Attachment G.17

SAPN_PUBLIC IT Data Centre Opex Step Change

03 July, 2015

SAPN G.17_Data Centre Opex Step Change

Original Proposal

SA Power Networks submitted an opex step change totalling $4.446 (June 2015, $ million)[1] for the 2015-20 Regulatory Control Period (**RCP**) in order to fund the operation of new data centre arrangements.[2] The capital investment to establish the new data centre arrangements was forecast at $4.3 (June 2015, $ million).[3]

- As noted by the AER in its Preliminary Determination, a trigger for the change in data centre arrangements is the impending exhaustion of capacity; however key factors related to the general adequacy of our current facilities as outlined in our Data Centre Strategy[4] and Business Case[5] are also very pertinent. In particular, the inadequacy of the current on-premise facilities exposes SA Power Networks to business continuity and disaster recovery (**DR**) risks.
- The build up of the opex step change was composed of:
    - the difference in cost of hosting SA Power Networks' systems in third party managed built-for-purpose Data Centres, compared to existing arrangements of hosting our systems utilising on-premise converted office space; and
    - the operational step required to fund a future 10% capacity augmentation related to application level DR capability (rack space and power consumption).
- The step change was composed of external services only and did not include any operational labour increases.

AER Preliminary Determination

In the Preliminary Determination, the AER did not include any step changes in its alternative opex forecast for Information Technology. In reviewing SA Power Networks' proposed opex step change for Data Centre arrangements, the AER made the following statement[6]:

> ***'Rate of change approach is designed to provide a business with incremental opex relating to business growth:***
>
> *For the Data Centre consolidation step change, SA Power Networks stated that its data centres are running out of capacity due to increased volumes of data and the increased portfolio of business systems and supporting infrastructure.*
> *This proposed step change relates to the estimated costs of SA Power Networks' incremental business needs which are already compensated for through our rate of change adjustment to base opex through output growth. It would double count these costs to provide a step change in addition to adjusting base opex for the rate of change.'*

[1] Net of benefits. The opex step change was $4.883 (Dec 2013, $ million) exclusive of benefits.
[2] SA Power Networks, *Regulatory Proposal 2015-20, Attachment 21.13. SA Power Networks Opex Step Changes*, October 2014, p.96, Table 8.
[3] SA Power Networks, *Regulatory Proposal 2015-20*, October 2014, p.155, Table 16.1.
[4] SA Power Networks, *Regulatory Proposal 2015-20, Attachment 16.2: EY: SAPN IT Data Centre Strategy*, June 2013.
[5] SA Power Networks, *Regulatory Proposal 2015-20, Attachment S20.102 IT BC Data Centre Consolidation*.
[6] AER, Attachment 7 – Operating Expenditure. p. 7-92.

Our response to the AER's Preliminary Determination

Summary

We do not accept the AER's preliminary determination and resubmit our original proposed opex step change of $4.446 (June 2015, $ million) for the 2015-20 RCP. We believe the AER has not taken into consideration other factors outlined in the Data Centre Consolidation Business Case[5]. These include the comparative prudency of the proposed option as an efficient capex/opex trade-off, the mandatory nature of the project with respect to the general inadequacy of the existing facilities irrespective of capacity constraints, and gaps in disaster recovery capabilities for critical applications that need to be addressed. Due to the risks associated with our existing facilities, we have commenced Phase 1 of our Data Centre Consolidation initiative in 2014/15. Phase 2 will continue into the 2015-20 RCP. We discuss these matters further below.

- **Prudent Capex/Opex Trade-Off**
  Investment in augmenting our data centre arrangements is mandatory when considering the extreme corporate risk rating and SA Power Networks' capital investment guidelines. Accordingly, SA Power Networks has an obligation to prudently invest to mitigate the identified risk and the preferred option is the most prudent in NPV terms[7]. Whilst the preferred option does require the largest step change in operational expenditure, the up-front capital expenditure is significantly less. Coupled with the fact the preferred option is the most prudent in NPV terms of the viable options, this represents an efficient capex/opex trade-off.

- **Facilities Risk**
  By moving our current applications and data from on-premise facilities to built-for-purpose data centre facilities, we incur an unavoidable operating expenditure step change. It is our understanding that the AER has rejected the proposed opex step change for Data Centre on the basis of capacity constraints alone, and that capacity growth is considered to be catered for by output growth allowances. A critical factor detailed in the business case that has not been considered by the AER is the general unsuitability of existing data centre arrangements irrespective of capacity, the risk this exposes SA Power Networks to and the cost difference required when utilising the services of a built-for-purpose data centre service provider.

- **Disaster Recovery (DR) Capacity**
  We do not have DR provisions for all critical applications and we must make further investments in DR. Application level DR capability provisions (typically the duplication of an application and its data at two physical locations) accelerate growth beyond incremental business needs with no economic benefit in the absence of a disaster occurring. There is an operational cost payable to our data centre providers to host the IT equipment necessary to enable DR capabilities in terms of facilities fees and power consumption.

[7] *SA Power Networks Risk Management Framework*, SA Power Networks, p. 21.

SA Power Networks' detailed response

Prudent Capex/Opex Trade-Off

Based on SA Power Networks' capital investment guidelines, investment in augmenting our data centre arrangements is formally considered discretionary, however based on the extreme corporate risk assessment score the project is in fact mandatory. Accordingly, SA Power Networks has an obligation to prudently invest to mitigate the identified risk. The proposed option (Co-location Hosted) is the most prudent option in overall NPV terms to address this risk. Whilst the preferred hosted option does require the largest step change in operational expenditure (of options that actually attempt to address the risk, ie excluding Do Nothing), the upfront capital expenditure is significantly less – as per Table 1 below. This therefore represents a prudent capex/opex trade-off.

In our Data Centre business case, we investigated alternative options of Building a New Primary Data Centre and Expanding and Upgrading the existing Data Centres. As outlined in Table 1, the Co-Location Hosted Option was by far the most prudent and risk averse approach, with an NPV 86% less than Option 2 and 150% less than Option 1. The 'Do Nothing' option was 12% less than the preferred option, but did nothing to address the identified risks. Without the necessary operating budget, we may need to reassess our decision to pursue the preferred option and reconsider the more capital intensive, but less economically viable, options in order to operate within the regulated capital and operating allowances. We believe that this is not in the best interests of South Australian electricity consumers or SA Power Networks.

Table 1: IT Data Centre Options Comparison, (Dec 2013, $ million)

Option	Total Capital[8]	2015-2020 RCP Opex[9]	NPV[10]	Overall Risk Rating
0: Do Nothing	-	6.724	-7.659	High to Extreme
1: Build	19.544	3.711	-21.395	High
2. Expand	13.891	2.772	-15.913	Medium to High
3. Co-Location Hosted	**4.682**	**4.883**[11]	**-8.562**	**Moderate**

Facilities Risk

Whilst the impending capacity constraints of the converted office space used for hosting our systems is one factor that triggered the need to review our Data Centre arrangements, the operational impact of incremental capacity increases necessary to service incremental business needs (ie incremental operational cost increases associated with the ongoing addition of more processing power, memory or storage capacity etc) is not the cause of the proposed change in operational costs.

As discussed in our Data Centre business case, we must significantly augment our Data Centre arrangements to address the risk and our claim for an operational step change is due to this unavoidable change in operating environment. The hosting premises at Keswick and Angle Park are effectively office space with tactical improvements in power, ventilation and air conditioning (**HVAC**) and security arrangements to make them perform some of the key functions of a Data Centre. Such an environment is not fit for purpose to support the current and future needs of SA Power Networks, which provides an essential service to approximately 1.7 million people of South Australia. Using the services of a specialised data centre service provider will:

[8] This represents the total capital investment, not just the portion attributable to the 2015-20 RCP.
[9] Opex value is exclusive of benefits and in Dec 2013 $, hence the differential in the stated and actual claimed opex step change.
[10] NPV (Net Present Value) is for the seven-year period from 2014/15 to 2020/21, calculated at a discount rate of 5.44%.
[11] The forecast opex step change net of benefits and in June 2015 $ is $4.5 million.

- provide SA Power Networks with purpose built facilities that have full redundancy for mains power, backup-power, air-conditioning, ventilation, fire suppression, flood protection, physical security and the future capacity scalability in accordance with good practice for IT infrastructure management and disaster avoidance;
- place SA Power Networks in a position where the available scalability will enable us to respond to regulatory changes in the National Energy Market (**NEM**); and
- ensure the immediate operational risks of running our systems under current hosting arrangements are mitigated; in particular, the risks related to critical services for managing the distribution network, assets and work, health and safety functions and many others.

A number of incidents have occurred over the last five years that highlighted the vulnerability and inadequacy of the existing facilities. Some of these included:

- burst water main cutting supply to the Keswick building and therefore shutting down air-conditioning dependent on chilled water. Many systems were required to be shut down to enable the remaining cooling capacity to support only critical business systems;
- a number of other air-conditioning failures resulting in system shut-downs given the redundancy in air conditioning is insufficient to support the operation of all systems simultaneously;
- motor vehicle accident cutting power supply to the Keswick building and a subsequent failure of back-up generation causing widespread system outages, including Network Operating Centre (**NOC**) systems; and
- a number of planned electrical maintenance events resulting in system shut-downs as a result of subsequent uninterrupted power supply (**UPS**) failures.

The likelihood and impact of incidents such as those outlined above when using built-for-purpose data centre services are significantly reduced.

With the exception of application disaster recovery capacity, which is discussed in the next section, the proposed operational step change covers the cost to host our current applications and data in purpose built facilities managed by a specialist data centre service provider. This includes facilities management costs (rack space rental) and power consumption. In formulating the step change forecast we have incorporated operational savings to be realised by decommissioning the Keswick and Angle Park data centres (IT equipment power consumption, HVAC power consumption, facilities management etc). Our forecast does not include any provision for the operational impact of capacity increases related to future incremental business needs.

Application Disaster Recovery (DR) Capacity

Whilst we are not forecasting an operational step change for incremental business needs, as stated in the Data Centre business case, we have invested in disaster recovery capabilities for our systems in response to increasing business reliance on IT systems directly supporting customers and reliability of supply. In fact 36% of infrastructure hosted in our secondary on-premise facility is for disaster recovery purposes[12]. Additionally we must make further investments in application DR capabilities over the upcoming RCP to address gaps in disaster recovery capabilities for business critical applications.

[12] Attachment 16.2 EY:SAPN IT Data Centre Strategy p.34.

Application disaster recovery capabilities requirements typically involve the duplication of IT infrastructure such that a given application and its data reside at two physical locations. This accelerates capacity consumption in excess of incremental business need for additional server and storage resources. Accordingly there is an operational cost payable to our data centre provider to host these additional server and storage resources in terms of facilities fees and power consumption.

There is no economic benefit to the business in having application disaster recovery capabilities, unless a disaster actually occurs. These investments are risk based and directly contribute to supporting reliability of supply for South Australian electricity consumers.

The operational step change in our Revised Proposal includes a provision for the future operational impact of a 10% increase in capacity directly related to disaster recovery capabilities. In a hosted data centre environment, operational costs are directly related to the hosted capacity (rack space and power consumption). Accordingly, the disaster recovery capacity component of our step change comprises approximately $0.445 (June 2015, $ million) of the proposed $4.446 (June 2015, $ million) step change.

Revised Proposal

We resubmit our original proposed opex step change of $4.446 (June 2015, $ million) for the 2015-20 RCP.

References / supporting documents

Ref Document Name	Date	Version	Author
Attachment 21.13. SA Power Networks Opex Step Changes.	30/10/2014	-	SAPN
SA Power Networks Regulatory Proposal 2015-20.	30/10/2014		SAPN
Supporting Document S20.102 IT BC Data Centre Consolidation	28/10/2014	1.1	Litmus
SA Power Networks Risk Management Framework			SA Power Networks
Attachment 16.2 EY:SAPN IT Data Centre Strategy	June 2013		EY