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Submission on AER ICT Expenditure Assessment paper

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1. ICT expenditure categories

Question 1

Do you agree with the RIN categories of ICT expenditure? Are there others we should request DNSPs to report? Does it make more sense to disaggregate ICT into its 'recurrent' and 'non-recurrent' components?

Ausgrid presented their ICT capex forecast into the categories 'Comply', 'Protect (cyber)', 'Maintain' and 'Adapt' that are based on purpose. Would stakeholders find these categories more useful than our suggested recurrent and non-recurrent categories?

We support the concept of an assessment framework based on merit order—which first considers total proposed ICT capex[1]—and if there is reason to do so, applies different assessment techniques which distinguish between:

- the ICT capex which an efficient operator would be expected to incur consistently every regulatory period (generally 'recurrent' expenditure), and
- the ICT expenditure which an efficient operator would not be expected to occur in every regulatory period (generally 'non-recurrent' expenditure).

In particular, we consider the use of top-down assessment techniques for recurrent expenditure and bottom-up assessment techniques for non-recurrent expenditure may appropriately reflect the differences in these types of investments. However, as set out below, we have a number of concerns with the specific application of the techniques proposed in the ICT Expenditure Assessment consultation paper (**Paper**).

To ensure the proper operation of the assessment techniques, clear definitions of Regulatory Information Notice (**RIN**) expenditure categories—that is, the inputs into the assessment methodologies—are critical to ensure the proposed framework will provide for decisions which are in the long-term interests of customers.

When developing expenditure categories, care should be taken to distinguish between the frequency (or recurrence) of expenditure and the drivers of expenditure. Although we consider the examples of recurrent ICT expenditure listed on page 16 of the Paper are reasonable, we do not consider it is appropriate to include in the proposed definition that 'recurrent ICT expenditures are those associated with maintaining existing ICT functions and capacity'[2] because, as explained below, there are circumstances where expenditure associated with maintaining an IT system is non-recurrent in nature (that is, the expenditure does not occur each five-year regulatory period).

Similarly, we do not believe the grouping of the four ICT capex categories from recent electricity distribution price reset RINs[3] (which predominately relate to the driver or purpose of the expenditure) into the categories of 'recurrent' and 'non-recurrent' provides an appropriate basis on which to apply the proposed assessment framework. Our main concern with the approach of utilising the four price reset RIN categories is that there are likely to be both recurrent and non-recurrent expenditure components to each of the reset RIN categories. For example, within expenditure targeted at maintaining the operation of existing systems, some expenditure will represent recurrent investments, but other investments may be non-recurrent—that is, they are *not* typically undertaken every regulatory period. An example of the latter is the age or condition-based replacement of an enterprise resource planning (**ERP**) system. Like all assets, these systems have finite technical lives and vendor support periods and will require replacement at some point. However, such replacements are large exercises typically managed as one-off projects, and would not be expected to be undertaken every regulatory period.

1 A possible option here is to compare total expenditure against global ICT trends—as is outlined in the ENA's submission—to assess whether the ICT expenditure trend of a particular DNSP is beyond normal growth levels. If this is the case, only then should a more detailed investigation be warranted.

2 AER, Consultation paper: ICT expenditure assessment, May 2019, p. 5.

3 For example, Attachment 5 of the AER's draft decision on Ausgrid's 2019-24 distribution determination outlines how the AER grouped the 'asset replacement' and 'asset remediation' RIN categories to consider recurrent expenditure, and grouped the 'asset extension' and 'capability growth' categories to consider non-recurrent expenditure.

Some investments are designed to increase the capacity or capability of systems (such as data storage or processing) to match organic growth in customer numbers and data volumes over time[4], with these investments carried out relatively consistently throughout and across regulatory periods. Although these projects would fall within the price reset RIN category definition of 'capability growth'—and therefore non-recurrent when aggregated—they are better suited to assessment as 'recurrent' expenditure under the proposed framework because growth can be a recurrent activity.

Given these challenges with the price reset RIN definitions, and their lack of fitness for use in the AER's proposed ICT assessment framework, we assessed–and concluded—that the ICT expenditure categories which have been historically included in the AER's Category Analysis (**CA**) RIN[5] would be more appropriate to use as a basis for assessing proposed ICT capex than the four categories contained in recent DNSP price reset RINs.

One further area which should be accounted for in relation to recurrent expenditure is the interrelationships and trade-offs between recurrent and non-recurrent expenditure that may occur during phases of business or system change. Just as the AER recognises the importance of considering efficient capex-opex trade-offs when assessing expenditure forecasts, trade-offs between different types of capex must also be considered. Again using the example of a major (non-recurrent) ERP system replacement, there may be cases where non-recurrent implementation preparation activities displace the need for recurrent expenditure which would otherwise be undertaken had a major system upgrade not been imminent. In other words, it may be prudent and efficient to not undertake annual patching on an old system in the final year before its replacement by a new system. If these interrelationships are not considered in the proposed assessment framework, there is a risk that comparisons of recurrent expenditure between two regulatory control periods could be misleading, and potentially understate (or overstate) the implied efficient level of recurrent expenditure for the forecast period if a major replacement project has (or has not) been undertaken during the current period.

Similar issues could arise as delivery models for software applications continue to evolve. In the future, it may become more efficient (on a total cost basis) for a DNSP to make trade-offs such as shifting from major system overhauls less frequently to minor system upgrades more frequently, which could result in increases in recurrent expenditure. However, a DNSP may be disincentivised from undertaking this efficient investment if there is a risk that increasing recurrent expenditure is deemed inefficient under the proposed framework and therefore not receive an overall efficient allowance through the price review process. In this regard, the assessment framework could work counter to the incentive regulation framework.

If the overall intention of this data is to assess the efficiency of expenditure through benchmarking, then we suggest that the capture of data based on fixed and variable measures is a better form of categorisation (refer to our response to question 2).

The Paper notes the use by Ausgrid of alternative categories which describe the purpose of their proposed ICT expenditure in its recent regulatory proposal. When recently developing and consulting on our ICT capex forecasts, we have used similar purpose-based categories and received positive feedback from some stakeholders on their usefulness in describing our forecast. However, we consider that the assessment approaches outlined in the Paper necessarily rely on expenditure being separated into recurrent and non-recurrent components, and an assessment framework based on expenditure purpose categories may not allow for the use of the techniques set out in the Paper. Should distribution network service providers (**DNSP**) wish, it is appropriate that they continue to be free to present forecasts in their regulatory proposal using their categories, as long as the information is also provided in the form and categories specified in the reset RIN.

[4] For example, we incur licencing costs from vendors for some IT systems on a per-customer (or connection point) basis.

[5] 'Recurrent', 'non-recurrent' and 'client device expenditure'. Having reviewed types of expenditure Jemena has historically classified as client device expenditure, our view is that this expenditure would also fit within the definition of recurrent expenditure (but for the definition of client device expenditure).

2. Assessment of recurrent ICT expenditure

Question 2

What other methodologies can we use to benchmark ICT capex? What are the benefits and disadvantages of each approach? What other benchmarking normalising factors do you consider appropriate? For example, Regulatory Asset Base (RAB) could be used as a proxy for asset size

Although we agree in principle that over time, a DNSP's revealed level of recurrent expenditure could be used as a basis to assess the efficiency of a proposed expenditure forecast, we consider there are a number of challenges in applying a methodology in the near term. Further, there are a number of aspects of the proposed benchmarking framework which are not clear—for example, would historic or forecast recurrent expenditure be benchmarked? Overall, we caution interpreting ICT expenditure benchmarking results based on historic RIN data. If benchmarking is used, it should only inform the AER's assessment of recurrent ICT capex at a very high level, and benchmarking results should only be used as a broad guide and not deterministically.

A significant issue is the quality and inter-DNSP comparability of historic information on ICT expenditure. Early years of reporting against the CA RIN were subject to high degrees of estimates, and even relatively minor differences between DNSPs in the interpretation of micro category definitions could significantly impact benchmarking results. For the proposed methodology to provide an appropriate basis for decision making, the level of each DNSP's recurrent expenditure should be expected to be relatively stable between five year periods or on a rolling five-year basis. **Appendix A** to this submission (confidential) provides charts of recurrent ICT capex for DNSPs obtained from CA RIN responses. This clearly shows that in real terms, there are significant differences between most DNSPs' lowest and highest reported recurrent ICT capex since 2009, with variations of over 100 per cent for the majority of DNSPs; any analysis on this data can only give low levels of confidence in its usefulness at best give, although, it's more likely to not reveal anything informative about a DNSPs benchmark performance. High degrees of tolerance should, therefore, be used when interpreting benchmarking results.

There are also risks associated with undertaking benchmarking at a relatively micro-level for only some categories of a DNSP's expenditure. The Paper notes the potential for trade-offs between ICT expenditure and non-ICT operational expenditure, particularly in relation to the automation of manual processes. We consider that such trade-offs will continue to be made in the future, and that not accounting for such trade-offs in benchmarking could disincentivise DNSPs from innovating and undertaking projects which may be efficient overall, particularly in cases where a DNSP's performance in a benchmarked area may be negatively impacted despite improved customer outcomes in a non-benchmarked area. The Paper itself alludes to such risks associated with the proposed application of benchmarking, noting differences and trade-offs between ICT costs and other operational costs. However, while the Paper states that the AER considers that such differences are 'relatively minor and does not affect the validity of the benchmarking result',[6] no analysis is presented to support this conclusion. Further, ICT expenditure features in the AER's recent decision on opex productivity, indicating that ICT is in fact of substance. Given this we consider that any benchmarking of ICT should take into account broader expenditure impacts.

The proposed methodology would also not consider important output factors which could account for apparent differences in efficiency where expenditure is considered in isolation. For example, over the short to medium term, a DNSP may lower its ICT expenditure, which would heighten the risk profile of that DNSP's technology asset base. Considering efficiency based on expenditure only could make this DNSP look more efficient, even if this lower expenditure level was not efficient over the long term. In other cases, the digitisation of processes can improve the quality of services provided to customers (for example, our engagement with customers has shown strong support for improvements to information available about customers' service requests or energy usage[7]). However, these customer benefits do not appear to be accounted for in the proposed methodology.

Energy Networks Australia's submission contains further commentary on the proposed application of ICT expenditure benchmarking, including discussion on normalisation factors. A further factor we consider should be accounted for in benchmarking is the distinction between fixed and variable costs between networks of different size. We note that ICT is distinct from other forms of network investment in that it has significantly high fixed costs

6 AER, ICT Expenditure Assessment – Consultation paper, May 2019, p.18.

7 Further information about our recent customer engagement can be found at https://yourgrid.jemena.com.au/42615/documents/95885

and relatively low variable costs. For example, each DNSP will have recurrent expenditure on ICT security systems irrespective of whether they serve 300,000 customers or 1,200,000 customers; with the cost of security much the same irrespective of scale. Further, and as a basis for comparison, an electrical transformer investment will serve a portion of customers—usually within a geographic area, meaning it is more variable in nature—whereas ICT investment will typically serve *all* customers in a DNSP area, making it fixed cost in nature. This means that benchmarking of ICT expenditure is more sensitive to output measures and that the partial indicators used to benchmark network capital investment—such as route length, customer numbers, etc.—are not suitable as partial factor indicators when assessing ICT benchmark performance.

Overall, we consider the scale of the challenges associated with the application of benchmarking to ICT capex assessment to be significant. In particular, the use of benchmarking analysis to inform a substitute estimate raises significant concerns given the complex interrelationships with other parts of DNSPs' expenditure forecasts.

In light of these data and methodological issues, we consider that the AER should instead rely on revealed costs as the 'base' used in assessing a DNSP's efficient level of recurrent ICT capex. As noted in the Paper, DNSPs' previous expenditure can (absent 'step changes') be a good indicator of the level of efficient spend required to achieve the capex and opex objectives. This approach would be consistent with the AER's Expenditure Forecast Assessment Guideline, and would also leverage the strong incentives provided through the regulatory framework[8] for DNSPs to ensure their expenditure is efficient.

[8] Including through the Capital Efficiency Sharing Scheme.

3. Step change ICT projects

Question 3

We note the difficulty in assessing the efficiency of implementing a compliance driven step-change ICT projects. What information do you consider is required to assess the efficiency of these projects?

In relation to the use of benchmarked recurrent ICT capex as a basis for assessing a DNSP's ICT capex forecast, we note the Paper appears to refer to potential increases in recurrent expenditure as those attributable to compliance-driven 'step change' projects only, and does not include any discussion on the application of 'trend' escalation to this 'base'.

Increases in recurrent expenditure should also be expected to be driven by factors other than new compliance obligations. Developments in technology are continuing to provide new opportunities for businesses to drive structural changes to processes and increased digitisation—for example, 'paper to digital' shifts in Geographical Information Systems and Field Mobility Systems. Over time, this trend is likely to increase the size of businesses' ICT asset bases, and therefore, the recurrent ICT expenditure required to maintain them will also increase. Additionally, expenditure to mitigate cybersecurity risks associated with a system may not always relate to a specific (or deterministic) regulatory obligation. Failing to recognise these trends in the recurrent ICT expenditure assessment framework risks distorting incentives for DNSPs to make efficient investments in new technologies that are in customers' long-term interests.

In cases where a new regulatory obligation requires ICT expenditure by DNSPs, any comparisons of proposed expenditure amounts between DNSPs should be interpreted with caution, as the efficient cost of a DNSP complying with a new obligation needs to be considered in the context of its own (existing) ICT ecosystem. It should also be noted that, depending on the new compliance obligation and nature of the technology investment response required, the *initial* major changes to a system (or implementation of a new system) to comply with a new obligation may be considered non-recurrent expenditure, but the ongoing expenditure required to maintain those systems (once in place) in future periods may be considered recurrent spend.

Therefore, in every case, the lack of comparability of step changes between DNSP's may not necessarily mean the expenditure is not inefficient when considered in the context of total expenditure or in the context of the maturity of system deployment; a more detailed investigation—rather than simple top-down comparisons—is required for step-change investments.

4. Business cases for non-recurrent ICT projects

Question 4

What do you consider a sufficient business case for an ICT project should include?

As noted in the Paper, it can be significantly more complicated to accurately quantify and assess the costs and benefits associated with technology investments compared to the well-established methodologies and frameworks routinely applied in electricity network expenditure. Compared to electricity network infrastructure, technology assets are considerably more varied in their type and nature, and typically do not have large data sets of historic asset failure rates available on which to quantify the probability of asset failure to use as a basis for replacement planning (noting that ICT assets are generally not run to failure). There are also significant challenges associated with quantifying risks which are often the drivers of large non-recurrent ICT asset replacement projects. Noting these complexities and the associated administrative costs, it is recommended to specify a materiality threshold for the assessment of business cases for non-recurrent projects—we suggest $1 million in proposed capex may be an appropriate threshold.

An example of these challenges can be seen when contrasting replacement planning to avoid the failure of an ICT system used to collect and process metering data and planning to avoid the failure of a zone substation transformer. The probability of an end-of-life failure of a transformer can be estimated using well-established techniques for condition monitoring of that asset family (given the condition of such assets generally degrades over the period of time prior to technical failure) and also by considering data on past failures of similar assets (as the DNSP may have a number of transformers on its network). In contrast, the probability of a technical failure of an ICT system may be extremely difficult to estimate, due to the uniqueness of the asset, a lack of historic performance and failure data and a large number of factors that could cause it to fail suddenly and without warning—with software bugs, interfaces with other systems, cybersecurity breaches and hardware faults just some of these factors.

Similarly, the consequence of an end-of-life failure of a transformer can be quantified using an estimate of the forecast energy usage by the customers supplied which would not be met in the event of a failure, and converted to an economic value using a value of customer reliability. The consequence of a functional failure (where vendor support is no longer available, and security vulnerabilities exist) of an ERP system cannot be easily quantified, with frameworks to assign an economic value to such events not being well established.

We welcome the Paper's acknowledgement that some non-recurrent ICT projects may be aimed at improving customer service (for example, improving the availability and accessibility of information to customers about the status of a service order). Based on our recent engagement, this is an area where customers' expectations of DNSPs are rapidly evolving, particularly driven by their experiences with other (non-energy) service providers. As such benefits may not be possible to quantify, we consider it is appropriate that DNSPs be expected to demonstrate clear customer support for such initiatives, including their additional cost.

In addition to the challenges of quantifying benefits associated with non-recurrent ICT investments, it can also be challenging to accurately forecast individual project costs for a regulatory proposal. DNSPs should be expected to rigorously evaluate the costs and benefits of a proposed investment before committing to it—ensuring that the most efficient option to address an identified need is selected, based on the best available information at the time of the investment decision. However, the continued rapid pace of technology evolution means that at the time a DNSP prepares its regulatory proposal, it is often not possible to envisage the technical solution and detailed scope which might be employed at a point up to seven years into the future. Where detailed cost estimates are produced so far in advance, they may tend to over-estimate the cost of a specific project, with technology vendors likely to price the uncertainty in scope and technology developments into market-sourced cost inputs.

We support the approach outlined in the Paper for the assessment of distributed energy resource (**DER**) integration ICT projects, particularly the recognition that DNSPs' expenditure required to efficiently manage

increasing DER penetration will likely span several categories of capital and operating expenditure, including ICT, augmentation capex and replacement capex. Similarly, it is likely that significant benefits associated with DER integration expenditure by DNSPs may be realised by customers through non-distribution segments of the energy market. Therefore, it is important the holistic assessment of projects' costs and benefits is undertaken. We look forward to the AER further expanding on its views on good practice for DER based investments later this year.

5. Historical post implementation reports

Question 5

What is your opinion on us requesting DNSPs provide post implementation reports from historical ICT investments?

We note that the Paper appears to presume that a significant proportion of non-recurrent ICT investments will result in productivity improvements by the DNSP; however, this presumption is not the case. The primary reason for ICT investment is to enable our business to provide services to customers; productivity is a means to delivering those services efficiently. Given this, the approach for assessing productivity should be taken in the context of the services expected by a DNSP's customers, particularly for non-recurrent expenditure.

Further, vendors typically add features or capabilities to new versions of software which they may claim provide productivity enhancements to users. However, in many cases, these new capabilities are incidental to the primary reason we may have invested in the new software, which would be to manage lifecycle risks associated with that system. Even though some newer systems may provide the potential for productivity improvements, these benefits would generally not be realised through the adoption of a new software version alone, as benefits realisation would also require investment to modify business processes. In other cases, new systems may enable improved customer experience, but without resulting in efficiency savings.

We do not consider that requiring DNSPs to provide post-implementation reports for historical ICT projects will provide information which can usefully inform regulatory decisions on prudent and efficient future ICT expenditure levels. As set out below, there are a number of reasons such documents will not provide the information sought by the AER.

The measurement of benefits associated with an individual ICT project can be highly subjective and prone to error. Actual (and even forecast) productivity benefits should be expected to vary significantly between types of projects and over time. As business processes continue to become increasingly digitalised, the incremental productivity gains associated with new technology investments are not assured. Any known productivity gains associated with historical projects will, therefore, become increasingly less relevant to the assessment of likely future gains over time.

The difficulties in accurately measuring productivity improvements relating to an individual ICT project should not be underestimated. Operating productivity improvements enabled by ICT investments would generally be expected to be dispersed across a number of areas within a business. Large organisations are also increasingly undertaking multiple business, system and process changes concurrently (and over extended periods), making it very challenging to attribute changes in operating productivity to specific ICT investments.

The Paper also notes that post-implementation reports would give stakeholders confidence that ICT investments made by DNSPs are delivering actual benefits. However, the Paper makes clear that the AER expects DNSPs to incorporate productivity benefits associated with ICT investments in their regulatory proposals. If, for example, such productivity benefits were incorporated in a regulatory proposal through an opex productivity growth factor or a negative opex step change, customer realisation of these benefits would essentially be 'locked in,' regardless of whether they are realised in practice or not. This means that DNSPs, and not customers, bear the risks associated with an ICT project not producing productivity benefits as forecast.

Overall, we do not consider that providing the AER with post-implementation review documents would lead to more preferable outcomes for customers. The EBSS and CESS already ensure that customers realise efficiency benefits achieved through ICT (and other) investments, while the National Electricity Rules' ex-post review mechanism protects customers from bearing the costs of inefficient capital investments.

6. Incorporating benefits into regulatory proposals

Question 6

What do you consider is required to demonstrate that DNSPs have incorporated benefits into its overall proposal?

Through our engagement, our customers have made it clear that while they support investments in new technologies, they expect to also realise the benefits of efficiency improvements in the future. However, there are a range of complexities and challenges in accurately forecasting productivity improvements associated with individual ICT investments—particularly where these ICT investments will occur up to seven years after the time a DNSP prepares its regulatory proposal, and developing a detailed scope and technical requirements become increasingly uncertain at the time of submission.

The risk of 'double counting' efficiency improvements associated with ICT investments or not considering the investment in the context of the primary investment driver (that is, the requirement to provide services to customers) should be recognised to ensure that DNSPs continue to receive a reasonable opportunity to recover at least their efficient costs, and are not disincentivised from making efficient investments which are in customers' long-term interests.

The AER's recent final decision on forecasting productivity growth for electricity distributors set out that 0.5 per cent per year was an appropriate forecast opex productivity growth factor for electricity distributors.[9] During the AER's consultation on forecasting productivity growth, we provided a report from Cambridge Economic Policy Associates (**CEPA**), which informed the AER's final decision. CEPA's report noted that investments in ICT assets were likely to be key enablers of productivity growth seen in sectors such as gas and water:

> *the productivity estimates from other sectors reflect the other sectors' adoption and use of new technology, such as information communication technology (ICT).* [10]

CEPA represented the Australian Bureau of Statistics' market sector quality-adjusted labour productivity estimates by growth cycle, between 1998-99 and 2011-12. They provided an estimate of different inputs and multifactor productivities' contribution to output growth, and therefore, labour productivity growth. CEPA concluded that:

> *The contribution analysis shows that capital services have been, by a large margin, the greatest contributor to output growth over all the periods considered. For example, in the 2003/04 to 2011/12 period output grew by 3.11 percentage points, and capital services accounted for 2.23 percentage points (or 72%) of the growth in outputs. This means that the estimated labour productivity growth is largely due to increases in capital services. In other words, labour productivity growth could not have been achieved without investment in technology such as ICT. Setting further opex productivity adjustments for DNSPs' investments in ICT would double count productivity and therefore set an unrealistic productivity target.*[11]

Noting the contribution of ICT capex to forecast productivity improvements, the incorporation of any additional productivity benefits in a DNSPs regulatory proposal should not double count efficiency gains.

9 AER, Forecasting productivity growth for electricity distributors – final decision, March 2019.

10 CEPA, *Analysis supporting Ausgrid's, Evoenergy's and Jemena's submission to the Australian Energy Regulator's review of its approach to forecasting operating expenditure productivity – Final Report*, December 2018, p. 30.

11 Ibid, p. 30.

7. Proposed approach to non-justified non-recurrent proposals

Question 7

Which scenario - self funding or productivity improvement - would you prefer and why? Are there other scenarios we should consider?

In the event the AER considers a DNSP has not demonstrated that a proposed capex project is prudent and efficient, or that it has not incorporated productivity benefits (or other benefits, for example, responding to customer preferences on services) identified in a project's business case into its regulatory proposal, then it would be appropriate for the AER to not include that project in its alternative estimate of efficient capex in its draft determination. This would provide the DNSP and stakeholders with the opportunity to submit additional information in response to specific concerns of the AER.

8. Proposed approach to non-justified non-recurrent proposals

Question 8

We welcome stakeholder comments on the practical application of a productivity adjustment. If we were to include a productivity adjustment on the basis of ICT expenditure, how should it be incorporated? If so, how should we determine how large should this adjustment be? What aspects of a DNSP's forecast should it be applied to?

As set out in our response to question 7, where there are non-justified parts of a DNSP's non-recurrent forecast, we consider it would be more appropriate for the AER to exclude these projects from its substitute estimate of non-recurrent ICT capex in its draft determination.

We do not support the Paper's proposed scenario where top-down adjustments could be applied to DNSPs' proposed expenditures in the event of non-justified non-recurrent projects, as there are a range of issues associated with this approach. As noted in the Paper, the AER undertaking in-depth crosschecks between interrelated expenditure forecasts would be cumbersome and potentially be inconsistent with the objectives of our incentive regulation framework—for example; it is unclear how consistency would be ensured with the capital expenditure and operating expenditure objectives.