integral's cost estimates for major projects and programmes appear efficient and realistic for the services provided. In general, unit costs appear reasonable."

We were satisfied from our review that the plans and indicative timing of the expenditure were reasonable.

Distribution Works Programme

We understand from the documents and our discussions with Integral Energy that the distribution works programme in the next period relates partly to normal high voltage distribution feeder work (e.g. in relation to ensuring that equipment ratings are not exceeded, dealing with voltage problems, etc) and partly to the work required to bring the network into compliance with the feeder utilisation limits in the licence conditions *viz.* achieving 80% feeder utilisation levels by FY 2014. This requires a step increase in expenditure.

Integral Energy states that the distribution works programme forecast excludes feeder works included in major projects or in the customer connections programme.

Integral Energy stated in its presentations that the distribution works programme forecast is developed from a "bottom-up" assessment for the year ahead and is projected from a base year using demand data for individual feeders. Insufficient documentation was available for us to review the method of forecasting under this heading but we noted that the modelling

and forecasting had been reviewed by PB, who said they were of the view that *"the expenditure forecasts [on the distribution works programme] represent a slightly aggressive but reasonable allowance to achieve the outcome of having no feeders overloaded by 2013/14"*. [15]

The programme itself comprises hundreds of small modifications to the network, the individual review of which was impractical. However, we did scan the folder of work sheets and noted the general nature of the work, considering its nature and degree of detail to be in accordance with normal practice.

Based on this information, we consider the work reasonable.

Customer-Driven Capex

Customer-driven capex is classified by Integral Energy into three sub-categories: industrial and commercial connections, non-urban extensions and underground residential development. We understand that it reflects the projected level of new residential and commercial development. We understand that the forecast level of capex takes account of direct customer or developer enquiries and the other usual information, particularly future development activity identified through the local councils' plans and land release programmes. It is recognised that these are subject to considerable uncertainty, particularly in the latter part of the period.

The method of estimation of this expenditure has not been stated by Integral Energy in detail but has been reviewed by PB, who describe the growth forecasts (in general) as prudent and efficient. [16]

We also noted that the level of capex in this category was in line with expenditure under this heading in the current period, as evidenced by the data in Table 5.1 above.

The cost of work funded by customer capital contributions is omitted from our tables and analysis unless noted otherwise and has not been examined by us for reasonableness, as we understand that mandatory policies for the calculation of contributions are in place in NSW and are being followed consistently by Integral Energy.

Other Growth Capex

The remaining growth capex is related to low voltage network development, metering and asset relocations. Given the minor nature of this expenditure when compared with the capex programme as a whole, we did not examine it further.

5.4 Other Considerations

Other Considerations when determining the reasonableness of the scope of work included the following.

Policies and Procedures

We were satisfied that Integral Energy had followed reasonable policies and procedures that included the identification of need and the determination of least-cost solutions when making its investment decisions.

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[15] See appendix K to the proposal.

[16] ibid.

Adequacy of Documentation

In respect of growth-related capex, we considered that the documentation made available for our review was adequate for the purpose.

Innovativeness of Planning Practices and Designs

We considered the level of innovation being applied to Integral Energy's investment decisions. Innovation in this context was taken to mean mainly the adoption of sound methods and ideas or the like rather than the introduction of new technologies in terms of network equipment, although we considered both possibilities.

Engineering and Operational Methods

In terms of engineering methods and ideas, Integral Energy's planning team appeared to be following current international planning practice in its work in most if not all respects and importantly, for growth-related expenditure, had adopted sound network planning concepts and criteria.

Integral Energy already considers zone substation load diversity and load transfers through the distribution system when planning its substation capacity augmentation.

Non-network options and demand-side management are recognised as potential alternatives to network augmentation solutions and are provided for in Integral Energy's procedures in accordance with the prevailing requirements in NSW.

Construction and Installation Methods

Integral Energy appeared from our review to be using appropriate methods for the construction and installation of its assets.

Types of Equipment

It appeared from our review that the particular types of asset entailed in the capex programme in the next period are appropriate for the purpose.

Conclusion

We did not find any evidence that suggested that material adjustment was needed in Integral Energy's proposed growth-related capex on the ground of these factors. In summary, therefore, we were satisfied that the scope of work proposed was reasonable and efficient for the purpose of this review.

5.5 Efficient Costs

We then considered whether the proposed expenditure was reasonable for the scope of work envisaged – in other words, whether it reflected efficient costs. We considered this under the following headings: the basis of the cost estimates, the method used to escalate historical costs to year 2009 dollars, the extent of any real cost increases that have been included in the estimates stated in the RIN templates in year 2009 dollars and, finally, the discussion of any issues arising.

Basis of Cost Estimates

Integral Energy built up its forecast of capex (and opex) in the next period from its demand forecast, asset data (particularly in relation to condition or, where that information was not available, from age), unit rates (which it derived from recent historical expenditure), cost

escalators and the application of overheads. [17] It said that costs associated with the identified capital works had been developed in FY 2008 dollars, escalated by relevant factors.

Integral Energy had engaged PB to review the assumptions underpinning its forecast and we reviewed the report, noting the scope of work, observations made and conclusions reached. [18] We noted PB's confirmation that: major projects timed for implementation "significantly in the future" had been estimated based on recent experience in similar works; major projects for which detailed analysis had been undertaken were estimated based on a "detailed estimating package" that considered component costs; distribution works generally were estimated for each project in the next year using standard estimating rates provided to the staff involved (based in turn on inputs from completed work); connection-related works were estimated on existing works and a projection of activity; and metering works were estimated on unit prices in supply contracts applied to forecast volumes. We considered these methods normal.

We noted that PB had generally endorsed Integral Energy's expenditure estimation methodology, including the cost escalation factors applied and that it had not identified any instances of contingencies having been included in project cost estimates. [19] [20]

These matters considered, we accepted Integral Energy's cost estimates as reasonable for the scope of work concerned.

Escalation to Year 2009 Dollars

Recognising that there has been a period of significant cost increases in the electricity supply industry from around 2003, Integral Energy engaged Competition Economists Group (CEG) to prepare forecasts for its input cost factors. [21] Its forecasts were applied to a weighted breakdown of Integral Energy's capital costs to develop annual real escalators that, in turn, were used to develop the capex forecasts. [22] A summary of the input cost escalators used is shown on p. 122 of the proposal and a summary of the real cost escalators derived for application to the capex projections (which were prepared in FY 2008 dollars) is given on p. 124 of the proposal.

We are not able to express a view on the reasonableness of the input assumptions regarding future cost movements. Nor were we able to verify ourselves that the methodology (and the escalators stated in the table above) had been applied in the stated manner, as an audit would be required for the purpose, although we did note PB's general endorsement of their application.

In conclusion, we accepted the basis of the cost estimates as reasonable for the scope of work concerned.

Real Price Increases Included in the Estimates

In essence, the effect of applying these escalation factors is that the forecast real price increases during the period FY 2009 to 2014 have been included in the estimates stated in the RIN expenditure templates in 2009 dollars to the extent shown on p. 124 of Integral Energy's proposal.

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17 See p. 108 of Integral Energy's proposal.

18 PB's report is given in appendix K to the proposal.

19 We expect contingencies to be included where necessary but not in a manner that leads to their being applied more than once.

20 PB noted in Integral Energy's "distribution cost calculator" that there was reference to FY 2009 costs and suggested that Integral Energy confirm that it had included in its proposal only costs in FY 2008 dollars. Integral Energy so confirmed.

21 CEG's report is given in appendix L to the proposal.

22 Integral say that this approach is consistent with the methods used by SP AusNet and ElectraNet for regulatory purposes.

Conclusion

We concluded that there was no ground on which to deem the costs applied to Integral Energy's growth capex programme inefficient. However, we note that Integral Energy has instituted a productivity improvement programme entailing a 2% p.a. improvement in labour productivity. Although most of the benefits will accrue in opex, the programme may also have the effect of reducing capitalised overheads and support costs and Integral Energy confirmed when commenting on the draft report that the capitalised overheads it had applied incorporated a reduction resulting from the impact of the productivity improvement factor.

5.6 Recommended Level of Growth Capex

Having considered the factors reported in this section, we conclude for the purpose of this review that no adjustment of the growth-related capex proposed by Integral Energy is needed.

6 Replacement Capex

6.1 Summary of Proposed Expenditure

Table 6.1 summarises the replacement capex proposed in the next period in comparison with that in the current period. [23] Expenditure under this heading constitutes 27% of the total capex proposed.

Table 6.1: Current and Forecast Replacement Capex ($ m 2009)

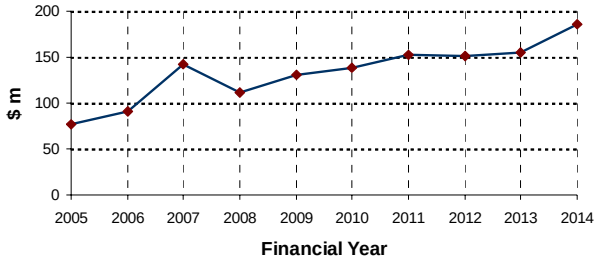
	Actual			Estimated		Proposed					Total in	Pct of
YE 30 June	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	'10-14	Total
Distribution substations	7	8	11	8	9	10	10	10	12	12	54	7%
Distribution mains	16	19	19	16	19	26	26	28	29	33	142	18%
Trans and zone substations	29	48	79	66	77	68	86	80	80	104	417	53%
Sub-transmission circuits	10	9	8	8	10	15	13	15	16	19	79	10%
Metering	2	3	5	4	5	9	9	11	11	7	47	6%
Other renewal/replacement	8	7	7	11	10	10	8	7	7	12	45	6%
	72	**94**	**128**	**112**	**131**	**139**	**153**	**151**	**155**	**187**	784	100%

Source: Integral Energy.
a/ There is a discrepency of $15 m between total FY 2005-09 capex and capex for the same period in the RIN template. This was not considered material to our analysis.

The total expenditure proposed is $784 m compared with an estimated $554 m in the current period, an increase of 42%. The increases are spread across all sub-categories but with notable increases in transmission substations, transmission mains, and distribution mains and substations. [24] The table also shows that 53% of the proposed expenditure is on transmission and zone substations, 18% is on distribution mains, 10% is on sub-transmission circuits and the remaining 19% is related to distribution substations (7%), metering (6%) and other renewal and replacement items (6%).

A rising trend is evident in replacement capex, as illustrated in Figure 6.1 and as expected, given the age profile of the assets.

Figure 6.1: Trend in Replacement Capex ($ m 2009)



The main thrust of the replacement programme is directed at transmission and zone substation equipment, much of which is aged with corroded outdoor structures, aged oil-filled

[23] See footnote 2 for a definition of the terms used in the table and in this section of the report.

[24] Based on analysis of appendix D of the strategic asset management plan, which gives expenditure by category from FY 2008 onwards.

switchgear and other problems. [25] The other components of the programme are conventional and directed at equipment in poor condition in the other asset categories. [26]

The forecasts have been developed through Integral Energy's strategic asset renewal planning process, as set out in its strategic asset management plan and its strategic asset renewal plan together with other supporting documents notably the metering asset management plan, zone and transmission substation renewal plan and the transformer replacement plan.

6.2 Review by Category

Integral Energy provided a list of projects and programmes in its RIN template and we noted that the totals in the list in the replacement category could be reconciled with the totals by sub-category in Table 6.1 above. Further details are given in the strategic asset management plan and in the other plans noted above.

Transmission and Zone Substations

Transmission and zone substations account for 53% of the proposed replacement expenditure. This work is coordinated with network growth and development projects through Integral Energy's integrated planning process and is divided into replacement and growth categories solely for the purpose of this review.

The major projects identified in Integral Energy's proposal were those at Granville, Penrith, Rydalmere and Guildford. [27] The existing Granville zone substation was commissioned in 1957. It has now reached the end of its serviceable life and lacks the capacity to serve demand in the area. In line with the strategy developed to meet the needs of the greater Parramatta area, it is to be rebuilt as a 132/11 kV substation.

The Penrith transmission substation contains many assets that have reached the end of their serviceable lives and lacks the capacity to serve demand in the area with the required level of security. The station is to be re-built.

The Rydalmere zone substation renewal project is under way. It involves the replacement of 66 kV and 11 kV switchgear characterised by slow operating mechanisms, high primary contact resistances, low insulation levels and oil leaks. There are additional issues with bus bar and cable ratings and access to feeder cables. The renewal with new indoor 66 kV (but rated at 132 kV) and 11 kV switchgear is consistent with plans to up-rate the substation to 132 kV and so avoid the need to develop a new zone substation at Ermington.

The 48-year-old Guildford transmission substation is a key part of the supply to the Parramatta area but it has extensive corrosion of bus work, substandard clearances on the 33 kV bus bars, power transformers at the end of their life, inadequate fault ratings and other various issues. Renewal of the substation is consistent with the development plans for the Parramatta area.

Other major projects that we identified and reviewed from the replacement standpoint included those at Springhill, Castle Hill, Rosehill, Holroyd and Kemps Creek. The Springhill sub-transmission substation is cited as being in poor condition with substantial corrosion of steel supports, transformers at the end of their life and other equipment in poor condition.

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[25] Integral Energy states that nearly a third of its zone and transmission substations are now at or are close to their retirement age, 25 are more than 45 years old and a further 70 will reach an age of 45 years within the next ten years.

[26] Minor overhead line components are generally expensed.

[27] Granville and Penrith are discussed here as they are cited in the proposal as renewal projects, although they are listed in the RIN template major project list as growth-related projects and their expenditure is included under the growth category.

The Castle Hill project replaces a 66 kV outdoor switchyard at this 52-year-old zone substation due to poor condition of the bus bars and equipment supports. The replacement equipment will be indoor equipment in accordance with modern practice. The 11 kV oil-filled switchgear will be replaced at the same time due to condition and risk mitigation.

The Rosehill project involves the replacement of an 11 kV switchboard and control building in poor condition following a fire in 1998.

The Holroyd 52-year-old zone substation has multiple condition issues, including corrosion, 33 kV circuit breakers with poor insulation and contact resistances, 11 kV circuit breakers of a type known for excessive maintenance problems, obsolete protection relays and capacity limitations due to the rating of the 11 kV transformer cables. Transformers 2 and 3 will be retained.

The 11 kV switchboard at Kemps Creek is in poor condition with high contact resistances and a lack of available type-tested spare parts. An explosive failure in a current transformer chamber in 2001 illustrates the risk entailed in keeping the equipment in service. The renewal work will include a new switch room to allow for expansion and upgrading of the station to 132 kV as part of the long-term development of the network in the area.

In conclusion, with respect of the identified substation work, we were satisfied from our review that the plans and indicative timing of the expenditure were reasonable.

Other Substation Renewal Projects

We noted that other specified projects in the substation category for which business cases have been developed are set out in the strategic asset renewal plan. They include projects under way with delivery in the next period and other specified projects of lesser cost to be commenced within the next period. [28]

We noted that fourteen further substation renewal projects for which business cases have not yet been developed are identified in the strategic asset renewal plan. The projects have been identified based on condition assessment and risk ranking and mostly fall at the end of the period. We accepted that the scope of work involved in these projects and their timing might change and noted that the inclusion of such work in the programme is to be expected but we also noted that expenditure in this category is projected to increase in the final year of the estimates to a level above the trend. We asked integral Energy for a further explanation of this work and it advised us that it expects an increasing level of work in this area, as more substations become candidates for renewal. However, whilst acknowledging that might be the case, we noted that the expenditure trend remains relatively flat up to and including FY 2013 and we considered that provisions of this type ought not to cause a deviation from the trend. In other words, we considered that a level of expenditure based on established levels of work ought to take precedence over an increased level of expenditure that lacked the same degree of supporting documentation. We have therefore proposed an adjustment in respect of this item in FY 2014. The adjustment has the effect of maintaining the level of expenditure in this category at that in the two preceding two years. Details are given in section 7.3.

Transformers

Integral Energy ranks its zone transformer replacement work by a combination of age, condition and other factors including how critical the availability of each transformer is in the network. The programme of identified replacements is coordinated with its growth and substation renewal projects.

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[28] Projects currently under way include Springhill and Lawson transmission substations.

We noted that oil renewal and mid-life refurbishment is becoming normal practice to maximise transformer life and is identified in Integral Energy's programme.

We considered the number of replacements forecast was reasonable, as it is consistent with recent replacement levels and reflects the age profile of this asset category.

A provisional programme of $11.5 m in FY 2008 dollars is proposed for transformer noise reduction where found necessary, should complaints be received. We considered that provisions of this type ought to reflect past levels of expenditure and Integral Energy confirmed on enquiry that that was the case. We therefore accepted the expenditure as reasonable.

Circuit Breakers

The substation circuit breaker replacement programme includes the replacement of breakers of specified types due to poor condition. Expenditure in the next period appears to be based on the age profile of the population. Although the quantification of expenditure in the next period is not well supported in the documentation by the identification or projection of condition, the forecast level of expenditure is consistent with current levels in respect of equipment in poor condition. On balance, we accepted the item as reasonable.

Civil Works

The majority of expenditure in this category is for the refurbishment of buildings and amenities, the installation of fire hydrants and oil containment systems and the renewal of items in unspecified projects. We considered the specified projects to be prudent but the provision of $9.4 m in FY 2008 dollars for unspecified work not to be, as no supporting documentation was provided to justify a departure from the expenditure trend in this category. We have made an adjustment in respect of it by removing the expenditure for this item from FY 2011-13 and reducing it by $1 m in FY 2014. Details are given in section 7.3.

Other Zone Substation Items

Other zone substation expenditure items include the renewal of support structures, isolators, voltage transformers, capacitor banks, earthing and switchyard lighting and the addition of surge protection. The expenditure appeared reasonable but is not material and was not examined further.

Distribution Mains

In the distribution mains category, key activities include the replacement of high voltage steel mains based on condition and failure history, replacement of cast iron cable terminations based on failure history, replacement of air break switches based on operational failures and safety concerns and replacement of low voltage concentric aluminium cable (Consac). The expenditure was considered reasonable. However, a programme for miscellaneous expenditure on mains involves expenditure of approximately $7.5 m in FY 2008 dollars that is not directed at a tangible activity. We considered the necessity of an adjustment in respect of it but the high fault rate evident on the overhead network suggested than an adjustment would be imprudent.

A programme of $21 m in FY 2008 dollars is proposed for service wire inspections and replacements based on "as-found" condition. This is a new programme, for which a business case is yet to be developed. On enquiry, Integral Energy stated that the cost estimate is based on its understanding of current expenditure in this area by other DNSPs, adjusted in scope for

Integral Energy. We compared the expenditure on a per customer per annum basis to that proposed by other NSW DNSPs and concluded that it was reasonable. [29]

Sub-Transmission Mains

In the sub-transmission mains category, key activities include the replacement of underground pilot cables based on condition and the benefits of introducing glass fibre cables, wood pole replacements based on pole condemnation numbers and steel tower refurbishment requirements. We considered these programmes reasonable. However, the provision of $11.6 m in FY 2008 dollars for unspecified works was not supported adequately in the documentation. On enquiry, Integral Energy stated that the expenditure was to compensate for the "roll-off" in identified short-term programmes and maintain a relatively constant level in the medium term. However, we considered that adjustment is required to maintain the level of expenditure in the last three years in this category at the same level as that in the preceding two years. Details of the adjustment are given in section 7.3.

Other Replacement Capex

Distribution substation replacement activity includes the refurbishment of pole-mounted substations for safety and reliability reasons, the refurbishment of ground substation housing for better functionality and staff safety and the replacement of distribution transformers in poor condition. Although the forecasts are not well supported in the documentation, the level of expenditure appears reasonable. However, a programme for miscellaneous expenditure on substations entailing expenditure of approximately $5 m in FY 2008 dollars is not directed at a tangible activity. On enquiry, Integral Energy stated that this expenditure was provided for ad-hoc renewal needs and that the level proposed was in accordance with current experience. Examination of the overall trend in distribution substation expenditure showed relatively constant levels and so no adjustment is proposed.

Meter replacement entails expenditure of approximately $47 m in FY 2009 dollars in respect of identified meter types to maintain meter accuracy. The programme also replaces failed load control relays at premises where meters are replaced. The scope of work is supported by the metering asset management plan and is considered reasonable.

Other expenditure items include part of a ten-year programme to replace old electro-mechanical protection relays and early electronic relays, remote terminal units that have been in service for 15 years or longer and various items of communications equipment. We considered the expenditure reasonable.

6.3 Other Considerations

Other considerations when determining the reasonableness of the scope of work included the following.

Policies and Procedures

We were satisfied that Integral Energy had followed reasonable policies and procedures that include the identification of need and the determination of least-cost solutions when making investment decisions, although we noted some weaknesses in the cases made for replacement capex in the final years of the period (stemming mainly from a lack of data), as discussed in section 6.2.

[29] Other DNSPs had estimated expenditure under this heading of around $7 per customer p.a. compared with Integral Energy's calculation of around $6 per customer p.a.

Adequacy of Documentation

In respect of replacement-related capex, we considered that the documentation made available for our review was adequate for the purpose.

Trend in Fault Rates

The comparison of fault rates between companies and our observations on Integral Energy's rate of faults due to equipment condition have already been outlined in section 2.2 of this report and were considered in our assessment.

Conclusion

We did not find any evidence that suggested that material adjustment was needed in Integral Energy's proposed replacement-related capex on the ground of these factors, other than as already stated in section 6.2. In summary, therefore, we were satisfied that the scope of work proposed was reasonable and efficient for the purpose of this review.

6.4 Efficient Costs

We were satisfied that the factors discussed in section 5.5 of this report in relation to the efficiency of Integral Energy's costs for its nominated scope of work were equally relevant to the replacement capex reported in this section. Thus, we concluded that there was no ground on which to argue that the costs applied to Integral Energy's replacement capex programme were inefficient.

6.5 Recommended Level of Replacement Capex

Having considered the factors reported in this section, we conclude that adjustment of the replacement-related capex proposed by Integral Energy for the purpose of this review is needed in respect of the following items:

- the provision for other substation renewal projects,
- the provision for un-specified civil works and
- the provision for un-specified work on sub-transmission mains.

Details are given in section 7.3 of this report.

7 System Capex in Total

7.1 Other Categories of Capex

Statutory Obligations, Environmental and Safety Capex

Table 7.1 summarises the capex proposed in the next period for environmental, safety and statutory compliance in comparison with that in the current period. Expenditure under this heading constitutes 14% of the total capex proposed.

Table 7.1: Current and Forecast Compliance Capex

	Estimated		Proposed					Total in	Pct of
YE 30 June	2008	2009	2010	2011	2012	2013	2014	'10-14	Total
Sub-transmission substations	34	12	22	13	6	3	1	45	11%
Sub-transmission lines	33	13	1	4	3	0	0	8	2%
Zone substations	29	43	93	78	32	26	0	228	57%
Distribution feeders	9	11	13	16	40	22	21	111	28%
Other compliance	2	2	2	2	2	2	2	11	3%
	107	**81**	**131**	**112**	**83**	**52**	**24**	403	100%

Source: Integral Energy.
a/ 2005 to 2007 annual capex did not reconcile with the RIN and was not considered at this level.

Expenditure under this heading is predominantly made up of the cost of bringing existing but non-compliant parts of the network into compliance with the licence conditions.[30] Approximately 70% of it relates to augmentation at the sub-transmission and zone substation level to achieve the required (n-1) security of supply and 28% relates to distribution feeder work to reduce the loads to a maximum of 80% of feeder rating under normal operating conditions. The remaining 1-2% is on other compliance items.

The licence conditions impose a significant requirement for network augmentation, equivalent in Integral Energy's case to around 25 major projects at the transmission and substation level. The projects are listed in the major projects list in Integral Energy's RIN template. The process followed when determining the options for these projects was the same as that used when determining options for network development under the 'growth' category and was reviewed as part of that assessment.

At the distribution level, the value compliance expenditure was $111 m as shown in the table above and in the list of major projects in the RIN template. The process followed when determining the options for these projects was the same as that used when determining options for network development under the 'growth' category and was reviewed as part of that assessment.

Integral Energy advised us that the balance of $11 m or 3% of the total expenditure under this category was for a small-scale trial interval meter rollout and an immaterial component of environmental enhancement works. We did not examine these expenditures further, given their small size.

[30] 'Existing' in this section refers to installations existing at July 2008. Expenditure required to maintain compliance as load rows is included in the growth capex reviewed in section 5.

After consideration, we accepted the proposed expenditure under this category as reasonable.

Reliability and Quality Improvement Capex

Table 7.2 summarises the reliability capex proposed in the next period in comparison with that in the current period. Expenditure under this heading constitutes 2% of the total capex proposed.

Table 7.2: Current and Forecast Reliability Capex

	Estimated		Proposed					Total in	Pct of
YE 30 June	2008	2009	2010	2011	2012	2013	2014	'10-14	Total
Reliab. enhancement projects	6	7	13	13	13	13	13	64	88%
Reclosers	2	1	1	1	1	1	1	3	3%
Automation	1	1	1	1	1	1	1	4	5%
Load break sws. to SCADA	1	0	0	0	0	0	0	2	3%
Pwr quality monitoring eqpt.	0	0	0	0	0	0	0	1	1%
	10	**9**	**14**	**14**	**15**	**15**	**15**	73	100%

Source: Integral Energy.
a/ 2005 to 2007 annual capex did not reconcile with the RIN and was not considered at this level.

Expenditure under this heading is that required to *maintain* average and individual feeder reliability performance within the levels in the licence conditions. The expenditure was estimated by monitoring the reliability performance of all 11 kV and 22 kV feeders, identifying those that do not meet the standards and developing responses for each. A programme has been developed to remedy non-compliant feeders and to improve the performance of those that contribute significantly to overall system SAIDI to comply with the licence conditions for "average" feeders and to address poor-performing areas of the network.

In examining this capex, we had regard to the current reliability of the network as reported in section 2.2 of this report and to the reliability targets in the licence conditions. We considered the reliability improvement capex reasonable.

Other Capex

The category of "other capex" accounts for only 0.4% of the total capex proposed in the next period. It includes the purchase of essential spares. Given its small size, it was not examined further.

7.2 Other Considerations

Coordination of Work and Overlap of Expenditure Estimates

We noted evidence that capex programmes and projects under the various expenditure headings were coordinated to avoid inefficiencies.

We did not find any evidence that suggested overlapping or double counting of expenditure.

Deliverability

Integral Energy has recognised that it will be competing with other Australian distribution businesses, as well as in the broader international market, for resources and expertise to implement its proposed investment programme and has taken measures to ensure that it is able to do so. It notes that its labour requirements will not increase as fast as its capex programme because much of the programme is in major works that are contracted out or in major plant items that are procured. It points out that it has demonstrated its ability to meet an increased capital expenditure programme in the current period. Its strategy for delivery in

the next period includes design standardisation, the management of its work programme and supply contracts, continues use of a mix of internal and external resources and increased internal staffing including more apprenticeships. It noted that PB had reviewed the delivery plan and considered it capable of achieving the planned result.

7.3 Recommended Level of Total System Capex

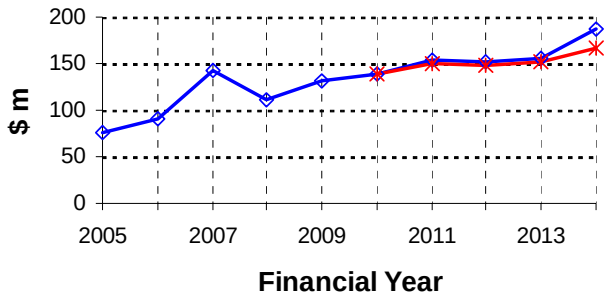
In summary, having considered the factors reported in sections 4 to 7 of this volume, we conclude that adjustment of the replacement-related capex proposed by Integral Energy for the purpose of this review is needed as shown in Table 7.3.

Table 7.3: Recommended Level of System Capex ($ m 2009)

YE 30 June	2010	2011	2012	2013	2014	Total
Capex proposed by DNSP	501	569	539	520	488	2,617
Proposed adjustments:						
Other substn renewal projs.	0	0	0	0	(15)	(15)
Unspecified civil renewal	0	(2)	(2)	(2)	(1)	(7)
Unspecified s-trans renewal	0	0	(1)	(2)	(3)	(6)
	0	(2)	(3)	(4)	(20)	(29)
Pct of replacement capex	0%	(1%)	(2%)	(3%)	(10%)	(4%)
Pct of proposed capex	0%	(0%)	(1%)	(1%)	(4%)	(1%)
Recommended capex	**501**	**567**	**535**	**516**	**468**	**2,588**

The adjustments constitute a reduction of 1% in total in the total capex proposed for the next period and 3.7% in replacement capex. Their effect is shown in Figure 7.1. The adjusted expenditure is in red in the figure and continues to exhibit a rising trend that we consider appropriate and consistent with our general observations on Integral Energy's network replacement needs, albeit not at the rate that Integral Energy's forecasts indicated. [31]

Figure 7.1: Impact of Recommended Adjustment ($ m 2009)



[31] In commenting on the draft report, Integral Energy considered that the deductions were unwarranted. However, we retained the view that it was not reasonable to accept the sharp upwards turn in the curve at the end of the period when it was based on less cogent evidence than the established preceding levels of expenditure.

8 Non-System Capex

8.1 Summary of Proposed Expenditure

Integral Energy's non-system capex comprises expenditure on IT systems, plant and equipment, motor vehicles, land, buildings and other non-system assets. Expenditure in the current and next period is shown in Table 8.1. Expenditure under this heading constitutes the remaining 11% of the total capex proposed.

Table 8.1: Current and Forecast Non-System Capex ($ m FY 2009)

	Actual			Estimated		Proposed					Total in	Pct of
YE 30 June	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	'10-14	Total
IT systems	11	14	24	17	20	22	23	24	19	19	107	32%
Furniture, fittings, plant and equipment	6	6	3	8	9	7	7	7	7	7	33	10%
Motor vehicles	23	27	23	22	25	25	23	25	23	22	118	35%
Buildings	6	37	8	26	36	19	19	16	14	9	77	23%
Land	8	5	0	0	0	0	0	0	0	0	1	0%
Other non-system assets	0	0	0	0	0	0	0	0	0	0	0	0%
	55	**90**	**58**	**73**	**90**	**73**	**72**	**72**	**63**	**57**	336	100%

Source: Integral Energy.

The total expenditure proposed in the next period is $336 m, compared with $366 m in the current period, a decrease of 8%. In the next period, expenditure on IT systems is projected to be higher than the current period, whilst expenditure on land and buildings is projected to be lower. Expenditure on vehicles, plant and equipment is projected to be at similar levels to the current period.

Basis of Forecast

Integral Energy has generally used a bottom-up approach to forecast its non-system capex.

Application of Cost Escalation Factors

Integral Energy advised us that no cost escalators have been applied to non-system capex apart from the adjustment to convert them to FY 2009 dollars. [32]

Efficiency of Overall Expenditure

Integral Energy's average non-system capex for the next period has been compared on a cost-per-customer and a cost-per-size basis with the other ACT and NSW DNSPs' forecasts and the regulatory allowances for Energex and Ergon Energy in the 2005 Queensland determination. [33] The comparisons are shown in Figure 8.1. [34]

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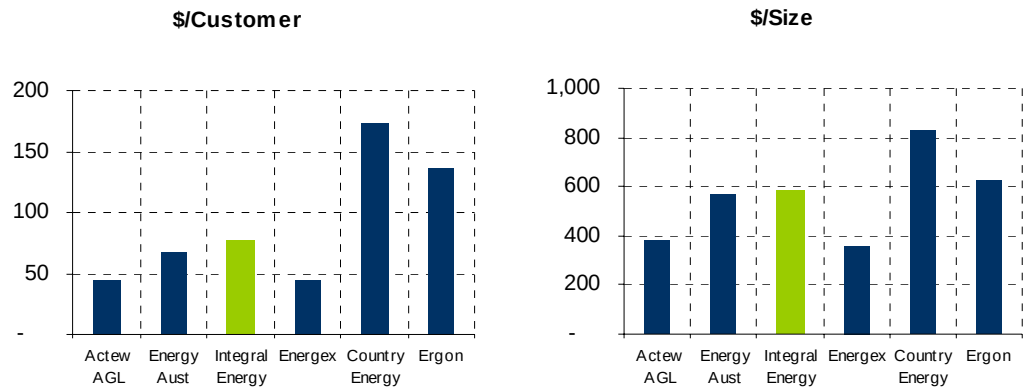
[32] Integral Energy did state that a real escalation rate had been applied to land but no non system-related land purchases are proposed in the next period.

[33] EnergyAustralia's expenditure excludes transmission-related costs.

[34] Size is taken as a composite variable $C^{0.5}L^{0.3}D^{0.2}$ where C equals the number of consumers, L equals the km of line and D equals the maximum demand, representing the networks by their key characteristics. This measure of size was developed by Ofgem but we have substituted demand for energy throughout in the formula on the ground that demand is a stronger driver of expenditure in a distribution lines business than is energy. Further details of the composite size variable are given in section 3 of volume 1 of this report.

Figure 8.1: Comparison of Non-System Capex



We consider that "cost per size" is the best benchmark to use as a comparison because it takes account of the main parameters that drive non-system capex. The comparison shows that Integral Energy's non-system forecast capital cost per size is in the middle of the range of the group analysed.

We consider that the benchmarking confirms from a "top-down" perspective that Integral Energy's overall level of non-system capex is reasonable.

The following sections of the report consider the proposed level of non-system capex from the standpoint of a "bottom-up" review of specific expenditure categories and projects.

8.2 Review by Category

IT Expenditure

Integral Energy informed us that it used a structured approach so that investment in IT systems is aligned with the network business priorities and deliver effective and efficient business outcomes. A two-stage process is used to develop investment as follows:

- A 5-year planning process in which
  - business systems managers identify demand at a programme level and
  - project programmes are aligned with current network strategy and assessment of future direction.
- The annual planning process in which
  - each annual planning cycle breaks programmes into specific projects,
  - projects are prioritised using business strategy criteria,
  - programmes are approved by the relevant general manager and
  - annual and quarterly reviews by the capital governance committee.

Integral Energy is proposing to spend $107 m on IT assets in the next period compared to $86 m in the current period, an increase of 25%. It stated that expenditure has increased in recent years due to increasing business automation to bring about efficiencies and replace ageing applications and infrastructure. Significant forecast IT work programmes include the following:

- *Outage management system development and integration:* This programme is focussed on improving response, extending capability and integrating system capability with related functions such as crew management in addition to keeping the systems up to date.

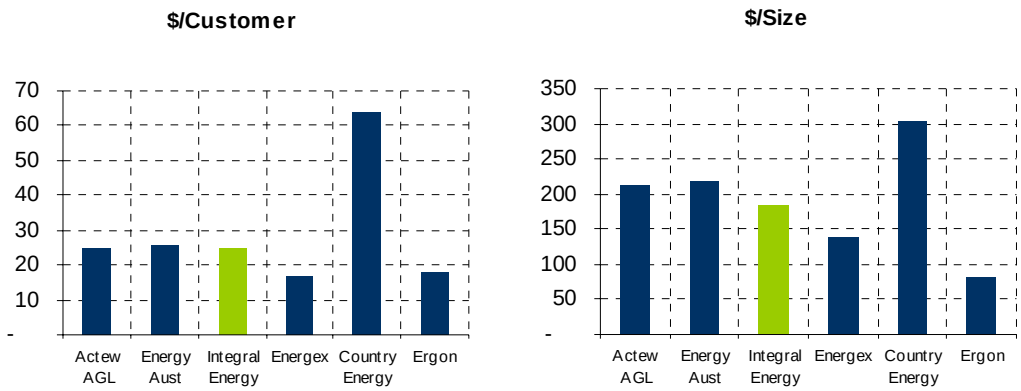
- *Field force automation:* This programme is to enable more efficient utilisation of field resources by providing data in field vehicles.
- *GIS:* As one of the major applications required by the network business, capex has been planned for regular upgrading and the introduction of new functions to handle additional information.
- *Programme management systems:* Up to date project management tools are needed to better manage work programmes and provide the necessary monitoring and reporting functions.

We reviewed the supporting document "*Information and communications technology investment plan 2008/09 – 2013/14 for network determination*" [35] which outlines the investment programme for the next period. Our review of the document showed that projects are identified based on need with the drivers of change, outcomes and initiatives identified for each programme. Projects are prioritised based on the needs and risks of the business. The list of projects is comprised of many small projects. The cost estimates have generally been prepared at a 'budget' level, based on market knowledge, particularly in the case of projects that commence later in the period. Detailed business cases have not been prepared yet for future projects but we reviewed a sample business case in respect of a project completed in the current period and found that the format used for IT business cases appeared to follow a robust process to evaluate and justify the expenditure.

The investment proposed is on systems that are needed in network businesses and it includes the regular replacement of hardware and software. We found nothing unusual or excessive in the proposed programme.

As an additional test, we benchmarked IT expenditure on a cost-per-customer and cost-per-size basis, as shown in Figure 8.2. The figure shows that Integral Energy's proposed IT capex is in line with that of the other distributors in the comparison.

Figure 8.2: Comparison of IT Capex



Integral Energy retained KPMG to assess its IT plan for the next period and to review the planning process, programmes and forecast capex. In its report, KPMG noted "*Integral Energy's programmes compare closely to those reported by its peer group*". We noted that KPMG also said that Integral Energy's IT capex compared favourably with data from KPMG's 2006/07 benchmark survey.

[35] A confidential attachment to the regulatory submission.

Motor Vehicles

Integral Energy is proposing to spend $118 m on motor vehicles in the next period compared to $120 m in the current period, a decrease of 2%.

Integral Energy's forecast fleet expenditure over the next period primarily comprises replacement expenditure for its existing fleet (78% of the projected expenditure) in accordance with Integral Energy's documented vehicle replacement policies. The forecast includes increases in the size of the fleet to support the proposed capital investment and maintenance programmes. Integral Energy has assessed the increases in staff required to deliver the proposed programmes in terms of skills and organisation and then used the information to determine vehicle requirements and fleet growth forecasts.

We consider the approach taken to establishing the forecasts for expenditure on motor vehicles is appropriate and the forecast levels reasonable.

Land and Buildings

Integral Energy is proposing to spend $78 m on land and buildings in the next period compared to $127 m in the current period, a decrease of 39%. Integral Energy's land and buildings programme is driven by growth, renewal and compliance requirements. Increased accommodation is required for the forecast growth in personnel numbers and higher expectations regarding safe work practices necessitate expenditure on both new and existing facilities. Major land and buildings projects include the redevelopment of the Springhill field service centre, modification and expansion of other existing field service centres and the replacement of aged plant and systems at the Huntingwood building. We were provided with a detailed breakdown of the proposed expenditure and were given details of other works that had been considered but deferred. We consider the proposed expenditure reasonable.

Furniture, Fittings, Plant and Equipment

Integral Energy's furniture, fittings, plant and equipment programme is made up primarily of tools and equipment for network construction and maintenance. Integral Energy is proposing to spend $34 m under this expenditure category in the next period compared to $33 m in the current period. We consider the proposed expenditure reasonable, based on the historical trend.

Other Non-System Capex

No expenditure is proposed in this category.

8.3 Recommended Level of Non-System Capex

Having considered the factors reported in this section, we conclude for the purpose of this review that no adjustment of the non-system capex proposed by Integral Energy is needed.

9 Opex

9.1 Expenditure in Current Period

Table 9.1 shows that Integral Energy's opex is projected to be $1,069 m over the current period, representing a total expenditure that is $44 m or 4% below the total allowed by IPART in its determination inclusive of agreed pass-through costs.

Table 9.1: Opex in Current Period *vs*. Determination ($ m nominal)

	Actual			Estimated		Total
YE 30 June	2005	2006	2007	2008	2009	
Determination	208	214	221	229	236	1,108
Pass through events	0	0	2	1	2	5
Opex in current period	157	190	214	243	265	1,069
Over-run / (under-run)	**(51)**	**(24)**	**(9)**	**12**	**27**	**(44)**
Over-run / (under-run) (%)	(25%)	(11%)	(4%)	5%	12%	(4%)

Source: Integral Energy.

Integral Energy stated that to make a like-for-like comparison of actual opex with that in the determination, adjustments are required in FY 2006 and FY 2007 to remove a credit for surplus superannuation funds of $5 m and a write back of provisions of $14.0 m. After making these adjustments, the under-run against the determination reduces to $25 m, or 2%.

The table shows that Integral Energy under-spent against the determination in the first three years (by a considerable margin in the first two years), and is predicting it will over-spend against it in the last two years. The expenditure profile is stated to be primarily due to the tight labour market and the longer-than-expected period required to ramp up its maintenance programme.

The difference between the levels in the determination and the actual or projected levels during the later years of the current period is said to be due to:

- an increase in input costs including labour cost increases above inflation over the current period,
- an increase over the current period in the volume of assets to be maintained and
- increases in activity levels over the period in response to mandatory obligations and new requirements in areas such as safety, environmental management and network performance, as specified in relevant legislation and regulations. Examples include the inspection of private poles and overhead wires for safety and risk mitigation reasons.

9.2 Proposed Expenditure in Next Period

Overview

Integral Energy's proposed opex in the next period compared with that in the current period is shown in Table 9.2. For practical reasons, the breakdown matches the information

provided by Integral Energy, rather than the categories in the RIN templates. [36] We considered that we had no choice but to analyse it that way as the supporting information was provided in a form that could be reconciled only with that breakdown. We were provided with high-level reconciliations that showed the totals matched.

Table 9.2: Current and Forecast Opex ($ m 2009)

	Actual			Estimated		Proposed				
YE 30 June	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Operating and maintenance										
Inspections	14	14	15	13	14	16	16	16	17	17
Maintenance	69	78	82	93	93	102	103	106	108	110
Other operating	31	34	41	42	48	51	50	53	56	58
	113	**126**	**139**	**148**	**156**	**169**	**169**	**176**	**181**	**186**
Corporate support	66	82	91	102	110	112	110	108	110	110
Total core opex	**179**	**208**	**230**	**250**	**265**	**281**	**280**	**284**	**290**	**297**
Debt raising costs	0	0	0	0	0	4	4	4	5	5
Equity raising costs	0	0	0	0	0	0	0	0	4	4
Self-insurance costs	0	0	0	0	0	3	3	3	3	3
Total opex	**179**	**208**	**230**	**250**	**265**	**288**	**287**	**291**	**302**	**309**

Source: Integral Energy.

The total "core" opex proposed in the next period is $1,431 m compared with an estimated $1,132 m in the current period, an increase of 26%. [37] Integral Energy has stated that the reasons for the increased level of expenditure include:

- continued real labour cost escalation;
- a step change in vegetation management contract costs;
- additional apprenticeships, and training for cadets and graduates;
- an increase in the size of the asset base;
- continued aging of the asset base; and
- clearance of a backlog of defects.

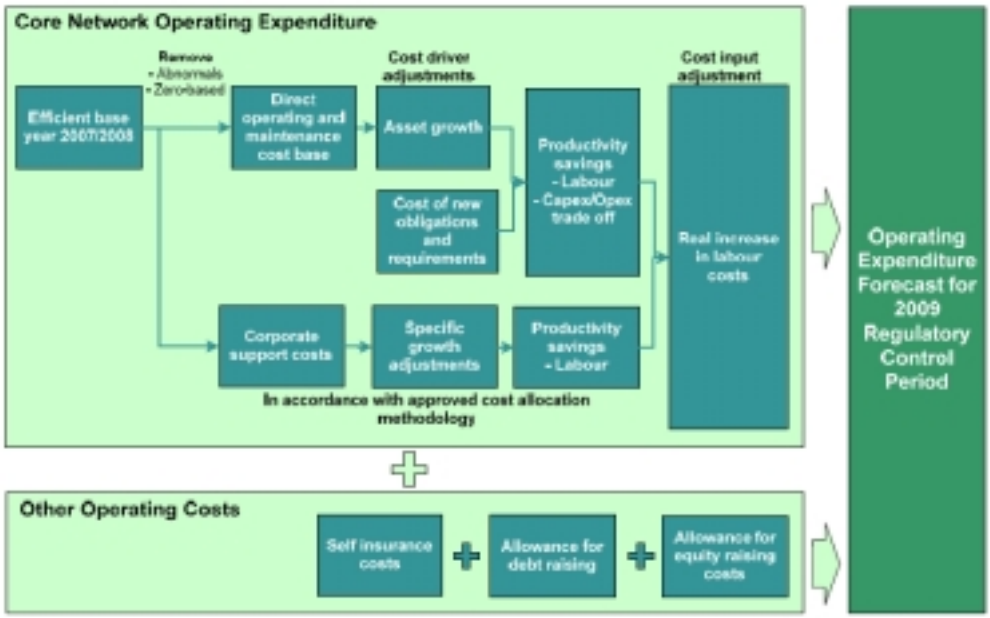
Basis of Forecast

Integral Energy has used a combination of escalation from a base year and "zero based" methods to forecast opex in the next period. The methodology is shown in Figure 9.1.

[36] See, in particular, tables 10.4 and 10.5 of the submission.

[37] In our analysis, we have defined "core" opex as that excluding expenditure related to the raising of debt and equity and to self-insurance.

Figure 9.1: Opex Forecast Methodology



Integral Energy stated that its core network opex forecasts have been derived by:

- establishing the costs for an efficient base year (2007/08);
- removing abnormal costs (and any other costs that are estimated using a zero-based approach) to establish direct opex cost base;
- adjusting direct opex for cost drivers (including growth in the asset population and the cost of new obligations);
- adjusting corporate support costs for one-off costs and for the impact of cost drivers;
- applying productivity savings;
- considering the interaction between opex and capex; and
- incorporating forecast real labour input cost increases over the next period.

The forecast costs of self-insurance and debt- and equity-raising were then added to give total opex.

Impact of External Factors

Integral Energy has proposed a step increase of approximately $5 m p.a. to meet the costs of new obligations in the next period. These include:

- a programme, in conjunction with Sydney Water, to check the integrity of neutral connections in older homes ($1 m p.a.),
- more pro-active assessment of neutral deterioration ($0.7 m p.a.),
- additional vegetation management ($2.2 m p.a.) and
- generator hire to meet the licence conditions where economic, e.g. in remote areas or places where load is seasonal ($1.1 m p.a.).

These programmes are explained in section 9.4 below.

Application of Cost Escalation Factors

In respect of opex forecasts for the next period, Integral Energy has escalated labour expenditure in accordance with the escalation factors in CEG's report compiled for all three NSW DNSPs and described in section 5.5. Integral Energy has not applied real cost escalators to non-labour costs. The same escalator, for electricity and gas workers, has been applied to all labour costs including overhead labour.

Integral Energy has also increased direct opex in proportion to recent historical increases in the asset population. The annual rate of increase has been determined at the asset category level using known costs in each category. This escalation has been applied only to direct opex and not to corporate support costs.

We noted that PB had reviewed the calculation and concluded that the approach might be conservative on the ground that growth capex in the next period is projected to be a higher proportion of total capex than historically. However, we do not agree that the approach suggested by PB would be better than the asset category approach adopted by Integral Energy as a great deal of the growth capex relates to zone substation capacity, an asset category that has a different maintenance cost profile to that of the network as a whole.

We have compared the effects of this escalation to other methods that could have been used to account for the increasing size of the network and consider that the approach taken by Integral Energy is the most appropriate.

Other Proposed Step Changes

Integral Energy has made allowance for various other step changes in expenditure. These are discussed in section 9.4.

Capex-Opex "Trade-Off"

Integral Energy has stated that the interaction between capex and opex is implicit in its normal approach to asset management, including in its design and maintenance standards, evaluation of tenders, decisions on maintenance *vs.* replacement and consideration of demand management alternatives.

In addition, Integral Energy has assessed the maintenance savings that will be achieved because of its forecast capital replacement programme. The resulting adjustment assumes that the replacement of aged assets will lead to a reduction of approximately 30% in maintenance expenditure. Integral Energy has calculated a resulting saving of $11 m over the next period and has deducted it from the projected opex. [38]

However, this reasoning is suspect, as maintenance reductions in respect of replaced assets will not extend to the network as a whole unless the replacement programme affects the majority of the asset base. It does not, in Integral Energy's case.

Whilst, intuitively, an increase in maintenance or replacement expenditure is expected as the average age of a network increases, the relationship between capex and opex is a dynamic not a static one and cannot be quantified easily at a network level. [39]

Although Integral Energy is proposing an increase in replacement capex, the average age of the network is still forecast to increase over the next period. [40] Therefore, we doubt that the savings foreseen will be realised to the extent calculated by Integral Energy, if at all.

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[38] We noted that this approach had been reviewed and supported by PB in respect of Integral Energy and apparently also in its proposed adjustment to SP AusNet's recent regulatory proposal: see *"SP AusNet revenue reset, an independent review"*, Parsons Brinckerhoff, 16 August 2007, p. 199.

[39] The other three DNSPs have suggested, based on expert opinion, that the relationship is exponential. However, as we discuss in the other volumes of this report, we are not convinced that this is the case.

Productivity Savings

Integral Energy has assumed the following productivity savings in its projections:

- a 2% compounding reduction in labour cost p.a. in all business units, including corporate support,
- the assumption that increases in cost above inflation in the non-labour components of opex will be offset by productivity improvements and
- the expectation that savings will arise from the continued rollout of its condition-based maintenance programmes.

These measures, which we consider aggressive, are projected to deliver cost reductions of $65 m over the next period. These savings substantially cancel out the increases from real labour cost escalation over the next period.

9.3 Efficiency of Overall Expenditure ("Top-Down" Analysis)

Comparison with Other DNSPs

Before proceeding to a review of the proposed opex by category, we first considered the efficiency of the proposed base-year opex, using a "top-down" approach and the benchmarking methodology described in volume 1 of this report. Although Integral Energy has chosen FY 2008 as its base year, we used FY 2007 for the comparison, as it was the latest year of actual data available to us and the base year used by the other three DNSPs. We have then separately considered the escalation of Integral Energy's expenditure from FY 2007 to FY 2008. Our objective was to help determine whether Integral Energy's opex in FY 2008 represented an efficient starting-point for the projection of opex in the following years.

Adjustments were made to the FY 2007 reported figures of all companies to remove abnormal and one-off items. The adjustments made for Integral Energy related to a one-off superannuation fund payment and a change in provisions. [41]

The conclusion from the analysis, which is presented in detail in volume 1 of this report, was that Integral Energy's FY 2007 opex is at or a little above the industry norm, established by a variety of comparisons. However, given the limitations of benchmarking, expressed in volume 1, we looked only for anomalous positions that might suggest higher-than-expected costs and thus implicitly inefficient expenditure levels and we are thus not able to say that Integral Energy's levels of opex are sufficiently at variance from the industry norm to conclude that they are inefficient, although the analysis tends to suggest that there may be potential for efficiency improvements within the business. A more detailed assessment of the businesses, beyond the scope of this review, would be required to quantify the degree of any efficiency gains possible.

(We noted that Integral Energy has itself recognised the opportunity for efficiency gains and has incorporated a compounding 2% p.a. productivity improvement into its forecasts for the next period.)

Noting again that Integral Energy has used FY 2008 as its base year, we saw that forecast expenditure in FY 2008 is 2.5% above the normalised FY 2007 level. The difference can be accounted for by real cost escalation in input costs and asset population growth and thus we considered that the conclusions drawn from our analysis were equally applicable to the FY 2008 year adopted by Integral Energy.

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[40] See Integral Energy's strategic network maintenance plan.

[41] See section 9.1.

We also noted that, after adjustment, Integral Energy's FY 2007 expenditure is close to its regulatory allowance (1% over) and that its forecast for FY 2008 is 5% above its regulatory allowance.

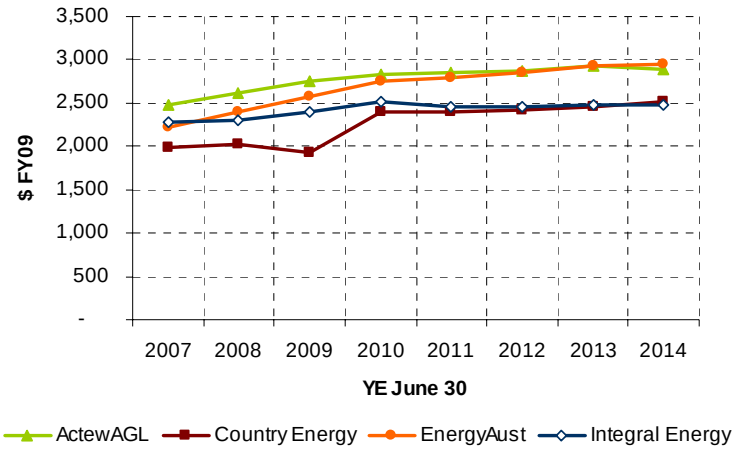
Summary of "Top-Down" Analysis

Our conclusion is that the FY 2008 base-year opex used by Integral Energy can be considered reasonable.

Movement in Opex from FY 2007

In order to look at the reasonableness of the forecast levels of total opex in the next period from a "top-down" perspective, we then analysed the movements in opex that took place or are forecast by the ACT and NSW DNSPs to occur from FY 2007 to FY 2014. The results are presented in Figure 9.2 based on opex by size (which accounts for increases in the size of the businesses over the period). [42] The analysis is based on the reported expenditure and expenditure proposals of the DNSPs. [43]

Figure 9.2: Comparison of "Opex by Size" for Period FY 2007 to FY 2014



On the measure of opex by size, Integral Energy's expenditure in FY 2010 (the first year of the next period) is 10% above that in FY 2007 and remains almost constant after that. The rate of increase from FY 2007 to FY 2010 is less than that forecast by the other DNSPs.

If the effects of real labour cost escalation are removed as shown in Figure 9.3, Integral Energy's FY 2010 "opex per size" is 2% above the FY 2007 level and the average over the next period is 3% lower than the FY 2007 level. By FY 2014, Integral Energy's "opex per size" after removal of real labour cost escalation is forecast to be 7% below its FY 2007 level.

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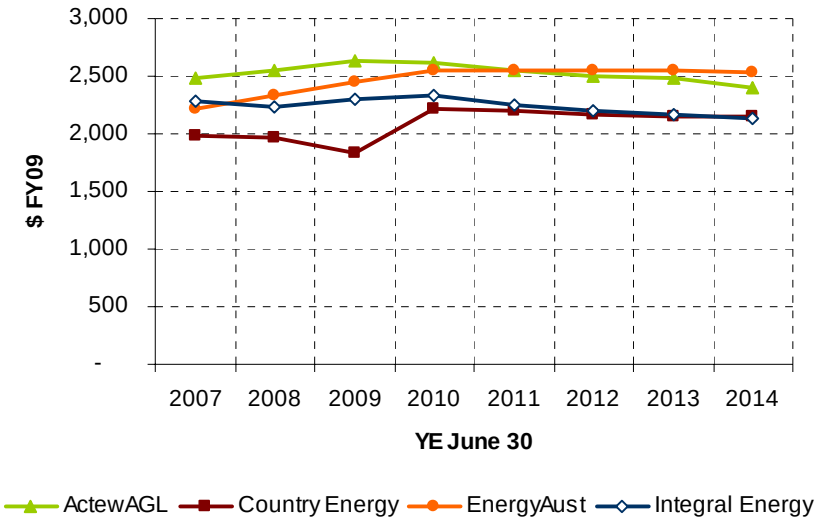
[42] It is appropriate to recognise that business costs will increase as the size of the business increases. We have used the composite size variable derived in volume 1as the measure used to account for size. Forecast customer numbers and maximum demands from the businesses regulatory information templates have been used over the period. No forecast of line km was available, so we have escalated this at the same growth rate as customer numbers.

[43] As in the case of the preceding analysis, abnormal and one-off expenditure was removed from the base year and the cost of debt- and equity-raising and of self-insurance was excluded.

Figure 9.3: "Opex per Size" 2007- 2014 – without Real Labour Cost Escalation



This analysis shows that, over the next period, Integral Energy's relative cost efficiency is forecast to improve significantly against the other businesses in the comparison.

Summary of "Top-Down" Analysis

The conclusion from the "top-down" analysis is that Integral Energy's opex over the next period can be considered reasonable. [44]

9.4 Review by Category ("Bottom-Up" Analysis)

Operating and Maintenance Expenditure

Integral Energy's key operating and maintenance programmes are set out in its network asset management policy and strategic network asset management plan [45] and in supporting documentation such as the strategic network maintenance plan (SNMP). [46] The SNMP analyses maintenance requirements against business objectives and details the maintenance strategies that have been adopted for particular assets to meet the performance requirements. Implementation of the SNMP is achieved through the development of operationally based regional network maintenance plans.

We reviewed the asset management plans and found the strategies and processes to be typical, generally, of those that a prudent distribution operator would adopt. We noted that Integral follows a risk-and-condition-based approach to asset management in some asset categories and is extending it to others in the next period. We noted also that Integral Energy is proposing to set up an asset maintenance group within the network group and we believe that will be a positive step that will improve information flows and maintenance planning.

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[44] We also noted that Integral Energy had retained PB to conduct a review of its historical and proposed opex And that PB "has not identified anything which would suggest that Integral Energy's 2004 regulatory period actual opex costs and 2007/08 opex projection does not: represent efficient and reasonable costs for the services provided in accordance with Integral Energy's current operation practices and asset management plans; or form an appropriate base for developing operating expenditure forecasts ". See appendix K of the proposal.

[45] Appendix J1 of the submission: *"Strategic asset management plan 2008-18"*.

[46] Appendix J7 of the submission: *"Strategic network maintenance plan 2008-11"*.

Overall, we found the approach to maintenance activities reasonable but with some scope for improvement in planning and implementation. The improvement strategies proposed should address these improvement opportunities.

We also noted that PB had carried out a high-level review of Integral Energy's distribution and sub-transmission maintenance practices, policies and asset maintenance plans and had formed the view that they are reasonable.

Inspections

Table 9.3 shows the actual and estimated expenditure on inspections for the current and next periods.

Table 9.3: Current and Forecast Expenditure on Inspections ($ m 2009)

	Actual			Estimated		Proposed				
YE 30 June	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Subtransmission and zone substations	1	1	1	1	1	1	1	1	1	1
Distribution substations	1	1	1	0	0	0	0	1	1	1
Overhead and groundline	6	7	8	9	9	9	9	9	9	9
Installation inspections	5	5	5	3	4	6	6	6	7	7
	14	**14**	**15**	**13**	**14**	**16**	**16**	**16**	**17**	**17**

Source: Integral Energy.

The proposed expenditure in the next period is $83 m compared with $70 m in the current period, an increase of 18%. Average annual expenditure over the next period is $17 m, 24% above the base-year level. Base-year expenditure has been escalated by asset population growth and real labour escalation and allowance has been made for productivity improvement. In addition, extra expenditure has been proposed from FY 2010 onwards for two additional programmes to inspect the earths in older houses.

One additional programme, which is being carried out in conjunction with Sydney Water, is to check the neutral connection integrity of older houses where historically the water piping was used for earthing of the electrical system, leading to a hazardous situation when the pipes are replaced with plastic materials. The programme is partly funded by Sydney Water. An allowance has also been made for a more pro-active assessment of neutral deterioration in other parts of the network to avoid the potential for hazardous situations developing. The total cost of these two programmes is $1.7 m p.a. for the duration of the next period. We consider that these programmes are prudent.

The programme with the greatest expenditure is that for inspection of overhead and ground lines. A significant proportion of the work is carried out by external contractors. We reviewed the cycle period used and found it to be consistent with industry norms.

We consider the proposed expenditure for inspections is consistent with historical levels after allowing for increases in the asset population and that the additional programmes, cost escalation and productivity improvement allowances were reasonable.

Maintenance

Table 9.4 shows actual and estimated maintenance expenditure for the current and next periods.

Table 9.4: Current and Forecast Maintenance Expenditure ($ m 2009)

	Actual			Estimated		Proposed				
YE 30 June	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Subtransmission and zone substations	8	6	6	5	10	10	10	10	10	11
Subtransmission mains	1	1	1	1	1	1	1	1	1	1
Distribution substations	2	2	2	2	2	2	2	2	2	2
Distribution mains	3	2	2	5	3	3	3	3	3	3
Network buildings	0	3	5	9	7	7	7	7	7	8
Defect management	14	12	13	20	17	20	20	22	22	22
Fault and emergency response	17	17	20	18	21	22	22	22	22	22
Vegetation management	25	35	32	33	34	38	39	39	40	42
	69	**78**	**82**	**93**	**93**	**102**	**103**	**106**	**108**	**110**

Source: Integral Energy.

Expenditure in the next period is projected to be $530 m compared with $416 m in the current period, an increase of 28%. Average annual expenditure over the next period is $106 m, 14% above the base-year level. Base-year expenditure has been escalated by asset population growth and real labour escalation and allowance has been made for productivity improvement. In addition, Integral Energy has advised us that extra expenditure has been allowed under this category for:

- an increased effort to address the backlog in sub-transmission and zone substation maintenance;
- a compounding 3.06% increase in defect management work to reduce a backlog; and
- an increase in vegetation management to meet the NSW industry safety steering committee requirements. [47]

Offsetting these additions, Integral Energy has allowed for reductions of $6 m over the later years of the period arising from improved maintenance strategy and reductions of $11 m from savings arising from the proposed capital replacement programme.

We were concerned with the proposed increase in expenditure on defect management, noting that it was to clear a backlog but noting also that there have been substantial increases in expenditure on defect management since FY 2007 and that a step change is also proposed in sub-transmission and zone substation maintenance expenditure that is also to clear a backlog.

We consider that these other increases should be sufficient to clear the backlog and that the further compounding increase should not be required. An adjustment is therefore proposed to remove the compounding growth rate. Details are given in section 9.5.

Apart from this adjustment, we consider the proposed maintenance expenditure reasonable. [48]

Other Operating Activities

Table 9.5 shows actual and estimated expenditure on other operating activities for the current and next period.

[47] The committee has proposed various requirements. Integral Energy is applying a "risk- managed" approach in response but says that additional vegetation management costs will be incurred to meet the requirements.

[48] We noted minor anomalies between the stated methodology and the expenditure proposed in several sub-categories but they were not material and may have resulted from changed expenditure allocation between sub-categories.

Table 9.5: Current and Forecast Expenditure on Other Operating Activities ($ m 2009)

	Actual			Estimated		Proposed				
YE 30 June	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
System switching	15	17	18	14	16	17	17	17	17	18
Metering	9	10	14	17	18	19	14	21	22	23
Third party recoveries	2	2	2	2	2	2	2	2	2	2
Quality of supply investigations	1	1	1	1	1	1	1	1	1	1
Other costs	3	4	6	8	11	11	16	12	13	13
	31	**34**	**41**	**42**	**48**	**51**	**50**	**53**	**56**	**58**

Source: Integral Energy.

Expenditure in the next period is $268 m compared with $195 m in the current period, an increase of 37%. Average annual expenditure over the next period is $51 m, 29% above the base-year level. Base-year expenditure has been escalated by asset population growth and real labour escalation and allowance has been made for productivity improvement. In addition, extra expenditure has been allowed from FY 2010 for various small additional activities and for additional resources in the metering sub-category for "customer churn".

We were concerned, however, that these additions do not adequately explain the 46% increase in expenditure under this sub-category from the base year to FY 2010. We have calculated an appropriate level by applying the average escalation over the next period (3.5%) to the base year to derive a new level and propose that an adjustment be made in this sub-category for the difference. We note that there appears to be an expenditure shift of approximately $4 m between "metering" and "other" in FY 2011 and we have accounted for it in making the adjustment. Details are given in section 9.5.

Apart from the adjustment to the "other" sub-category, we consider the expenditure under this overall heading reasonable.

Corporate Support Expenditure

Table 9.6 shows actual and estimated corporate support expenditure for the current and next period.

Table 9.6: Current and Forecast Corporate Support Expenditure ($ m 2009)

	Actual			Estimated		Proposed				
YE 30 June	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Board	1	6	7	7	2	3	1	2	2	1
Company secretary	0	3	4	4	4	4	4	4	4	4
Finance	15	30	32	29	34	31	31	31	31	31
Human resources	7	7	8	22	27	29	29	27	27	28
Regulatory & corporate affairs	37	31	33	33	35	37	38	36	37	38
Retail & customer services	6	6	7	7	8	8	8	8	8	7
	66	**82**	**91**	**102**	**110**	**112**	**110**	**108**	**110**	**110**

Source: Integral Energy.

Expenditure in the next period is $550 m compared with $451 m in the current period, an increase of 22%. The average annual expenditure over the next period is $110 m, 8% above the base-year level. Base-year expenditure has not been escalated by asset population growth but labour escalation and productivity improvements have been applied. In addition, extra expenditure has been allowed for:

- increased accounting resources for financial governance of increased programmes;
- additional maintenance costs, leases, rates and taxes on the property portfolio;

- costs associated with additional apprenticeships and training programmes for cadets and graduates;
- additional IT costs due to higher activity and staff levels including contract renewal and offsetting cost reductions; and
- environmental improvement costs.

Integral Energy stated that its corporate support costs have been allocated to the network business in accordance with the approved cost allocation method.

The increases in corporate support costs from the base year are relatively modest, with the major change being the increase in training costs. This increase is common to all DNSPs and to the industry in Australasia at large.

We noted that Integral Energy has used the electricity and gas workers' labour escalation rate for corporate support labour cost escalation, rather than a general labour rate. We queried this and were informed that this rate had been used as over 90% of staff are covered by a single enterprise bargaining agreement and the same wage escalation rate is essentially applied on average to other staff. We considered that the general labour rate might be more appropriate for use in this category other than in respect of apprenticeships and technical staff training but accepted Integral Energy's reasoning.

Overall, we consider the corporate support expenditure to be reasonable.

9.5 Recommended Level of Opex

In summary, Integral Energy's proposed opex has been reviewed in this section from a "top-down" and "bottom-up" standpoint.

"Top-Down" Analysis

The "top-down" analysis suggests that Integral Energy's base-year level of expenditure cannot be considered inefficient but there may be potential for cost reductions in the business. This has been recognised independently by Integral Energy, which has included productivity improvements of 2% p.a., compounding over the next period.

The increase in expenditure from the base year to the start of the next period (after adjustment for the increase in size of the business) is 10%, of which approximately 7% is accounted for by real labour cost escalation. Size-adjusted opex then remains more-or-less constant over the next period, despite the real labour cost escalation included in the forecasts. With the effects of real labour cost escalation removed, "opex per size" drops by 7% over the next period.

"Bottom-Up" Analysis

Our conclusion from the "bottom-up" analysis is that two adjustments could be applied to the proposed expenditure, amounting to 2% of the total proposed in the next period. The adjustments are shown in Table 9.7 with reference to Integral Energy's "core" opex. [49]

[49] See footnote 37 for the definition of "core" opex.

Table 9.7: Proposed and Recommend Level of Opex ($ m 2009)

YE 30 June	2010	2011	2012	2013	2014	Total
Core opex proposed by DNSP	281	280	284	290	297	1,431
Proposed Adjustments:						
Defect management	(1)	(1)	(2)	(2)	(3)	(9)
Other costs	(3)	(3)	(3)	(3)	(4)	(16)
	(4)	**(4)**	**(5)**	**(6)**	**(7)**	(25)
Pct of proposed capex	(1%)	(1%)	(2%)	(2%)	(2%)	(2%)
Adjusted level of opex	278	275	279	284	290	1,406
Recommended core opex	**281**	**280**	**284**	**290**	**297**	**1,431**

Conclusion

Having considered both analyses, we conclude that the level of opex proposed by Integral Energy should be accepted without adjustment on the grounds that the identified adjustments are minor, the business has included aggressive productivity improvement assumptions of 2% p.a. in its forecasts and its reductions in maintenance expenditure from replacement capex may have been over-estimated. The level of expenditure recommended for the next period is thus as shown in the bottom line of the table above.

10 Other Matters

10.1 Public Lighting Expenditure

We understand that the only alternative control service provided by Integral Energy is public lighting. Integral Energy's proposed capex and opex for this service in the next period compared with that in the current period is shown in Table 10.1.

Table 10.1: Public Lighting Expenditure ($ m 2009)

	Estimated		Proposed				
YE 30 June	2008	2009	2010	2011	2012	2013	2014
Capex	4	5	5	5	5	5	6
Opex	5	6	10	10	10	9	10

Source: Integral Energy.

We noted that Integral Energy's public lighting expenditure for FY 2007 was reviewed by us for IPART in October 2007 and again in January 2008 after Integral Energy tabled a revised proposal. [50] The level of efficient capex recommended by us to IPART for FYs 2008 and 2009 was $5.0 m and $5.1 m respectively, excluding any costs in relation to assets that have been gifted or funded by other parties. The level of efficient opex recommended by us to IPART for FYs 2008 and 2009 was $11.8 m and $12.0 m respectively, excluding customer-funded and 'Night Watch' opex, transmission and distribution use-of-system charges, the cost of electrical energy, financing charges and depreciation. [51]

The table shows that Integral Energy's proposed capex and opex is in line with our earlier detailed assessment of public lighting expenditure requirements (assuming it has been presented on a comparable basis) and therefore we did not examine it further.

10.2 Scope of Self-Insurance

It is common for electricity network businesses to carry their own insurance in certain respects, particularly where the risk of widespread loss is considered minimal, the premium for insurance is high or the deductibles or conditions attached to insurance cover make it worthless. We note from its proposal that Integral Energy has resolved to self-insure against the following risks:

(a) fraud,
(b) earthquake,
(c) insurer's credit risk,
(d) counterparty credit risk,
(e) bushfire risk,
(f) key person risk,
(g) risk of non-terrorist impact of planes and helicopters, and

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[50] See *"Review of Integral Energy's public lighting capital and operating expenditure (final report)"*, Wilson Cook & Co, October 2007 and *"Review of operating expenditure in Integral Energy's revised public lighting price proposal (final)"*, Wilson Cook & Co letter to IPART dated 28 February 2008.

[51] We note for the record that IPART did not allow the recommended levels of opex to be charged in full in these two years because an overhead component of them was already being recovered under its determination for the period ending on 30 June 2009. Details are given in our reports and in Integral Energy's proposal.

(h) workers' compensation.

It is the prerogative of owners to determine their own risk appetite and we have no comment to make in respect of the proposed self-insurance categories, as they are outside our area of expertise. [52]

We did not review the financial provisions associated with self-insurance but noted Integral Energy's advice in its proposal that some of the costs of managing the following risks are included or implicit in its base-year (FY 2007) opex: theft of assets, general public liability risk, fault and emergency work associated with network assets and exposure related to power quality complaints. We consider those costs normal business costs in the electricity distribution industry.

10.3 Opex Deemed Uncontrollable in Benefit-Sharing Scheme

We understand that the AER has developed an efficiency benefit-sharing scheme to apply to the ACT and NSW DNSPs and that the purpose of the scheme is to allow incremental opex efficiency gains or losses made during the next period to be carried over for five years after the year in which they were made, providing an incentive for DNSPs to improve the efficiency of their opex. [53] Four cost categories are excluded from the scheme: changes in capitalisation policy, differences between forecast and actual demand growth over the period, recognised pass-through events and non-network alternatives.

The AER has allowed the DNSPs to propose additional cost categories for exclusion from the scheme and we understand that Integral Energy has proposed the following:

(a) additional cost pass-through events (as detailed in section 10.4) and
(b) transmission use-of-system (TUOS) charges.

We considered the proposals solely from the standpoint of whether the costs are uncontrollable. We considered that they should meet a high threshold in that sense, as the pressure on DNSPs to minimise costs efficiently in any reasonable changing circumstance ought not to be diluted.

On that basis, we consider that TUOS costs and any approved cost pass-through events would qualify for exclusion as the costs are clearly outside the control of the DNSP (although we would not expect to find them in the expenditure reviewed anyway).

Expenditure to Address Backlogs

For the AER's guidance, we also suggest that care is taken when defining the scheme to exclude expenditure relating to backlogs of work from the base year as any such expenditure should not form part of the opening balance in the calculation of future benefits.

10.4 Additional Cost Pass-Through Events

Four general types of cost pass-through event are provided for in the Rules: regulatory change, service standard events, tax changes and instances of terrorism. [54] However, a DNSP may nominate additional cost pass-through events to apply in the next period and Integral Energy has proposed the following twelve: asbestos events, an automated interval meters event (essentially, a mandatory requirement to introduce automated interval meters), a business continuity event, a change in ownership event, a change in reporting requirements, a

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[52] Wilson Cook & Co does not advise clients on insurance matters.

[53] The scheme does not apply to capex or distribution losses.

[54] We understand that the Rules provide for an insurance pass-through event in the case of transmission determinations.

distribution loss change event, an electric and magnetic fields event, an emissions trading scheme event, a functional change event, a gradual pollution event, a retailer of last resort event and sabotage events.

As a general principle, we suggest that additional pass-through proposals are not to be recommended unless they are of a type that a prudent DNSP would not normally provide for in its expenditure estimates. We suggest that such proposals should meet a high threshold in that respect. In essence, we suggest that the potential events ought to be exceptional in nature. Normal or foreseeable business risks, including risks that an owner of the business ought to bear, should be excluded.

In that context, and dealing with the only proposal that appears to fall within our field – interval metering – we make the following observations.

We understand that Integral Energy defines an interval meter event as an event which results in Integral Energy being required to install automated interval meters (otherwise known as smart meters) for some or all of its customers or to conduct large scale metering trials during the course of the regulatory control period, regardless of whether that requirement takes the form of the imposition of a statutory obligation or not, and which: (a) falls within no other category of pass-through event; and (b) materially increases the costs of Integral Energy providing the direct control services. Integral Energy says that the definition is intended to cover a situation where Integral Energy is required to undertake work and incurs costs associated with a full or partial smart meter rollout or with undertaking trials related to a smart meter rollout.

The definition appears reasonable but lacks a materiality threshold. This would need to be corrected, as the cost of a pilot programme has been included in the capex proposals that we have reviewed.

However, with some exceptions, the case for compulsory installation of these meters has not yet been made in Australia or elsewhere. It would be regrettable, therefore, if acceptance of this item as a pass-through removed the incentive for DNSPs to argue against it, if they do not consider the expenditure beneficial. Of course, there would be no choice if it were legislated – but there may be provision for pass-through under that heading already.

We suggest that the matter is one for resolution by discussion between the AER and Integral Energy.

Other Possible Pass-Through Events

Finally, we were asked to say whether any other expenditure categories or items in the main capex projections would be more appropriately treated as pass-through events but no such cases were evident to us.

11 Conclusion and Recommendations

11.1 Opinion

Having considered the information received from Integral Energy and the factors required to be considered as summarised in this report, and based on that information, the representations made to us by Integral Energy and our own experience, our opinion in respect of Integral Energy's expenditure proposals is as stated below.

(a) Integral Energy's proposed capex from 1 July 2009 to 30 June 2014 including in respect of public lighting is considered to be prudent and efficient, subject to the adjustment proposed in section 7.3 (system capex) – see also sections 8.3 (non-system capex) and 10.1 (public lighting expenditure) of this volume.

(b) Integral Energy's proposed opex from 1 July 2009 to 30 June 2014 including in respect of public lighting is considered to be prudent and efficient – see section 9.5 (opex) and section 10.1 (public lighting expenditure).

(c) We have no reason to suppose that Integral Energy will be unable to carry out its proposed programmes through a lack of resources – see section 7.2.

11.2 Matters for the AER's Consideration

We have no other matters for the AER's consideration in concluding this volume of the report on Integral Energy.

11.3 Conditions Accompanying Our Opinion

Assessment Not an Assessment of Condition, Safety or Risk

Notwithstanding any other statements in this report, this review is not intended to be and does not purport to be an assessment of the condition, safety or risk of or associated with the assets and nothing in this report shall be taken to convey any such undertaking on our part to any party whatsoever.

All Earlier Advice Superseded

For the avoidance of doubt, we confirm that this report supersedes all previous advice from us on this matter, whether written or oral, and constitutes our sole statement on the matter.

Disclosure

Wilson Cook & Co Limited has prepared this report in accordance with the instructions of its client on the basis that all data and information that may affect its conclusions have been made available to it. No responsibility is accepted if full disclosure has not been made. No responsibility is accepted for any consequential error or defect in our conclusions resulting from any error, omission or inaccuracy in the data or information supplied directly or indirectly.

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With the exception of its publication by the AER, in relation to its review of Integral Energy's expenditure proposals, neither the whole nor any part of this report may be included in any published document, circular or statement or published in any way without our prior written approval of the form and context in which it may appear.