

# **Concerns Regarding 14 September 2015 EMCa Review of Proposed Capital Expenditure in Ergon Energy's Revised Regulatory Proposal**



23 October 2015



## Purpose of Report

On Thursday 15 October 2015 the AER requested Ergon Energy (AER Ergon 106) review the 14 September 2015 EMCa report “*Review of Proposed Capital Expenditure in Ergon Energy’s Revised Regulatory Proposal - Report to Australian Energy Regulator from Energy Market Consulting associates*” (hereafter the EMCa report) and respond only with the identification of any confidential information.

Ergon Energy responded to this request on Monday 19 October 2015.

However, during the review of the content of this report Ergon Energy identified a number of new and material issues and inaccuracies in EMCa’s latest review which, if accepted on face value by the AER, may lead to adverse consequences for Ergon Energy’s Final (revenue allowance) Determination, due by the end of October 2015.

Ergon Energy was extremely concerned by the number of errors contained in the EMCa report and remains unclear why the AER chose not to request or seek Ergon’s feedback on the EMCa report given it contained new analysis of Ergon’s system capex forecasts, including analysis which has incorrectly rejected a new safety and compliance driven programme to address low clearance conductors. Ergon also notes that in relation to a recent review by EMCa of ‘Other system enabling capex’ received shortly before the September 2015 EMCa report that substantive feedback was sought from Ergon on this particular report.

Ergon Energy notes that it is raising these concerns about the EMCa report with the AER in close proximity to the release of the final determination by the AER. Ergon also notes that the EMCa report is dated 14 September 2015 and was not provided to Ergon until 15 October 2015. Had the AER chosen to make the report available much earlier than it did, Ergon Energy would not now find itself in the position of having to deal with this matter on extremely short notice.

In the absence of being given adequate opportunity to engage with the AER and EMCa on this latest report, Ergon Energy therefore wishes to provide responses to a number of specific statements or findings made in the EMCa report that Ergon Energy finds to be of material concern and/or flawed. Responses are provided with reference to the EMCa report section and paragraph descriptors; however an effort to reduce duplication has been made where Ergon Energy has previously provided explanation to the AER or EMCa.

As with previous responses on the analysis undertaken by EMCa, Ergon Energy remains open to discussing the matters raised in this response with the AER and/or EMCa as and when convenient to the AER.

# Ergon Energy Response to Findings of the EMCa Report

## 1. Response to findings of Section 3 - *Revised proposed Augex*

### Summary of Ergon's RRP

51. Table 3 shows the comparison between Ergon's RP and RRP for each of the five sub-categories of distribution network augex. We understand that the figures in the RP are partially escalated and the figures in the RRP are fully escalated and therefore cannot be directly compared. As we have not been provided with values that can be directly compared, we have applied our own CPI adjustments to approximately reconcile the supplied total forecasts provided in the RP in 2014-15 dollars. (15, 16)

*Table 3: Comparison of partially escalated and fully escalated sub-categories of Distribution augex<sup>17</sup>*

\$m	Ergon's RP \$real 2012-13	EMCa converted \$real 2014-15	Ergon's RP \$real 2014-15	Ergon's RRP \$real 2014-15
Work in Progress	42	44		45
Photovoltaic	41	43		44
Distribution transformer	8	9		9
Unspecified DNAP	80	85		88
Specified DNAP	136	143		132
<b>Total</b>	<b>306</b>	<b>324</b>	<b>342</b>	<b>318</b>

*Source: EMCa analysis - totals may not align due to rounding errors*

Ergon Energy wishes to clarify the position for EMCa to enable a comparison to be made. EMCa's approximate reconciliation total equals \$324 million and is not correct; the original RP provides a total of \$342 million.

Below are the correct forecasts.

	Ergon's RP \$real 2012-13	Ergon's RP \$real 2014-15	Ergon's RRP \$real 2012-13	Ergon's RRP \$real 2014-15
<b>Work in Progress</b>	<b>42</b>	<b>46</b>	<b>42</b>	<b>45</b>
<b>Photovoltaic</b>	<b>41</b>	<b>45</b>	<b>41</b>	<b>44</b>
<b>Distribution transformer</b>	<b>8</b>	<b>9</b>	<b>8</b>	<b>9</b>
<b>Unspecified DNAP</b>	<b>80</b>	<b>90</b>	<b>80</b>	<b>88</b>
<b>Specified DNAP</b>	<b>136</b>	<b>152</b>	<b>122</b>	<b>132</b>
<b>Total</b>	<b>306</b>	<b>342</b>	<b>293</b>	<b>319</b>

## Remediation of power quality issues due to photovoltaics (PV)

### Ergon's Risk Assessment

65. Moreover, we consider Ergon's own actions (in progressively addressing the issue rather than undertaking comprehensive immediate action) to clearly indicate that it does not consider the risk to be 'Extreme'. Similarly, if the physical network risk was 'Extreme', then we would expect to see action by the technical regulator, such as to issue warning notices if immediate action was not taken. Ergon has not indicated that it has received any such notices.

Under the Queensland Electricity Regulations, there is no concession made for the amount of time that can be spent outside of the nominal voltage range (i.e. 240V +/-6%) with an overarching consequence of non-compliance with the Regulation may be loss of distribution authority. It is important to note that Queensland does not use the Australia 230V standard as the other states do, which allows the network to operate outside of the nominal voltage band (i.e. 230V +10% / -6%) for 1% of the time.

66. We note that Energex (in its RRP) rates the risk of voltage non-compliance (exacerbated by the growth in PV installations) as a 'Medium' risk.<sup>25</sup> Based on the information provided by Ergon, we consider that the impact of PV's on its network does not present a significantly greater risk as compared to Energex's situation.

In contrast to Ergon Energy, voltage regulation is not as dominant a factor in the performance of Energex's distribution networks. The Energex network is more compact, with significantly more network in CBD areas as well as heavy urban type of feeders, which are shorter in length with higher load and customer densities, larger distribution substations and dominant underground LV networks. In addition, Energex has none of Ergon Energy's type of rural feeders (with lengths of over 100km) and almost no SWER schemes.

As such, it would be expected that Energex's networks would have higher "PV adaptation factors", and Energex's "Medium" risk reflects a logical assessment. Ergon Energy has longer, low capacity feeders where the impact of load variations (exacerbated by the growth in PV installations) is more significant which presents a significantly higher level of risk.

It is unclear why EMCa has made these comparative findings without testing the correctness of their underlying assumptions with Ergon Energy.

### Ergon's option analysis and strategy

69. The three options include an operational control component and account for different PV growth forecasts (low, medium, high).<sup>29</sup> The business case includes the results of a cost benefit analysis which indicates that the selected option<sup>30</sup> provides the best balance of cost and risk of the options considered. However, the assumptions underpinning this analysis are not apparent from the business case.

All assumptions and calculations have been included in detail as part of the supporting document "07.02.12 Distribution Network Impacts of Photovoltaic Connections to 2020". This includes the assumptions and variables of uptake, the effectiveness (both modelled and validated) of solutions,

and their suitability down to an individual network type level. It is not clear what analysis EMCa has undertaken of this document.

71. We remain concerned that the business case and projections are based on: (i) limited experience with the impact of relatively new enforcement of the inverter trip setting at 255V; and (ii) appear to seek to address all existing and projected voltage excursions in the network to reduce the legal/regulatory and safety risk to 'Low' by 2020. We consider that a more reasonable strategy would be to address known issues in areas where the PV penetration is high (e.g., >40%) as a means of reducing overall program cost whilst addressing the areas in which voltage excursions are likely to be highest. We also consider that the following options should be explored in greater depth:

- enforcing voltage set points on installed inverters (at the owners' cost) as a more equitable approach to apportioning the cost of managing voltage excursion issues to PV system owners; and
- changing the operating voltage to 230V<sup>31</sup>

The report indicates that EMCa have accepted Ergon Energy's rationale of forecast and management which is acknowledged. However, Ergon Energy considers that an approach of having distributed generation "trip off" without any further action to address any underlying voltage issues is unacceptable. This would implement a regime where customers with distributed generation are not entitled to have the same level of power quality as customers with only loads (for example Ergon Energy would not be permitted to trip off a customer's load if their voltage was too low). Customers with distributed generation should be able to expect that their equipment should be able to operate when normal conditions exist on the network and that inverters would only need to trip in exceptional circumstances. If the AER is of the opinion that this equality between load and generation for power quality is not correct, then Ergon Energy would require a formal confirmation and a much greater understanding of the engineering approach outlined by EMCa and then examine how it can adjust its investment plan appropriately. It is recommended however that such a decision is made following sufficient stakeholder consultation to ensure it meets the expectations of affected parties.

## **2. Response to findings of Section 4 - *Revised proposed Repex***

11. We consider that the systemic issues identified in our initial review of Ergon's RP have not been adequately addressed in Ergon's RRP. Accordingly, the systemic issues are likely to remain present in the revised forecast, leading to an over-estimation bias. Our updated findings in regards to the relevant expenditure, as compared to our initial findings, are as follows:

(ii) Inadequate links to prudent needs analysis:

- Ergon has provided new information in relation to its CBRM analysis for Transformers and Switchgear, which establishes the need for renewal programs. However, we have identified opportunities where we consider that Ergon is more likely to prudently defer the work. Ergon does not appear to have considered these opportunities or taken them into account in its forecast; and
- Ergon has made reductions to its forecast expenditure for some programs within the SCADA, network control and protection asset category without explanation, which casts doubt over the prudence of the original analysis and justification.

As stated in Ergon Energy's response to AER's *question 103*, Ergon Energy made no changes to un-escalated forecast expenditure for; SCADA, network control and protection programs in its RRP compared to its original regulatory proposal.

The forecast reductions are entirely owing to the application of lower cost escalations to provide the forecasts in 2014-15 real dollars.

Ergon Energy notes that EMCa now recognises the need for renewal programs for the AER category; Transformers and Switchgear (para 11 (ii)). Having recognised the need, EMCa appear to opt for a catchall argument that there is a reasonable likelihood of, or opportunity for prudent deferral of some work (various sections). EMCa provide neither support for, nor argument to justify such comments. In section 4.8.4, EMCa suggest that distribution transformers are included in CBRM, which is incorrect and explicitly documented by Ergon Energy. Distribution transformers are typically run-to-failure, and replaced under the Defect remediation program.

Ergon Energy remains concerned that EMCa do not properly understand the use of CBRM models, the calculations performed, and the methods of scenario evaluation. Various references to the inner workings of CBRM by EMCa appear to be inconsistent (examples detailed below). Furthermore, Ergon Energy's Engineering Reports relating to CBRM derived programs; discuss and document the various risks and their amortised outcomes, make comparisons between scenarios, and discuss the pros and cons of the highlighted options. The reports also provide risk modelling forecast trends. Based upon the provided footnote references in this document, it would appear that Ergon Energy's provided suite of documents may not have been fully considered.

In discussing Ergon Energy's Defect Program (section 4.2), Ergon Energy notes that EMCa expected detailed condition data about an extremely large volume of low cost assets, whereas Ergon Energy has explicitly detailed that obtaining and recording historical data other than population defect history is not cost justified. Ergon Energy provided its entire defect database and documented expected trends and functions, yet EMCa appears to have either not understood or disregarded this information.

In section 4.8.5, EMCa observe that they consider Ergon Energy's distribution earth defect management strategy (which did not change) to have insufficient analysis to justify the proposed level of expenditure. Yet in their April report about the same item (section 7.2.1 of the April EMCa report) advises they consider the work to be indicative of prudent decision making (but could be strengthened by an assessment of risk for each option). No clear basis for this change in position by EMCa is offered.

### **SCADA, network control and protection**

186. It is not clear from the information provided by Ergon in its RRP whether: (i) the reductions it has made are associated with a top-down review of its forecast; and/or (ii) individual programs have been reviewed to address the systemic issues identified in our initial review. While Ergon has not provided information to demonstrate that it has addressed the systemic issues, its reduction to this program, to some extent, might reasonably reflect reductions that would occur by addressing these issues.

As stated above, expenditure reductions in Ergon Energy's RRP is a result of lower cost escalations applied.

## ‘Other’ asset category

### Assessment of the proposed conductor clearance to ground backlog remediation program

#### Establishing the need for the expenditure

199. Multiple variables impact line to ground clearances at transmission and distribution voltages. Further, many of these variables are subject to change over time (e.g., conductor loading, air temperature and land use). Whilst the requirements of ground clearance are absolute, the changing variables in operating a line have a significant impact on the risk that any line may present and the corresponding management strategy that may be required to mitigate that risk.

EMCa appear to treat statutory and regulatory non-compliance (and degrees of non-compliance) as optional, with justification being subject to risk assessment and cost benefit analysis. EMCa suggest that statutory obligations for conductor height should be subject to such review. This analysis by EMCa is flawed and has no proper regard to the underpinning mandatory compliance and safety obligations Ergon Energy faces in this area. At no stage has EMCa sought to test the correctness of its findings on Queensland’s legislative requirements with Ergon Energy’s engineering subject matter experts.

Ergon Energy notes that it provided a sample list of around 5000 sites in Ergon Energy’s Central Region where the conductor heights were actually measured. This list provides direct evidence that these heights were all below legislative defined levels. Variables such as loading and temperature impact the conductor sag height; however this is managed by the ratings review process. Much of Ergon Energy’s network is lightly loaded due to the extensive distances involved and therefore these variables do not tend to present a dominant influence. Ergon Energy does not accept the EMCa’s suggestion that a further level of granularity is required to allow an assessment of prudent expenditure. Ergon Energy always undertakes prioritisation for large volume tasks, but this does not impact prudence or efficiency of performance – or the need to meet mandatory requirements.

The AER should give no weight to this analysis by EMCa and it would be clearly unreasonable for the AER to rely on the EMCa analysis of this matter, given their apparent lack of understanding of existing clearance obligations in Queensland.

#### Assessment of Risk

201. In its business case, Ergon states that its “assessment of risks and appropriate and reasonable treatment methods for these risks associated with conductor clearance to ground must use the so far as is reasonably practicable (SFAIRP) methodology.”<sup>66</sup> Whilst we found inclusion of references to Ergon’s governing legislation, we did not find an explicit reference to a risk methodology for SFAIRP in its business case or risk management framework.

SFAIRP represents an obligation to mitigate, which is a significantly stronger obligation compared to the ALARP obligation. Ergon Energy’s engineering reports provide a reference to the need for SFAIRP when a safety issue is to be managed, and articulate what Ergon Energy would consider to be “grossly disproportionate”. (For example, Section 8 of document 07.01.05 *Engineering Report Power Transformer Replacement and Refurbishment Program*, and a similar section appears in most engineering reports). EMCa’s comments again suggest they have not read the complete suite of Ergon Energy provided documentation to the AER and/or have an incorrect understanding of our jurisdictional requirements.



202. Notwithstanding the potential requirement for some risk mitigation identified from the results of the ROAMES survey, we have not seen sufficient evidence to justify the need for the proposed level of expenditure and that is supported by assessment of the legal, regulatory and/or safety risks.

Again, Ergon Energy questions whether EMCa has read and understood all the documentation provided by Ergon Energy. There is no forecasting employed to determine the volumes of work to be done. The simple fact is that every single span has been measured and evaluated. The number of spans below statutory heights is known. In the past, the Electrical Safety Office has employed its Request for Information process for below clearance conductors. This likely represents the first stage of a formal "Order" under legislation that requires Ergon Energy to remediate, not manage risk.

### **Consideration of level of risk**

204. A key element of an NSP's risk framework is the Board's risk appetite, which determines the level of risk that the NSP considers tolerable. In making decisions and judgements about what can be done within the operating constraints of the NSP, we consider that maintaining a tolerable level of risk does not imply removal of all risk.

Ergon Energy agrees and routinely exercises this approach. However, Ergon Energy does not accept that to leave intolerable risks unresolved is acceptable, prudent or efficient. In terms of safety, Ergon Energy is required by Queensland Law to undertake removal or mitigation of risk so far as is reasonable practical, and until the cost is grossly disproportionate to the benefit. Ergon Energy annually records incidents where members of the public come into contact with overhead conductor. Where actual measurements of conductor height reveal the assets are below statutory defined heights, a public safety risk, a legal compliance risk, and a criminal negligence risk for corporation officers come into existence. To knowingly do nothing is considered an intolerable risk

### **Management approach to risk appears internally inconsistent**

206. Accordingly, we observe that Ergon's assessment of risk, and specifically application of ALARP/SFAIRP in the case of low spans, is not consistent with Ergon's application of risk management and work prioritisation that it has taken for other significant programs where it has applied a risk-based prioritisation approach.

Ergon Energy identified a significant statutory non-compliance. Ergon Energy has previously identified a number of incidents relating to public shock and near death events owing to members of the public coming into contact with low conductors. Such incidents occur every year and have been referenced within Ergon Energy's submission. The risk assessment yields an intolerable risk, and Ergon Energy has responded accordingly. EMCa's approach, effectively not to resolve some of these non-compliances would appear to be indefensible and likely considered negligent in any legal proceedings. Ergon Energy is obliged to meet its statutory obligations, and not to do so would constitute a breach of its Licence obligations. It would also be in breach of National Electricity Law.

### **Insufficient consideration of available options**

207. Ergon provided a strategic level estimate as part of its Gate 1 approval, but provided no evidence of consideration of alternative risk treatment options, such as to address the highest priority low spans through the use of relatively low cost measures such as fencing, signage or



landscaping. Rather, Ergon proposed a single program to resolve all defects in a single year based on a single unit cost. There is no evidence that other prospective risk treatment options available to Ergon were considered and which would be expected to have a material impact on the cost estimate.

The measures EMCa have suggested are both imprudent and impractical and would generally cost more than Ergon Energy's proposed solutions. Given the volume of issues involved and the very recent identification, Ergon Energy has made a reasonable estimate based upon the likelihood that some work will merely require pole straightening, some might require stay renewal and some will require line section redesign. EMCa appear to incorrectly assume Ergon Energy owns the land beneath all of its assets and this is not the case. Ergon Energy holds easements and wayleaves over some but not all of the land traversed by its assets. Therefore the low cost measures suggested by the EMCa do not provide a feasible basis for the rejection of Ergon Energy's forecast costs.

We also note that EMCa has raised no concern with the overall cost estimation methodologies or unit rates approach adopted by Ergon Energy for its capex programme and previously found the unit rates to be at industry benchmark levels. In light of this and the other flaws in the EMCa analysis of this programme, it is clear that there is no adequate or proper basis for the AER to accept EMCa's findings on this aspect of its cost analysis.

208. We note that Ergon has applied further refinements to the rectification process to achieve improved efficiency. However, we did not see evidence of consideration of: (i) efficiencies achieved across the program; (ii) efficiencies with other elements of the augex and repex program (such as where an augmentation project may mitigate the risk); (iii) consideration of lower cost options; or (iv) where the cost of remediation would be disproportionate to the risk avoided.

Much of the apparent lack of evidence appears to have been brought about because EMCa appears to have not considered the full suite of documents contained in Ergon Energy's submission.

Efficiencies to be gained by other elements of capex programs are extremely small, and not at all material. Ergon Energy has provided details about the various volumes of assets, their defect rates and their replacement forecasts. The predicted replacement volumes are typically less than 1-2% of each class and the measureable impact of dispersed system augmentation on those volumes is far less than typical annual variations due to weather. Ergon Energy has documented the trade-off between remediation costs and risk avoidance; such elements are detailed within the underpinning Engineering Reports. Ergon Energy has repeatedly made reference to elements related to efficiency and prudence within its Engineering Reports. Throughout its submission, Ergon Energy has provided information about performance improvements and evidence of its prudence and efficiency.

Ergon Energy's review of other DNSP costs suggests that Ergon Energy's average remediation costs are typically low per defect by comparison, and Ergon Energy is actively working to push the 'efficiency frontier' by continuous improvement practices.

## Insufficient incident data to support forecast

209. We reviewed the performance data provided by Ergon to support the assessment of increasing incident trends. Whilst conductor contact incidents appear to be increasing over the period 2009-10 to 2014-15, there is no breakdown to indicate the percentage of incidents that relate to low conductor that is the basis of the proposed expenditure, as opposed to other factors such as high loads (which Ergon state is also increasing over the same period).

210. Similarly, we note the apparent increasing trend in the number of Priority 1 conductor clearance to ground defects that have been identified through a complete 4-year inspection cycle. However Ergon dismisses the reliability of the inspection process for identifying low conductor defects as part of its justification for relying on ROAMES.

Ergon Energy has not dismissed the issue at all; the elements identified by ROAMES were not identified by the current inspection process. In addition the new ROAMES technology is able to identify any changes to conductor height or environmental changes (e.g. new structure below the line) on an annual basis. The new ROAMES technology achieves measurement of every span every year at little incremental cost as it is employed for vegetation clearance issue identification anyway. This is contrasted by the present ground based inspection regime which effectively incurs an inspection cost per span, achieves inspection rates of less than 25% per annum, and has been demonstrated prima facie to be subjective and inaccurate when compared against the new and highly accurate aerial surveying, Lidar technology and proprietary algorithms utilised by the ROAMES platform. The variability and results of the ground based inspection process demonstrates that this method is flawed, and clearly less efficient than the new ROAMES capability developed initially by Ergon Energy. Ergon Energy is phasing out the old inspection scheme in favour of the cost effective and Edison Institute Award Winning ROAMES product, which clearly represents world's best practice for this type of issue.

211. We consider that the supplied data is insufficient to conclude a reliable increasing trend of low conductor incidents, or to support the proposed volume of defect rectification.

Ergon Energy supplied a large sample of the actual measurements from a single region only, and advised the rest were available on request by the AER (which was not forthcoming). The volume was well in excess of those identified via the current identification practice across the entire network. Again, Ergon Energy considers that the analysis undertaken by EMCa is superficial and flawed and has not properly considered the high quality and reliability of the data released to Ergon Energy via the ROAMES platform. A plain English 'Service Sheet' from FugroROAMES is attached to explain the nature and advantages of this world leading technology, developed initially by Ergon Energy.