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Information Paper. Information Technology

Roma Brisbane Pipeline 2022-2027 access arrangement revised proposal

January 14, 2021

Contents

1. APA's Information Technology portfolio

1.1 Introduction

APA's enterprise-wide Information Technology (IT) program enables core business information, communications and operational technology to respond in an effective way to the energy sector shift to decarbonisation, decentralisation and digitisation and to protect APA against cyber security threats.

Information, communication and operational technology is necessary support everyday business functions and technical operations of assets. The shift to digitisation is playing a greater role in more aspects of the day-to-day operations in energy.

Investment in fit-for-purpose information, communication and operational technology is necessary to enable APA to continue to operate efficiently and deliver reliable, secure and safe services to customers. Fit-for-purpose systems are crucial for APA to remain compliant with regulatory obligations including regulatory information notices. Fit-for-purpose Information, communication and operational technology is crucial for APA to operate effectively in the complex energy market.

APA's IT program provides enterprise-wide delivery of business transformation, continuous improvement initiatives and technology solutions and maintains and protects APA's operations. The enterprise-wide approach to information, communication and operational technology provides economies of scale and scope in the delivery of services.

The enterprise-wide approach (rather than a stand-alone approach) enables customers to benefit from lower costs. This benefit applies to both customers of APA's regulated and unregulated assets. The economies of scope allows APA to apply the enterprise-wide information and technology systems to support customers and asset management across APA.

APA's Information Technology organisation covers the following core functions:

- Enterprise Program Management Office
- Operational Technology
- Information Technology.

Effective information, communication and operational technology is vital to ensure that we can meet regulatory obligations and provide information for our customers and community.

The Security of Critical Infrastructure (SoCI) program is discussed in a separate business case (refer to Attachment 11 - RBP - Business Case SoCI Legislation - 220114 - Confidential).

1.2 Structure of this paper

This Paper discusses:

- Description of investment drivers for IT
- Forecasts for RBP and how costs have been allocated
- Description of programs and projects by portfolio, benefits and forecasts.

This Information Paper presents best available information on IT forecasts and expenditure requirements for RBP. The expenditure forecasts have been influenced by our expectations of greater program migration to cloud-based services. These expenditure forecasts are the best forecasts available at this time.

2 Description of drivers for IT program

APA's legacy systems are in need of an upgrade to be fit-for-purpose and a transformation program is underway to modernise and upgrade important systems. Our transformation program is seeking to bring our existing suite of information technology and operational technology applications to good industry standard.

The key drivers for investment Information Technology program going forward include:

- Replacement of obsolete legacy systems
- Migration to cloud-based services for obsolete systems
- Routine upgrades and maintenance
- Compliance with new regulatory obligations for cyber security
- Compliance with the AS 2885 the Standard for Gas and Liquid Petroleum Pipelines.

This paper does not include forecasts for APA's SoCI program. These are presented in Attachment 11 - RBP - Business Case SoCI Legislation - 220114 - Confidential.

2.1 Replacement of obsolete legacy systems and routine upgrades

APA has a number of legacy systems that are out of support and are at end of technical life. The need for replacement of these systems is driven by:

- Poor condition
- No longer fit-for-purpose
- Obsolescence including no or limited warranty/ support and service from vendors
- Hard to find components and spare parts and outdated software.

Replacement of out-of-date systems are necessary to bring some of our legacy systems to good practice standard. These include the programs that are part of the EPMO portfolio.

2.2 Migration to cloud-based services

Up until recently, APA's IT infrastructure has been based in-house. This is changing with the evolution in the technological architecture of entities across Australia to cloud-based computing. Cloud-based computing is having significant changes in computing business solutions.

Cloud-computing involves hosting information technology services off-premises in a third party databases. The services can include Software-as-a-Service (SaaS), Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS).

APA is currently assessing a range of cloud-based computing solutions for a number of enterprise-wide programs. As cloud adoption becomes more commonplace and the de facto platform for many application vendors, we have an opportunity to assess whether there is a greater role for cloud hosting to deliver our ICT infrastructure. The shift to cloud migration has been driven by external factors not within APA's control.

The primary driver for reassessing APA's business solutions is a combination of:

- Cloud-based services becoming the primary platform for many application vendors
- Obsolescence and limited vendor support for business critical technologies used by APA.

2.2.1 Clarification to accounting standards

The shift to more cloud-based computing is impacting the allocation of costs between operating and capital expenditure.

The IFRIC Interpretations Committee (IFRIC®) has published two agenda decisions clarifying how arrangements in respect of a specific part of cloud technology, Software-as-a-Service (SaaS), should be accounted for. The agenda decisions do not address the accounting for other components of cloud technology such as Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS).

The first agenda decision, published in March 2019, concludes that SaaS arrangements are likely to be service arrangements, rather than intangible or leased assets. This is because the customer typically only has a right to receive future access to the supplier's software running on the supplier's cloud infrastructure and therefore the supplier controls the intellectual property (IP) of the underlying software code.

The second agenda decision, published in April 2021, deals with specific circumstances in relation to configuration and customisation costs incurred in implementing SaaS:

- In limited circumstances, certain configuration and customisation activities undertaken in implementing SaaS arrangements may give rise to a separate asset where the customer controls the IP of the underlying software code. For example, the development of bridging modules to existing on-premises systems or bespoke additional software capability.
- In all other instances, configuration and customisation costs will be an operating expense. They are generally recognised in profit or loss as the customisation and configuration services are performed or, in certain circumstances, over the SaaS contract term when access to the cloud application software is provided.

The clarification of accounting standards has had an impact on allocating more costs into operating expenditure and is discussed in this paper.

2.3 Routine maintenance

Ongoing programs will be maintained and updated as required on a routine basis in line with vendor requirements. Ongoing maintenance is required to mitigate the risks associated with system failure. This in turn minimises safety risks to customers and employees, as well as unplanned outages and disruption of supply for customers.

Maintaining and updating business systems in line with vendor requirements is a prudent approach to manage overall lifecycle costs and reduce the risk of failure, and reduce the potential for compliance breaches.

2.4 Security of Critical Infrastructure

APA Group (APA) is currently captured under Security of Critical Infrastructure Act 2018 (the Act) as the responsible entity for 23 Critical Infrastructure assets. The existing Security of Critical Infrastructure

Act 2018 (the Act)[1] will be replaced by the Security Legislation Amendment (Critical Infrastructure) Bill (SoCI Amendment Bill) 2020.

It has been proposed to pass in two separate Bills to address urgent elements of the reform as soon as possible. The Bill is expected to be passed in its entirety by mid-2022.

The SoCI Amendment Bill not only increases the number of APA Critical Infrastructure assets captured, but also increases the obligations and requirements APA must comply with.

The Security of Critical Infrastructure (SoCI) program is discussed in a separate business case (refer to Attachment 11 - RBP - Business Case SoCI Legislation - 220114 - Confidential).

2.5 The Standard for Gas and Liquid Petroleum Pipelines

The AS/NZS 2885 The Standard for Gas and Liquid Petroleum Pipelines is the foundation on which the petroleum pipelines industry which represents good industry practice. It is a driver for gas transmission operations programs and operational technology.

[1] https://www.legislation.gov.au/Details/C2018A00029

3 Forecasts for Roma Brisbane Pipeline

3.1 RBP and the Information Technology program

APA's enterprise-wide IT program services APA's regulated and unregulated assets. The programs that are discussed in this information paper are used across all of APA's assets.

RBP is allocated a proportion of the corporate IT costs. The forecast IT costs include capital expenditure and operating expenditure. These costs do not include SoCI related cyber security costs. SoCI program is discussed in a separate information paper and business case.

3.2 Capital expenditure forecasts

The IT capital expenditure forecasts for RBP are shown in the following table.

Portfolio	Unit	2023	2024	2025	2026	2027	2023-2027
EPMO	$2022	1,222,500	1,222,500	733,500	244,500	244,500	3,667,500
Operational Technology	$2022	471,885	463,328	380,198	388,755	400,980	2,105,145
Information Technology	$2022	66,068	19,281	2,262	56,062	-	143,673
Total	**$2022**	**1,760,453**	**1,705,109**	**1,115,960**	**689,317**	**645,480**	**5,916,318**

The programs and projects are discussed later in this paper.

3.3 Operating expenditure forecasts

The IT operating expenditure forecasts for RBP are shown in the following table. These costs are new and incremental costs related to the shift to cloud-based computing. These drivers are discussed in section 2.

Portfolio	Unit	2023	2024	2025	2026	2027	2023-2027
EPMO	$2022	1,418,100	1,760,400	1,002,450	635,700	635,700	5,452,350
Operational Technology	$2022	4,890	17,115	34,230	39,120	34,230	129,585
Total	**$2022**	**1,422,990**	**1,777,515**	**1,036,680**	**674,820**	**669,930**	**5,581,935**

Information on the programs that make-up these portfolio forecast expenditures are set out in the next sections of this Paper.

3.4 IT cost allocation to RBP

APA's approach to cost allocation is set out the Cost Allocation Methodology (CAM) document prepared for APA regulatory reporting purposes.

The purpose of the CAM is to set out the policy for attributing and allocating cost to services in accordance with the National Gas Rules, and for reporting operating and capital costs information to the AER. The CAM provides guidance for APA management and staff in relation to cost allocation principles, policies, and ongoing obligations as they relate to the operations and delivery of the services.

APA's CAM was submitted as part of the RBP 2022-2027 access arrangement proposal (refer to APA RBP - RBP 2022-27 - Attachment 10 - APA Cost Allocation Methodology - July 2021).

4 Information Technology

4.1 Enterprise Program Management Office

The Enterprise Program Management Office (EPMO) defines and delivers the strategy for transforming APA into a leading, world class energy business. The EPMO is responsible for ensuring projects deliver optimum business value as early as possible and ensuring a continuous improvement focus by creating safe spaces to innovate, learn fast and adjust where required.

APA is embarking on transforming critical applications and IT infrastructure to bring them up to modern good industry practice-standards. The benefits of this transformation will provide better services to customers, enhancing the digital customer experience, and providing timely and more accurate information.

EPMO is managing the upgrades of four programs - Grid customer services, Asset Management, Back Office and Field Mobility. Business solutions for the programs are currently being prepared but are not ready in time for the RBP revised proposal. We expect to have better information in early 2022.

4.2 Forecast expenditure

The EPMO expenditure forecasts reflect the expected impact of the migration of APA's corporate systems to cloud based software as a service. The impact is that costs are shifting from capital to operating expenditure.

RBP has been allocation a proportion of the APA enterprise-wide costs based on the approved Cost Allocation Method as discussed in section 3.4.

4.2.1 Capital expenditure forecasts

The capital expenditure EPMO capital expenditure forecasts are presented below.

Program	Unit	2023	2024	2025	2026	2027	2023-2027
Grid customer services (current system)	$2022	244,500	244,500	-	-	-	**489,000**
Grid customer services (new system)	$2022	978,000	978,000	733,500	244,500	244,500	**3,178,500**
Total	**$2022**	**1,222,500**	**1,222,500**	**733,500**	**244,500**	**244,500**	**3,667,500**

The Grid customer solutions (EC component) is a platform that is hosted within a cloud environment – most likely APA's cloud. It will have single tenancy and be configured and built specific for APA's need and not shared with any other customers and is exclusive built for APA. APA will be able to take possession of the product at any stage and move it to APA's cloud environment – but more than likely being built in our own environment. Under the IFRIC clarification the new Grid customer solutions (EC component) will be capitalised.

(Note that in the RBP access arrangement proposal submitted in July 2021, RBP had forecasts that the new Grid customer services solution would be included as operating expenditure. It has since been clarified by IT that based on the latest information on the business solution (APA specific cloud as described above) the new grid customer services solutions is capital expenditure). The capital expenditure forecasts for the EPMO portfolio of programs are discussed in section 4.3.

4.2.2 Operating expenditure forecasts

EPMO operating expenditure forecasts are presented below. These costs are new and incremental operating costs. These are costs that reflect the migration of systems to the cloud.

Program	Unit	2023	2024	2025	2026	2027	2023-2027
Asset Management	$2022	293,400	97,800	24,450	24,450	24,450	**464,550**
Back office	$2022	1,075,800	1,418,100	953,550	586,800	586,800	**4,621,050**
Field Mobility	$2022	48,900	244,500	24,450	24,450	24,450	**366,750**
Total	**$2022**	**1,418,100**	**1,760,400**	**1,002,450**	**635,700**	**635,700**	**5,452,350**

The description and justification for the EPMO portfolio of programs is presented in the next section.

Note, as discussed above, the operating expenditure forecasts have been revised to remove the new Grid customer services solution.

4.3 EPMO portfolio of programs

The EPMO is undertaking a review of back office (Enterprise Resource Planning), and middle office - asset management and grid customer service systems. The reviews are aimed at modernising APA's systems to ensure that systems are robust and fit-for-purpose and to meet the needs of customers in an efficient way.

The review of back and priority middle office systems commenced in FY2021 and a business case is likely to be completed by February 2022. At this stage, business solutions have not yet been defined or selected. This Paper presents the latest status of reviews and consideration of business solutions.

The expectation is that the majority of programs and projects subject to transformation will be shifted to cloud-based solutions.

The forecast capital expenditure has been based on best estimates by APA subject matter experts and where possible have been cross-checked with external consultants.

4.3.1 Back office and middle office systems

A review of back office functions key findings and recommended design considerations is set out in the following table.

	Inside-Out Key findings	Design considerations
Back office		
Business capabilities	APA's legacy implementations are technology focused, not capability focused Work-arounds are required to mitigate gaps across systems	A simple upgrade is not sufficient The strength, experience and potential cost advantage to stay with the Oracle needs to be compared with the benefits of other systems.
Simplify landscape	Back office capabilities are not integrated and use their own system-specific data models	An integrated solution suite will significantly accelerate data model

	There is an immediate need to decide the future solution approach as vendor support for the current solution ends by December 2021	standardisation and integration capabilities
Data reliability	APA does not operate on a standardised data model across its enterprise Core finance processes occur outside the system	The future solution must ensure robust and compliant regulatory reporting for APA's business Processes must operate on a well-defined and consistent data model across solutions and business boundaries.

To prepare best available information for the RBP access arrangement review, APA sought assistance from CapGemini on external benchmarks across the energy sector for the cost of implementing solutions similar to APA's needs. This information represents our best available at this time and have been incorporated into forecasts.

4.3.2 Asset Management program

A review of APA Asset Management systems found that there were areas for improvement. The findings are summarised in the table below.

	Inside-Out Key findings	Design considerations
Asset management		
Simplify landscape	APA operates a significant amount of paper-based processes due to limitations in current solution capabilities and overly complex requirements Some assets continue to run on their individual legacy solution	Develop a roadmap to transition legacy assets and systems to a new, standardised solution and operating model
Data reliability	Manual processes reduce reliability and availability of asset data Limited integration with finance systems reduces the ability to get automated, accurate and timely reporting	APA needs a holistic data model with well-defined single sources of truth Focus needs to be on data elements with highest impact on integration readiness first

These findings have been incorporated into the forecasts.

4.3.3 Grid Customer Services program

APA Grid (old system)

APA Grid, is a key enabler for APA's gas transmission operations. APA's grid customer management, billing and operations systems are collectively called the APA Grid. The APA Grid incorporates a database of customer details, relevant contractual information and pipeline details,

and is fundamental to the daily operation of APA's assets, meeting regulatory and contractual obligations as well as customer requests.

Customers nominate their daily gas needs through a customer portal. The APA Grid also produces an operational schedule to ensure that customer gas transport and storage needs are met, which is then conveyed to the operational control systems, and then generates invoices at the end of each month.

APA Grid is critical for ensuring that APA meets its regulatory reporting requirements, such as providing capacity information to the Gas Bulletin Board, the Short-Term Trading Market, and to provide the Capacity Trading & Auction platforms to the market.

APA developed APA Grid and the core suite of information technology systems 13 years ago. In the past 10 years, the demands on APA Grid have increased as the gas market has become more complex. APA Grid capabilities have been added to over the years but is now at a point where it has moved beyond its original design life.

Due to ongoing growth in complexity and volume of contract and regulatory changes, there is a growing issue of manual processing of data exacerbating the risk of invoicing errors and regulatory compliance errors.

Energy Components Grid Solutions (new system)

Energy Components (EC) Grid Solutions is a proposed replacement of APA Grid. At this stage we are in the early phases of scoping this piece of work.

Benefits of the replacing the APA Grid with EC Grid Solutions:

- Reducing system complexity and standardised coding will require less effort to input changes
- Improved customer experience
    - quicker implementation of new products and services
    - improved invoicing accuracy and timeliness
    - simplified daily commercial operation of customer contracts
- Risk reduction
    - market regulatory and contract compliance improvements through better system alignment to requirements
    - reduced dependency on manual intervention and monitoring
- System sustainability
    - reduction in APA specific customisation with more functionality built into the core product and a shift to “EC as a Service”
    - underlying technology – cloud-hosted, containerised, scalable and secure
    - less reliance on IT development resources to conduct business level tasks – contract entry, day of ops management
    - improved reporting and data and analytics.

Capgemini have confirmed our assumptions about the cost on this type of implementation for APA. The numbers presented here are our best estimates at this time and we intend to have a preliminary business case in early 2022.

4.3.4 Field mobility

Field mobility refers to the automation and works management from paper based manual processes to online systems. The benefits of field mobility include optimising work management and recording of work instructions. The field mobility program is a component of the Connected Worker program under the Operational Technology Portfolio

It will provide opportunity for better integration into APA asset management systems.

5 Operational Technology

5.1 Function

Operational Technology (OT) ensures APA has appropriate, resilient and high performing real-time systems and engineering applications, data and solutions to manage assets and assist personnel in the field. We use control systems, "digital twins", IoT technologies and advanced analytics to enable and automate the efficient and safe operation, monitoring and maintenance of APA's physical assets, including:

- Providing OT Technology and Solutions Standards and Requirements.
- Providing OT data governance, standards, procedures and master data engineering.
- Ensuring OT Systems' performance, reliability and support.
- Providing end-user support services and associated reporting.
- Continuously evolve OT solutions to operational excellence and innovation.
- Delivering OT Technology strategy and asset management.

5.2 Primary investment drivers

The operational technology program is driven by:

- Obsolescence with equipment reaching end-of-life and vendor support not available
- Improving integration of data between operational and information technology
- Improving efficiency of data management through automation
- Compliance with the AS 2885 the Standard for Gas and Liquid Petroleum Pipelines.

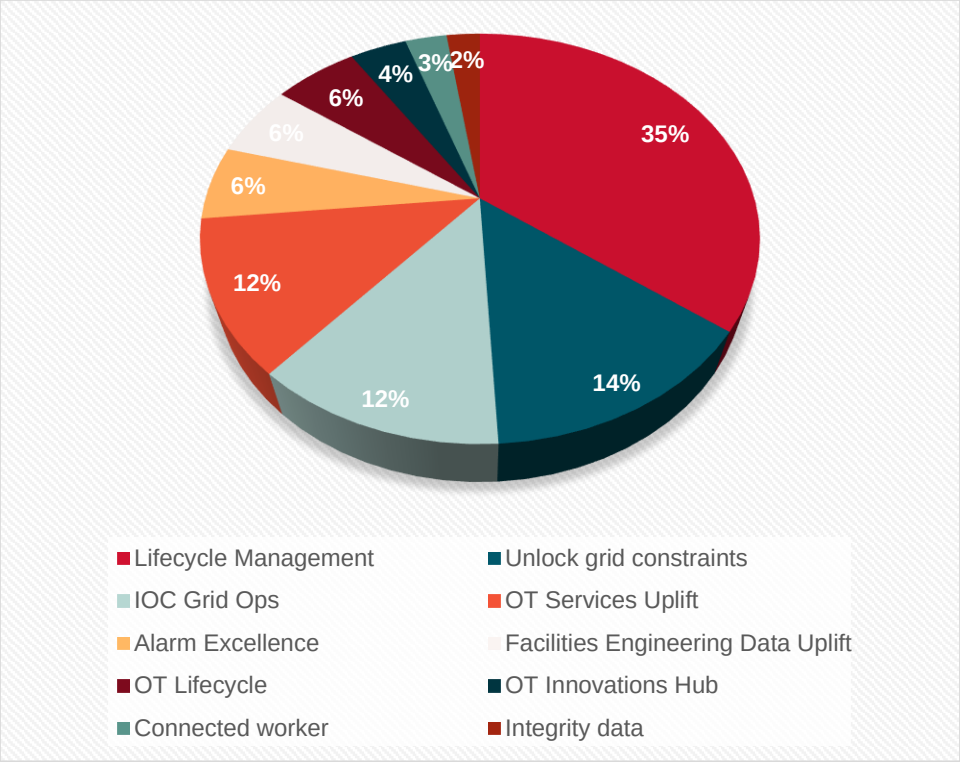
5.3 Operational technology programs and projects and expenditure forecasts

There are 11 operational technology programs and projects planned for the 2022-2027 access arrangement period. Operational Technology capital expenditure forecasts by program & projects for RBP are presented below.

Table 1 Operational Technology programs & projects and capital expenditure forecasts

Programs & projects	Unit	2023	2024	2025	2026	2027	2023-2027
Lifecycle Management	$2022	171,150	171,150	117,360	134,475	146,700	740,835
Unlock grid constraints	$2022	48,900	48,900	48,900	73,350	73,350	293,400
IOC Grid Ops	$2022	51,345	51,345	51,345	51,345	51,345	256,725
OT Services Uplift	$2022	56,235	47,678	47,678	51,345	51,345	254,280
Alarm Excellence	$2022	44,010	44,010	34,230	-	-	122,250
Facilities Engineering Data Uplift	$2022	24,450	24,450	24,450	24,450	24,450	122,250
OT Lifecycle	$2022	29,340	31,785	12,225	24,450	24,450	122,250
OT Innovations Hub	$2022	14,670	17,115	17,115	17,115	17,115	83,130
Connected worker	$2022	12,225	12,225	12,225	12,225	12,225	61,125
Integrity data	$2022	19,560	14,670	14,670	-	-	48,900
Total	**$2022**	**471,885**	**463,328**	**380,198**	**388,755**	**400,980**	**2,105,145**

Figure 1 OT programs & projects as proportion of total OT program



As shown in the above table and figure the Lifecycle Management program is the most significant program with the Operational Technology Function representing 35% of the total capital expenditure forecast. The justification for the Lifecycle Management program is presented in section 5.5.

The table below sets out the key deliverable for each of the OT programs and projects.

Table 2 Operational Technology program and project deliverables

Program	Deliverable
Lifecycle Management	Ensuring OT Systems' performance, reliability and support. Migration of end-of-life communication services (obsolescence)
Unlock grid constraints	Providing end-user support services and associated reporting
IOC Grid Operations	Delivering OT Technology strategy and asset management.
OT Services Uplift	Providing OT Technology and Solutions Standards and Requirements
Alarm Excellence	Delivering OT Technology strategy and asset management
Facilities Engineering Data Uplift	Providing end-user support services and associated reporting
OT Lifecycle	Ensuring OT Systems' performance, reliability and support
OT Innovations Hub	Continuously evolve OT solutions to operational excellence and innovation

Connected worker	Delivering OT Technology strategy and asset management
Integrity data	Providing end-user support services and associated reporting

5.4 Consideration of investment options

The typical approach to considering alternatives in operational technology:

- Larger projects typically included FEED and pilot projects which included detailed benefits, and options assessments, the current projects are follow on phases, which are footprint expansions and extensions of the original and updated strategy
- All technology/ systems undergo detailed options assessment before installation and long term strategy development
- Projects being delivered for business groups include a set of goals and objectives. The scope is developed using a detailed benefits assessment which considers a detailed design using OT existing systems. Where a solution requires significant development, an assessment is done of using existing systems vs new system vs do nothing.

The following programs have been subject to options assessment.

5.5 Lifecycle Management program

5.5.1 Project need and driver

The Lifecycle Management program (SCADA WAN Hardware) is driven by the need to address obsolescence of communications systems.

APA has a number of critical communication services that provide communication between remote sites and centralised operational technology systems. The SCADA WAN communication systems enable monitoring and control of APA assets.

The primary driver of the Lifecycle Management program is due to a number of technology assets reaching end-of-life and to ensure ability to continue to remotely monitor and control our APA field assets. Migration or upgrading of communication equipment needs to occur before reaching their end-of-life date.

The key strategic benefit of the SCADA WAN Hardware Lifecycle Program is to ensure the currency of the WAN communication at remote and accessible sites to monitor and maintain the APAs key asset. This is a technology asset life extension activity task required to be undertaken as a result of third party communications technology obsolescence to prevent service interruption to the SCADA WAN.

These services that are subject to the Lifecycle are as follows:

- ADSL services decommissioning under the NBN rollout schedule. Targeted implementation FY22/23
- Skywire satellite gateways end of life and in extended support. Targeted implementation FY22/23.

There is a risk of adverse impact to operations if these communications services are allowed to lapse as this would result in a loss of ability to monitor and control APA assets. The objective is to ensure there is no loss of access to the asset.

The program will be commencing in FY22 to ensure sufficient time to deploy new services prior to expiration of legacy services.

5.5.2 Benefit realisation

During the 2022-2027 access arrangement period, RBP allocation of lifecycle management costs will total $740,835. This expenditure is necessary to maintain communication services to assets on the RBP.

Investing in the communications will reduce the risk of access to assets. The benefits realisation/ risk reduction that are forecast to be derived from the project are shown in the following table.

Table 3 Benefits realisation of Lifecycle management program

Benefit type	Benefit	Baseline	Target
Risk	Risk reduction (maintaining communication)	High risk	Low risk

5.5.3 Options Considered

The following options have been analysed to achieve the outcomes that will address the business problem(s).

Option 1: Do nothing

Option 1 do nothing is not a credible option because of the operational impact to services being end-of-life.

These services allow APA to perform asset maintenance of the network to ensure continuity of communications to each site for the purposes of providing regulatory and compliance data, and be able to nominate gas supply to customers or manage key financial systems. This option would result in high risk to APA's communication capabilities.

There is not option for extended support and the vendors are decommissioning the affected satellite equipment.

Option 2: SCADA Wan Hardware Asset Lifecycle Management Program

Commence the SCADA Wan Hardware upgrade to ensure continuity of services. The benefit of Option 2 would be to reduce risk from High Risk under Option 1 to Low Risk.

Option 2 would involve

Objectives	
1	Stand up 3rd Teleport hub to transition sites over to new satellite service ensuring no loss of redundancy in the network.
2	Transition Thaicom4 (TC4) sites to new MeaSat service
3	Transition 3G sites to 4G before June 2024 (Telstra 3G network shut down date)
4	Transition ADSL service off the Telstra copper network to Clear Fixed Wireless Service
5	Upgrade obsolete equipment
6	Bring sites that currently have no communication SLAs under new Ursys MSA.

These services allow APA to perform asset maintenance of the network to ensure continuity of communications to each site for the purposes of providing regulatory and compliance data, and be able to nominate gas supply to customers or manage key financial systems.

The program will be commencing in FY22 to ensure sufficient time to deploy new services prior to expiration of legacy services.

5.5.4 Consistency with the National Gas Rules

Consistent with the requirements of Rule 79 of the National Gas Rules, APA considers that the capital expenditure is:

- Prudent – The expenditure is necessary in order to maintain the safety, reliability and security of RBP assets. It is of a nature that a prudent organisation would incur
- Efficient – The work is being carried out in sufficient time to replace and upgrade before end-of-lie. The works will be subject to APA procurement policy and be carried out by a suitably qualified external contractor. The expenditure can therefore be considered consistent with the expenditure that a prudent organisation acting efficiently would incur
- Consistent with accepted and good industry practice – Maintaining communications equipment and services is accepted as good industry practice. In addition, the reduction of risk to as low as reasonably practicable in a manner that balances cost and risk
- To achieve the lowest sustainable cost of delivering pipeline services – The sustainable delivery of services includes reducing risks to as low as reasonably practicable.

5.6 Unlock grid constraints

The Unlock grid constraints is the second largest program in the OT portfolio of programs, with a total allocation to RBP of $293,400 or 14% of the total OT program. The three projects with the unlock grid constraints program are discussed below.

5.6.1 Controls Excellence

Project aimed at reducing the control system risks with the current configuration. The aim is to move from being reactive and therefore doing fixes to a position of optimisation.

5.6.2 Optimisation Pi Visual Screens Data Uplift

The screens will provide better visibility for the whole business and allow for improved information with screens showing accurate data. This will aid improved operational decision making. This includes gas storage visualisation for Melbourne.

5.6.3 Visualisation Excellence

The project provides real time operational information for situation analysis. It also provides more context for alarms. May help schedule resources with this proactive management.

5.7 Integrated Operations Centre Grid Operations

Integrated Operations Centre (IOC) Grid Operations is an ongoing transformation program. The objective of this program is to improve business processes by the IOC. A key focus in improving processes between IOC and Operations (Engineering). Key benefits of the program are to automate processes, improve measurement data (efficiency) and debottleneck capacity.

This project comprises a number of different elements.

5.7.1 120 Day Forward Looking Capacity Analysis

The key aim of the project is to avoid overlapping work that could impact capacity and therefore the contracts with customers. Currently there is too much reliance on the tacit knowledge of individuals (team leads in the control room) to spot overlaps and generate queries and risks. If overlaps can be identified, then there is the potential to reschedule work and avoid overlaps with resultant major impacts on capacity.

The project takes an existing IOC projects tool and creates a systematic process and clear responsibilities for visualisation of capacity on APA's system of assets.

This project uses data from multiple systems to provide operational guidance with key stakeholders and large customers and production planning. The IT Systems deliver data sources with the project providing integration of operational guidance into operational environments in real time.

A key benefit of this project is that all personnel will have a single location to access the same information.

5.7.2 Constraint Identification and Rapid Capacity Analysis

There are currently tools to assist APA to calculate capacity in response to failure situations with asset not available/broken/taken off-line for planned maintenance. However, these are ad-hoc tools and have not been standardised across the business. Recalculating capacity is a highly iterative process and can take upward of six hours.

Process Optimisation currently utilise Synergi Gas input tools (from capacity planning) to determine maximum capacity of each pipeline asset in response to maintenance and defect/emergency scenarios. To achieve this the project would develop input standardisation to quicken the process and also allow multiple team members to be able to operate the system with clearly defined processes.

Currently every model requires a manual process with lots of tags, whereas the future state would see automation of the data feeds.

5.7.3 Integrated Operations Centre - Grid Ops & Operations Streamlining Program

Focuses business process improvements mainly within the Integrated Operations Centre (IOC), but with some activities in Engineering. The key processes with the main benefit relate to Process Optimisation for Controllers and cover:

- Manage Operations and Optimise delivery
- Validate measurement data (possible efficiency benefits)

There are also process improvements for support optimised energy delivery, but these are likely to be smaller (with the possible exception of debottleneck capacity).

5.8 OT Services Uplift

5.8.1 Data Connectivity and Mapping between OT & IT Systems

Moving data between OT and IT systems is not automated and the process of moving data between systems is time-consuming and can increase the likelihood of manual errors being made.

An example of data that may require OT and IT connectivity relates to compressors. Compressor run hours are held in PI not Maximo. The process of data transfer requires someone to issue a work order in Maximo when compressor hit 10,000 hours. Currently someone requests a report from PI and enter data in Maximo to issue work order.

Plan is to have standard data maps to mitigate this effort. Project includes:

- Master/reference data management requirements
- Data Map showing master/reference data management
- Templates in OT Systems to match master data management requirements
- OT reference tables in systems requiring references
- IT access to master data (E2E database) to link master real-time tag names.

This project will result in efficiency benefits from not having to move data between systems and users able to access all data. Other benefits include automatic initiation of work orders.

5.8.2 Integrated Operations Platform

This is a pilot to test integration of SCADA and other systems data (e.g. Maximo) into a single link that sits above the SCADA system. The objective is to provide integration between Grid Operations, Com Ops and Engineering.

5.8.3 OT and IT Operations Visual Systems Integration

This project involves the integration of Pi Vision and ARC GIS. Currently all assets are mapped in GIS as the “source of truth”. GIS does not have real time data going into the systems. This project will pull maps into Pi, or integrate real time date into ARC GIS data.

This will allow work to be scheduled by physical locations.

5.8.4 SCADA and Ops Pi Configuration Automation

OT and Control systems engineers put in significant effort into generating tag lists and programming target systems with tag configurations. Tags being set up in two systems separately takes time with additional effort for verification. This project would make the Tag configuration systemised to enable an increased level of work process automation. The system provides metadata and master data management for all OT Tags with automation delivering the hierarchy in PI from the SCADA solution.

Around 60 SCADA projects are implemented each year with Tags and these need to go into development, production and pre-production systems. OT need to create Tag list and build site hierarchy with tag names. There are some automation tools but there are varying spreadsheets and approaches with the current process introducing risk of error.

This project would automate the development work in SCADA and whilst would still need to do some of the activities manually including graphical design many could be automated.

5.8.5 OT Data Quality Uplift

This project is focused on Tag standardisation and mapping data through the systems. It includes fixing data that is not named properly, fixing tags broken between systems and bringing information up to the most recent standards. Power BI identifies many of the data issues between systems.

5.8.6 Versiondog and Ex-Online Feature and Footprint Expansion

Expanding the use of versiondog (data management tool) and Ex-online to more of APA's assets. In the past controllers have had trouble obtaining the latest version of the code before it was on versiondog. This should ensure controllers are always working on the master version of code.

5.9 Alarm Excellence

Alarm Excellence is a continuing program.

Alarm excellence project is aimed at improving the performance of the network alarm systems within the operation centre. The project is aimed at high consequence events that may be avoided by the alarms project with significant impacts damaged equipment should these alarms be missed.

Multiyear project is aimed at addressing several issues:

- Overload of alarms (resulting in missed alarms by the controllers
- Missing alarms (not showing)
- Consistency with what is being alarmed
- Controller actions
- Alarm set-point management and approval.

Recently alarm standards have been/ are being updated. In the 2022-2027 access arrangement period, more sites will be rationalised using these standards.

An important part is design standards and reducing alarm design time for projects. The project will deliver tools and processes to assist with this and develop a standard approach for future alarm.

5.10 Facilities Engineering Data Uplift

Facilities Engineering Data Uplift is an ongoing program.

A project to help with remote analysis and reset of trips. When the control room has a trip and it cannot be remotely reset then field crew need to be sent to the site to try and recreate the trip event and get a log of what happened in order that engineers can start to investigate.

Options analysis

The following options have been analysed to achieve the outcomes that will address the business problem(s):

Option 1: Do nothing

This is the current state being compared against.

Option 2: install vendor specific data collection and analysis tools

Vendors' pilots have shown that vendors do not provide APA with data and only provide recommendations. These recommendations are not sufficient for operating compressors to optimise pipeline pressures and flows. Option 2 is not supported.

Option 3: install specialised on-site hardware, collect data and provide to APA rotating specialists for analysis

Initial pilot showed that adequate data was available to prevent the need to re-trip the compressor. This saves damage to equipment as well as reducing drive time. Option 3 is preferred.

This proposed solution is to install cards on the PLC that control compressors that will allow 300-400 additional pieces of information to be sent to PI with screens to review and interrogate data.

The benefits of the proposed solution will help to reduce travel time to compressors that have tripped and adds to the time to resolve the issue and sometimes the compressor trip cannot be recreated. The faster the compressor trip can be addressed the better for reliability of the service.

5.11 OT Lifecycle

This project has several elements.

5.11.1 Human Manual Interface Alignment with ClearSCADA

This project would provide alignment of the clearSCADA views in the control room and on the Human Manual Interface (HMI) in the field. This is a program to replace legacy HMI.

Currently, different alarms and views can create uncertainty with maintenance of different HMI. Older versions of clearSCADA can have different screens and different alarms between the control room and site.

This is replacement of old HMI devices and is part of a gradual program to move to ClearSCADA.

The move to clearSCADA will enhance understanding of different HMIs.

5.11.2 OT Systems Capacity, Lifecycle Review and Refresh

Investment to avoid obsolescence of OT and ensure Core RTU platform is fully supported includes:

- New tag licences (estimated in other projects)
- RTU lifecycle review, including
- Systems capacity review
- Obsolescence assessment.

5.12 OT Innovations Hub

OT Innovations Hub is a new program.

The key driver for this program is the digitisation of:

- Digital innovation and research. Technology reviews in areas of interest for the business to allow identification of technology value and have technology options available when business has a clear need

- Microgrid control capability development. Development of microgrid control capability including:
  - Standards for hybrid controller functional and interface requirements and Ops environment integration
  - Strategy for internal upskilling in microgrid technology, project delivery and O&M Support.

5.13 Connected Worker

Connected Worker is a new program. The program comprises a number of elements as discussed below.

5.13.1 CCTV Rollout

The justification for the project includes:

- Reduce the need to send technicians out to check some issues (e.g. smoke alarms goes off, but no fire). It will also allow for faster decision making as can see an issue
- Safety benefits as can check on workers at site. Current rules require a helicopter to be dispatched to sites if field crew aren't in contact every few hours, but this is not acted upon and workers could have other back up safety options
- CCTV could provide a deterrent to theft and damage, which can be an issue at some of the remote sites. It wouldn't stop it but would help record the incident and possible resolve after the event
- Other benefit around bushfire checking and flood checking (i.e., is it too wet for a vehicle)
- Opens potential resetting remotely once you use CCTV to check.

5.13.2 Field Operations Technology Strategy

Strategy for staged technology introduction and transition from paper based systems to using mobility. This includes strategy for supported ops laptops and OT/IT road mapping.

5.13.3 Remote Sites Connectivity Uplift

This is a remote WAN Access Study and rollout to better access corporate applications. There are a number of problems from not being able to have network connectivity including:

- Connections timing out due to lack of bandwidths
- Engineers not being able to support field crews
- Additional travel time before going to remote sites
- Not able to have online teams meetings on site
- Can use Versiondog for PLC to confirm on latest version
- Duplicate recording – write down and then have to enter separately in Maximo.

5.14 Integrity data

Integrity data program is an expansion of a current program. This project has two elements.

5.14.1 Cathodic Protection Data Model and Pipeline Asset Condition

There are thousands of data loggers installed in the field and these are connected to the cloud based system but not integrated back into APA's systems.

There is a need to connect the information from these loggers with other data in APA's system and have enhanced analysis to provide insights to assist in the prioritisation of maintenance.

Four key objectives of the project:

- Maximise capability of cathodic protection engineering resources to assist in early identification of poorly protected pipeline segments
- Maximise capability of cathodic protection visualisation to the IOC to ensure relevant actions are taken and irrelevant information is removed/hidden
- Provide detailed information to Asset Management and senior leadership on each asset's current protection state
- Provide justification for operational and capital expenditure for managing each asset's protection state.

The benefits of the cathodic protection data model project includes:

- Efficiency – improve maintenance strategies by providing better maintenance data
- Efficiency – less travelling to take measurement
- Effectiveness - improved decision-making (less asset damage with better condition monitoring and maintenance)
- Regulatory requirements.

5.14.2 Pipeline integrity data framework

This is part of a larger longer term project, which is strategic for all the work that the Integrity team will do in the future. Integrity data is stored in numerous locations is of varying quality and accuracy and in various forms. There is a lack of process around data acceptance and assessment leading to no real time status of asset health with data unable to be visualised and a lack of standardisation.

This project is foundational to Reliability Centred Maintenance for pipeline integrity. Benefits are similar to CP project, but this project addresses all the other types of data that are required to ensure pipeline integrity projects can be scheduled and performed effectively. It is part of larger CP project that has a business case:

- Efficiency (not quantified) - Integrity engineers spend hours/days preparing data and this will reduce this time
- Risk reduction - Standard way of assessing pipeline risk to ensure highest risk assets have projects performed first
- Capex reduction - Integrity projects such as dig ups, pipeline coating, cut outs and capacity reduction cost the company millions every year. Better data could lead to reduction (e.g. dig ups that could be avoided 5-10 per year)
- Regulatory Compliance – Better documentation will help comply with regulatory obligations.

5.15 Operating expenditure forecasts

The RBP will be allocated new and incremental operating costs for new software support and maintenance. The new costs are related to cloud-based computing and other programs.

The new and incremental RBP Operational Technology operating expenditure forecasts are presented below.

Program	Unit	2023	2024	2025	2026	2027	2023-2027
Cloud (CP, integrity, versiondog and other minor i		4,890	9,780	9,780	9,780	9,780	**44,010**
Integrated Operations Platform		-	7,335	14,670	14,670	14,670	**51,345**
Lifecycle Management		-	-	9,780	14,670	9,780	**34,230**
Total		**4,890**	**17,115**	**34,230**	**39,120**	**34,230**	**129,585**

6 Information Technology

Information Technology (IT) partners with all business units to deliver end to end IT solutions and services, which are secure, compliant and contribute to the organisation's strategic objectives and goals.

- Delivering modern and adaptive technologies to enhance and optimise our business
- Enhancing APAs information and analytical capabilities to deliver predictive insights
- Delivering continuous improvement and innovation for internal and external customers
- Enabling an engaged workforce that is able to operate and collaborate anytime and anywhere
- Developing a culture of joint business-IT accountability for business outcomes through collaboration and engagement
- Safeguarding the security, compliance and availability of APAs systems and information.

6.1 Forecast expenditure

6.1.1 Capital expenditure forecasts

Information & Technology capital expenditure forecasts are presented below.

Program	Unit	2023	2024	2025	2026	2027	2023-2027
Enterprise Asset Management	$2022	53,346	-	-	19,995	-	73,341
Other	$2022	12,722	19,281	2,262	36,066	-	70,331
Total	$2022	**66,068**	**19,281**	**2,262**	**56,062**	-	**143,673**

There are no incremental operating expenditure costs associated forecast for Information Technology.

7 Information Technology portfolio for RBP program is prudent and efficient

7.1 Approach to estimating forecasts

The forecast operating and capital expenditure is based on best information we have to date about the scope of information, communication and operational business solutions. The scope of the programs is subject to ongoing assessment and a better understanding of APA requirements will be available in early 2022.

The cost estimates have been based on the best judgement of external consultants and APA subject matter experts.

RBP customers benefit from economies of scale and scope in the delivery of services of APA's enterprise-wide approach to IT (rather than a stand-alone approach for each asset). This enables customers to benefit from lower costs for the services that the IT program enables and supports.

APA Group is a listed company and costs are scrutinised by market investors and security holders. This may provide stakeholders with some assurance that the IT costs are proportionate, prudent and efficient.

7.2 Meeting National Gas Rules, Rule 79

Consistent with the requirements of Rule 79 of the National Gas Rules, APA considers that the capital and operating expenditure proposed for the IT portfolio of programs is:

- Prudent – The expenditure is necessary in order to enable RBP to support financial reporting systems, market systems and asset management systems. These are systems integral to the proper functioning of an energy business. Upgrading and maintaining operational and information technology is critical to maintaining the safety, reliability and security of RBP services. The program is necessary to maintain and improve the safety of the public and personnel. The proposed expenditure is of a nature that a prudent organisation would incur.
- Efficient – The IT program is drawing on expertise from external IT consultants in preparing the scope of APA need. The work is being carried out in sufficient time to replace and upgrade before end-of-life to ensure to disruption to operations. The works will be subject to APA procurement policy and be carried out by suitably qualified external contractors and consultants. RBP benefits from economies of scale and scope relative to have to incur IT costs on a stand-alone basis. APA is subject to market scrutiny and greater discipline to minimise costs that slows on to a benefit for customers. The program expenditure (based on current information) is consistent with the expenditure that a prudent organisation acting efficiently would incur.
- Consistent with accepted and good industry practice – Maintaining information, communications and operational technology is accepted as good industry practice. APA operations with AS 2885. APA seeks to reduce risk to as low as reasonably practicable in a manner that balances cost and risk.
- To achieve the lowest sustainable cost of delivering pipeline services – The sustainable delivery of services includes reducing risks to as low as reasonably practicable.

Glossary

CAM	Cost Allocation Methodology
EC	Energy Components
EPMO	Enterprise Program Management Office
HMI	Human Manual Interface
IaaS	Infrastructure-as-a-Service
IFRIC®	IFRIC Interpretations Committee
IOC	Integrated Operations Centre
IP	Intellectual property
IT	Information Technology
OT	Operational Technology
PaaS	Platform-as-a-Service
SaaS	Software-as-a-Service
SoCI	Security of Critical Infrastructure