



Enterprise Management Systems

**CP BUS 7.11 - EMS - Jan2020 - Jan2020 - Public
Regulatory proposal 2021–2026**

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1 Overview

Business	CitiPower and Powercor Australia
Title	Enterprise Management Systems
Project ID	CP BUS 7.11 - EMS - Jan2020 - Jan2020 - Public
Category	IT capital expenditure - recurrent
Identified need	<p>We need to maintain the currency of our Enterprise Management Systems (EMS) to enable us to continue to efficiently deliver of our services and alignment to our customer and regulatory commitments. Capital expenditure on our EMS systems during 2021-2026 is required due to:</p> <ul style="list-style-type: none"> • applications reaching end of life or end of vendor support • integration of EMS applications with upgraded SAP system • changes in technology, customer requirements and cyber security threats.
Recommended option	Option 1 – perform required updates, upgrades and refreshes to maintain a stable and efficient IT ecosystem, while retaining an adequate level of vendor support
Proposed start date	2021/22
Proposed commission date	2025/26
Supporting documents	<ol style="list-style-type: none"> 1. CP MOD 7.17 - EMS - Jan2020 - Public 2. CP MOD 12.02 - Quoted services labour rate - Jan2020 - Public 3. CP BUS 7.01 - SAP - Jan2020 - Public 4. CP ATT181 - Gartner - Top priorities for customer service - Apr2019 - Public 5. CP ATT182 - Gartner - Cyber attacks protection - Apr2019 - Public 6. CP ATT183 - Oracle - Oracle database - Jul2018 - Public 7. CP ATT184 - MuleSoft - SAP integration best practice - May2019 - Public

We rely on a number of IT solutions comprising of over 300+ systems to manage and orchestrate the maintenance of our assets, deliver the best level of service to our customers, and ensure the safety and reliability of our distribution networks. The IT solutions cover a wide range of capabilities and must be regularly reviewed, updated, or upgraded to ensure stability, resilience, and performance.

This business case includes twelve applications within our Enterprise Management Systems (**EMS**) that will require capital expenditure over the 2021–2026 regulatory period. This business case does not include our SAP system.¹ In order to simplify our analysis, the EMS applications have been grouped into five high level categories, based on the function/s they support:

Figure 1 High level application grouping



Source: CitiPower

Within the next regulatory period, the set of applications identified in this business case will need to be updated, upgraded, or refreshed in response to a variety of changes in the internal and external environment. The three key categories that are expected to drive a need for capital expenditure are listed below:

- End of Life (**EoL**) or out of vendor support - a subset of our current applications will reach EoL or run out of vendor support in the upcoming regulatory period. Running on legacy or out of date applications would expose us to increased risks of failure or breaches, and as a result, also expose our customers to increased safety, security, and/or financial risks.
- Adapting to changes to other parts of our technology landscape - The highly integrated nature of our IT ecosystem means that when undertaking necessary changes or transformations, existing application integrations and customisations become obsolete and need to be refreshed or re-written.
- External factors - external factors and industry trends may drive the need to alter part of our IT landscape including evolving security threats, technology advancements and changing customer requirements.

In response to the challenges outlined above, the following three options were assessed to identify the best suited approach for the next regulatory period:

- Option 0: do nothing—do not perform any work, leave systems in current state and manage resulting impacts and consequences
- Option 1: maintain—perform required updates or upgrades to maintain a stable and efficient IT ecosystem, while retaining an adequate level of vendor support
- Option 2: transform—identify opportunities for transformation with the aim of unlocking larger benefits that could be passed on to customers (additional functionalities and efficiencies).

¹ For information on our proposal to maintain currency and upgrade our SAP system refer to the SAP business case (CP BUS 7.01).

Our analysis concluded that the best option for customers is option 1. This option presents a measured and efficient approach to addressing the challenges at hand, considerably reduces the risk profile of these applications, and delivers the best value to our customers.

Table 1 summarises the result of our analyses:

Table 1 Options analysis summary, \$m June 2021

Option	Description	Capital expenditure
0	Do nothing – do not perform any work, leave systems in current state and manage resulting impacts and consequences	0.0
1	Maintain – perform required updates or upgrades to maintain a stable and efficient IT ecosystem, while retaining an adequate level of vendor support	14.8
2	Transform – identify opportunities for transformation with the aim of unlocking larger benefits that could be passed on to customers (additional functionalities and efficiencies).	19.0

Source: CitiPower

2 Background

We are responsible for the safe and reliable delivery of electricity to over 1.1 million Victorian households and businesses (350,000+ customers for CitiPower and 870,000+ customers for Powercor) across our distribution networks. Disruption to the supply of electricity or delivery of our services can result in serious impacts and major cost implications for the Victorian economy and public safety.

We rely on a number of IT solutions comprising of over 300+ systems, to manage the maintenance of our assets, deliver the best level of service to our customers, and ensure the safety and reliability of our distribution networks. The IT solutions cover a wide range of capabilities and must be regularly reviewed, updated, or upgraded to ensure stability, resilience, and performance.

This business case includes twelve applications within our Enterprise Management Systems (**EMS**) that will require capital expenditure over the 2021–2026 regulatory period. Note this business case does not include our SAP system.² However some of the applications covered under this business case have links or integrations to the SAP platform. To avoid any cost overlaps, all costs relating to integration of the EMS applications with our proposed SAP upgrade are only included in this business case and not in the SAP business case.

To assist with the analysis supporting this business case, the applications have been grouped into five high level categories, based on the function/s they support:

Figure 2 High level application grouping



Source: CitiPower

- **Asset investment planning** - systems used to analyse large and complex data sets, highlight trends and critical components, and support decision making regarding investments on assets.
- **Corporate services management** - solutions required to operate back office services such as employee lifecycle management, payroll, tax, and financial compliance.
- **Customer facing platforms** - solutions and platforms that provide direct interactions with our customers.
- **Database management** - systems required to save, organise, and manipulate our multiple data sets.
- **Field services** - applications supporting field work and manage data relating to operational assets.

The business case analyses consider possible options for the target applications according to the three themes outlined within our regulatory proposal, namely:

- **Safe & dependable:** ensure the overall safety and reliability of our services, while maintaining operational efficiency and general compliance.
- **Flexible:** maintain a flexible IT ecosystem that is able to adapt to changing business requirements, compliance requirements, and customer expectations.
- **Affordable:** ensures activities performed are cost effective and deliver the best value to our customers.

² For information on our proposal to maintain currency and upgrade our SAP system refer to the SAP business case (CP BUS 7.01).

3 Identified need

EMS represents the foundational system that allows the business to conduct key internal and customer processes. Within the 2021–2026 regulatory period, target applications will need to be updated, upgraded, or refreshed in response to a variety of changes in the internal and external environment. The three key categories that are expected to drive a need for capital investment are listed below:

EoL or out of vendor support

A subset of our current applications will reach EoL or run out of vendor support in the upcoming regulatory period. Running on legacy or out of date applications would expose us to increased risks of failure or breaches, and as a result, also expose our customers to increased safety, security, and financial risks.³

EoL and out of support applications have the following limitations:

- Limited vendor support—available vendor support is only offered on a reasonable effort basis,⁴ if an application fails that has either reached EoL or is outside of the vendor support window. This would negatively impact our time to recovery and the associated cost.
- Lack of security patches—EoL and out of support applications do not benefit from the same patching schedule as current applications. The lack of zero-day,⁵ or regular security patching, would expose our operations and data to increased risks.
- Limited and costly market expertise—the skills and expertise linked to legacy applications becomes limited and is therefore associated with a price premium.

Changes to other parts of our technology landscape

In line with our commitment to modernise our services, better adapt to changing compliance requirements, we constantly review our IT portfolio and assess opportunities to optimise the value we are providing to customers, including through large transformations. The highly integrated nature of our IT ecosystem means that when undertaking necessary changes or transformations, existing application integrations and customisations become obsolete and need to be refreshed or re-written.

With the upcoming transition from SAP ECC6 to SAP S/4HANA and other large transformations, we need to undergo testing and validation exercises to ensure integrations with peripheral applications are maintained. A refresh exercise will also be required to ensure that workflows and data processes remain functional and data integrity is maintained.

External factors

In some instances, external factors and industry trends drive the need to alter part of our IT landscape. Two relatively common scenarios are:

- Technology advancements and changing customer requirements - over the last few years, the exponential adoption of technology and the increased diversity of devices have pushed us to rethink the way we deliver information and services to our customers. Our technology landscape, especially our customer facing platforms, need to be regularly reviewed and adapted to keep in line with evolving requirements and deliver

3 Gartner, Protect Your Organisation From Cyber and Ransomware Attacks (CP ATT182).

4 Reasonable effort – the vendor will assist with addressing issues only to the extent that they deem reasonable. This implies that they are not necessarily committed to getting to a conclusion or resolution.

5 Zero-day patching refers to patches released on the same day a system weaknesses is identified to avoid directed cyber-attacks

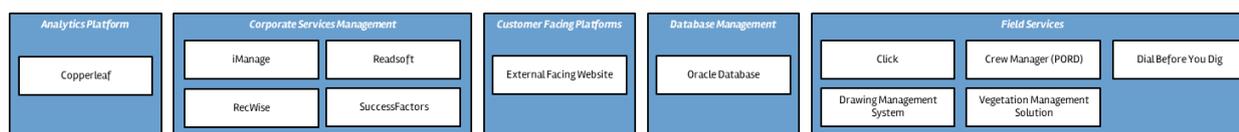
the highest value to our customers. If we do not adapt our technology, there is a heightened risk that our customers may not be able to access our services or critical information.⁶

- Evolving security threats - cyber threats against industrial control systems (ICS) and critical infrastructure continue to increase in intensity, frequency, and complexity. The highest success rate for hackers comes from exploiting weak links in a technology chain, as opposed to employing the more 'traditional' brute force attacks. It is now more than ever critical for us to ensure that our systems are patched, upgraded, or updated as this will limit the risk of weak links.

3.1 Current state

These applications have been assigned to one of five categories on the basis of service area or capability linkage. Note that only those applications relevant to the regulatory reset (i.e. those that have a link to customers) have been included, this is by no means a comprehensive mapping of all applications that support a particular service area or capability.

Figure 3 Mapping of applications to grouping



Source: CitiPower

Asset investment planning

Copperleaf supports investments decisions and the way we prioritise the activities required to manage our network assets and distribution networks. The application allows us to prioritise investment opportunities based on rational economic and risk mitigation assessments, and supports decision making around pre-emptive maintenance works.

The functions covered under this category are essential in ensuring that:

- investments are made in the right areas to ensure that our distribution network remains stable and interruptions are avoided
- the overall safety of our network is maintained by ensuring that maintenance work is performed proactively
- our investments deliver the maximum value to both the business and our customers.

Corporate services management

Refers to the set of solutions required to operate back office services such as employee lifecycle management, payroll, tax, and financial compliance. A number of the applications covered under this grouping are critical to our finance operations and the maintenance of transaction traceability for audit and compliance purposes.

The functions covered under this category are essential in ensuring that:

- the management of our finances and employee transactions retain high levels of accuracy and compliance, to limit the risk of errors and fines that might ultimately impact our ability to provide the best value to our customers.

6 Gartner, 2018 Top Priorities for Customer Service and Support (CP ATT181).

- we retain strong relationships and service quality from our vendors by ensuring the appropriate settlement of our Accounts Payable.

Customer facing platforms

Refer to solutions and platforms that provide direct interactions with our customers. This includes the public website which is the primary landing space for customers to access general information across a range of topics including connections, bushfires prevention programs, emergency procedures, and access to our customer portals.

The functions covered under this category are essential in ensuring that:

- key information is available and accessible to all customers, especially in emergency scenarios
- network pricing is accessible to the customer, ensuring compliance requirements are met
- customer experience is maintained at a high standard to allow for ease of use
- customers are provided easy access to our tools and services.⁷

Database management

Refers to the systems required to save, organise, and manipulate our multiple data sets. This is a horizontal function that cuts across all business areas and underpins 80% of applications used within the company, including 80+ critical applications and the public website.

The functions covered under this category are essential in ensuring that:

- all data (including customer related information) is safely managed, and data integrity is maintained during all our transactions
- all customer facing information and services remain available and accurate (e.g. outage maps, streetlight fault reporting, etc.)
- in case of a major data issue, recovery is efficient and service downtime is limited.

Field services

Refers to the set of applications required to support work carried out in the field and manage data pertaining to operational assets. The applications cover services such as preventive vegetation management, scheduling and dispatching of field resources, and management of engineering diagrams.

These functions are essential in ensuring that:

- customer related jobs and tasks are tracked and carried out in an acceptable time frame
- technicians and resources are tracked and managed allowing accurate completion information to customers
- vegetation is proactively managed to ensure compliance with regulatory obligations and avoid any instances of bushfire, human harm, or service interruptions
- proper and accurate data is available on demand to inform efficient execution of field activities, avoiding instances of infrastructure damage, human harm, and service disruptions.

⁷ Note: this business case only covers the currency requirements of the presentation platform; initiatives linked to related tools and customer portals are covered in a separate business case, Customer Enablement (CP BUS 7.02).

Please refer to Appendix A for more details about the current state of application covered under each category.

3.2 Desired future state

Our aim is to ensure that all the applications in the scope of this business case are kept current (N-1)⁸, efficient, secure, and within an adequate vendor support window over the 2021–2026 regulatory period. We want to ensure the general stability and robustness of our overall IT ecosystem by not introducing failure points across the landscape. These above-mentioned activities will enable us to deliver best outcome for our customers and execute against our three guiding themes for this next period, namely being safe and dependable, flexible and affordable.

8 'N-1' refers to a state where applications are maintained within one release of the latest available version. This approach ensures that we are not affected by bugs or glitches that potentially present in the latest version.

4 Options analysis

4.1 Approach

We followed a structured approach when analysing how various options could address our requirements over the 2021–2026 regulatory period.

Figure 4 High level approach diagram



Source: CitiPower & Powercor

Assess

In defining the scope of this business case, we undertook the following sequence of activities:

- performed a comprehensive assessment of our technology IT portfolio (current state assessment of applications)
- reviewed industry trends affecting the energy sector
- identified the key or critical systems, not covered under other business cases for our 2021–2025 regulatory proposal, that would be impacted by any of the three scenarios outlined in the Problem Statement section
- validated vendor roadmaps (where applicable and available).

Identify

Considering the set of applications identified in the first step, we assessed a number of potential options in order to define an approach that would result in the best value for our customers, and ensure our ability to maintain a stable technology environment while aligning to our compliance requirements:

- Option 0: do nothing – identify the risks and impacts that might result from keeping all identified systems in their respective current state, i.e. do not perform any system update, upgrade, patching, or refresh.
- Option 1: maintain – identify the nominal set of initiatives required to maintain currency and stability of the target list of applications, i.e. apply adequate and timely updates, upgrades, patches, and perform refreshes where required.
- Option 2: transform – identify opportunities for transformation with the aim of unlocking larger benefits that could be passed on to customers (additional functionalities and efficiencies).

Compare

We assessed the proposed options against our three themes:

- **Safe and dependable** – ensure the overall safety and stability of our services is not compromised
- **Flexible** – maintain a flexible IT ecosystem that can be easily adapted to changing requirements and customer expectations
- **Affordable** – balance costs and benefits, while ensuring that the work performed delivers value to customers and the business.

Recommend

Based on the outcome of the comparison, we selected Option 1 as it delivers the best value for our customers according to the above-mentioned criterion.

In line with the portfolio and governance management structures outlined in our regulatory proposal, our recommendation also considered a number of general factors (e.g. project concurrency, resource availability, etc.) to ensure that the option selected was pragmatic, actionable, and would have the highest probability of delivering a successful outcome.

Estimate and roadmap

The recommended option was fully estimated using a bottom up approach that leveraged information on historical projects relating to the target applications, and information on projects of similar nature and scope. Estimates were produced in terms of labour, contracts and material costs, with labour rates being based on a blended external IT labour rate provided by PwC.⁹

On the back of this process, we developed an indicative high level roadmap.

4.2 Summary

The results of our analysis against our three options are summarised below. Table 2 summarise the costs as total capital expenditure over the 2021–2026 regulatory period.

Table 2 Options summary, \$m June 2021

Option	Description	Capital expenditure
0	Do nothing – do not perform any work, leave systems in current state and manage resulting impacts and consequences	0.0
1	Maintain – perform required updates or upgrades to maintain a stable and efficient IT ecosystem, while retaining an adequate level of vendor support	14.8
2	Transform – identify opportunities for transformation with the aim of unlocking larger benefits that could be passed on to customers (additional functionalities and efficiencies).	19.0

Source: CitiPower

⁹ See CP MOD 12.02 - Quoted services labour rate - Jan2020 - Public.

4.3 Option 0 – do nothing

The first option that we analysed was to retain the target applications in their respective current state and not apply any updates, upgrades, patches, or refreshes.

Table 3 provides details of the key advantages and disadvantages of option 0.

Table 3 Advantages and disadvantages of option 0

Category	Advantages	Disadvantages
Safe & Dependable		<p>Increased risk of repeated and/or extended service (both IT and network) outages resulting from system failures, which will in turn increase the safety and financial risks to our customers, especially in case of bushfires or emergencies.</p> <p>System efficiency and performance will be at risk, and delayed service provision to our customers and potentially attracting penalties (e.g. for non-compliance with the Electricity Distribution Code).</p> <p>Increased risk of system integration failure that might have a flow on effect to other parts of the IT ecosystems, creating additional costs (e.g. to remediate issues) being passed onto customers as well as delaying service delivery.</p> <p>Increased risks of cyber-attacks due to unpatched security vulnerabilities, potentially compromising the network and privacy of customers.</p> <p>Running of legacy or obsolete technology poses a high risk to the general stability of our overall IT environment and may increase run costs through lost productivity and inefficient processes, ultimately passed on to our customers.</p>
Flexible		<p>Acquired technology debt over time will constrain flexibility and adaptability. New applications and technologies might not work properly with legacy systems and technical workaround would be costly; additional costs would potentially be passed down to our customers.</p> <p>Running on legacy system would place regulatory compliance at risk; system would likely be slower and harder to rectify to line up with possible changes in policies or regulations. Any benefits expected out of the changes would take longer to be delivered to our customers.</p>
Affordable	As this option assumes no work, the upfront capital expenditure is negligible.	In the event of a system failure, the remediation cost is likely to be high assuming a lack of (or minimal) vendor support, and longer timeframes to analyse and deploy a fix.

Source: CitiPower

4.4 Option 1 – maintain

The second option analysed looked at a measured approach to maintain the currency, stability, and overall efficiency of applications covered in the target list. This includes the following actions:

- maintain 'N-1' currency, i.e. keeping to one version behind the latest market available (**MA**) version
- refresh applications where necessary to address external factors or changes to other parts of our technology landscape (e.g. Microsoft Silverlight coming to end of life)
- ensure previous investments are consolidated (e.g. SuccessFactors).

These activities will support our primary objective of ensuring customer value and benefits are maximised, and ensuring our overall risk profile remains acceptable. The initiatives included under this option require differing levels of effort depending on the complexity of the application being updated/updated/refreshed.

Table 4 provides details of the key advantages and disadvantages of option 1.

Table 4 Advantages and disadvantages of option 1

Category	Advantages	Disadvantages
Safe & Dependable	<p>Currency of the applications/systems will be maintained, reducing the risk of service (both IT and network) and maintaining our ability to keep our services safe and dependable for customers.</p> <p>The risk of introducing instability to peripheral applications will be reduced, avoiding costs passed on to customers by preventing resources being spent rectifying issues.</p> <p>Adequate vendor support will be maintained and will assist with faster and affordable recovery in case of system failures.</p> <p>From a technical standpoint, application libraries¹⁰ will be current and in line with the rest of our IT landscape, thus streamlining maintenance effort and avoiding cost increases that would impact our customers</p> <p>Simplified system integrations and shared libraries will allow for a reduction in workaround solutions to avoid cost increases being passed on to customer. It will help maintain data security and integrity.</p>	
Flexible	<p>Up-to-date applications and systems are easier to adapt to changes in the technology landscape and evolving customer expectations around service delivery and changes to compliance requirements</p> <p>New application libraries will allow more flexibility on how data is captured, managed, and presented, resulting in better adaptation and alignment to our customers’ expectations.</p>	<p>Transition to a new version of an application can potentially lead to a short and temporary freeze of peripheral applications to allow for work required to be completed.</p>
Affordable	<p>Market skillsets and expertise required to maintain applications is less costly if applications are current; resources specialising in legacy or out-of-date applications charge a premium. This limits the risks of additional costs that might have impacted the value passed down to our customers.</p> <p>If applications are kept within a vendor support window, fixes and patches are provided at no extra cost.</p>	<p>Maintaining currency of applications requires regular project work that incurs a cost.</p>

Source: CitiPower

10 Application library: a set of pre-defined functionalities/resources that reside outside of the main application and can be shared by multiple systems.

Table 5 presents a summary of the key initiatives linked to option 1.

Table 5 Option 1 – summary of key initiatives

Category	Initiatives
Asset Investment Planning	Copperleaf: extend application to Fleet and Customer Services Group in 2021/22, implement predictive analysis module in 2022/23, and integrate with SAP S/4 HANA in 2024/25 to streamline the input of financial data points.
Corporate Services Management	iManage: minor upgrade required in 2023/24. Readsoft: minor upgrades required in 2022/23 and 2024/25 Recwise: minor upgrade in 2023/24. SuccessFactors: implementation of Learning Management System (LMS) in 2023/24, and validation of the SAP S/4 HANA integration in 2024/25.
Customer Facing Platforms	External facing website: patching and upgrades required between 2021/22 and 2025/26.
Database Management	Oracle database: upgrade to oracle database 12c in 2021/22.
Field Services	Click: Upgrade to Click 8.4 in 2021/22, maintain Click 8.4 currency between 2022 and 2023, and upgrade to Click Field Service Edge (FSE) between 2022 and 2024. Crew Manager: Functionality refresh in 2021/22, and minor upgrade in 2024/25. Dial Before You Dig (DBYD): major upgrade in 2021/22, and minor upgrade in 2025/26. Drawing Management System: major upgrades in 2021/22 and 2024/25. Vegetation Management Solution: core solution integration in 2021/22, and integration with S4 HANA in 2024/25.

Source: CitiPower

The upgrade patterns for the different applications have been derived from a combination our past experience with the solutions, vendor product roadmaps (where available), and vendor consultations. Appendix B provides further detail on the different initiatives and an overview of the expected activities.

4.5 Option 2 – transform

Option 2 builds on the proposed investment in option 1. The option only considers some of the applications from the target list and assumes that all remaining applications will align to initiatives covered under option 1. The basis in defining option 2 was for us to identify different ways of addressing currency concerns for some of the applications covered under this business case. Our aim with this option is to explore opportunities to unlock additional benefits for our customers over the 2021–2026 regulatory period, while maintaining the robustness of our IT systems and adhering to compliance requirements. This option does however carry an additional level of risk and capital expenditure when compared to option 1.

Table 6 provides details of the key advantages and disadvantages of option 2.

Table 6 Advantages and disadvantages of option 2

Category	Advantages	Disadvantages
Safe & Dependable	<p>Delivers new functionalities that would enhance customer experience and deliver added benefits when compared to the current state.</p> <p>Leverages the latest technology innovation and unlocks a number of opportunities for efficiency gains (AI for automated decision making); our customers would benefit from better and more interactive services.</p> <p>Offers an opportunity to review current vendor arrangements and negotiate better deals for the business and ultimately our customers.</p> <p>Represents an opportunity to review and streamline processes and limit manual interventions; this would enhance the quality of services and data delivered to our customers.</p>	<p>The large extent of time required to deploy and embed in the organisation could temporarily affect the quality of services delivered to our customers.</p> <p>In the event that the replacement system does not have a particular functionality, customisations or workaround solutions would be required; this would lead to incremental costs that might negatively impact any value passed down to our customers.</p> <p>New solutions that are untested in our environment will initially be more prone to issues and might lead to a level of instability in the short term, and negatively affect customer services</p>
Flexible	<p>New solutions built to be delivered as a service provide easier and more flexible integration with other systems (API¹¹ driven applications) which would enable us to react faster to any changes to compliance or customer requirements.</p>	<p>Transition to a new version of an application can potentially lead to a temporary freeze of peripheral applications to cater for deployment.</p>
Affordable	<p>In the case of transition to SaaS solutions, the long term effect is a shift from capital expenditure to operational expenditure with potential cost savings that could be passed down to our customers.</p>	<p>Transformation initiatives require large capital expenditure and would negatively impact value delivered to our customers in the short term.</p> <p>Internal capabilities will need to be uplifted to manage and maintain new applications (leading to higher operational expenditure implications that would negatively impact the value passed down to our customers).</p>

Source: CitiPower

Table 7 presents a summary of the key initiatives linked to option 2.

11 Application Programming Interface (**API**) refers to a set of functions and procedures that allow for easy transfers of data in and out of applications, and for exposed application functionalities to be called upon.

Table 7 Option 2 – summary of key initiatives

Category	Initiatives
Asset Investment Planning	Same as option 1
Corporate Services Management	<p>Initiatives for iManage, SuccessFactors would be same as Option 1. Additional initiatives set out below.</p> <p>Readsoft - develop integrations over MuleSoft to replace functionalities</p> <p>Automated reading and scanning of invoices, and key data transfer to SAP can be achieved through integration layer software. In this particular scenario, the integration platform being considered is MuleSoft, which owned by Salesforce. With its Anypoint Platform™, MuleSoft is considered one of the market leaders in API-led integration. It has a fast growing list of pre-defined integrations with market leading enterprise platforms like SAP. Unlocking data across the enterprise through application networks, will create opportunities for increased operational efficiency and differentiated customer experiences¹². The networks can be expanded over time, and MuleSoft would serve as the supporting platform to efficiently share and manipulate information across multiple systems.</p> <p>RecWise - Transfer functionalities to SAP S/4 HANA</p> <p>SAP S/4 HANA has in-built reconciliation functions that can be used to replace RecWise. Based on our current IT project portfolio, we are expecting to transition over to the new SAP platform within the 2021–2025 regulatory period. Application consolidation would help reduce the complexity of our IT portfolio, facilitate maintenance, and deliver cost savings in the long term.</p>

12 MuleSoft SAP Integration Approaches (CP ATT184).

Customer Facing Platforms	<p>External Facing Website - outsource development and management</p> <p>Outsource development and management of our external facing website to a third party vendor. Moving to an external specialist provider would ensure that we always have access the latest innovations, and the skillsets required to support technology adoption.</p>
Database Management	<p>Oracle - upgrade to version 18c</p> <p>The new version of the database product was released in July 2017 and marks Oracle’s transition to a more flexible and responsive strategy to release management, whereby new features will now be brought to market every year. Looking forward, customers will no longer have to wait multiple years for the latest generation of Oracle Database, and can anticipate the introduction of new database features and enhancements on a regular annual basis. Version 18c is by default compatible with on premise, cloud, or hybrid deployments, and offers a higher level of performance than previous versions of the database software. The Autonomous Database Cloud is specifically designed to provide customers with a higher level of service at lower cost by automating routine administrative tasks and eliminating human error through:</p> <ul style="list-style-type: none"> • Self-driving - users simply define workloads and policies, and database automation makes them happen. • Self-securing - protection from both external attacks and internal users • Self-repairing - automated protection from all downtime.¹³ <p>An upgrade version 18c would deliver system improvements during 2021-2026 regulatory period and enable a shift of workloads to the cloud in future.</p>
Field Services	Same as option 1.

Source: CitiPower

13 Introducing Oracle Database 18c (CP ATT183).

5 Recommendation

Our analysis concluded that Option 1, which aims to maintain core functionalities by updating, upgrading, or refreshing applications as needed over the 2021–2026 regulatory period, is the recommended option.

Option 1 ensures our ability to deliver against our three guiding themes addresses the challenges outlined in the problem statement and mitigates identified risks.

Option 0 is too high risk as none of the identified risks are mitigated. Option 2 introduces new risks linked to the transformative and aggressive nature of the proposed projects and is higher cost.

Option 1 delivers against our regulatory reset guiding themes as follows:

- **Safe and dependable** – Ensures our ability to remain compliant, as well as the overall safety and reliability of our services. It address cyber threats concerns and allows us to actively minimise the number of potential attack points within our technology landscape.
- **Flexible** – Maintains a flexible IT ecosystem that is able to rapidly adapt to changing compliance requirements and customer expectations.
- **Affordable** – Ensures that the activities performed are balanced, cost effective and ultimately creates savings that can be passed on to our customers.

Option 1 address the challenges is the problem statement as follows:

- EoL or out of vendor support – ensures applications are kept current and within an adequate vendor support window
- Changes to other parts of our technology landscape – allows us to address impacts from other parts our application landscape, and ensure workflows and integrations are maintained.
- Technology advancements and changing customer requirements – allows us to actively manage our technology debt, and deliver against our customers’ expectations.
- Evolving security threats – reduces weak links and potential attack targets from our IT portfolio.

Table 8 summarises the expenditure profile for option 1 in the 2021–2026 regulatory period.

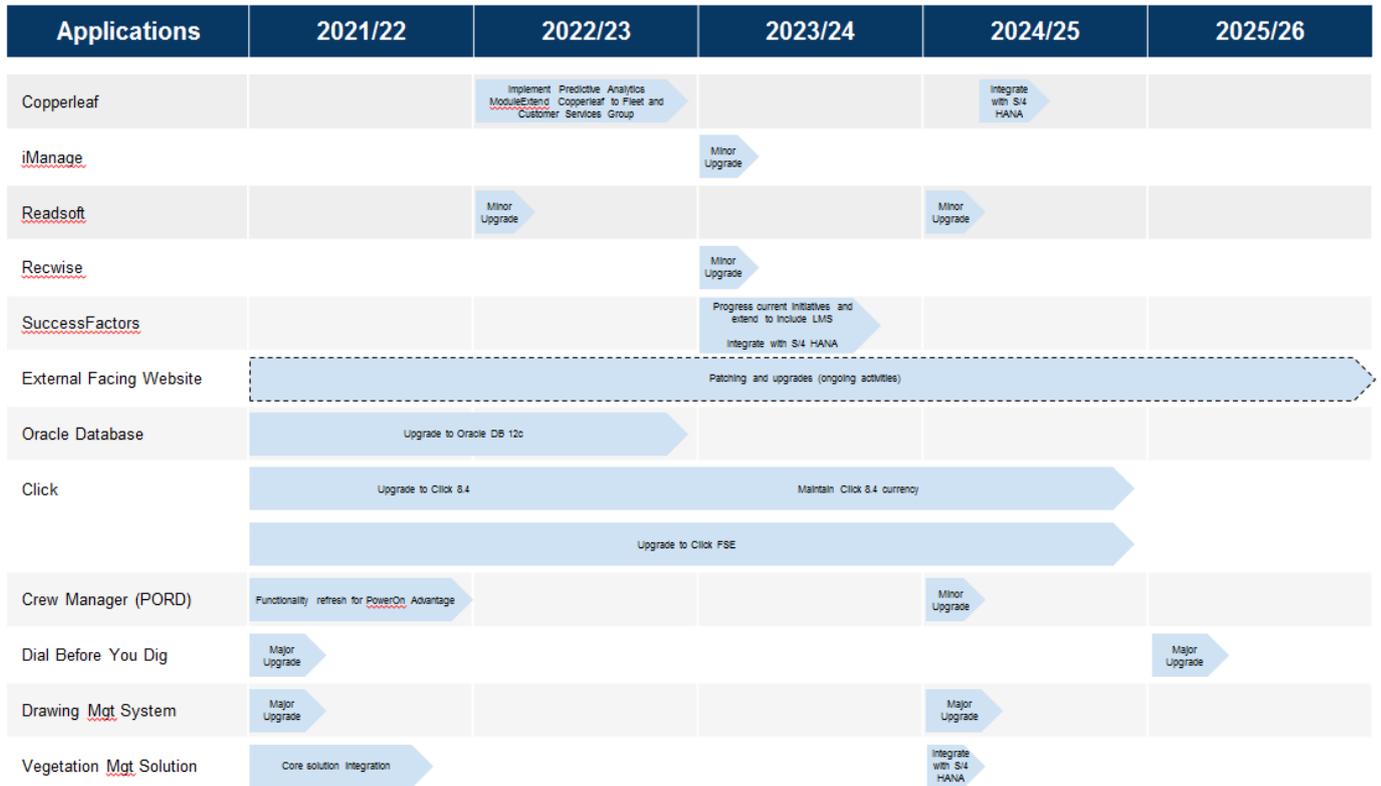
Table 8 Recommended option: expenditure profile, \$m June 2021

Expenditure forecast	2021/22	2022/23	2023/24	2024/25	2025/26	Total
CitiPower	1.4	0.9	0.6	1.4	0.1	4.4
Powercor	3.3	2.0	1.4	3.4	0.3	10.4
Total	4.8	2.8	2.0	4.8	0.4	14.8

Source: CitiPower

The figure below provides the implementation roadmap for implementing option 1.

Figure 5 Option 1 high level roadmap



Source: CitiPower

A Current state application details

Table 9 Current State Application Details

Asset Investment Planning	
Copperleaf	<p>Copperleaf C55 is an asset management solution which provides an assessment framework that can be consistently applied across our investments. It is a modular and configurable solution that consists of the following 6 separate components that can be either used in isolation or combined:</p> <ul style="list-style-type: none"> Value & Risk Modelling Investment Portfolio Optimization Performance Management Asset Aware Investments Predictive Analytics Investment Lifecycle Management <p>Copperleaf helps us model the value of our investments, taking into account risk profiles and economic conditions. It allows us to select and prioritise investments based on business and customer value. It provides a centralised mechanism that reduces dependency on the 'human factor' during analysis and provides a rational sequencing for investments. Copperleaf plays an important role in helping us align to ISO 550000: Asset Management Standards, and it also provides an 'independent assessment' of our investment portfolio against our organisation's values and corporate objectives.</p> <p>At present, Copperleaf is primarily used by our Finance team for forecasting purposes and operates as a standalone system and we are starting to integrate it into our Networks and IT Investment Portfolio Optimization</p> <p>Current solution: Copperleaf C55</p>
Corporate Services Management	
iManage	<p>iManage is a document management tool used to facilitate collaboration in 'matter centric'¹⁴ scenarios. It allows documents and emails to be consolidated under project files, and has a robust governance and security architecture that allows for granular management of permissions and restrictions. iManage also provides the ability to extend collaboration to external stakeholders and acts as a secure channel for developing and sharing information on particular projects. It has integrations into our email platform and supports seamless data sharing across distributed email accounts, and rule-based processing of emails.</p> <p>iManage is primarily used in instances where matter centric collaboration is required, and information being dealt with is either confidential or sensitive in nature (legal case, employee records, etc.).</p> <p>Current solution: iManage 10.2</p>

14 Matter centric – refers to specific scenarios where information relating to a particular matter across multiple repositories needs to be either unified or linked in a central location and assigned a unique identifier.

Readsoft	<p>We currently use 'ReadSoft Invoices' to view and manage supplier invoices, and 'Readsoft Process Director' to scan invoices directly from emails and import the content to SAP Finance automatically. In response to our recent transition to Microsoft Office 365 Mail, these two applications were recently upgraded in order to maintain functionality.</p> <p>Current solution: Readsoft Invoices version 6.0, Readsoft Process Director 7.7</p>
Recwise	<p>RecWise is an integrated reconciliation management application that facilitates the preparation and review of account reconciliations for the end of the month financial settlements. It is critical to our finance architecture in ensuring that all reconciliations are performed in a standard, compliant, and timely manner. The tool has in-built workflows that support the automated treatment of exceptions, segregation of duties, and provide the ability for users to define auto-complete rules to accelerate the reconciliation process. All steps of the reconciliation process are closely tracked, and reports generated from Recwise provide assurance to management and auditors that reconciliations are completed and issues are cleared in a timely manner.</p> <p>Current solution: Recwise Version 3.4.0.027020</p>
SuccessFactors	<p>Currently, our people management capability, which includes functions such as recruitment and on-boarding, and payroll, is distributed across a number of different platforms (SAP HCM for payroll functions, SuccessFactors for the management of employee profiles and general information, Taleo for recruitment and on-boarding, etc.). The distributed nature of the information drives a high level of overhead in terms of integrations required (some of which are manual) and poses a high risk to data integrity.</p> <p>In order to address these challenges, we have focused our investments into SuccessFactors with the aim of creating a 'one-stop shop' for all employee queries and actions. This will help to reduce duplication of data across multiple systems and streamline the employee management functions. We currently have the Performance and Goals, and Employee Central modules deployed, and are planning to roll out the Onboarding and Recruitment module before the end of the current regulatory period.</p> <p>Current solution: SuccessFactors Q4 2018 Release</p>
Customer Facing	
External Website	<p>Our public website provides a key interaction platform with our customers. It acts as landing area for people looking for information and news pertaining to our services. The content covers a wide range of key topics, including items such as:</p> <ul style="list-style-type: none"> Outage maps - an interactive and real-time view of outages across our distribution network Life support services - guidelines for our customers in need of life support equipment Safety instructions - guidelines and rules to be followed in order to ensure safety around the distribution network Bushfire mitigation programs - Our strategy and work regarding the prevention of bushfires caused by electrical faults Pricing - our network pricing information Compliance - our commitments and compliance requirements <p>It also provides access to customer portals and allows quick 'self-serve' options with services such as street light fault reporting, or application for work permits.</p> <p>Current solution: React 16.8, WordPress 5.0</p>

Database Management

Oracle Database	<p>A large number of our applications have an Oracle backend for data storage, management, and manipulation. Oracle Lifetime Support Policy guarantees customers access to technical expertise for as long as the Oracle products remain licensed. The policy is broken down into stages and delivers varying levels of support throughout the product life cycle:</p> <p>'Premier Support' - Valid for a period of 5 years after the general availability (GA) date and provides the highest level of support and maintenance</p> <p>'Extended Support' - Can be purchased for a period of 3 years post Premier Support expiry and covers a similar scope as Premier Support, with the exception of 'Certification with most new third party products'</p> <p>'Sustaining Support' - Valid for an indefinite amount of time, but offers minimal support</p> <p>The majority of our Oracle back ends currently run off version 11g, but we still have a few applications that run off older versions of the software. These are harder to maintain and are often linked to instability incidents. Based on the current vendor roadmap, 'Extended Support' for Oracle Database (DB) 11g will end in December 2020.</p> <p>Current solution: Oracle DB 11g/10g/9i</p>
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Field Services

Click	<p>Click is the core platform used for scheduling and dispatching people and equipment out in the field. It acts as the orchestration centre for activities carried out across the distribution network and allows work to be conducted in a timely and cost effective manner. It allows teams to self-manage through a mobile interface, and provides a real-time view of the overall resource pool utilisation and assignment.</p> <p>Current solution: Click version 8.3</p>
Crew Manager (PORD)	<p>Crew Manager (PowerOn Remote Dispatch) is part of the GE Outage Management System (OMS) known as PowerOn Restore suite. The suite is a combination of inbuilt and bespoke applications used to manage outages and emergencies across our networks. Crew Manager's primary function is to help manage the assignment of crews to assist with faults resolution and emergency situations. It is also used to manage 'on-duty' rosters across our multiple depots for operational response.</p> <p>Crews and crew IDs are initially created within our mobility solution, Click, and the mapping to faults and emergencies (in OMS) is handled by Crew Manager. Crew Manager provides us visibility on resource assignments, resource availability, crew composition, key contact information, and task allocations. The effective management of our work crews allows us to respond to outages and emergencies in a timely and efficient manner.</p> <p>Note: Activities linked to the update/upgrade of Crew Manager are not included in the Network Management business case.</p> <p>Current solution: Crew Manager 4.3</p>

DBYD	<p>When performing work in the field that involves digging, it is important for any person (contractor, worker, or community member) to ensure that they have all the necessary information regarding existing underground electrical infrastructure in the vicinity of the work area so the right measures and procedures can be actioned. Failure to ascertain this information prior to digging might lead to catastrophic consequences including human harm, infrastructure damage, and service disruptions.</p> <p>The DBYD solution is an efficient and automated way for any person performing work in the field to request site information about a particular work area. Upon receipt of a new request, the system consults existing engineering repositories and sends back a PDF document that depicts any documented underground infrastructure in the target area. The compliance requirements around response time are currently set to 2 calendar days, but the DBYD allows requests to be processed within minutes.</p> <p>Current solution: Mipela version 5.7.0</p>
Drawing Management System	<p>A critical aspect of managing our distribution networks is the ability to create and manage engineering diagrams and designs. These provide the necessary foundation to support work performed on the networks, and inform the Network Operating Centre (NOC) switching process required to ensure safety of field operators while work is undertaken in the field. Engineering diagrams and designs are also used to support other critical services like DBYD.</p> <p>Current solution: Vault 24.1.42.0 (AutoDesk)</p>
Vegetation Management	<p>Vegetation Management is critical to the safe running and maintenance of the electricity distribution network, and the prevention of bushfires resulting from electrical faults. Its primary aim is to assist with the identification of high risk vegetation and the execution of appropriate preventive cutting to limit the probability of outages, fires, or human harm. It helps to prioritise work in high risk areas, and manage cutting work plans in accordance with the policies imposed by Energy Safe Victoria (ESV).</p> <p>Every year, we inspect all parts of our distribution network (including Hazardous Bushfire Risk Areas - HBRA), using a combination of ground and Light Detection And Ranging (LiDAR) methods, to identify risk areas that need remediation. Once captured, appropriate actions are undertaken in alignment to our Bushfire Mitigation Strategy Plan. The actual treatment of vegetation is performed by external providers, but all activities are regularly audited to ensure quality and compliance.</p> <p>The Vegetation Management capability is currently supported by 'Vegetation Management Solution' from Mondo. The solution acts as the single source of truth' for our vegetation management program, and requires integration with a number of peripheral systems (including SAP Finance, data analytics platform, Geographic Information System - GIS). Currently, a number of these integrations are either manual or require a material level of manual intervention.</p> <p>Current solution: Vegetation Management (Mondo)</p>

Source: CitiPower

B Option 1 maintain – initiative details

Table 10 Option 1 – initiative details

Asset Investment Planning		
Copperleaf	Status as of January 2021	Copperleaf C55
	Initiatives	<p>Extend Copperleaf to Fleet and Customer Services Group:</p> <p>The solution is currently mainly used by our Finance team, and our aim is to expand its application to the Fleet and Customer Services Group in 2021 to help drive a more rigorous and robust investment planning for assets.</p> <p>Implement Predictive Analytics Module:</p> <p>We are in the process of implement 4 out of the 6 modules available under Copperleaf. Our plan is to implement a fifth module, namely 'Predictive Analytics' to assist with forecasting of long-term sustainment needs of assets based on risk and economics. It will assist with better management of our funding plan and resource management plan</p> <p>Integrate with SAP S/4 HANA:</p> <p>Integrate Copperleaf with our SAP S/4 HANA platform to reduce the amount of manual transfers across systems, streamline the input of financial data points, and allow for more efficient reporting. To avoid duplication of investment, Copperleaf will not be integrated with our current SAP ECC6 platform; integration is currently planned for 2024 to align with the deployment of the S/4 HANA platform.</p>
Corporate Services Management		
iManage	Status as of January 2021	iManage 10.2
	Initiatives	<p>Minor upgrade:</p> <p>Minor scheduled upgrade, in line with the vendor roadmap. Due to the Integration with office 365, we will need to refresh, validate and test the application.</p>
Readsoft	Status as of January 2021	Readsoft Invoices Version 6.0 , Readsoft Process Director 7.7
	Initiatives	<p>Minor upgrade:</p> <p>Based on the vendor's current product revision schedule, it is expected that Readsoft will require a minor upgrade</p> <p>Minor upgrade:</p> <p>Based on the vendor's current product revision schedule, it is expected that Readsoft will require a minor upgrade</p> <p>Note: Readsoft is compatible with SAP by default and we do not expect that any integration work will be required</p>
Recwise	Status as of January 2021	Recwise 3.4.0.027020

	Initiatives	Minor upgrade: Scheduled maintenance
SuccessFactors	Status as of January 2021	SuccessFactors Q4 2020 Release
	Initiatives	<p>Progress current initiatives and extend to include LMS:</p> <p>Ensuring our employees have access to training and learning modules is paramount to our operational success. We currently use a variety of different applications to manage our training and learning for employees and are looking to create a one-stop-shop for training by implementing the LMS to SuccessFactors. LMS will ensure our employees have access to standardised training, ensuring our ability to remain compliant and deliver consistent and quality services to our customers.</p> <p>Test and Validate API and Integration between SAP S/4HANA and SuccessFactors:</p> <p>As our current major enterprise management system SAP ECC6 will be upgraded to SAP S/4HANA, the integration between SuccessFactors and the new instance of SAP will need to be tested and validated to ensure all links are adequate and functionality of the systems are maintained.</p>
Customer Facing Platform		
External Facing Website	Status as of January 2021	React 16.x, WordPress 5.2
	Initiatives	<p>Patching and upgrades:</p> <p>The website is based on open source platforms that need to be patched and updated to ensure robustness and safety of the overall hosting ecosystem. We also carry out regular testing to ensure that an adequate service level is maintained, including capacity/load testing, and failover testing.</p>
Database Management		
Oracle Database	Status as of January 2021	Oracle 11g/10g/9i
	Initiatives	<p>Upgrade to Oracle Database 12c:</p> <p>The majority of our Oracle back ends currently run off version 11g of the software, but we do however still have a few applications that run off older versions of the software; these older versions are becoming harder to maintain and are linked to recent instability incidents. Based on the current vendor roadmap, 'Extended Support' for Oracle DB 11g will end in December 2020. Post this date, customers will receive minimal support and no new features, fixes, or patches. The newer version of the database is more adaptable to cloud infrastructure (12c), and offers higher performance levels.</p> <p>Note: For databases that are older than 11g, updates will need to be implemented sequentially up to 12c (i.e. cannot update databases from their current version directly to 12c). This is because databases cannot be directly upgraded to the latest version of the software</p>

Field Services		
Click	Status as of January 2021	Click version 8.3
	Initiatives	<p>Upgrade to Click 8.4:</p> <p>Click 8.3 is built on the Microsoft Silverlight platform. In 2013, Microsoft had announced it was ceasing development on Silverlight and that the platform will no longer be supported after October 2021. To address this constraint, the vendor has announced the release of Click 8.4 which will negate the use of the Silverlight platform. The new version is expected to be available for business use in December 2020.</p> <p>Maintain Click 8.4 currency:</p> <p>Version 8.4 of the solution will require regular updates in line with the vendor product roadmap.</p> <p>Upgrade to Click FSE:</p> <p>ClickSoftware (the vendor) have announced that version 8.4 (or any earlier version of Click), will not be supported after December 2023/24. We will need to transition onto the new solution, Click FSE, to retain vendor support. Click FSE is a new product is available in the market, but which is still in its early maturity stages. It has been deemed prudent to delay the transition over to Click FSE to allow the solution time to mature and stabilise. The transition to Click FSE will occur during the 2021-2026 regulatory period. The exercise is expected to include a large portion of change management to ensure that all field and administration teams are fully across the details of the new solution.</p>
Crew Manager (Power On Remote Dispatch)	Status as of January 2021	Crew Manager 4.3
	Initiatives	<p>Functionality refresh of Crew manager</p> <p>Crew Manager will need to be retained and refreshed to integrate with PowerOn Advantage. This involves a minor upgrade.</p> <p>Within the Network Management business case, we propose consolidating the platform for our Distribution Management System (DMS) and Outage Management System (OMS) by transitioning to PowerOn Advantage.</p>
DBYD	Status as of January 2021	Mipela version 5.7.0
	Initiatives	<p>Major upgrade:</p> <p>Upgrade system in line with vendor product roadmap to maintain currency</p> <p>Major upgrade:</p> <p>Upgrade system in line with vendor product roadmap to maintain currency</p>
Drawing Management System	Status as of January 2021	Vault 24.1.42.0 (AutoDesk)

	Initiatives	<p>Major upgrade: Upgrade system in line with vendor product roadmap to maintain currency</p> <p>Major upgrade: Upgrade system in line with vendor product roadmap to maintain currency</p>
Vegetation Management Solution	Status as of January 2021	Vegetation Management (Mondo)
	Initiatives	<p>Core solution integration: Development of integrations in 2021/22 between the vegetation management solution and:</p> <ul style="list-style-type: none"> • SAP ECC6 (version of the platform that will be in place at that point in time) • GIS • Data analytics platform • Reporting platform • Map Viewer (utilised by cutting contractor Asplundh). <p>Integration with S/4 HANA: Redevelopment of integration with SAP in 2024 to cater for the transition from ECC6 to S/4 HANA</p>

Source: CitiPower