APA GROUP

BUSINESS CASE IT VTS01

Application Renewal

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Project No.	IT VTS01
Project Alias No.	
Project Name	Application Renewal
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PROJECT APPROVAL	
Prepared By:	Trevor Coles, Applications Manager, Information Technology
Approved By:	Bill Fazl, General Manager Information Technology
APA Approval Level	Board/EMT/COO/CEO/Other [APA to populate]

TABLE OF CONTENTS

1. Project Overview

Description of Issue/Project	The Applications Renewal project is required to ensure that the APA GasNet (Operations) Pty Ltd (APA), Victorian Transmission System (VTS) critical Information Technology (IT) applications are kept up-to-date over the next (1 January 2018 to 31st December 2022) Access Arrangement (AA) period. The Applications Renewal project will involve systematically upgrading the nationalised software and applications that manage APA's operational business and pipeline services. The key objectives of this project are to: • continue to maintain reliable, secure, compliant and efficient business processes and systems; • preserve the ongoing integrity of APA pipeline services; and • comply with regulatory and customer obligations. The key benefits from this project is to substantially reduce the level of risk of system(s) failure or integration between systems not working as required and improving the levels of systems security and data integrity.
Options Considered	The following options have been considered: 1. Option 1: Reduced scope; and 2. Option 2: Regular upgrades of critical IT applications in the next AA period.
Proposed Solution	Option 2 has been selected.
Estimated Cost	APA VTS - $4m

Consistency with the National Gas Rules (NGR)	The Application Renewal project complies with the new capital expenditure criteria in rule 79 of the National Gas Rules because:
	• it is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services (Rule 79(1)(a)); and
	
	• it is justified under 79(2)(c) as it is required to:
	   o maintain and improve the safety of services (rule 79(2)(c)(i)) - making this investment reduces the risk of failure of the critical systems or the risk of security breaches, which could adversely affect the safety of services;
	
	   o maintain the integrity of services (rule 79(2)(c)(ii)) - the project reduces the risk to the integrity of the pipeline services that will be adversely affected by a failure of any of the critical IT applications; and
	
	   o comply with a regulatory obligation or requirement (rule 79(2)(c)(iii)) - the project mitigates the risk of a breach of regulatory obligations if the systems were not available (e.g. managing nominations, scheduling and billing timeframes).

2.   Purpose

In order to ensure that business processes and IT application systems are efficient and effective, APA has undertaken a significant investment in a number of Business & Technology (B&T) projects over the past few years. To this end, APA has an ongoing IT application upgrade program incorporated in an overall IT plan, designed to maintain the security and integrity of the IT systems and to keep technology risks at an acceptable level.

During previous Access Arrangement Periods (pre CY18) a number of major projects to nationalise and upgrade key application systems were implemented. These projects provided improved scalability, flexibility and reliability.

The B&T projects delivered over the previous Access Arrangement periods include:

•   Gas Management System;

•   Enterprise Asset Management;

•   Portfolio and Project Operating Model;

•   Financial Transformation;

•   Hydrocarbon accounting and billing (Project Colin); and

•   Enterprise Historian.

These projects delivered sustainable application systems and aligned business processes to ensure that APA's systems continue to meet current and future needs. APA proposes to continue its prudent investment in B&T projects in order to maintain its systems integrity of services and to mitigate avoidable risks.

3.   Background

An application upgrade roadmap, based on a stay in business program of work, has been developed to ensure that these application systems are kept up-to-date.

Generally an application upgrade will involve not only the application upgrade itself, but also upgrades to the underlying associated technology platform components, assessment, design and implementation of any changes to configuration, customisations and integrations associated with the upgrades and complete testing of all impacted end to end processes.

This project is required to perform upgrades on existing IT assets and does not involve their replacement.

Software application assets are upgraded based on a 2 year cycle* depending on the assets and the policies of the vendors for the frequency of upgrades. There exist interdependencies between the various software applications which are integrated to support business requirements. This interdependency creates a working construct of software applications, and associated technology platform components, that are at risk if they are not maintained at compatible software release levels as prescribed by technology vendors.

In order to ensure that the IT application systems are kept stable and at optimum performance, APA utilises an application lifecycle management methodology to determine upgrade timelines and

priorities. An application upgrade plan is in place which is based on a stay in business program of work and ensures compliance with an underlying principle of staying at a minimum of (N-1) for application upgrades. This enables appropriate levels of operation and inter-operability between vendors.

* Note: Mobility technology upgrades have been identified as an exception to the applied 2 year cycle of application upgrades. The rapid change in technology cycle, security exposure and the ongoing speed of mobility based change indicates that a yearly upgrade cycle for Mobility is a prudent approach in this area.

This application roadmap is used to identify and prioritise upgrades, and has been used as the basis for this proposal.

Based on the application upgrade plan, the following APA IT systems will be upgraded over the period CY18 to CY22:

- Energy Components - Hydrocarbon accounting and billing, Tieto;

- Historian System – Osisoft PI System;

- Telemetry System – ClearSCADA;

- Middleware – Microsoft BizTalk;

- Dial Before You Dig (DBYD) – Mipela;

- Field Data / Mobility Systems;

- Geospatial Information System (GIS) – GE SmallWorld / ESRI; and

- Enterprise Asset Management (EAM) – IBM, Maximo

As part of this investment, APA intends to carry out periodic upgrades of critical IT applications to ensure that these systems are kept up-to-date.

4. Objectives of the project

The Applications Renewal project is required to embed the benefits of the IT systems nationalisation program, maintain the current levels of IT services, maintain security and mitigate risks associated with APA's core business systems.

The Applications Renewal project will involve systematically upgrading the nationalised software and applications that manage APA's VTS pipeline. The key objectives of this project are to:

- continue to maintain reliable, secure, compliant and efficient business processes and systems;

- preserve the ongoing integrity of these services; and

- comply with the Retail Market Procedures and other relevant regulatory obligations.

The upgrade will involve systematically upgrading the software and applications outlined in the Applications Upgrade Plan shown in Table 1 below:

Table 1: Application Upgrade Plan

Upgrade Projects	2018	2019	2020	2021	2022
Energy Components	X		X		X
Historian		X		X	
SCADA		X		X	
Middleware		X		X	
DBYD		X		X	
Field Data / Mobility	X	X	X	X	X
GIS		X		X	
EAM	X		X		X

These upgrades are required to manage the transition of one version of the technology to a subsequent improved version of the technology, correct defects in the technology (which includes how a technology type interacts with other technology types) and attend to security concerns. Upgrade versions are provided by vendors who recommend that their technology be upgraded to ensure ongoing support and maintenance contracts and that any known issues including security vulnerabilities are addressed.

Software application assets are usually upgraded on a 2 year cycle[1] depending on the assets and the policies of the vendors for the frequency of upgrades. The application of version upgrades to critical business systems every 2 years is good industry practice as vendors typically provide at least one major and several minor upgrades or patches over that period. There exist interdependencies between the various software applications, which are integrated to support business requirements. This interdependency creates a working construct of software applications, and associated technology platform components, that are at risk if they are not maintained at compatible software release levels as prescribed by technology vendors. The interoperability of disparate applications must be constantly monitored in order to have visibility of potential incompatibilities. The application of version upgrades through a quality based testing regime mitigates any risks associated with this issue.

To ensure that the IT application systems are kept stable, secure and at optimum performance, APA utilises an application lifecycle management methodology to determine upgrade timelines and priorities, which is outlined in Appendix C. The Application Upgrade Plan outlined above is in place as a stay in business program of work that ensures compliance with an underlying principle of staying at a minimum of (N-1) for application upgrades. The alignment with industry practice of N-1 ensures ongoing vendor support and mitigates the risk of security breaches, system outages and potential regulatory non-compliance.

This enables appropriate levels of operation, data integrity and inter-operability between various vendors provided technologies. This application roadmap is used to identify and prioritise upgrades, and has been used as the basis for the development of the Applications Upgrade Plan, which sets out the applications and the frequency of upgrades that APA proposes to carry out in the next AA period.

This upgrade program will:

- Ensure upgraded applications continue to provide required integrated functionality to support business processes;

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[1] Mobility technology upgrades have been identified as an exception to the applied 2 year cycle of application upgrades. The rapid change in technology cycle and the ongoing speed of mobility based change indicates that a yearly upgrade cycle for Mobility is a prudent approach in this area.

- Manage alignment with other co-existing applications;

- Ensure validity of support requirements with technology vendors;

- Introduce appropriate new functionality; and

- Improve software performance and efficiency.

5. Benefits from the project

The major benefits from the upgrade of the key applications are the reduced level of risk of system(s) failing or the integration between systems not operating as intended. Key points to note on this suite of systems are:

- Critical IT applications are linked together and are reliant on each other to allow high volumes of transactions to flow from one to the other;

- It is necessary to ensure the full functionality of these linked critical IT application systems to satisfy retail market rules and APA's business requirements;

- Significant IT investment has been made in recent years to ensure that APA's application systems meet their obligations as set out in the retail market rules. APA needs to ensure this investment is managed and maintained and this requires an upgrade strategy.

- Failure of the critical systems will have impacts across the business as the true state of the network will not be reliably known creating safety and operational risks.

- Alongside the reduced risks of failures from the critical systems there are also a number of benefits of moving to the latest versions. This includes:

    - Continuation of IT vendor support, which will require movement to a recent version of the software;
    - Security and integrity of business information which will improve with upgrades with the continued emphasise that vendors place on these solutions.
    - Improved stability of IT systems over time;
    - Compliance of the latest IT systems with market requirements.

6. Options Considered and Recommendation

Two options were considered:

Option 1. - Reduced scope: This option involves reducing the scope of the upgrades to the critical business IT applications identified in option 2 by delaying the upgrade of some applications and / or not upgrading some applications at all.

However, due to the interdependency between the applications, this is not considered to be a prudent solution as it may expose APA to:

- unacceptable IT security risks;

- a reduction in availability of services;

- a reduction in integrity of services; and

- an inability to comply with regulatory obligations or requirements.

The risks associated with Option 1 are shown in the Appendix A as the 'Risk Untreated' and summarised in Section 8. This option would expose APA to a 'High' risk rating during the next AA period.

Based on this risk assessment, it is imperative that the IT applications are upgraded in the next AA period. Therefore, is not a feasible option.

Option 2 - Regular upgrades of critical IT applications in accordance with good industry practice and APA's application lifecycle management methodology (i.e., every two years for most of the applications).

The risks associated with Option 2 are shown in Appendix A as 'Risk Treated'. While the consequence of an event happening remains the same as in Option 1, the likelihood of the event happening over the next AA period is reduced to 'Unlikely' due to the ongoing stay-in-business two year cycle of upgrades. This would reduce the overall risk level to 'Moderate', which is considered to be consistent with good industry practice.

This is the only option to mitigate the risks identified with Option 1 and keeps the technology risks at an acceptable level by ensuring the security and integrity of the IT environment via a prudent cycle of application upgrades.

The key benefit of Option 2 is that it will reduce, to the extent practical, the level of risk of system(s) failure, the integration between systems not operating as required or staff and customer data being compromised which is of considerable importance given that:

- failure of the critical IT systems will have adverse effects across the business as the true state of the transmission pipeline will not be reliably known, thereby creating public safety and operational risks (for example, if the GIS system fails, it could result in the DBYD service not providing the latest gas location information to the public. This could result in a significant public safety issue if underground excavation is carried out in an area that APA had indicated was clear of gas assets, but in fact was not;

- critical IT applications are linked together and are reliant on each other to allow high volumes of transactions to flow from one system to another. For example, a failure in the Hydrocarbon accounting and billing application will impact the ability to manage nominations and scheduling for safe pipeline operation. Market and Business confidence will be negatively impacted, where unavailable or inaccurate business reporting was to occur. This will significantly increase the risk of non-compliance with the Retail Market Procedures. Where operational information relating to pipelines is interrupted there is an immediate safety risk, as well as forced delays to planned maintenance activity;

- the full functionality of these linked critical IT application systems is necessary to satisfy the Retail Market Procedures, and more generally, APA's operating requirements; and

- significant IT investment has been made in recent years to ensure that APA's application systems meet their obligations as set out in the Retail Market Procedures. This investment requires APA to implement an upgrade strategy that is consistent with good industry practice.

Other benefits of upgrading critical IT applications include:

- ensuring upgraded applications continue to provide required integrated functionality to support business processes;

- managing alignment with other co-existing applications, including in other states where APA operates;

- ensuring validity of support requirements with technology vendors;

- maintained systems security with critical security upgrades applied thereby protecting information assets from confidentiality, integrity and availability risks;

- introduction of new functionality in a timely manner;

- improvement to software performance, efficiency and stability of IT systems over time;

- providing for the continuation of IT vendor support (this requires movement to a recent version of the software);

- improving the security and integrity of business information as vendors place greater emphasis on these solutions; and

- ensuring compliance to market requirements for the latest IT systems.

Recommendation

The recommendation is to go with Option 2: Upgrade critical IT applications on a regular basis, every two years, as per good industry practice. This is the only option to address the risks associated with the failure to upgrade critical business IT applications.

7. Project Costs and Delivery Approach

The approach that APA has used to develop this forecast and its proposed approach to carrying out the work is outlined below.

The APA application environment consists of a number of systems that are tightly integrated. With tightly integrated systems there is a resulting interdependency of associated technologies. Upgrades to applications, infrastructure and associated technologies, are typically not completed in isolation of one another. They instead tend to be run as internal Business & Technology (B&T) projects, which involves the following:

- APA uses an industry standard B&T Project Methodology, which is managed through formal governance. This B&T Methodology divides the projects into key stages – concept, develop, plan, deliver and close. Each stage consists of key tasks and activities to ensure the consistency and standardisation across projects. The project methodology is outlined in Appendix C.

- The methodology includes an Estimation Tool, to ensure project estimates are standard and consistent. This estimation tool has been used to forecast the work and cost estimates for the program of work. This estimation tool utilises historic figures from the current AA period for resource work effort estimates. The work estimates are based on a complexity matrix tool, which uses a series of questions to categorise projects into simple, medium and complex.

- The material and direct labour costs, and applicable planning, design and commissioning charges, are based on historic actual costs of similar projects. Resource Unit Costs (both internal and external) are based on APA's Project Management Office (PMO) research, where actual placement costs have been used based on historical project resources and current resourcing rates (2016).

- When implementing the project, APA will use a formalised Project Methodology and utilise a combination of internal and external resources (through vendors and trusted recruitment agencies) to deliver the program of work to ensure that services are carried out in a prudent and efficient manner. The Project Methodology is outlined in Appendix C and provides a consistent, standard and quality assured project implementation framework. The PMO will provide guidance and governance to the project, ensuring that the work is carried out in a professional manner.

The summary costs over the next AA period and the cost breakdown by cost category are provided below. These costs were estimated from 'bottom-up' using a standard IT cost model and the approach outlined above. These costs have also been reviewed and endorsed by members of the IT Estimates Review Committee.

The detailed cost breakdown by individual project is provided in Appendix B.

Forecast Cost Breakdown

The proposed expenditure for the next AA period is provided below:

Table 2: CAPEX by project split ($000 real 2017 – excluding overheads)

Upgrade Projects	2018	2019	2020	2021	2022	Total
Energy Components	193	0	193	0	193	579
Historian	0	75	0	75	0	150
SCADA	0	354	0	354	0	707
Biztalk	0	84	0	84	0	167
DBYD	0	90	0	90	0	180
Field Data / Mobility	54	54	54	54	54	268
GIS	0	268	0	268	0	536
EAM	493	0	493	0	493	1,479
Total	735	918	735	918	735	4,039

Table 3: Project Cost Estimate, by Cost Type ($000 real 2017 – excluding overheads)

Cost Type	2018	2019	2020	2021	2022	Total
Internal Labour	222	277	222	277	222	1,220
External Labour	481	600	481	600	481	2,642
Materials	37	46	37	37	37	203
Total	739	924	739	924	739	4,065

The proposed expenditure summary per project by cost type is shown in Appendix B

8. Risk Assessment

APA's core applications are reliant on each other to allow high volumes of transactions to flow from one IT system to another and any system failure would have a significant impact across all pipeline operations for an extended period of time while the remediation work was completed. If the upgrades are not implemented, the risk of catastrophic failure increases year-on-year, and if this extends beyond the next AA period, the risk will increase to 'Extreme'. Additionally, not implementing timely upgrades makes applications more vulnerable to cyber-attacks and increases the likelihood of security breaches. Security breaches compromise the confidentiality and integrity of corporate and customer data, and availability of operational and corporate systems giving rise to risks across most of the risk categories described below.

As IT systems age, it becomes increasingly difficult to address security weaknesses and implement the remedial actions required to resolve a system failure. In a worst-case scenario, the application or technology platform may have a catastrophic failure and cannot be recovered, resulting in an urgent need to implement either an upgrade or replacement of that system to restore network operations. The security, safety, operational, customer, reputation, compliance and financial risks summarised below and detailed in Appendix A would be realised and magnified unnecessarily because reactive remedial actions take significant time and cost to implement. Furthermore, APA's management and staff would be under major pressure to recover functionality quickly, thereby increasing the risk of error.

The planned upgrades are required, among other reasons, to manage the transition of one version of the technology to a subsequent improved version. Upgrade versions are provided by vendors who recommend that their technology be upgraded to ensure continued provision of ongoing support and maintenance and that any known issues including security vulnerabilities are addressed.

If the Applications Renewal does not proceed, the risk assessment shows some significant consequences in the following areas:

- **Health and Safety:** Failure of the critical IT systems will have adverse effects across the business as the true state of the pipelines will not be reliably known, thereby creating public safety risks; for example, if the Geospatial Information System (GIS) system fails, it could result in the Dial Before You Dig (DBYD) service not providing the latest gas location information to the public. This could result in a significant public safety issue if underground excavation is carried out in an area that APA had indicated was clear of gas assets, but in fact was not. Furthermore, security breaches may cause outages in operational systems resulting in insufficient safety information available in real time to field crew and lack of a pictorial representation of the asset increasing the likelihood of a safety incident.

- **Operational:** Systems with uncorrected deficiencies and poor integration may result in inefficient work order processing, an inability to make spatial and logical queries, inability to carry out timely repairs and maintenance, longer outages and operational risks of errors in manual data processes compared to electronic communications and confidential staff information being compromised.

- **Customers:** The Health and Safety and Operational risks will result in slower and inefficient responses to call outs, and longer outages. In addition, security breaches may result in confidential customer data being compromised.

- **Reputation:** APA's reputation could be damaged significantly in the event of health and safety incidents; supply disruptions; delayed repairs and maintenance; compromised corporate, staff and customer information and resultant litigation.

- **Compliance:** Unsupported and poorly integrated systems and compromised customer information may result in APA not complying with Retail Market Procedures.

- **Financial:** The Health and Safety, Operational and Customer consequences summarised above, and Compliance consequences summarised below will result in sizeable additional costs and compromised staff and customer data could lead to significant litigation costs. In addition, without the continuation of IT vendor support which requires movement to a recent version of the software, APA will be forced to find and hire IT specialists with detailed knowledge of the outdated systems' inner workings and the programming language used. Financial penalties may also be imposed for not complying with Retail Market Procedures.

The summary of the results of the risk assessment is provided in the table below. Refer to the full risk assessment results included as Appendix A to this business case.

Table 4: RISK RATING

Risk Area	Untreated Risk Level
Health and Safety	Moderate
Environment	Negligible
Operational	High
Customers	Moderate
Reputation	Moderate
Compliance	Low
Financial	High
Untreated Risk Rating	**High**

9. Consistency with the National Gas Rules

Consistent with the requirements of Rule 79(1)(a) of the National Gas Rules (NGR), APA considers the forecast capex for this project to be:

- *Prudent* – The expenditure is necessary in order to maintain the integrity of services and comply with regulatory obligations and requirements and is of a nature that a prudent service provider would incur.

- *Efficient* – The Applications Renewal project will enable APA to maintain its operational efficiency and address the high risks of non-compliance with relevant regulations and legislation, potential customer and business interruptions and corresponding adverse financial and reputation impacts.

  Additionally, the manner in which APA intends to carry out the upgrade (i.e., by using a combination of internal and external resources to deliver the program of work and using the PMO to provide guidance and governance to the project) is consistent with good industry

practices and can be considered efficient. The expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.

The project will allow APA to maintain its cost effectiveness and operational efficiency and address the high risks of non-compliance with relevant regulations and legislation, potential customer and business interruptions and corresponding adverse financial and reputation impacts.

- *Consistent with accepted good industry practice* – The Applications Renewal project will ensure that APA continues to operate in line with good industry practice, in terms of having all critical systems up to date, secure and supported by vendors.

- *Achieves the lowest sustainable cost of delivering pipeline services* – The Applications Renewal project is necessary to mitigate the risks associate with operating on older versions of the software with the resultant performance, data integrity and cost implications should these systems fail and is therefore consistent with the objective of achieving the lowest sustainable cost of service delivery.

The capex can therefore be viewed as being consistent with Rule 79(1)(a) of the NGR.

Rule 79(2)(c)

The proposed capex is justified under Rule 79(2)(c) because it is necessary to:

- maintain and improve the safety of services (rule 79(2)(c)(i)) - making this investment reduces the risk of failure of the critical systems or security breaches, which could adversely affect the safety of services;

- maintain the integrity of services (rule 79(2)(c)(ii)) - the project reduces the risk the integrity of the pipeline services will be adversely affected by a failure of either of these critical applications; and

- comply with a regulatory obligation or requirement (rule 79(2)(c)(iii)) - the project mitigates the risk of a breach of regulatory obligations if the systems were not available (e.g. Retail Market Procedure requirements for processing timeframes).

Appendix A – Risk Assessment

Based on the previously discussed project risks and benefits, risk mitigation is the key driver for the Application Renewal project. The risk assessments below demonstrate the change in risk profile associated with the two options considered in this business case. As noted in Section 8, if the periodic upgrades to the APA's critical IT applications are not implemented, the risk of catastrophic failure increases year-on-year, and is assessed as 'High' during the next AA period.

		Health & Safety	Environment	Operational	Customers	Reputation	Compliance	Financial	Total Option Risk
Risk Untreated **Option 1**	Likelihood	Possible	Unlikely	Possible	Possible	Possible	Possible	Possible	**HIGH**
	Consequence	Medium	Insignificant	Significant	Medium	Medium	Minor	Significant	
	Risk Level	Moderate	Negligible	High	Moderate	Moderate	Low	High	
Residual Risk **Option 2**	Likelihood	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	**MODERATE**
	Consequence	Medium	Insignificant	Significant	Medium	Medium	Minor	Significant	
	Risk Level	Moderate	Negligible	Moderate	Moderate	Moderate	Low	Moderate	

In the event Option 1 – Reduce Scope is adopted:

the IT systems may be unable to support business strategic objectives, particularly with national alignment and the delivery of initiatives to improve cost effectiveness;

• as software licence renewals are becoming due, staying with existing systems will lock APA into old technology and another licence cycle;

• critical IT applications which are linked together and are reliant on each other to allow high volumes of transactions to flow from one system to another will cease to integrate;

• software vendor improvements to security and integrity of business information will not be implemented;

• security breaches will compromise the confidentiality and integrity of corporate and customer data, and availability of operational and corporate systems giving rise to risks across most of the risk categories described below; and

• failure of the critical systems will have adverse effects across the business as the true state of the pipeline will not be reliably known creating safety and operational risks.

resulting in a broad spectrum of risk consequences as described below.

Health and Safety: Due to the timeframe of vendor release cycles and the current age of telephony It applications, not upgrading will expose APA to the risk of core systems being vulnerable to security incidents, which would adversely affect the safety and integrity of APA services.

Operational: Note that the following operational consequences will also result in significant financial consequences.

- failure in older applications may occur, resulting in unplanned production outages;

- technology upgrades for core software will be required so not continuing with the planned upgrades will mean the opportunity for 'change out' of inefficient technologies will be missed;

- as software licence renewals are becoming due, staying with existing systems will lock APA into old technology and another licence cycle;

- failure to introduce new functionality in a timely manner;

- no improvement to software performance, efficiency and stability of IT systems over time;

- inability to extract and interrogate the data and use this to make spatial and logical queries, and hence improved business decisions;

- inefficient Work Order processing – continued use of, or reversion to, the more manual and paper based processes will result in slower response and restoration times and unnecessary operational costs;

- inability of operational staff to carry out timely repairs and maintenance;

- operational risks of errors in manual data processes compared to electronic communications; and

- confidential staff and customer information being compromised.

Customers: As described under Health and Safety and Operational consequences above, there is an increased risk of failure in older applications, which could result in unplanned production outages, and slower and inefficient responses to customer calls.

Reputation: APA's reputation could be damaged significantly in the event of health and safety incidents, unplanned production outages and compromised corporate, staff and customer information and resultant litigation.

Financial: Each of the Health and Safety and Operational consequences above will result in significant costs. In addition:

- core applications will no longer be supported by IT vendors;

- the IT systems may be unable to support business strategic objectives, particularly with national alignment and the delivery of initiatives to improve cost effectiveness;

- targets for effective IT development and minimisation of support costs may not be achieved; and

- without the continuation of IT vendor support which requires movement to a recent version of the software, we will be forced to find and hire IT specialists with detailed knowledge of the outdated systems' inner workings and the programming language used;

- compromised staff and customer data could lead to significant litigation costs; and

- financial penalties may be imposed for not complying with Retail Market Procedures

Compliance: A catastrophic failure in underlying application may result in outages of APA's core IT systems which, in turn, may lead to non-compliance of with regulatory and customer obligations.

Appendix B – Breakdown of upgrade costs by system

Note: Estimates are for individual renewal projects and are repeated on a two year upgrade cycle over the period next AA period ($000 real 2017 – excluding overheads)

Energy Components

Cost Type	2018	2019	2020	2021	2022	Total
Internal Labour	58	0	58	0	58	174
External Labour	125	0	125	0	125	376
Materials	10	0	10	0	10	29
Total	193	0	193	0	193	579

Historian

Cost Type	2018	2019	2020	2022	2023	Total
Internal Labour	0	23	0	23	0	45
External Labour	0	49	0	49	0	98
Materials	0	4	0	4	0	8
Total	0	75	0	75	0	150

SCADA System

Cost Type	2018	2019	2020	2021	2022	Total
Internal Labour	0	106	0	106	0	212
External Labour	0	230	0	230	0	460
Materials	0	18	0	18	0	35
Total	0	354	0	354	0	707

Middleware - Biztalk

Cost Type	2018	2019	2020	2021	2022	Total
Internal Labour	0	25	0	25	0	50
External Labour	0	54	0	54	0	109
Materials	0	4	0	4	0	8
Total	0	84	0	84	0	167

Dial Before You Dig

Cost Type	2018	2019	2020	2021	2022	Total
Internal Labour	0	27	0	27	0	54
External Labour	0	59	0	59	0	117
Materials	0	5	0	5	0	9
Total	0	90	0	90	0	180

Field Data – Mobility Systems

Cost Type	2018	2019	2020	2021	2022	Total
Internal Labour	27	27	27	27	27	134
External Labour	11	11	11	11	11	54
Materials	16	16	16	16	16	80
Total	54	54	54	54	54	268

Geospatial Information System

Cost Type	2018	2019	2020	2021	2022	Total
Internal Labour	0	80	0	80	0	161
External Labour	0	174	0	174	0	348
Materials	0	13	0	13	0	27
Total	0	268	0	268	0	536

Enterprise Asset Management

Cost Type	2018	2019	2020	2021	2022	Total
Internal Labour	148	0	148	0	148	444
External Labour	320	0	320	0	320	961
Materials	25	0	25	0	25	74
Total	493	0	493	0	493	1,479

Appendix C – Methodology

APA Project Methodology

To manage all its IT projects, APA utilises an industry standard Business and Technology (B&T) Project Methodology, which is managed through formal governance. The key aspects of this methodology are outlined in the diagram below.
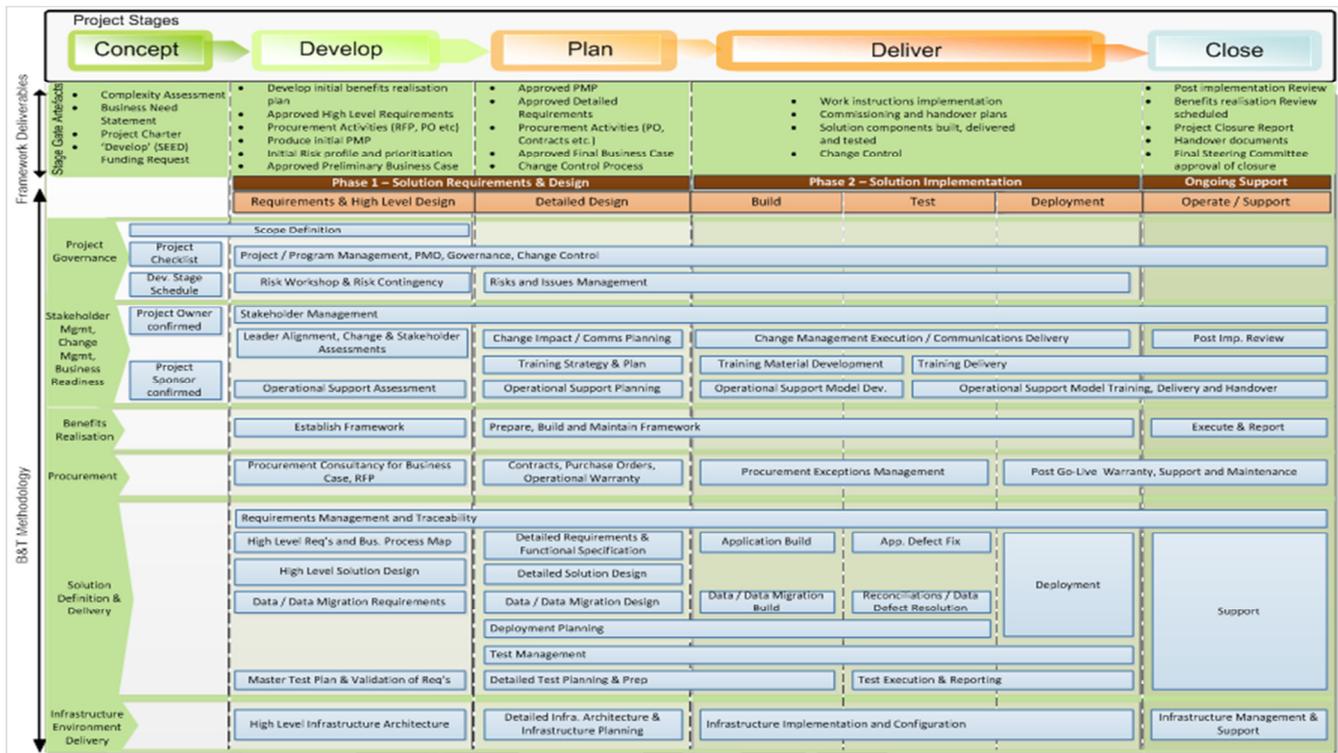
APA Application Lifecycle Management

APA utilises an industry-standard application lifecycle management methodology and a practical framework to determine upgrade timelines and priorities. The diagram below outlines the key aspects of this framework.