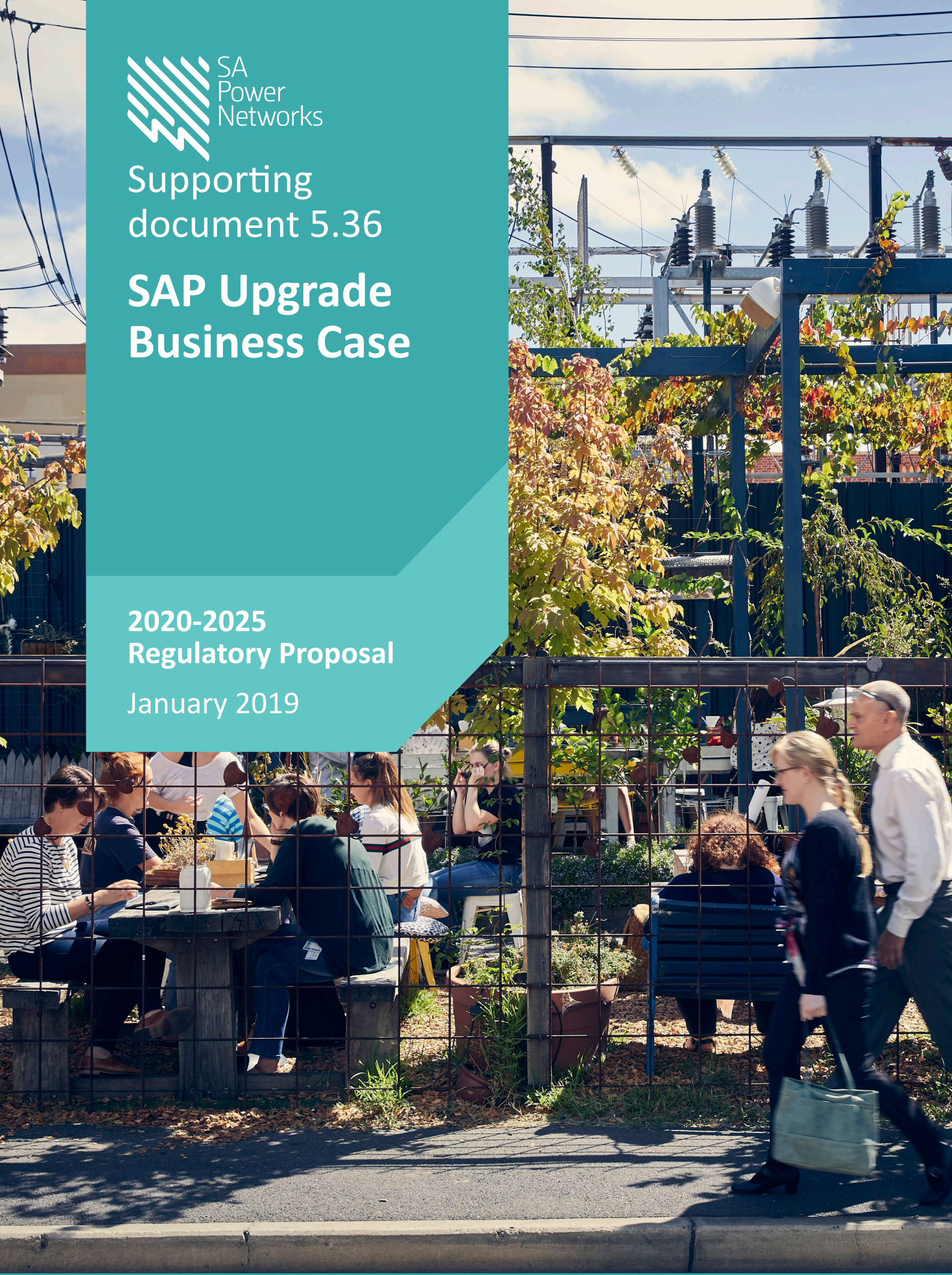
SA Power Networks

Supporting document 5.36

SAP Upgrade Business Case

2020-2025 Regulatory Proposal

January 2019



SA Power Networks

SAP Upgrade Business Case

IT regulatory submission for the 2020-2025 Regulatory Control Period

January 2019

Contents

1. Executive Summary

Topic	Detail
Category of expenditure	Non-recurrent non-network IT capex
Context / background	SAP is the core asset management, customer management, work management and enterprise software application for SA Power Networks. SAP is an integrated suite of capabilities that enable: • management of all network assets; • work management including prioritising and executing both planned and supply restoration work for field crews; • delivery of customer services including managing the connection, disconnection of customers and customer billing; • management of safety of field staff and customers, including life support and critical customers; • critical bushfire risk management processes; • customer messaging alerts and restoration information; • enterprise services including finance, planning, procurement, human resources, payroll, warehouse management and project delivery; and • enabling technology services including security, mobility, integration, information management, reporting and analytics. In 2015 SAP Australia Pty Ltd announced that the current version of their SAP application, used by SA Power Networks, will become unsupported in 2025 and an option for extended maintenance support beyond 2025 will not be provided. Hence, if SA Power Networks does not act, prior to 2025, to resolve the problem of SAP being unsupported, SA Power Networks will be at risk of being unable to deliver on its obligations to South Australian customers (refer section 2.2). Note that while this risk would not be realised until post-2025, at that point SA Power Networks would have little or no ability to effectively mitigate it. SAP was implemented in 1997 and the scale and complexity of the move to a supported new version of the application is such that SA Power Networks must begin activities well in advance of 2025, including pre-work that will be performed during this current 2015-20 regulatory control period (**RCP**), to ensure that the transition is completed by the date SAP Australia Pty Ltd withdraws support for the version of SAP currently used at SA Power Networks. SA Power Networks' strategy is to take a prudent approach to managing its IT assets and to extend their useful life, whilst maintaining system security and compliance with regulatory and legislative requirements. The recommended option in this document is aligned with SA Power Networks IT Asset Management Plan, which has an objective to *extend the useful life of IT Assets by prudent upgrades and updates*.
Drivers	If SA Power Networks does not act to address the risks related to SAP being out of support in 2025, it will have systems which, post 2025, are not able to be supported by the vendor and kept compliant and secure. This will expose SA Power Networks to significant business risk and compromise SA Power Networks' ability to reliably supply services to customers because:

Topic	Detail
	• core business operations including Network Asset Management, Work Management and critical corporate functions won't be able to operate effectively; • corporate systems won't be compliant with Regulatory and Legislative requirements; and • IT systems will be at greater risk of cyber-attack and data loss (including customer data). These drivers are explained in more detail in Section 2 of this Business Case.
Options considered	Following SAP Australia Pty Ltd's announcement, SA Power Networks conducted an extensive assessment of options, over 12 months and through two options analysis stages. An initial qualitative analysis examined which of the following options were appropriate: • do nothing • upgrading to the new supported version (SAP S/4); • moving to a competitive core platform like Oracle ERP Cloud or Microsoft Dynamics; or • moving to a portfolio of Best of Breed applications[1]. This analysis established that upgrading to the SAP S/4 version was the most prudent approach (refer section 4.1). SA Power Networks then undertook a second stage of options analysis to identify the most prudent and efficient implementation approach. The options were: • **Option 1 – New SAP S/4 implementation (and de-commission the existing SAP system):** – Keep SAP supportable by implementing a-brand new SAP S/4 system. The new system would be implemented alongside the existing SAP system and includes new enterprise business processes, selective migration of data and significant business change management. Once complete the existing SAP system would be de-commissioned and users would use the new system. This option is also known as a "green fields" implementation of SAP S/4. The assessment determined Option 1 needed to be implemented over three RCPs to minimise cost and risk to customers. – Total project cost of $60.2 million capex over three RCPs[2]; – $55.1 million within the 2020-25 RCP; and – NPV of ($44.6) million[3]. • **Option 2 – Upgrade the current SAP system to SAP S/4 over two periods:** – Total project cost of $29.7 million capex;

[1] A Best of Breed application is one that is best in its niche area or category. However, these systems require the maintenance of many systems, and create significant maintenance and integration challenges.
[2] All dollars in this business case are expressed in Dec $2017 and are exclusive of corporate overheads.
[3] Net present value of the proposal over the period 1 January 2019 to 31 December 2033, based on discount rate of 2.89%.

Topic	Detail
	– $28.7 million within the 2020-25 RCPRCP; and – NPV of ($25.2) million. • **Option 3 – Upgrade the current SAP system to SAP S/4 over three periods:** – Total project cost of $29.8 million capex; – $24.6 million within the 2020-25 RCP; and – NPV of (25.0) million.
Option selected	Options 1, 2 and 3 all achieve the required outcome to keep continuity of business operations, maintain compliance and mitigate risks however, **Option 3 - Upgrade the current SAP system to SAP S/4 over three periods has been selected** because: • it is the option which costs the least within the 2020-25 RCP; • it is the option with the lowest delivery risks; and • it appropriately addresses the business risk of an unsupported critical business application (refer to Options Assessment in Section 4).
Estimated cost	The total forecast capital expenditure for Option 3 is **$29.8 million** over three RCPs of which **$24.8 million** falls within the 2020-2025 period. The costs in the 3 RCPs are: 2015-2020: $1.0 million 2020-2025: $24.6 million 2025-2030: $4.2 million
Estimated benefits	The benefits associated with Option 3 are that it: • is the least cost option within the 2020-25 RCP to keep SAP supportable, enabling SA Power Networks to continue to deliver critical services to customers; • requires less change management for the organisation compared with a new implementation of SAP (Option 1) which in addition to a new version of SAP would also introduce new organisational-to-technical business processes; and • has the least risk of impacting customers, business as usual activities, and less delivery risk, particularly with respect to other dependent projects to be delivered during the 2020-25 RCP; and • provides $2.3 million in benefits over 15 years which are achieved by the combination of: ○ a temporary decrease in IT recurrent capex for the 2020-25 RCP; and ○ An operating expenditure (**opex**) cost avoidance from the increased SAP footprint being offset by mandatory SAP conversion simplifications.
Risks of not proceeding	The overall risk of not proceeding has been identified to be **Extreme**. The risks of not proceeding include: • Significantly increased risk of repeated and extended interruptions in SA Power Network's network services due to an increased likelihood of issues with SAP and associated dependence of emergency response field crew management processes on SAP. • SA Power Networks Market regulatory market obligations potentially compromised by delayed processing of customer transactions.

Topic	Detail
	• SA Power Networks could be exposed to significant occupational health and safety risks related to reduced reliability of SAP including the ability to: – identify, notify and maintain reliability of supply to critical and life support customers; – proactively manage bushfire vegetation risks and determine when critical assets should be switched off to protect customers or property; and – provide asset location information used to accurately identify impacts of switching activities in the field on field services personnel, other emergency services personnel and the public. • SA Power Networks' ability to generate accurate regulatory and reliability reporting could be compromised. • SA Power Networks would be unable to efficiently implement regulatory compliance changes to SAP, such as payroll, superannuation, tax changes and ASIC mandated alterations to accounting standards. • The ability to effectively long-term manage network asset data used for identification, planning and scheduling inspections and maintenance work could be impacted. This would have an adverse impact on ongoing costs (both opex and replacement expenditure (**repex**)). • Increased risk of exposure to cyber security intrusions and disruptions to electricity due to SAP not being patched properly. • Significantly increased costs if SA Power Networks' is required to revert to manual processes to address any of the above. • Remediating SAP in the future may be more expensive and risky as SAP Australia Pty Ltd may not offer tools to assist with the upgrade[4]. Note that while these risks would not be realised until post-2025, at that point SA Power Networks would have little or no ability to effectively mitigate them. For further detail on risk assessment and the benefits associated with reducing the identified risks, refer to Section 2.
Regulatory framework	SA Power Networks considers that the capital and operating expenditure to implement the SAP S/4 Upgrade program is required in order to achieve the expenditure objectives listed in clauses 6.5.6(a) and 6.5.7(a) of the NER. In particular, the expenditure is required to: • meet and manage the demand for network services; • maintain the reliability security and safety of the distribution system; and • comply with applicable regulatory obligations and requirements. Consistent with the requirements of clauses 6.5.6(c) and 6.5.7(c) of the NER, SA Power Networks considers that the forecast operating and capital expenditures requirement to implement the SAP S/4 Upgrade Program is: • efficient because a robust analysis informed by external input, including from industry peers, has concluded an upgrade to S/4 is the most efficient option; • prudent because it best addresses the significant operational risk posed by the removal of SAP maintenance support in 2025; and

[4] *If SA Power Networks was to upgrade SAP during the period that the current version remains supported, SAP will provide technical tools to assist with that upgrade activity. Post 2025, it is unclear if SAP will continue to provide these tools. If the tools were not available any SAP upgrade activity would be expected to carry both higher costs and risks*.

Topic	Detail
	• realistic because the figures used to determine the costs have been based on a combination of external advice from a global solutions provider, the vendor, and collaboration with industry peers.
Supporting evidence	SAP Australia Pty Ltd mandated in 2015 that customers (globally) move to SAP S/4 prior to 2025 should they require ongoing product support from SAP Australia Pty Ltd. SA Power Networks has undertaken a thorough process over a 12-month period to determine the most prudent approach to keep SAP supportable. Gartner recommendations for asset intensive organisations were included in this assessment. The figures used to determine the costs of the considered options were based on advice from a global solution provider, Capgemini, who developed the underlying cost models for the options presented in this business case. SA Power Networks also collaborated with other utilities, both in Australia and overseas, to ensure the approach taken to address the risk is optimal and aligned with the industry. These commercial-in-confidence discussions confirmed that their estimates are of a similar order of magnitude considering the relative scope, maturity, and integration levels of their SAP implementations when compared to the current SAP implementation at SA Power Networks.
Customer and stakeholder engagement	We presented our proposal to the customer consultative panel and reference groups at an IT Deep Dive workshop in June 2018 facilitated by Think Human[5]. Our customers sought: • further information on our options analysis; • an option other than SAP; • consideration of expenditure deferral into the following RCP. We have taken these comments on board in our analysis, refer Section 4. Other customer engagement surveys and workshops have shown that *"customers place a very high priority on receiving timely and accurate information about our services but particularly during outages. They consider this as important as reliability or price"* (SA Power Networks, Customer Research, 2017). Maintaining a supported suite of SAP products enables this capability.
Dependencies	This business case is dependent on the Infrastructure business case to deliver appropriate and supportable infrastructure.

[5] *Information Technology Deep Dive Workshop Report, SA Power Networks, 28th June 2018, version1*

2. Drivers

2.1 Introduction

SA Power Networks operates a distribution network that stretches across South Australia, comprising thousands of kilometres of powerline and hundreds of substations. SA Power Networks' integrated IT application portfolio delivers customer and enterprise business services that are critical to the efficient and effective operation and maintenance of our network, and the supply of timely and accurate information to customers during outages.

Systems Applications Products (**SAP**) has been used at SA Power Networks for over 20 years and sits at the core of the integrated IT application portfolio. SAP enables a significant number of key business functions, including:

- network asset management
- works management
- payroll and human resource management
- finance, procurement and warehouse management
- customer and network projects
- regulatory reporting and compliance
- operational decision support and analytics.

In addition, SAP functionality is currently being expanded to include customer network billing and management as part of the Customer Program for the 2015-20 Regulatory Control Period (**RCP**).

The diagram below (Figure 1) represents the core functionality within SAP utilised to bring together our applications landscape to deliver services for customers and the business.

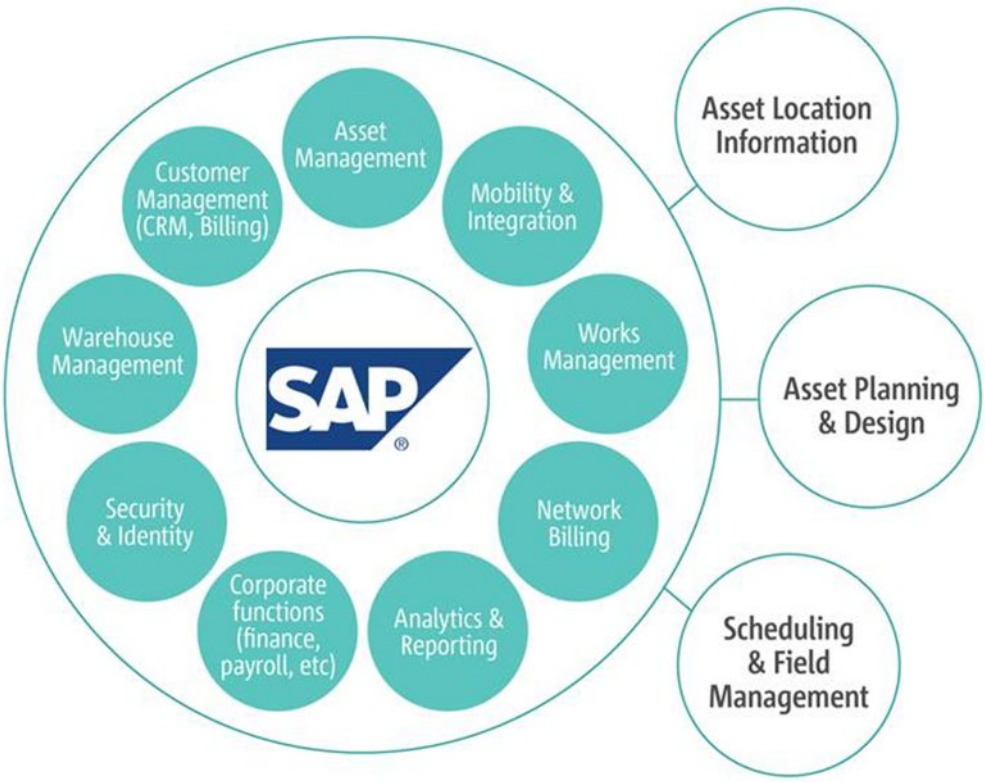


Figure 1: SAP is the core of SA Power Networks IT Application Portfolio

The following two scenarios are used to illustrate the pivotal role that SAP currently plays in the delivery of services to SA Power Networks' customers.

Scenario: Car damages pole causing outage.

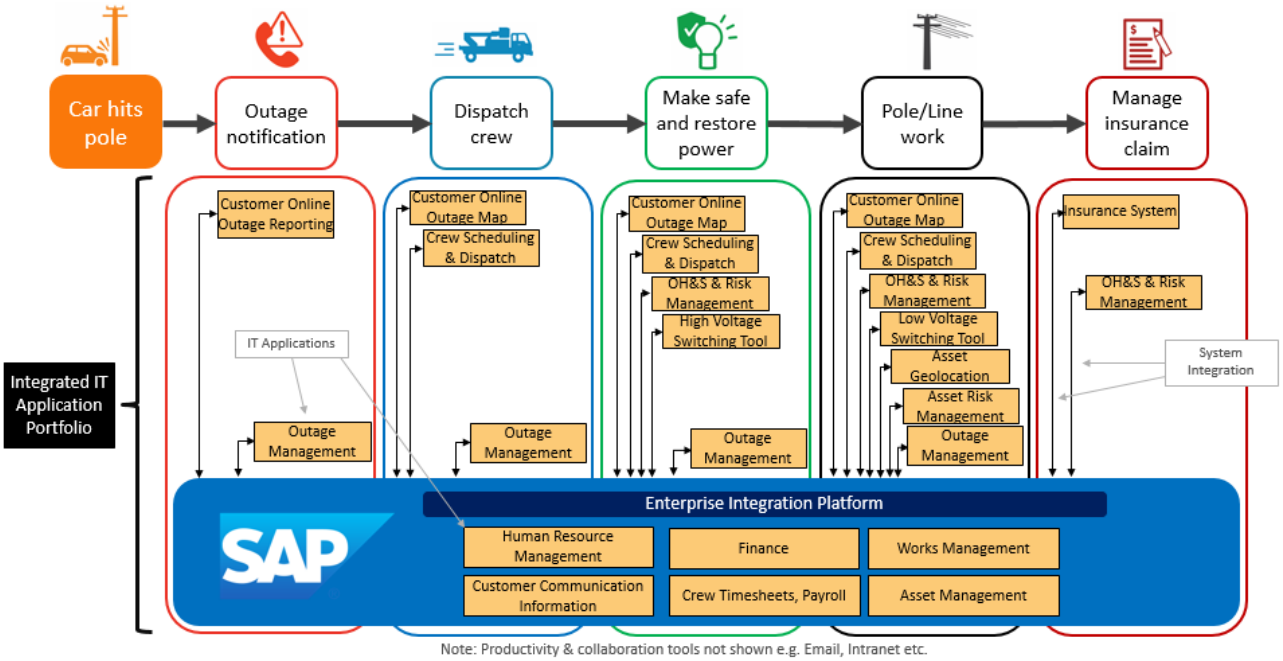


Figure 2: Business Scenario – Car hits pole causing outage

A rapid response to asset damage is critical to minimising supply interruptions. Automated interfaces, facilitated by SAP middleware (software that enables one system to talk to another), are essential to ensuring rapid and accurate data transfer between systems.
The steps involved in this scenario are represented in Figure 2 above, and include:

- Supply to many customers is interrupted after a car collides with a pole. The outage is reported by customers online and sent to the Outage Management System (**OMS**) via the SAP Enterprise Integration Platform.
- A job is created in OMS assigned to the optimal field crew in OMS by a Network Outage Centre Operator. A corresponding job is automatically created in the SAP asset management tool. The job is dispatched to crew a mobile OMS application. Meanwhile customers are notified about the outage via the SAP Customer communication tools. These customer applications are updated from data supplied via the SAP integration platform from information supplied by the field crew via their mobile OMS application.
- A repair is completed in the field, power restored to customers, and the area made safe. The work is closed out using the mobile OMS tool and the related records updated automatically in the SAP asset management tool. Any follow-up work to permanently replace the pole is created in the SAP asset management tool as subsequent planned work and passed by SAP integration platform to the scheduling tool.
- The follow-up work is added to the work schedule automatically each night by the scheduling tool and assigned to the optimal field crew based on location and capacity. Once the follow up work is done the scheduling tool passes the close out information back to the SAP asset management tool.
- An insurance claim case is raised in the insurance tools, and damage costs recovered from the driver's insurer.

Scenario: New Customer Connection

Completion of customer connections at planned appointments is key to customer satisfaction and demands close coordination between customer, electrician, Retailer, and field crews. This process is managed in the SAP asset management tool and the linked Customer information system, market transaction system, Retailer and crew scheduling tool and the automated interfaces between these systems. The steps involved in this scenario include:

- A customer requests a standard connection, e.g. a new meter and supply point. The request entered online into the SAP external portal for registered electricians or via a public web form. This data is recorded in the SAP asset management application.
- The work is scoped in SAP asset management systems and any charges determined and the customer advised.
- The Retailer sends a Service Order, a new National Meter Identifier (**NMI**) is allocated, and a service order is created in the Customer information system. The SAP asset management tool is updated, and the customer confirms an appointment time.
- The Work Order created by the SAP asset management tool is automatically sent via the SAP integration platform to the crew scheduling tool. The work is scheduled automatically each night by the scheduling tool and assigned to the optimal field crew based on location and capacity.
- The connection is energised in the field, and the Retailer advised that the customer is energised. The close out data is passed from the crew scheduling tool to the SAP asset management tool.
- A Sales Order is created in the SAP sales application based on the charges determined at scoping in the SAP asset management tool.

As identified from our business impact analysis modelling, if SAP is unavailable for more than 1 hour this will impact vital services such as:

- scheduling of all field work across the state (including outage restoration);
- critical bushfire risk management processes;
- customer messaging alerts and restoration information; and
- asset management inspection and work selection.

In some scenarios, if these services are interrupted this could potentially put at risk the safety, or lives, of SA Power Networks customers and staff (refer to operational risks in Table 2 Section 2.2 for details).

Transformation of existing SAP Software

SAP has announced that the current version of SAP used by SA Power Networks will become unsupported in 2025 and this affects all SAP customers. SAP has advised customers they must upgrade to SAP S/4 (the new version of SAP) to maintain system availability, integrity, security and regulatory and legislative compliance beyond 2025.

SAP S/4 is the most significant change to the SAP software since 1992 when the current version was released. The changes include:

- modifications to how the SAP software delivers many organisational-to-technical business processes that will require:
    - IT to replace existing capabilities with new ones; and
    - the business to change the way it uses SAP (e.g. finance, order to cash, procure to pay, enterprise asset management, enterprise project and portfolio management, warehouse management and core human resources and payroll);
- mandatory technology changes that must be implemented including:
    - significant changes to underlying data structures that have been in place for over 20 years and requiring IT to change:
        - integration with other systems;
        - custom applications that are built using the impacted database structures;
    - changed versions of the SAP mobile and desktop applications (new user interface);
    - a different reporting and analytics approach; and
    - the replacement of SAP data warehouse.

The scope of change requires careful planning, technical execution, testing and effective change management and training across the organisation, to ensure an acceptable level of risk is maintained throughout.

Additionally, the scale of this activity is such that it will not be possible for SA Power Networks to wait until 2025 to begin the work, to upgrade or otherwise replace SAP's capability in some form, without significantly impacting business as usual activities. Instead, SA Power Networks must begin this work, estimated to take between five and seven years to complete, well in advance of 2025. This will include pre-work, which will commence during this current 2015-20 RCP, to ensure that the transition is completed by the date SAP withdraws support.

To continue to deliver critical services to South Australian customers, SA Power Networks must act before 2025. To ensure this is done in the most prudent manner, SA Power Networks has undergone an extensive assessment over the past 12 months and explored options with the product vendor SAP and solution providers. The outcomes from this assessment and the recommended approach are presented in this business case.

2.2 Issues and Risks Associated with Not Proceeding

Given the criticality of SAP at SA Power Networks, if no action was taken to resolve the situation of SAP being out of support, by either upgrade or replacement in some form, SA Power Networks would not be able to meets its regulatory obligations to South Australian customers.

SAP is a vital part of SA Power Networks' integrated application landscape which supports critical business processes used to keep the network available to customers. To ensure SAP is available to carry out these business processes, it is important for it to be patched and supported by the vendor. Any unplanned outage of the SAP system for an extended period can have a significant impact on the ability of SA Power Networks to deliver business outcomes.

The following table summarises the key impacts to in the situation where SA Power Networks does not act, prior to 2025, to resolve the problem of SAP being unsupported. Note that while these risks would not be realised until post-2025, at that point SA Power Networks would have little or no ability to effectively mitigate them.

Table 1: Issue Scenarios Illustrating the Importance of Vendor Support

Issue Scenario	With SAP Vendor Support	Without SAP Vendor Support
SAP services experience an unplanned outage	Commence investigation and raise a ticket with SAP Support. SAP will provide a technical fix (eg Patch to be implemented) to resolve the application software issue causing the outage, irrespective of whether it is a known or new issue.	If the software is not supported by the vendor, no vendor updates will be available to help restore SAP services: • In the event of an outage being caused by a previously unknown technical issue SAP will not provide a fix to SA Power Networks as the solution would no longer be supported. • Instead, SAP will advise SA Power Networks to upgrade to a supported version of the software (S/4) and apply additional patches as required to address the issue. • At this point, to resolve the outage, SA Power Networks must continue an open-ended investigation of the

Issue Scenario	With SAP Vendor Support	Without SAP Vendor Support
		issue in the hope of discovering a solution or a workaround. • Both options will lengthen the time of the outage that would otherwise have been experienced. • Assuming that workarounds can eventually be developed, as workarounds begin to be applied over other workarounds, the system will become less robust. • As a result, the likelihood of more frequent and extended outages to SAP will increase. This will have knock on effects to services SA Power Networks deliver that are enabled by SAP.
Security incident	Currently SAP Australia Pty Ltd provides security updates on a continual basis and these are applied at least every month or more frequently based on business risk.	No security patches/fixes will be available which would lead to security vulnerabilities increasing the likelihood of cyberattacks which could lead to extended outages, potential loss of trust in our control systems and theft of customer information.
Statutory updates	SAP Australia Pty Ltd provides annual updates to ensure the SAP system remains compliant with statutory legislation. These are applied to SAP to ensure SA Power Networks complies with statutory changes. Example of these changes include changes to payroll, superannuation, tax rates and ASIC mandated changes to accounting standards.	No updates will be available, and the SAP system will not remain compliant with statutory legislation. Assuming workarounds could be developed, they would be likely to be both costly and inefficient.
Interoperability (ability to use information across different types of software and computer systems)	The SAP application resides in an IT environment that consists of hardware and software components from different vendors. This includes servers, operating systems and the IT network. In addition, SAP is tightly integrated with applications from other vendors. As these non-SAP components get updates from their respective vendors, SAP Australia Pty Ltd works with them to ensure that	In the absence of updates from SAP Australia Pty Ltd, it is likely that updates to the IT environment will make an unpatched SAP environment incompatible, leading to extended unplanned outages.

Issue Scenario	With SAP Vendor Support	Without SAP Vendor Support
	our SAP system continues to function. SAP Australia Pty Ltd provides the required updates to maintain interoperability with the technical environment within which it operates.	

The following operational risk assessment has been conducted in accordance with SA Power Networks' Corporate Risk Framework (refer Appendix A). This includes the application of the appropriate qualitative measures of likelihood and consequence, and the resulting overall risk rating. The following risks are assessed against the situation whereby SAP is no longer supported. As previously observed, while these risks would not be realised until post-2025, at that point SA Power Networks would have little or no ability to effectively mitigate them at that point.

Table 2: Operational Risk Assessment – Risk of Not Proceeding: SAP Unsupported Post 2025

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
1	Network Reliability	The operation and reliability of the electrical distribution network is heavily dependent on SAP and any network reliability issue can, in turn, result in company liability damages. The management of emergency response field crews is also heavily dependent on SAP. • Reliability (> 40k customers affected for an extended period of time) • Financial ($10m > SLAs < $100m) • Reputation / Customer Service (Repeated Interventions by Ombudsman or Regulator)	Possible	Major	High
2	Market Obligations	If National Electricity regulatory market obligations potentially compromised by delayed processing of Customer transactions, then SA Power Networks would be liable for significant non-compliance penalties. • Financial ($1m < Penalties < $10m)	Likely	Moderate	High

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
3	Health and Safety • Critical and Life Support Customers • Bushfire Risk Management • Switching Activities	<u>Critical and Life Support Customers:</u> Network outage management teams unable to identify, notify and maintain reliability of supply to Critical and Life Support Customers. There are potentially catastrophic consequences associated with not being able to identify critical and life support customers. SA Power Networks has more than 9,500 National Metering Identifiers (NMIs)[6] recorded for Life Support Customers. • OH&S (Multiple Fatalities) • Financial/Regulatory (> $100m penalties for notification failures) • Reputation (adverse media coverage/repeated intervention by Regulator) <u>Bushfire Risk Management:</u> SA Power Networks unable to manage bushfire risks as SAP is critical to bushfire risk management as the central collation point between several systems enabling SA Power Networks to determine when critical assets should be switched off to protect customers or properly report on and manage vegetation-related risks. In the event of bushfire caused by SA Power Networks, in addition to loss of life and property, there could be significant financial loss from Regulator and aggrieved party legal actions. • OH&S (Multiple Fatalities) • Financial / Regulatory (Fines, Court Action, Compensation Costs for loss of life and property) • Reputational (Adverse media campaigns, Intervention by Regulator) <u>Switching Activities:</u> SAP is critical to integration of GIS information with other key systems used to accurately identify impacts of switching activities in the field. This can have health and safety consequences for field services personnel, other emergency services personnel, and the general public, particularly during severe weather events. • OH&S (Death or Permanent Disability) • Financial / Regulatory (Related Fines, Workcover, Court Action, Compensation Costs) • Reputation (Adverse media coverage) • Organisational (Industrial action in the event workers are injured or killed)	Possible	Catastrophic	High

[6] *Per SAPN SAP report run 9 September 2018*

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
4	Legal Compliance	Unable to efficiently implement regulatory compliance changes to SAP, such as payroll, superannuation, tax changes and ASIC mandated alterations to accounting standards, and hence SA Power Networks would be liable to market and statutory penalties to both SA Power Networks and its directors. HR issues due to incorrect application of tax rates and superannuation could lead to issues with workforce including industrial action. • Financial/Regulatory ($1m < Penalties < $10m) • Organizational (Significant impact due to HR issues, industrial action and related reputational damage)	Almost Certain	Minor	High
5	Regulatory and Reliability Reporting	Ability to generate accurate regulatory and reliability reporting, which is heavily dependent on SAP, could be compromised. • Reputation (Intervention by Regulator) • Regulatory / Financial ($1m < Penalties >$10m)	Likely	Moderate	High
6	Planned Asset Maintenance	Ability to effectively long-term manage network assets, the data for which is maintained within SAP and used as inputs for identifying, planning and scheduling inspections and maintenance work, could be impacted. The inability to prioritise, plan and schedule planned work correctly would have an adverse impact on ongoing costs (both opex and repex). • Financial (Cost impact > $10m)	Possible	Major	High
7	Security	The vulnerability of SAP to security breaches is related to its security configuration, encryption levels, and whether regular security patching is being applied. A successful cyber-attack could result in loss of data, impact reliability of supply or compromise control systems. SA Power Networks could also expect significant financial loss from Regulator and aggrieved party legal actions. • Reliability (> 40k customers without supply for extended period) • Regulatory / Financial (Fines, legal action, damaged equipment) • OH&S (Death or Permanent Disability) • Reputation (Adverse media, intervention by Regulator)	Likely	Major	High

Risk Summary	
Given all of these operational risks would concurrently be rated at 'High', the overall risk rating for not proceeding with this program has been determined to be:	Extreme

As an example of how SAP outages effect the operational risks described above, consider the example of "Regulatory and Reliability Reporting". Without vendor support, through the provision of compliance-related patches and updates, SA Power Networks will be unable to effectively implement regulatory compliance changes to SAP, including payroll, superannuation, tax changes and ASIC mandated alterations to accounting standards. As a result, SA Power Networks would be liable to market penalties for failing to comply.

However, SA Power Networks would also be exposed to financial and reputational risk, due to significant impacts on our customers through extended outages. There would be a significant increase in the organisation's risk profile which, if realised, could have a catastrophic impact on the organisation.

As one example of the type of financial business risks that could be realized, the availability of the SAP system is required for the timely completion of the following processes. Breaching the Service Level Agreements (**SLAs**) for these activities incurs financial liabilities for SA Power Networks under the NECF and the Essential Services Commission of South Australia's GSL Scheme:

- Responding to outages and restoration of supply;
- Communication of planned outages to customers and, in particular, life support customers;
- Repairs of Streetlights;
- Customer connection, dis-connections and re-connection response time; and
- Providing timely quotes for customer requested work.

Scenario: Responding to Outages and Restoration of supply
SAP is integral to SA Power Networks' ability to respond rapidly and effectively to outages in the network. Although a small portion of the low voltage network will be monitored by 2025, for the majority of the low voltage network, SA Power Networks will still be reliant on customers reporting outages. Because customer outage reports rely on SAP being available, there is significant impact if SAP is down and SA Power Networks cannot get vendor support to resolve the problem quickly. Effectively, SA Power Networks will be 'flying blind' in respect of appropriately prioritizing, locating and dispatching field crews to investigate and resolve customer outages. As a result, SA Power Networks will be unable to resolve them in a timely manner.

It is not unusual for a storm event to affect 10,000 to 20,000 customers. If such a storm were to occur while SA Power Networks was attempting to resolve a significant SAP outage, without vendor assistance, the scale of liability that SA Power Networks could incur would be large. If unable to restore power to those customers within 48 hours in such circumstances, SA Power Networks could be liable for between $2 million and $3.5 million in GSL payments[7], from just that single event. In the event of a severe storm the impact would be much worse. Further, there would be significant and potentially life-threatening risks to the health and safety of Life Support customers as SA Power Networks would struggle to identify which faults were affecting them as well as to other Critical Customers who provide many essential services on which the South Australian public rely.

There could also be significant economic impacts to the broader South Australian community if restoration of power to South Australian businesses is delayed. The 2016 state-wide blackout was estimated to have cost South Australian businesses $367 million[8], a figure which was based on 70% of the affected businesses having power restored within 24 hours and, given the blackout occurred late in the trading day, effectively losing only one trading day of business.

[7] *Based on proposed new GSL payments and the number of historical Major Event Days*
[8] *https://business-sa.com/Commercial-Content/Media-Centre/Latest-Media-Releases/September-Blackout-Cost-State-$367-Million*

2.3 Detailed Description of Drivers

The key drivers behind this program are:

1. **Ensuring that core business operations including Network Asset Management, Works Management and critical corporate functions can continue to operate effectively**

   SAP is critical to the following business processes:

   - Network Asset Management (Lifecycle):
     - The prioritisation of all asset management inspections and maintenance is done within SAP.
   - Scheduling of all field work across the state (including outage restoration):
     - SAP is responsible for managing all work across the state. This is done by taking outage information from the OMS, the geo-location of assets from the GIS systems, Customer information from SAP, and using this to create a work order in SAP for the scheduling system to prioritise and execute the restoration of services. After the work is completed, the time spent on the restoration, any follow-up work on the asset and the condition of assets is captured in SAP.
   - Critical bushfire risk management processes:
     - SAP is the critical system combining information from multiple systems. This enables SA Power Networks to determine when critical assets need to be turned off to protect the safety and security of our customers and network.
     - Vegetation management, a key process within SAP, is also used to manage bushfire risk.
   - Customer messaging alerts and restoration information:
     - SAP is responsible for sending restoration information and alerts to customers. This is done by combining data from OMS with customer data held within SAP.

2. **Ensuring that Corporate Systems remain compliant with Regulatory and Legislative requirements**
   - SAP Australia Pty Ltd provides annual updates to ensure the SAP system remains compliant with statutory legislation.
   - These updates are applied to SAP to ensure SA Power Networks complies with statutory changes. Examples of these changes include changes to payroll, superannuation, tax rates and ASIC mandated changes to accounting standards.

3. **Ensure that IT systems are not vulnerable to cyber-attack and data loss (including customer data)**
   - A security breach could lead to the loss of customer data, impact the reliability of supply or compromise the safety of the network.
   - SA Power Networks operates 'critical infrastructure' as defined by the Australian Federal Government. As a core operational system, SAP is an important asset that must be maintained to support effective and secure operations. As stated recently by the Hon Peter Dutton MP "Owners, operators and regulators of critical infrastructure are the first line of defence"[9].
   - After 2025, there is no option for securing maintenance support, including security patches, from SAP Australia Pty Ltd.

   SA Power Networks' current version of SAP going out of support in 2025 will mean that SA Power Networks will no longer receive security patches. Therefore, SA Power Networks' systems and customer information will be exposed to increased risks associated with cyber-attacks. These attacks may lead to extended outages, loss of customer information, or compromise the safety of the network.

[9] *Opening Address to the Australian Cyber Security Centre Conference, Canberra, 11 April 2018* http://minister.homeaffairs.gov.au/peterdutton/Pages/australian-cyber-security-conference.aspx

3. Scope

3.1 In Scope

The scope of this business case is the suite of SAP applications that need to be maintained to support the operations of SA Power Networks.

To keep SAP supportable, the following applications and technologies need to be upgraded before 2025:

- SAP Business Suite (ECC6);
- SAP Business Warehouse (BW); and
- SAP Enabling Technology.

If these applications and technologies are to be replaced, the replacements should have similar functionality.

Figure 3 below depicts a more detailed view of the in-scope SAP applications and technologies that need to be upgraded to keep SAP supportable or replaced with similar functionality.

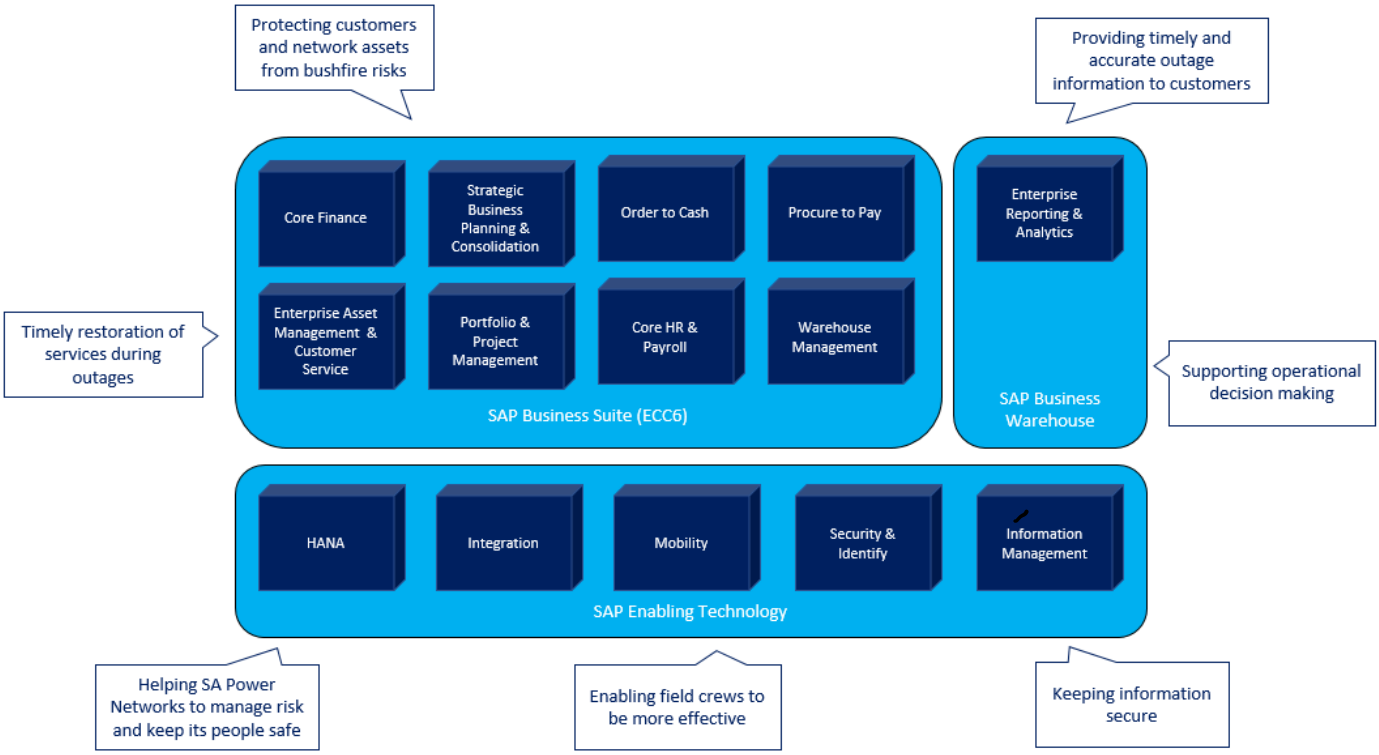


Figure 3: In-scope SAP Applications

In addition to upgrade, or replacement, of the above SAP applications, the scope would include the following:

- **Updates on interfaces to other legacy systems** - Being a core application, SAP is integrated to multiple systems. As part of this program, all legacy interfaces will need to be updated, or new interfaces developed, to ensure end-to-end business processes continue to work seamlessly across applications in the portfolio.
- **Organisational Change Management** - Organisational change management will be required to ensure a smooth adoption of any necessary changes to business processes.
- **User training** - User training will be required to support the organisation change management initiative for a successful transition.

3.2 Out of Scope

Non-SAP systems.

4. Options Assessment

4.1 Option Assessment Process

The standard approach to planning IT application upgrades, once SA Power Networks is notified by a vendor of the need to upgrade an IT application, is to follow an options assessment process in accordance with SA Power Networks' IT Asset Management plan[10]. This document guides all IT asset management work and ensures a prudent approach to IT asset management, whilst maintaining an acceptable level of risk. A key objective of the IT Asset Management plan is to extend the useful life of IT assets where there is value in doing so to our customers and stakeholders.

The purpose of this options assessment process is to determine if and when the upgrade should occur. The process considers factors including:

- business criticality;
- business and technology risk;
- implications to SA Power Networks and its customers; and
- the latest point at which the upgrade can be performed.

When it became clear that the current SAP environment was no longer going to be supported by SAP Australia Pty Ltd beyond 2025, SA Power Networks initially investigated options for extended maintenance support with the product vendor (SAP Australia Pty Ltd). SAP Australia Pty Ltd advised SA Power Networks, that no option currently exists for extended maintenance and it was unsure whether this would be offered in the future.

SA Power Networks considered the following approaches to ensure that the business capability provided by SAP was available in a platform that was vendor supported beyond 2025:

- Upgrade to the SAP S/4 version.
- Move to a competitive core platform like Oracle ERP Cloud or Microsoft Dynamics.
- Move to a portfolio of Best of Breed applications.

These alternate approaches were evaluated against a comprehensive list of qualitative criteria to determine the suitable options for a detailed bottom-up evaluation of a program to deliver a vendor supported core application platform for SA Power Networks.

The assessment criteria ratings are:

	Table 3	Table 4
Meets the majority of our criteria		
Meets most of our criteria with some issues		
Does not meet our criteria		

The table below provides an outline of our evaluation of the possible approaches:

[10] *Supporting Document 5.34 - IT Asset Management Plan 2019-2023*

Table 3: Evaluation of Approaches

Evaluation Criteria		Upgrade SAP to S/4	Implement New Competitive Core Platform like Oracle ERP Cloud or Microsoft Dynamics	Implement New Best of Breed Applications
Area	**Criteria**			
Approach adopted by peers in utilities industry	Implementation approach	We do not know of any DNSP, currently a SAP Australia Pty Ltd customer, who is not planning a move to the supported S/4 platform.	SAP Australia Pty Ltd has a dominant market share in the utilities industry worldwide.	This approach is not considered prudent and good practise for a large utility that is part of the Critical national infrastructure; it is more suited to smaller organisations.
Availability of Current Functionality	Core Finance	Currently Used.	Comparable.	Fragmented solutions available.
	Strategic Business Planning and Consolidation	Currently Used.	Functionality not available.	Fragmented solutions available.
Availability of Current Functionality	Enterprise Asset Management	Currently Used.	Functionality not comparable. Does not provide the same depth of functionality tailored to our industry.	Fragmented solutions available.
	Order to Cash	Currently Used.	Comparable.	Fragmented solutions available.
	Procure to Pay	Currently Used.	Comparable.	Fragmented solutions available.
	Portfolio and Project Management	Currently Used.	Functionality not comparable. Does not provide the same depth of functionality tailored to our industry.	Fragmented solutions available.
	Core HR & Payroll	Currently Used.	Comparable.	Fragmented solutions available.
	Warehouse Management	Currently Used.	Functionality not comparable. Does not provide the same depth of functionality tailored to our industry.	Fragmented solutions available.

Evaluation Criteria		Upgrade SAP to S/4	Implement New Competitive Core Platform like Oracle ERP Cloud or Microsoft Dynamics	Implement New Best of Breed Applications
Area	**Criteria**			
Enabling Technology capabilities	Mobility	Currently Used.	Functionality not available.	Fragmented solutions available.
	Security and Identity Management	Currently Used.	Comparable.	Fragmented solutions available.
	Integrated data model enabling fast analysis.	Currently Used.	Functionality not available.	Fragmented solutions available.
Enabling Technology capabilities	Integration	Current SAP Platform part of an integrated IT applications portfolio.	To replicate integration across other IT applications will be challenging (i.e. we would have to develop new integration to our non-SAP applications from scratch). Also, since many of these applications were originally selected, in part, for good fit with SAP, we may need to develop bespoke integrations for them.	To replicate integration not only across other IT applications but also among the group of applications to replicate the current functionality would be extremely challenging.
Enterprise Reporting and Analytics	Real time operational Reporting	Currently Used.	Functionality not available.	Functionality not available.
	AI and Automation capabilities	Currently Used.	Comparable.	Comparable.
	Predictive Analytics and Predictive Maintenance capabilities	Currently Used.	Comparable	Comparable
Market Reputation	Market Share in Utilities Industry Vertical	Clear industry leader.	Isolated utilities customers.	Utilities are moving away from this approach as not considered prudent or efficient.
	Position within CKI group (parent entity) world wide	Widespread use.	Isolated usage.	Not used or in the process of being phased out.

Evaluation Criteria		Upgrade SAP to S/4	Implement New Competitive Core Platform like Oracle ERP Cloud or Microsoft Dynamics	Implement New Best of Breed Applications
Area	**Criteria**			
	Existing vendor relationships.	There is a global initiative across CKI to manage ongoing maintenance costs.	Some established relationships with some vendors via CKI Group related to isolated usage descried above.	None. (Multiple would be required).
Technical Support	Availability of support to equivalent levels.	Existing vendor with excellent support.	Technical support equivalent to that provided by SAP Australia Pty Ltd is available.	Fragmented technical support, due to involvement of multiple application vendors, would add complexity to resolution of integration issues between applications.
Delivery Risk	Change Management & Training	Business Users where functionality has changed between versions. Some minor retraining of some support staff.	Entire organisation will need to be retrained from scratch in the new platform including support staff.	Entire organisation will need to be retrained in the use of many different applications including support staff.
	Data Migration	SAP Conversion tools available for data migration.	Different platforms have different data models: • Inability to migrate legacy data would require implementation of a new data warehouse application. • Related reporting would have to be compiled from two different sources until the legacy data was no longer required.	This approach has several disadvantages: • Disparate applications would need to hold multiple copies of the same data (no 'single source of truth'). • Inability to migrate legacy data would require implementation of a new data warehouse application. • Related reporting would have to be compiled from multiple sources until the legacy data was no longer required.

Evaluation Criteria		Upgrade SAP to S/4	Implement New Competitive Core Platform like Oracle ERP Cloud or Microsoft Dynamics	Implement New Best of Breed Applications
Area	**Criteria**			
	Conversion Tools to convert existing ('brownfields) platform to new platform.	Available; this provides different options for moving to a supported environment	A new, greenfield implementation is the only option available.	A new, greenfield implementation is the only option available (a new implementation would be required for every application implemented).
Delivery Risk	Availability of skilled resources or implementation partners available in Adelaide.	SAP Australia Pty Ltd has a clear and dominant market share in Adelaide making it easier to get suitable support resources. However, given the number of organisations migrating to S/4 that there will be shortage of supply of resources in the market during the next RCP.	Support resources more difficult to get, increasing the delivery risk.	Disparate applications will need different support skills which may be harder to find together in one person. SA Power Networks may have to use more support resources or train support resources with unique combinations of skills.
	Availability of skilled internal functional and technical resources within SA Power Networks.	SA Power Networks has a strong SAP technical and functional skill base	No internal functional or technical resources within SA Power Networks. Training or recruitment would be required.	No internal functional or technical resources within SA Power Networks. Disparate applications will need different support skills which may be harder to find together in one person. SA Power Networks may have to recruit more support resources or train support resources with unique combinations of skills.
Security	CIC Compliance	Current vendor; services used are compliant as any global supplier.	Compliant as any global supplier.	Some niche product suppliers overseas may not be fully CIC compliant.

Evaluation Criteria		Upgrade SAP to S/4	Implement New Competitive Core Platform like Oracle ERP Cloud or Microsoft Dynamics	Implement New Best of Breed Applications
Area	**Criteria**			
	Regular and timely security patching of identified vulnerabilities.	Compliant to SA Power Networks' security policy.	Compliant to SA Power Networks' security policy.	Compliant to SA Power Networks' security policy

The findings from Table 3 were then summarised (see Table 4 below) to qualitative criteria to determine the most prudent options for a detailed bottom-up evaluation:

Table 4: Summary of Approach Evaluation

	Approach		
Evaluation Criteria	**Upgrade SAP to S/4 Version**	**Implement New Competitive Core Platform like Oracle ERP Cloud or Microsoft Dynamics**	**Implement New Best of Breed Applications**
Approach adopted by peers in utilities industry	Consistent with peers.	SAP is dominant amongst our peers.	Not considered prudent practice for Utilities Industry.
Availability of Current Functionality	Equivalent to current use.	Industry-tailored functionality not comparable.	Fragmented solutions available.
Enabling Technology capabilities	Mobility, Security and Integration equivalent to current.	Some functionality not available or would need to be bespoke.	Some fragmented functionality available but replicating of current levels of functionality would be very complex.
Enterprise Reporting and Analytics	Equivalent to current use.	Real time operational Reporting would not be available.	Real time operational Reporting would not be available.
Market Reputation	Industry leader used broadly across SA Power Networks' parent and sister companies.	Isolated utilities coverage, limited usage amongst SA Power Networks' parent and sister companies.	Utilities are moving away from this approach as not considered prudent or efficient.
Technical Support	Equivalent to current.	Equivalent to current.	Fragmented technical support, due to involvement of multiple application vendors, would add complexity.
Delivery Risk	SAP Australia Pty Ltd provides data migration tools and conversion tools for flexibility of delivery approach, good availability of skilled resources both internally and in the local market.	Only one delivery approach, no data conversion tools, limited skilled resources in local market, entire organisation would require retraining.	Various delivery approaches, no data conversion tools, limited skilled resources, with required combinations of skills available in local market, entire organisation would require retraining across a range of applications.
Security	Equivalent to current.	Equivalent to current.	Some niche vendors may not be fully compliant.

As shown by the above qualitative analysis, the most prudent approach for SA Power Networks would be to move to a supported SAP S/4 version.

At this point, SA Power Networks conducted:

- a detailed technical change assessment of our current SAP environment compiled by SAP Australia Pty Ltd;
- detailed planning analysis and cost modelling for options, prepared by Capgemini, for options for a:
    - technical Conversion ('Brownfields') S/4 Upgrade; and
    - entirely new SAP S/4 ('Greenfields) implementation; and
- an assessment of what SA Power Network's peers were doing to address the situation.

SA Power Networks engaged SAP Australia Pty Ltd to undertake a detailed technical change impact assessment of its existing environment to determine the complexity, sequencing and technical approach and effort required to move to a supported SAP S/4 environment.

With the technical readiness recommendations provided by SAP Australia Pty Ltd, SA Power Networks then consulted Capgemini, a global consulting and implementation organisation, to undertake detailed planning analysis (inclusive of cost models) for the following two technical approaches to move to a supported SAP S/4 environment:

- upgrading the current SAP implementation to a S/4 SAP implementation ('Brownfields); and
- starting fresh with an entirely new SAP S/4 implementation ('Greenfields') and then decommissioning the existing SAP implementation.

SA Power Networks also reviewed what its peers were doing in respect of addressing the risk of their current SAP implementations moving out of support. It was determined from those commercial-in-confidence discussions that SA Power Networks' peers, who use SAP, were all moving to adopt SAP S/4.

A number of SAP options were identified and some, including attempting to complete all S/4 transition activities within a single reset period, were discounted due to the delivery risk this would create with other associated with other dependent 2020-25 RCP activities. The following options were shortlisted and underwent more detailed analysis.

The options considered were:

- Option 1: New SAP S/4 Implementation (and de-commission the existing SAP system);
- Option 2: Upgrade the current SAP system to SAP S/4 over two periods; and
- Option 3: Upgrade the current SAP system to SAP S/4 over three periods.

The following diagram summarises the options that were assessed in more detail versus not proceeding:

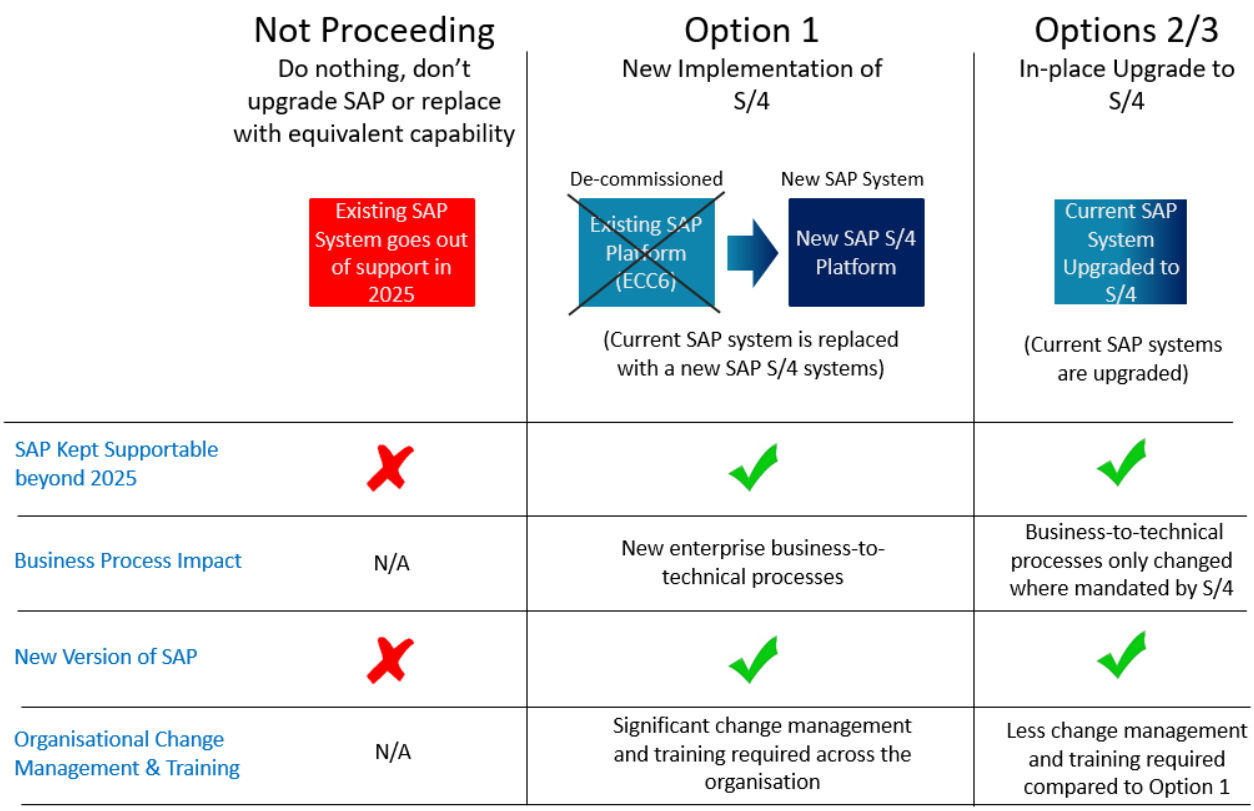


Figure 4: Keeping SAP Supportable Options Summary

4.2 Option 1: New SAP S/4 implementation (and de-commission the existing SAP system)

This option involves installing and configuring an entirely new SAP S/4 system alongside the existing SAP system. This option has the most business impact of all the options with business wide organisational-to-technical business process re-design and implementation, in addition to a new version of SAP for the business to learn. It also has the least reuse of past SAP platform investments (e.g. mobile applications). As a result, this option has the largest up-front capital investment of all the options.

Key phases of the new implementation project are:

1. Building new organisational-to-technical business processes for configuration in SAP S/4 across the whole business;
2. Migrating legacy data from the old SAP to new SAP S/4;
3. Change management and training related to the new technical business processes; and
4. Decommissioning the existing SAP system.

The post-projects planned in the RCP period 2025-2030 are required to ensure data clean-up to adopt and leverage the new technological capabilities of S/4. The timing of these projects is consistent with the industry practice as these are usually done after the conversion and have no impact on the vendor supportability of the underlying application platform. This approach provides a benefit in respect of reducing the delivery risk of other dependent 2020-25 RCP activities (refer Benefits below).

Costs

Option 1 is spread across three RCPs and includes expenditure of $55.1 million in the regulatory 2020-25 RCP.[11]

Table 5 - Option 1 Capital Expenditure Cost Estimates ($'000 Dec $2017)

Project Phase	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2020-25 RCP	2025/2026	Total Cost
ERP Content Migration and Archiving									
S/4 Greenfield Migration									
S/4 Release Update									
Custom Solution Replacement									
BW4HANA Technical Conversion									
Migration to Success Factors (Employee Central)									
Embedded Analytics									
Business Planning and Consolidation									
BW Modelling & Report Alignment									
TOTAL	911	-	19,708	33,475	1,960	-	55,143	4,157	60,211

(Details of the underlying cost models are provided in Appendix B)

Benefits

- Keeps SAP supportable enabling SA Power Networks to continue to deliver critical services to customers.
- Scheduled post-projects outside the 2020-25 RCP slightly reduce the delivery risk of other dependent 2020-25 RCP activities.
- Business processes in SAP are better aligned to best practice.
- As Option 1 will require all organisational-to-technical business processes to be redefined and rebuilt, there will be better alignment with standard SAP processes, a reduction in customisations and an overall simplification of the SAP environment (whereas in the two technical conversion options the intention is to not rebuild processes unless technically necessary to do so). A new SAP S/4 implementation will therefore:

[11] *All dollars are expressed in Dec $2017*

- better align business processes in SAP to best practice, potentially delivering broader organisational financial and qualitative benefits (although this is difficult to define – refer to disadvantages below); and

These IT maintenance and upgrade benefits equate to **$13 million** over a 15-year cash flow analysis (2019 – 2033). Benefits other than the once off recurrent IT capex cost reduction commence in 2024 following completion of the main S4 Greenfields Migration project.

Disadvantages

- Highest upfront cost option.
- Uncertain investment payback that would necessitate approximately $28 million of business productivity benefits (in addition to the IT maintenance and upgrade benefits described above) over the 10 years following the new SAP S/4 implementation (2024 to 2033) in order to achieve an investment appraisal (NPV) advantageous to technical conversion (Option 3).
  - The ability to achieve such business productivity benefits is highly speculative given that until a given business process has been re-modelled, any estimation of the efficiency improvement in that process cannot be estimated with any reasonable level of certainty. Given a new SAP S/4 implementation entails the modelling and definition of hundreds of processes across the organisation, this is not possible in the context of a regulatory submission investment level business case.
- Ties up both technical and business (i.e. BAU and service delivery) resources across the organisation for an extended period of time due to the need to revisit and rebuild all organisational-to-technical business processes. This could potentially have knock on effects to customers.
- **Delivery risks**:
  - High level of delivery risk as very large program of work with significant resource intensity.
  - Any delays in this project could potentially impact on other projects in the same period (i.e. timing of this activity versus proposed timing of other 2020-25 RCP activities dependent on the completion of this program's 2020-2025 activities).

- Availability of appropriate S/4 resources (many other organisations will be performing similar remediation work hence resources will be scarcer as we approach 2025).
- Risk of cost overruns.
- Risk of inability to retain all past transaction data; and
- Dependence on infrastructure refresh and cloud hosting projects.

Risks

The following residual operational risk assessment has been conducted in accordance with SA Power Networks' Corporate Risk Framework (refer Appendix A). This includes the application of the appropriate qualitative measures of likelihood and consequence, and the resulting overall risk rating.

The following risks are assessed for Option 1.

Table 6: Option 1 Risk Assessment

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
1	Network Reliability	The operation and reliability of the electrical distribution network is heavily dependent on SAP and any network reliability issue can, in turn, result in company liability damages. The management of emergency response field crews is also heavily dependent on SAP. • Reliability (> 40,000 customers affected for an extended period of time) • Financial ($10m > SLAs < $100m) • Reputation / Customer Service (Repeated Interventions by Ombudsman or Regulator)	Unlikely	Major	Medium
2	Market Obligations	If National Electricity regulatory market obligations potentially compromised by delayed processing of Customer transactions, then SA Power Networks would be liable for significant non-compliance penalties. • Financial ($1m < Penalties < $10m)	Unlikely	Moderate	Low

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
3	Health and Safety • Critical and Life Support Customers • Bushfire Risk Management • Switching Activities	<u>Critical and Life Support Customers:</u> Network outage management teams unable to identify, notify and maintain reliability of supply to Critical and Life Support Customers. There are potentially catastrophic consequences associated with not being able to identify critical and life support customers. SA Power Networks has more than 9,500 NMIs recorded for Life Support Customers. • OH&S (Multiple Fatalities) • Financial/Regulatory (> $100m penalties for notification failures) • Reputation (Severe media coverage/repeated intervention by Regulator) <u>Bushfire Risk Management:</u> SA Power Networks unable to manage bushfire risks as SAP is critical to bushfire risk management as the central collation point between several systems enabling SA Power Networks to determine when critical assets should be switched off to protect customers or properly report on and manage vegetation-related risks. In the event of bushfire caused by SA Power Networks, in addition to loss of life and property, there could be significant financial loss from Regulator and aggrieved party legal actions. • OH&S (Multiple Fatalities) • Financial / Regulatory (Fines, Court Action, Compensation Costs for loss of life and property) • Reputational (Adverse media campaigns, Intervention by Regulator) <u>Switching Activities:</u> SAP is critical to integration of GIS information with other key systems used to accurately identify impacts of switching activities in the field. This can have health and safety consequences for field services personnel, other emergency services personnel, and the general public, particularly during severe weather events. • OH&S (Death or Permanent Disability) • Financial / Regulatory (Related Fines, Workcover, Court Action, Compensation Costs) • Reputation (Adverse media coverage) • Organisational (Industrial action in the event workers are injured or killed)	Rare	Catastrophic	Medium

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
4	Legal Compliance	Unable to efficiently implement regulatory compliance changes to SAP, such as payroll, superannuation, tax changes and ASIC mandated alterations to accounting standards, and hence SA Power Networks would be liable to market and statutory penalties to both SA Power Networks and its directors. HR issues due to incorrect application of tax rates and superannuation could lead to issues with workforce including industrial action. • Financial/Regulatory ($1m < Penalties < $10m) • Organizational (Significant impact due to HR issues, industrial action and related reputational damage)	Unlikely	Minor	Low
5	Regulatory and Reliability Reporting	Ability to generate accurate regulatory and reliability reporting, which is heavily dependent on SAP, could be compromised. • Reputation (Intervention by Regulator) • Regulatory / Financial ($1m < Penalties >$10m)	Rare	Moderate	Low
6	Planned Asset Maintenance	Ability to effectively long-term manage network assets, the data for which is maintained within SAP and used as inputs for identifying, planning and scheduling inspections and maintenance work, could be impacted. The inability to prioritise, plan and schedule planned work correctly would have an adverse impact on ongoing costs (both opex and repex). • Financial (Cost impact > $10m)	Rare	Major	Low
7	Security	The vulnerability of SAP to security breaches is related to its security configuration, encryption levels, and whether regular security patching is being applied. A successful cyber-attack could result in loss of data, impact reliability of supply or compromise control systems. SA Power Networks could also expect significant financial loss from Regulator and aggrieved party legal actions. • Reliability (> 40,000 customers without supply for extended period) • Regulatory / Financial (Fines, legal action, damaged equipment) • OH&S (Death or Permanent Disability) • Reputation (Adverse media, intervention by Regulator)	Unlikely	Major	Medium

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
8	Delivery Risk	Significant delivery risk due to the implementation of an enterprise wide application caused by cost overruns, delayed schedules due to potential for resource and schedule conflicts with other proposed activities in the 2020-25 RCP, risk of impact on other organisational activities due to the need to completely rebuild all organisation-to-technical business processes. • Financial ($10m > cost overruns < $100m) • Organisational impact due to impact on on-going operations	Likely	Major	High

Risk Summary	
The overall risk rating for Option 1 is:	High

4.3 Option 2: Upgrade the current SAP system to SAP S/4 over two periods

Option 2 is based on an in-place technical upgrade of the current SA Power Networks' SAP system to SAP S/4 with completion in 2025.

This requires SA Power Networks to:

1. Execute a series of pre-projects to prepare the system for conversion;
2. Execute the conversion. This will include transformation of existing legacy customized organisational-to-technical business processes, configured in SAP, which will not work within the new release;
3. Execute the post-projects to complete the conversion program; and
4. Change management and training.

The work required to complete Option 2 would be spread over the 2015-2020 and 2020-25 RCPs.

A key benefit of this option (over Option 1) is that it enables a more prudent approach to change management, by maximising reuse of existing organisational-to-technical business processes, configured in SAP, and other past SAP platform investments.

Costs

Option 2 is a compressed scenario which has all work completed during two RCPs and includes expenditure of $28.8 million in the regulatory 2020-25 RCP.

Table 7 - Option 2 (Compressed Activity & Cost) Program Expenditure Capital Cost Estimates ($'000 Dec $2017)

Project Phase	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2020-25 RCP	2025/2026	Total Cost
ERP Content Migration and Archiving	[redacted]								
Revenue Accounting									
Prep Customer Vendor Integration									
Customer Vendor Integration									
Employee to Business Partner									
New Credit Management									
Initial Code Remediation and Analysis									
S/4 Technical Conversion									
S4 Release Update									
BW4HANA Technical Conversion									
Migration to Success Factors (Employee Central)									
Customer Service									
Embedded Enterprise Warehouse Management									
Embedded Analytics									
Business Planning and Consolidation									
BW Modelling & Report Alignment									
TOTAL	961	4,684	5,806	10,585	3,554	4,122	28,750	-	29,711

(Details of the underlying cost models are provided in Appendix B)

Benefits

- Keeps SAP supportable enabling SA Power Networks to continue to deliver critical services to customers.
- Lower overall project cost than a new implementation (Options 1).
- Lower cost than a new implementation (Option 1) within the 2020-25 RCP.
- Lower overall project cost than Option 3 (although more expensive than Option 3 within the 2020-25 RCP).
- Will retain existing SAP functionality (like for like conversion) which requires less change management/training impact on the organisation.

- Whilst the premise for Option 2 (and Option 3) is like for like system conversion, it will be necessary for some business processes to be altered and some SAP system simplification to occur where the conversion process makes it technically necessary to do so (ie existing process configuration or customisations will simply not work with the new release). This will reduce some of the customisations and simplify some parts of the SAP system (albeit much less than Option 1). This simplification of SAP is expected to result in the following financial benefits:

These IT maintenance and upgrade benefits equate to **$2.3 million** over a 15-year cash flow analysis (2019 – 2033). Benefits other than the once off recurrent IT capex cost reduction commence in 2024 following completion of the core conversion program projects.

Disadvantages

- Most legacy organisational-to-technical business processes configured in SAP, will be retained. This may result in these processes being more complex and/or less efficient than would otherwise be the case with a new SAP S/4 implementation. As the intention is to not redefine and rebuild organisational-to-technical business processes unless technically necessary to do so to convert to SAP S/4, any inherent process complexity or inefficiencies may also be retained.
    - **Delivery risks:**
        - pre-project delays could have an impact on the main project;
        - any delays in this project could potentially impact on other projects in the same period (i.e. timing of this activity versus proposed timing of other 2020-25 RCP activities dependent on the completion of this program's 2020-2025 activities);
        - availability of appropriate S/4 resources (many other organisations will be performing similar remediation work hence resources will be scarcer as we approach 2025); and
        - dependence on infrastructure refresh and cloud hosting projects.

Risks

The following operational risk assessment has been conducted in accordance with SA Power Networks' Corporate Risk Framework (refer Appendix A). This includes the application of the appropriate qualitative measures of likelihood and consequence, and the resulting overall risk rating.

The following risks are assessed against Option 2.

Table 8: Option 2 Risk Assessment

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
1	Network Reliability	The operation and reliability of the electrical distribution network is heavily dependent on SAP and any network reliability issue can, in turn, result in company liability damages. The management of emergency response field crews is also heavily dependent on SAP. • Reliability (> 40,000 customers affected for an extended period of time) • Financial ($10m > SLAs < $100m) • Reputation / Customer Service (Repeated Interventions by Ombudsman or Regulator)	Unlikely	Major	Medium
2	Market Obligations	If National Electricity regulatory market obligations potentially compromised by delayed processing of Customer transactions, then SA Power Networks would be liable for significant non-compliance penalties. • Financial ($1m < Penalties < $10m)	Unlikely	Moderate	Low

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
3	Health and Safety • Critical and Life Support Customers • Bushfire Risk Management • Switching Activities	<u>Critical and Life Support Customers:</u> Network outage management teams unable to identify, notify and maintain reliability of supply to Critical and Life Support Customers. There are potentially catastrophic consequences associated with not being able to identify critical and life support customers. SA Power Networks has more than 9,500 NMIs recorded for Life Support Customers. • OH&S (Multiple Fatalities) • Financial/Regulatory (> $100m penalties for notification failures) • Reputation (Severe media coverage/repeated intervention by Regulator) <u>Bushfire Risk Management:</u> SA Power Networks unable to manage bushfire risks as SAP is critical to bushfire risk management as the central collation point between several systems enabling SA Power Networks to determine when critical assets should be switched off to protect customers or properly report on and manage vegetation-related risks. In the event of bushfire caused by SA Power Networks, in addition to loss of life and property, there could be significant financial loss from Regulator and aggrieved party legal actions. • OH&S (Multiple Fatalities) • Financial / Regulatory (Fines, Court Action, Compensation Costs for loss of life and property) • Reputational (Adverse media campaigns, Intervention by Regulator) <u>Switching Activities:</u> SAP is critical to integration of GIS information with other key systems used to accurately identify impacts of switching activities in the field. This can have health and safety consequences for field services personnel, other emergency services personnel, and the general public, particularly during severe weather events. • OH&S (Death or Permanent Disability) • Financial / Regulatory (Related Fines, Workcover, Court Action, Compensation Costs) • Reputation (Adverse media coverage) • Organisational (Industrial action in the event workers are injured or killed)	Rare	Catastrophic	Medium

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
4	Legal Compliance	Unable to efficiently implement regulatory compliance changes to SAP, such as payroll, superannuation, tax changes and ASIC mandated alterations to accounting standards, and hence SA Power Networks would be liable to market and statutory penalties to both SA Power Networks and its directors. HR issues due to incorrect application of tax rates and superannuation could lead to issues with workforce including industrial action. • Financial/Regulatory ($1m < Penalties < $10m) • Organizational (Significant impact due to HR issues, industrial action and related reputational damage)	Unlikely	Moderate	Low
5	Regulatory and Reliability Reporting	Ability to generate accurate regulatory and reliability reporting, which is heavily dependent on SAP, could be compromised. • Reputation (Intervention by Regulator) • Regulatory / Financial ($1m < Penalties >$10m)	Rare	Moderate	Low
6	Planned Assets Maintenance	Ability to effectively long-term manage network assets, the data for which is maintained within SAP and used as inputs for identifying, planning and scheduling inspections and maintenance work, could be impacted. The inability to prioritise, plan and schedule planned work correctly would have an adverse impact on ongoing costs (both opex and repex). • Financial (Cost impact > $10m)	Rare	Major	Low
7	Security	The vulnerability of SAP to security breaches is related to its security configuration, encryption levels, and whether regular security patching is being applied. A successful cyber-attack could result in loss of data, impact reliability of supply or compromise control systems. SA Power Networks could also expect significant financial loss from Regulator and aggrieved party legal actions. • Reliability (> 40,000 customers without supply for extended period) • Regulatory / Financial (Fines, legal action, damaged equipment) • OH&S (Death or Permanent Disability) • Reputation (Adverse media, intervention by Regulator)	Unlikely	Major	Medium

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
8	Delivery Risk	Significant delivery risk due to the implementation of an enterprise wide application caused by cost overruns, delayed schedules due to potential for resource and schedule conflicts with other proposed activities in the 2020-25 RCP, risk of impact on other organisational activities due to the need to completely rebuild all organisation-to-technical business processes. • Financial ($10m > cost overruns < $100m) • Organisational impact due to impact on on-going operations	Unlikely	Major	Medium

Risk Summary	
The overall risk rating for Option 2 is:	Medium

4.4 Option 3: Upgrade the current SAP system to SAP S/4 over three periods

Like Option 2, Option 3 is based on an in-place technical upgrade of the current SA Power Networks' SAP system to S/4, enabling a more prudent approach to change management, by maximising reuse of existing organisational-to-technical business processes configured in SAP. A further advantage to Option 3, is that the upgrade activity is spread over 3 RCPs which further reduces the associated delivery risks and upfront capital investment.

Option 3 requires SA Power Networks to:

1. Execute a series of pre-projects to prepare the system for conversion;
2. Execute the conversion. This includes the transformation of existing legacy customized organisational-to-technical business processes, configured in SAP, which will not work within the new release;
3. Execute the post-projects to complete the conversion program; and
4. Change management and training.

Rationale of this Approach

Being a complex conversion to an application with a modern digital technological platform, and with over 20 years' business transaction data in its SAP system, SA Power Networks is adopting a prudent and conservative approach to ensure this core platform remains supported. The pre-projects start in the existing 2015-20 RCP such that the core conversion project to S/4, which ensures supportability, is planned to be completed by 2023.

The post-projects planned in the RCP period 2025-2030 are required to ensure data clean-up to adopt and leverage the new technological capabilities of S/4. The timing of these projects is consistent with the industry practise as these are usually done after the conversion and have no impact on the vendor supportability of the underlying application platform. This approach provides a benefit in respect of reducing the delivery risk of other dependent 2020-25 RCP activities (refer Benefits below).

Costs

Option 3 is an optimized option which spreads out both activity and expenditure. The estimated costs for Option 3 are for the same activities as in Option 2 but spread out across three RCPs. It includes expenditure of $24.6 million in the regulatory 2020-25 RCP and moves $4.2 million post the regulatory period.

Table 9 - Option 3 (Spread Activity & Cost) Program Expenditure Capital Cost Estimates ($'000 Dec $2017)

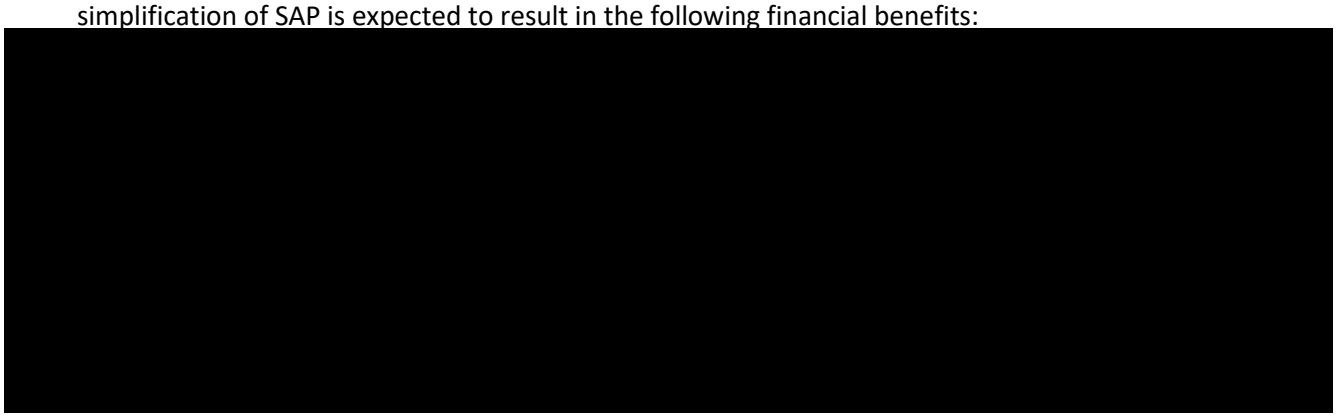
Project Phase	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2020-25 RCP	2025/2026	Total Cost
ERP Content Migration and Archiving									
Revenue Accounting									
Prep Customer Vendor Integration									
Customer Vendor Integration									
Employee to Business Partner									
New Credit Management									
Initial Code Remediation and Analysis									
S/4 Technical Conversion									
S4 Release Update									
BW4HANA Technical Conversion									
Migration to Success Factors (Employee Central)									
Customer Service									
Embedded Enterprise Warehouse Management									
Embedded Analytics									
Business Planning and Consolidation									
BW Modelling & Report Alignment									
TOTAL	961	4,684	3,624	10,585	4,142	1,593	24,628	4,235	29,825

(Details of the underlying cost models are provided in Appendix B)

Benefits

- Keeps SAP supportable enabling SA Power Networks to continue to deliver critical services to customers.
- Lower cost option than a new implementation (Option 1) both on overall cost of project and cost within 2020-25 RCP.
- Least cost option within the 2020-25 RCP.
- Retains existing SAP functionality (like for like conversion) which requires less change management/training impact on the organisation.

- With all other SAP Australia Pty Ltd customers involved in a similar activity to move to SAP S/4, this approach minimises the delivery risk with the plan to complete the core conversion project by 2023. This provides us with a buffer in case of resource availability issues from service providers.
- This approach also minimises the delivery risk of other 2020-25 RCP initiatives dependent on a suitable and supported SAP environment compared with Option 2, having the least likelihood of scheduling and resource conflicts with other projects.
- Like Option 2, the premise for Option 3 is a like for like system conversion, therefore it will be necessary for some business processes to be altered and some SAP system simplification to occur where the conversion process makes it technically necessary to do so (i.e. existing process configuration or customisations will simply not work with the new release). This will reduce some of the customisations and simplify some parts of the SAP system (albeit much less than Option 1). This simplification of SAP is expected to result in the following financial benefits:



These IT maintenance and upgrade benefits equate to **$2.3 million** over a 15-year cash flow analysis (2019 – 2033). Benefits other than the once off recurrent IT capex cost reduction commence in 2024 following completion of the core conversion program projects.

Disadvantages

- Most legacy organisational-to-technical business processes configured in SAP, will be retained. This may result in these processes being more complex and/or less efficient than would otherwise be the case with a new SAP S/4 implementation. As the intention is to not redefine and rebuild organisational-to-technical business processes unless technically necessary to do so to convert to SAP S/4, any inherent process complexity or inefficiencies may also be retained.
- Delivery risks:
  - pre-project delays could have an impact on the main project;
  - any delays in this project could potentially impact on other projects in the same period although the risk of this is less than for the Option 2 (i.e. considering timing of this activity versus proposed timing of other 2020-25 RCP activities dependent on the completion of this program's 2020-2025 activities);
  - availability of appropriate S/4 resources (many other organisations will be performing similar remediation work hence resources will be scarcer as we approach 2025); and
  - dependence on infrastructure refresh and cloud hosting projects.

Risks

The following operational risk assessment has been conducted in accordance with SA Power Networks' Corporate Risk Framework (refer Appendix A). This includes the application of the appropriate qualitative measures of likelihood and consequence, and the resulting overall risk rating.

The following risks are assessed against Option 3.

Table 10: Option 3 Risk Assessment

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
1	Network Reliability	The operation and reliability of the electrical distribution network is heavily dependent on SAP and any network reliability issue can, in turn, result in company liability damages. The management of emergency response field crews is also heavily dependent on SAP. • Reliability (> 40,000 customers affected for an extended period of time) • Financial ($10m > SLAs < $100m) • Reputation / Customer Service (Repeated Interventions by Ombudsman or Regulator)	Unlikely	Major	Medium
2	Market Obligations	If National Electricity regulatory market obligations potentially compromised by delayed processing of Customer transactions, then SA Power Networks would be liable for significant non-compliance penalties. • Financial ($1m < Penalties < $10m)	Unlikely	Moderate	Low

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
3	Health and Safety • Critical and Life Support Customers • Bushfire Risk Management • Switching Activities	<u>Critical and Life Support Customers:</u> Network outage management teams unable to identify, notify and maintain reliability of supply to Critical and Life Support Customers. There are potentially catastrophic consequences associated with not being able to identify critical and life support customers. SA Power Networks has more than 9,500 NMIs recorded for Life Support Customers. • OH&S (Multiple Fatalities) • Financial/Regulatory (> $100m penalties for notification failures) • Reputation (Severe media coverage/repeated intervention by Regulator) <u>Bushfire Risk Management:</u> SA Power Networks unable to manage bushfire risks as SAP is critical to bushfire risk management as the central collation point between several systems enabling SA Power Networks to determine when critical assets should be switched off to protect customers or properly report on and manage vegetation-related risks. In the event of bushfire caused by SA Power Networks, in addition to loss of life and property, there could be significant financial loss from Regulator and aggrieved party legal actions. • OH&S (Multiple Fatalities) • Financial / Regulatory (Fines, Court Action, Compensation Costs for loss of life and property) • Reputational (Adverse media campaigns, Intervention by Regulator) <u>Switching Activities:</u> SAP is critical to integration of GIS information with other key systems used to accurately identify impacts of switching activities in the field. This can have health and safety consequences for field services personnel, other emergency services personnel, and the general public, particularly during severe weather events. • OH&S (Death or Permanent Disability) • Financial / Regulatory (Related Fines, Workcover, Court Action, Compensation Costs) • Reputation (Adverse media coverage) • Organisational (Industrial action in the event workers are injured or killed)	Rare	Catastrophic	Medium

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
4	Legal Compliance	Unable to efficiently implement regulatory compliance changes to SAP, such as payroll, superannuation, tax changes and ASIC mandated alterations to accounting standards, and hence SA Power Networks would be liable to market and statutory penalties to both SA Power Networks and its directors. HR issues due to incorrect application of tax rates and superannuation could lead to issues with workforce including industrial action. • Financial/Regulatory ($1m < Penalties < $10m) • Organizational (Significant impact due to HR issues, industrial action and related reputational damage)	Unlikely	Moderate	Low
5	Regulatory and Reliability Reporting	Ability to generate accurate regulatory and reliability reporting, which is heavily dependent on SAP, could be compromised. • Reputation (Intervention by Regulator) • Regulatory / Financial ($1m < Penalties >$10m)	Rare	Moderate	Low
6	Planned Assets Maintenance	Ability to effectively long-term manage network assets, the data for which is maintained within SAP and used as inputs for identifying, planning and scheduling inspections and maintenance work, could be impacted. The inability to prioritise, plan and schedule planned work correctly would have an adverse impact on ongoing costs (both opex and repex). • Financial (Cost impact > $10m)	Rare	Major	Low
7	Security	The vulnerability of SAP to security breaches is related to its security configuration, encryption levels, and whether regular security patching is being applied. A successful cyber-attack could result in loss of data, impact reliability of supply or compromise control systems. SA Power Networks could also expect significant financial loss from Regulator and aggrieved party legal actions. • Reliability (> 40,000 customers without supply for extended period) • Regulatory / Financial (Fines, legal action, damaged equipment) • OH&S (Death or Permanent Disability) • Reputation (Adverse media, intervention by Regulator)	Unlikely	Major	Medium

Risk ID	Risk Description	Consequence Description	Likelihood	Consequences	Risk Rating
8	Delivery Risk	Significant delivery risk due to the implementation of an enterprise wide application caused by cost overruns, delayed schedules due to potential for resource and schedule conflicts with other proposed activities in the 2020-25 RCP, risk of impact on other organisational activities due to the need to completely rebuild all organisation-to-technical business processes. • Financial ($10m > cost overruns < $100m) • Organisational impact due to impact on on-going operations	Unlikely	Major	Medium

Risk Summary	
The overall risk rating for Option 3 is:	Medium

4.5 Cost Assumptions and Options Summary

A summary of the costs and benefits associated with the options detailed above is set out in the table below[12].

Table 12: Costs associated with options considered $ million Dec $2017

Option	Total Program Cost[13]	NPV[14]	2020-25 RCP Cost[15]	Overall Risk Rating	Benefits[16]	Ranking
Option 1: New SAP S/4 Implementation (and de-commission the existing SAP system)	60.2	(44.6)	55.1	High	13.0	3
Option 2: Upgrade the current SAP system to SAP S/4 over two periods	29.7	(25.2)	28.7	Medium	2.3	2
Option 3: Upgrade the current SAP system to SAP S/4 over three periods	29.8	(25.0)	24.6	Medium	2.3	1

The figures used to determine the costs of the considered options were validated by a global solution provider, Capgemini, who provided a detailed understanding of similar projects and upgrades. SA Power Networks also collaborated with other utilities, both in Australia and overseas to confirm that their estimates are of a similar order of magnitude considering the relative scope, maturity, and integration levels of their SAP implementations when compared to the current SAP implementation at SA Power Networks.

The following assumptions underpin the cost estimates in this business case:

- SA Power Networks is required to be compliant with the Australian Signals Directorate Critical Infrastructure Compliance (**CIC**) requirements. Due to the data contained within SA Power Networks' SAP system it is within the scope of CIC.
    - The key implication for this business case is that an onshore delivery model must be used whereby all project resources are based in Australia. This has a higher cost than a hybrid (onshore/offshore) delivery model.[17]
- Options 1 would deliver benefits, but the magnitude of the benefit required to recover the cost of the investment is significant and the benefits themselves in many cases cannot be verified at this stage,
- Options 2 and 3 do not deliver additional change / business improvement. In other words, the options deliver as close to a like for like migration as possible to reduce cost and minimise business change.
- No changes to other non-SAP/external systems have been included in the business case.
- The current integration platform will continue to be used (SAP Process Orchestration and SAP Cloud Platform Integration) and no new interfaces will be required to enable the move to SAP S/4.

[12] *All dollars are expressed in Dec $2017*
[13] *Represents the total project expenditure.*
[14] *Net present value of the proposal over the period 1 January 2019 to 31 December 2033, based on discount rate of 2.891%.*
[15] *Represents the total capital expenditure within the 2020-25 RCP.*
[16] *Represents the total IT maintenance and upgrade benefits (capex & opex) over a 15-year cash flow analysis (1 January 2019 to 31 December 2033). Benefits other than the once off recurrent IT capex cost reduction commence from 2024.*
[17] *Based on SA Power Networks internal cost analysis prior to off shoring the SAP Service Delivery support model.*

- There will be minimal/no other changes occurring in the SAP technical environment during the period of the technical conversion. As a result, no additional technical environments will need to be created.
- Option 3 is marginally more expensive than Option 2 due to the deferral of several projects to the 2025-30 RCP in Option 3. The additional cost relates to the ramp-up and onboarding costs for the project team in the 2025-30 RCP and a minor increase in resource rates for those projects given a smaller piece of work will be negotiated with suppliers.

4.6 Recommended Option

The NPV of Option 3 is marginally better than Option 2 and the cost within the 2020-25 RCP is lower. The delivery risk associated with or impacting other 2020-2025 activities and projects is also lower. On this basis the recommended option is **Option 3 - Upgrade the current SAP system to SAP S/4 over three periods**[18].

Table 13: Costs of Recommended Option ($ million Dec $2017)

Option	Total Program Cost[19]	NPV[20]	2020-25 RCP Cost[21]	Overall Risk Rating	Benefits[22]	Ranking
Option 3: Upgrade the current SAP system to SAP S/4 over three periods	29.8	(24.6)	24.6	Medium	2.3	1

Option 3 is the recommended option to keep SAP supportable because it:

- delivers the best outcome for customers;
- helps to achieve the expenditure objectives (e.g. managing the demand for network services, complying with applicable regulatory obligations and requirements and maintaining the reliability and safety of the distribution system);
- prudently allows SA Power Networks to maintain its current risk profile rather than see it increase by continuing to rely on a system that is at the end of its application lifecycle;
- retains existing SAP functionality which requires less change management / training impact on the organisation;
- has the least likelihood of impacting other projects;
- delivers an efficient and prudent solution that meets the needs of consumers and the business as an upgrade requires less expenditure and is less resource intensive than creating all new SAP implementations; and
- provides $2.3 million in benefits over 15 years from a combination of a temporary decrease in Recurrent Capex for the 2020-25 RCP and opex Cost Avoidance from the increased SAP footprint being offset by mandatory SAP conversion simplifications.

4.7 Supporting Evidence

For asset intensive organisations, Gartner recommends an approach to renovate the core ERP with cloud extensions. Gartner acknowledges that many existing systems have maintenance policies that expire in a few years and provides recommendations [23]. Our options analysis has considered these recommendations.

SA Power Networks has undertaken a thorough process over a 12-month period to determine the most prudent approach to managing our core system. The key evidence to support the recommendations presented in this paper is summarised below:

- SAP Australia Pty Ltd mandated, in 2015, that customers (globally) move to S/4 prior to 2025 should they require ongoing product support from them. SAP Australia Pty Ltd has confirmed that it will not be providing an option for extended maintenance support.
- SA Power Networks engaged a global solution provider, Capgemini, to assist with the analysis, utilising its detailed understanding of similar projects and upgrades performed elsewhere. The figures used to determine the costs of the considered options were based on advice from

[18] All dollars are expressed in Dec $2017
[19] Represents the total project capital expenditure.
[20] Net present value of the proposal over the period July 2019 to June 2034, based on discount rate of 3.41%.
[21] Represents the total capital expenditure within the 2020-2025 RCP.
[22] Represents the total IT maintenance and upgrade benefits over a 15-year cash flow analysis (July 2019-June 2034). Benefits other than the once off recurrent IT capex cost reduction do not commence from 2024.
[23] Gartner: Predict 2018: Postmodern ERP Evolves to Support Digital Business, Investments Must Be Evaluated Cautiously, ID: G00342190, Published 20 November 2017

Capgemini, who developed the underlying cost models for the options presented in this business case.

- SA Power Networks has collaborated with other utilities, both in Australia and overseas, to ensure the approach taken to address the risk is optimal and generally aligned with the industry. These commercial-in-confidence discussions confirmed that their estimates are of a similar order of magnitude considering the relative scope, maturity, and integration levels of their SAP implementations when compared to the current SAP implementation at SA Power Networks.
- Our approach is in line with the recommendations from Gartner on the cost-efficient management and migration of modern ERPs (incl. SAP) for asset intensive organisations through:
    - Planning and starting well ahead of time
    - Consideration of multiple options for migration
    - Eliminating customisations over time to minimise change costs
    - Developing a loosely coupled architecture, including using cloud capabilities, to deliver the best value for a given capability, without being locked into a single supplier where it is not as efficient.

4.8 Customer and stakeholder engagement

We presented our proposal to the customer consultative panel and reference groups at an IT Deep Dive workshop in June 2018 facilitated by Think Human[24]. Our customers sought:

- further information on our options analysis
- an option other than SAP
- consider deferring expenditure into the following RCP
- risk of being dependant on SAP and future pricing.

We have taken these comments on board in our analysis.

Other customer engagement surveys and workshops have shown that *"customers place a very high priority on receiving timely and accurate information about our services but particularly during outages. They consider this as important as reliability or price"* (SA Power Networks, Customer Research, 2017). Maintaining a supported suite of SAP products enables this capability.

4.9 Consistency with NER Expenditure Requirements

SA Power Networks considers that the capital and operating expenditure to upgrade SAP to SAP S/4 is required in order to achieve the expenditure objectives listed in clauses 6.5.6(a) and 6.5.7(a) of the National Electricity Rules (NER). In particular, the expenditure is required to:

Meet and manage the demand for network services - This project will assist in achieving the capital expenditure objectives by enabling the effective and efficient operation of SA Power Networks' IT systems, which, in turn, are critical for the effective and efficient operation of the network and meeting and managing the demand for network services.

Maintain the reliability, security and safety of the distribution system – This project will assist in maintaining the secure and reliable operation of our network by:

- Ensuring SAP is maintained within an acceptable level of risk;
- Ensuring SAP is secure and operational;
- Ensuring SAP remains compatible with other applications and continues to support our business processes; and
- Ensuring 'break-fix' services and remediation can be undertaken.

[24] *Supporting Document 0.15 - Think Human IT Deep Dive Workshop Report*

Comply with applicable regulatory obligations and requirements – This project will enable SA Power Networks to maintain compliance with all applicable regulatory obligations or requirements through ensuring SAP continues to support business and customer services.

Consistent with the requirements of clauses 6.5.6(c) and 6.5.7(c) of the NER, SA Power Networks considers that the forecast operating and capital expenditures requirement to implement the SAP S/4 Upgrade Program is:

Efficient – The program is considered efficient because it is the it is the option which costs the least within the 2020-25 RCP. The approach and costs have been compared to estimates made by industry peers and the estimates are of a similar magnitude given the relative scope, maturity and integration levels of SA Power Networks' SAP implementation.

Prudent – The program is prudent because it addresses the significant operational risks posed by the removal of maintenance support by SAP Australia Pty Ltd in 2025, enables SA Power Networks to maintain its existing operational risk profile, and of the proposed options provides the best balance between costs and delivery risks.

Realistic expectation of the demand forecast and cost inputs – The figures used to determine the costs of the considered options were based on advice from a global solution provider, Capgemini, who were able to provide a detailed understanding of similar projects and upgrades. SA Power Networks also collaborated with other utilities, both in Australia and overseas, to ensure the approach taken to address the risk is optimal and aligned with the industry. This confirmed that their estimates are of a similar order of magnitude considering the relative scope, maturity, and integration levels of their SAP implementations when compared to the current SAP implementation at SA Power Networks.

5. Glossary

Acronym / Abbreviation	Definition
AER	Australian Energy Regulator
ASIC	Australian Securities and Investments Commission
BAU	Business as Usual
BW	Business Warehouse
capex	capital expenditure
CIC	Critical Infrastructure Compliance [security rules]
FTE	Full Time Employee
GIS	Geographic Information Systems
HR	Human Resources
IT	Information Technology
NECF	National Energy Customer Framework
NEM	National Electricity Market
NER	National Electricity Rules
NMI	National Meter Identifier
OH&S	Occupational Health & Safety
OMS	Outage Management System
opex	operating expenditure
RCP	Regulatory Control Period
repex	Replacement expenditure
S/4, S/4HANA	S/4HANA is the new version of SAP
SAP	Systems Applications Products [enterprise resource planning software platform]
SAPN	SA Power Networks
SLA	Service Level Agreement

Appendix A: SA Power Networks Risk Management Framework

The SA Power Networks' risk management framework defines the following quantitative measures of likelihood and consequence that are in turn used to determine the risk rating. The detailed risk assessment instructions are available on the SA Power Networks Intranet site.

Risk Likelihood Rating

Rating	Descriptor	Description	Probability	Indicative Frequency
5	Almost Certain	Is expected to occur	96 – 100%	At least one event per year
4	Likely	It will probably occur	81 – 95 %	One event per year on average
3	Possible	May occur	21 – 80%	One event per 2 – 10 years
2	Unlikely	Not likely to occur	6 – 20%	One event per 11 – 50 years
1	Rare	Most unlikely to occur	0 – 5%	One event per 51 – 100 years

Risk Consequence Rating

Rating	1 Minimal	2 Minor	3 Moderate	4 Major	5 Catastrophic
Financial	Less than $100,000	$100,000 or more, but less than $1m	$1m or more, but less than $10m	$10m or more, but less than $100m	$100m or more
OH and S	Incident but no injury	Medical treatment only	Lost time injury	Death or Permanent Disability	Multiple Fatalities
Environment	Brief spill incident. No environmental damage.	Minor spill. Pollutant on site. No environmental damage.	Escape of pollutant causing environmental damage	Significant pollution on and off site < $0.5 m	Long term environmental damage
Reputation / Customer Service	Localised customer complaints	Widespread customer complaints or Complaints to Ombudsman or Regulator	Intervention by the Ombudsman or Regulator	Repeated intervention by the Ombudsman or Regulator	Loss of Distribution Licence
	Adverse regional media coverage	Adverse State media coverage	Adverse media campaigns by customers, media, industry groups	Severe negative impact on both regulated and un-regulated businesses	Loss of Distribution Licence
Legislative and Regulatory	Minor breaches by employees resulting in customer complaints or publicity	Act or Code infringements resulting in minor fines	Severe Company or Officer fines for Act or Code Breaches	Prison sentences for Directors or Officers	Loss of Distribution Licence
	ACCC require apology and / or corrective advertising	ACCC require special offer be made to all customers / suppliers	ACCC minimum level penalties	ACCC moderate level penalties	ACCC maximum level penalties
	Directors / Officers given minimum fines	Directors / Officers given moderate fines	Directors / Officers given severe fines	Directors / Officers given prison sentences	Loss of Distribution Licence
Organisational	Absorbed without additional management activity	Absorbed with minimal management activity	Significant event which requires specific management	Critical event which can be endured with targeted input	Disaster which can cause collapse of the business

Rating	1 Minimal	2 Minor	3 Moderate	4 Major	5 Catastrophic
Reliability	2000 customers without supply for a min. of 12 hours (i.e., a medium size urban feeder)	10,000 customers without supply fora min. of 24 hours (i.e., a major storm related outage or a major substation outage)	Up to 40,000 customers without supply for a min. of 48 hours (i.e., major multiple zone substation coincident outages)	Over 40,000 customers without supply for longer than 48 hours (i.e., major geographical areas off supply)	Adelaide CBD without supply for longer than 24 hours

Risk Classification Rating

Likelihood (Probability)	Threat Consequences				
	Minimal (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Almost Certain (5)	Medium	High	High	Extreme	Extreme
Likely (4)	Low	Medium	High	High	Extreme
Possible (3)	Low	Low	Medium	High	High
Unlikely (2)	Negligible	Low	Low	Medium	High
Rare (1)	Negligible	Negligible	Low	Low	Medium

Appendix B: Cost Models

The detailed cost models are provided in the following documents which are available on request by the AER:

- **SAP Upgrade Option 1 – Greenfield Implementation**
- **SAP Upgrade Option 2 – SAP Tech Conversion (2RCP)**
- **SAP Upgrade Option 3 – SAP Tech Conversion (3RCP)**