14 August 2017

victorian transmission system

access arrangement revised proposal.

submission response to draft decision.

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Abbreviations

ABS	Australian Bureau of Statistics
AC	Alternating Current
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
APA VTS	APA VTS Australia (Operations) Pty Ltd & APA VTS Australia (NSW) Pty Ltd
BCP	Brooklyn Corio Pipeline
Black CAPM	Black's Capital Asset Pricing Model
CPI	Consumer Price Index
d	Day
DCVG	Direct Current Voltage Gradient
DWGM	Declared Wholesale Gas Market
EBSS	Efficiency Benefit Sharing Scheme
EMAT	Electro-Magnetic Acoustic Transducer
ERA	Economic Regulation Authority, Western Australia
FEED	Front End Engineering and Design
GJ	Gigajoule
GPG	Gas Powered Generation
GWh	Gigawatt hour
ILI	In line inspection (pigging)
kPa	Kilopascal
MRP	Market Risk Premium
NGL	National Gas Law
NGR	National Gas Rules
PCP	Precinct Structure Plans
PJ	Petajoule (1PJ=1,000,000GJ)
PTRM	Post-Tax Revenue Model
RBA	Reserve Bank of Australia
SEA	Service Envelope Agreement

SL CAPM	Sharpe-Lintner Capital Asset Pricing Model
SMS	Safety Management Studies
SWP	South West Pipeline
TAB	Tax Asset Base
TJ	Terajoule (1TJ=1,000GJ)
UGS	Underground Storage
VTS	Victorian Transmission System
WACC	Weighted Average Cost of Capital
WORM	Western Outer Ring Main

Summary of draft decision response

Context

On 3 January 2017, APA VTS Australia (Operations) Pty Limited (APA VTS) filed its access arrangement revision proposal for the Victorian Transmission System (VTS), as required under its current access arrangement and the National Gas Rules. The Australian Energy Regulator (AER) issued, on 6 July 2017, its draft decision on those proposed amendments.

The AER specified the amendments required in order for it to approve APA VTS's access arrangement revision proposal. In all, the AER required 25 amendments before it would be prepared to approve the proposed revisions.

Many of these amendments were summary in nature and combined several required changes to APA VTS's proposal in a single amendment, or amendments that were consequential on amendments required in other areas. For example, the amendment to the forecast depreciation allowance is impacted by amendments to prior period capital expenditure (which impacts the value of the opening capital base and the remaining asset lives), and the forecast of capital expenditure for the upcoming period. In this submission, APA VTS has addressed the root cause of the amendments rather than the summary outcomes.

This submission provides supporting information for APA VTS's proposed revision of the access arrangement for the VTS to apply for five years from 1 January 2018. This submission accompanies APA VTS's proposed revised access arrangement and access arrangement information, and should be read in conjunction with those documents.

Services

The AER draft decision accepted APA VTS's definition of Services. No amendments were required and no further amendments are proposed.

Demand and utilisation

The AER draft decision largely accepted APA VTS's demand forecast. APA VTS as adopted the AER's draft decision amendments to the forecast, and has made no further changes to its forecast.

Capital expenditure

The AER draft decision was not to approve forecast expenditure for a number of capital expenditure projects scheduled for 2017 (the final year of the current access arrangement period) and in the forecast access arrangement period.

APA VTS has addressed the AER's concerns in the draft decision through the following:

- Inline inspection – providing additional evidence and support for APA's inline inspection program, and why alternative methodologies are not acceptable substitutes under current Australian Standards;
- Warragul looping – providing additional information supporting APA VTS's forecast costs associated with this project;
- Safety management – reinstating expenditure for safety management revising aspects of the scope of this project, and some minor adjustments in timing, in line with the AER's draft decision to give these matters more consideration;
- Wollert compressor station overhaul – Reinstating capital expenditure associated with this project, and providing additional information in support of why this project is capital rather than operating expenditure; and
- Coogee decommissioning – removing proposed expenditure from the forecast.

Indexation

APA VTS has retained its approach to inflation in its revised access arrangement proposal, while addressing the concerns raised in the AER's draft decision.

Rate of return and value of imputation credits

APA VTS has retained its approach to calculating the rate of return in its revised access arrangement proposal, while addressing the concerns raised in the AER's draft decision.

The proposed revised access arrangement includes a post-tax cost of equity of 8.8 per cent, a pre-tax cost of debt of 6.9 per cent, for a post-tax vanilla WACC of 7.67 per cent.

Operating expenditure

The AER's draft decision was to approve the majority of APA VTS's proposed operating expenditure, with some adjustments associated with the calculation of the allowance resulting from the application of the efficiency benefit sharing scheme (EBSS), as well as to update the allowance for debt raising costs as a function of the change to the total revenue requirements.

APA VTS accepts the AER's draft decision on operating expenditure, but has updated the calculation of debt raising costs in line with the revenue requirement proposed in this revised proposal.

Tariffs and tariff variation mechanism

The AER proposed revisions to the tariff structure to apply the cross system tariff to Iona Underground Gas storage (UGS) refill volumes that subsequently flow to South Australia.

While agreeing with this revision in principle, APA VTS has identified significant barriers to implementing this revision. These barriers relate to the availability of metering data which relates to facilities that are not part of APA VTS, and the inability to accurately identify relevant gas volumes to which the cross system tariff would (regardless of access to metering data).

In considering the AER's rationale for this revision, APA VTS has applied the cross system tariff to all Iona UGS refill volumes that are injected from Longford.

APA VTS has largely adopted the AER's revisions to the tariff variation mechanism, with the exception of the deletion of the carbon cost event and the New gas market structure development event. APA VTS has made some revisions to these proposed cost pass through event definitions, as well as providing additional information in support of these events as cost pass through events.

Summary – revised building block revenue proposal

Capital and operating expenditure

APA VTS's revised forecast capital and operating expenditure over the access arrangement period are set out in Table E.1 and discussed in Chapter 4 and Chapter 7 of this submission.

Table E.1 – Forecast capital and operating expenditure over the access arrangement period

$m real 2017	2018	2019	2020	2021	2022
Capital expenditure	65.7	73.8	71.8	16.5	16.5
Operating expenditure	32.7	30.1	29.3	29.2	27.3

Revenue requirement

APA VTS's revised proposed revenue requirements and X-factors are shown in Table E.2. The revenue requirement is translated into a price path in a CPI-X format. Positive X-factors translate into real reductions over the access arrangement period.

Table E.2 Forecast revised revenue requirements and X-factors

$m nominal	2018	2019	2020	2021	2022
Return on capital	76.5	80.8	85.7	90.5	90.3
Regulatory depreciation	12.5	15.2	16.9	20.6	18.4
Corporate tax allowance	2.7	3.2	3.4	3.0	2.2
Incentive mechanisms	7.0	4.2	3.5	2.4	-
Operating costs	26.6	27.3	28.0	29.8	30.8
Total	125.3	130.8	137.6	146.2	141.7
Smoothed revenue requirement	**115.0**	**124.9**	**135.7**	**147.3**	**160.0**
X factors tariff revenue (%)		**-6.0%**	**-6.0%**	**-6.0%**	**-6.0%**

1 Introduction

1.1 Context

On 3 January 2017, APA VTS Australia (Operations) Pty Limited (APA VTS) filed its access arrangement revision proposal for the Victorian Transmission System (VTS), as required under its current access arrangement and the National Gas Rules. The Australian Energy Regulator (AER) issued, on 6 July 2017, its draft decision on those proposed amendments.

The AER specified the amendments required in order for it to approve APA VTS's access arrangement revision proposal. In all, the AER required 25 amendments before it would be prepared to approve the proposed revisions.

The AER's draft decision established a deadline of 14 August 2017 for APA VTS to respond to its draft decision and, if it chooses to, revise its proposal, and 15 September 2017 for comments from interested parties.

1.2 Purpose of this submission

Rule 60 of the National Gas Rules provides the process for APA VTS to respond to the AER's draft decision.

> *(1) The service provider may, within the revision period, submit additions or other amendments to the access arrangement proposal to address matters raised in the access arrangement draft decision.*
>
> *(2) The amendments must be limited to those necessary to address matters raised in the access arrangement draft decision unless the AER approves further amendments.*
>
> *(3) If the service provider submits amendments to the access arrangement proposal, the service provider must also provide the AER (together with the amendments) with a revised proposal incorporating the amendments.*
>
> *(4) As soon as practicable after receiving the revised access arrangement proposal, the AER must publish it on its website.*

This submission addresses the AER's revisions to APA VTS's access arrangement revision proposal. In many cases, APA VTS has incorporated the amendments as specified in the draft decision. In a few cases, APA VTS has not adopted the AER's revisions and has provided additional information in support of its proposal. It is important to note that some amendments will have consequential impacts on other amendments; this submission has attempted to highlight these consequential amendments when they arise. A table setting out the AER's revisions, and where they are addressed in this submission, is set out in Attachment A.

This submission accompanies a revised proposed access arrangement and access arrangement information, reflecting the approach taken to address the AER's revisions as outlined in this submission. Together these documents make APA VTS's access arrangement revision proposal.

1.3 Basis of information in the access arrangement revision proposal

Rules 73 states that:

> *(a) Financial information must be provided on:*
>
> *(i) a nominal basis*
>
> *(ii) a real basis*
>
> *(iii) some other recognised basis for dealing with the effects of inflation.*
>
> *(b) The basis on which financial information is provided must be stated in the access arrangement information.*
>
> *(c) All financial information must be provided, and all calculations made, consistently on the same basis.*

Unless otherwise stated, all historic information in this submission is in nominal dollars, and all forecast information is real December 2017 dollars.

The revised proposal uses the following conventions for referring to access arrangement periods:

- Current access arrangement period or earlier access arrangement period, for the access arrangement period spanning 1 July 2013 to 31 December 2017; and

- Access arrangement period or forecast access arrangement period for the access arrangement period spanning 1 January 2018 and 31 December 2022.

Units used in the access arrangement revision proposal are noted throughout and described in the abbreviation list at the beginning of this submission.

1.4 Consumer engagement in respect of the access arrangement

The AER has in recent times sought to increase the level and quality of consumer engagement that service providers undertake in developing their access arrangements. The AER's approach, and expectations, principally arise from their focus on distribution sector proposals for both electricity and gas businesses, largely because of the prevalence of regulation in that sector, the impact that network charges have on the final customer bill, and the historic disengagement between networks businesses and end use customers.

The same factors are not present in the gas transmission sector. Gas transmission consumers are the shippers that directly use the services provided by gas transmission pipelines.

The gas transmission sector is characterised by commercial relationships between the pipeline operator and the shipper, usually culminating in contractual agreements that can run for several years. While the VTS is a market carriage system and therefore does not have contractual carriage for gas within the system, the commercial relationships and philosophy remains – APA VTS has deep ongoing relationships with its customers that extend beyond the access arrangement revision cycle or the borders of the VTS. In fact, most customers have multiple arrangements in place with APA across its pipeline network.

The AER states in its draft decision that it saw no evidence that APA VTS undertook engagement with users in developing its access arrangement proposal.[1] APA VTS rejects this characterisation. The AER appears to have an expectation for APA VTS to undertake the type of engagement with end users undertaken in recent times by the distribution businesses, and appears

[1] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Overview*, p 51

to take the absence of this type of purpose-driven engagement as evidence of a lack of engagement with users at all.

APA's engagement with users of its pipeline network is deep and continuous. Through our commercial team we seek to understand each of our customers and their needs, not just as part of the access arrangement cycle, but always.

APA VTS considers that the AER's expectation of visibly ostentatious consultation with shippers, in the form undertaken by distribution businesses through events like public workshops, both undervalues the real and deep engagement that APA VTS actually has with its customers, as well as the nature of the sector where shippers are often in direct competition with each other. APA VTS would not get real and frank engagement with shippers in a public setting, and the elucidation of outcomes of more private consultation, which often goes to future commercial plans of shippers, in a public submission document would breach customer confidentiality.

APA VTS is firmly of the view that the AER's (and consumer panel's) expectation of public consultation on gas transmission business proposals is unrealistic and would ultimately be a waste of time and resources. It would be a very poor outcome if it replaced actual engagement that occurs between APA VTS and various shippers on an almost daily basis.

APA VTS has not sought to directly engage with small end use consumers of gas beyond reaching out to consumer representative groups. This is appropriate given the very minor impact that transmission tariffs have on customer bills. In fact, the scope of tariff changes being discussed in this access arrangement revision proposal amount to approximately $3 a year – an impact that would be entirely swamped by normal variation in an individual customer's pattern of gas use year-on-year.

Given the minor impact on gas bills this decision has, it is not surprising that APA VTS's efforts to engage with small consumer representatives has not met with enthusiastic interest. APA VTS understands that consumer groups have limited resources and, in the context of the significant energy price rises that are currently occurring that are driven by changing costs in other parts of the energy supply chain, this access arrangement revision process is not one that they have indicated that they are interested in engaging with.

The same is not true of larger energy users and direct shippers on the VTS. They are very interested in the access arrangement revision process, and in particular investment in the VTS.

Recently emerging security of supply concerns, in particular in relation to the ability to refill the Iona Underground Gas Storage (UGS) facility, have figured strongly in this review process. As part of its decision to propose the Western Outer Ring Main (WORM) as a late inclusion to its access arrangement proposal, APA VTS engaged directly with a number of shippers within the VTS, and with the Australian Energy Market Operator (AEMO), on the need for this investment, and its expected impact on tariffs. The desire to see the WORM project undertaken in the coming access arrangement period amongst shippers was clearly seen through submissions to the access arrangement revision process. APA VTS supported its proposal through public engagement in events like the AEMO winter preparedness conference, where APA VTS sought to increase awareness of its revised proposal to include the WORM, and the ultimate impacts of this investment on security of supply.

APA VTS intends to continue its direct engagement with users of the VTS so that it can understand shippers' needs, and develop its pipeline network to meet them. This engagement occurs for regulated and unregulated pipelines, and regardless of the regulatory cycle. This type of engagement is the ultimate purpose and aim of the AER's consumer engagement guideline where engagement is embedded within the business, rather than an adjunct process completed as part of the access arrangement revision cycle.

2 Services

2.1 Reference Services

APA VTS described a single pipeline service, which was also the reference service, in its access arrangement proposal.

In its draft decision, the AER accepted the specification of the scope of pipeline services and the reference service as described in the access arrangement.[2]

APA VTS proposes no further revision to services set out in the access arrangement.

2.2 Non-tariff components

APA VTS made only very minor revisions to its access arrangement in respect of non-tariff components.

In its draft decision, the AER accepted these elements of the access arrangement without revision.

APA VTS proposes no further revision to the non-tariff element in the access arrangement.

2.2.1 Efficiency benefit sharing scheme

Revision 9.1

Remove clause 8.2 of the proposed access arrangement.

Revision 9.2

Remove clause 3.6 of the proposed access arrangement and replace it with the following text:

[2] Australian Energy Regulator 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 1 – Services covered by the access arrangement*, July, p 1-6

Revision 9.2: Remove clause 3.6 of the proposed access arrangement and replace it with the following text:

3.6 Opex incentive mechanism

(a) In each of the first five years after 2022, the Reference Tariffs must be determined in a manner that includes, in addition to all other amounts required or permitted under the Rules or Service Provider's Access Arrangement, a benefit sharing allowance calculated in accordance with this section.

(b) The benefit sharing allowance (B_t) in each year (t) is equal to the sum of the efficiency gains (E_t) in selected prior years, as given in the following table:

Year (t)	B_t
2023	$E_{2018} + E_{2019} + E_{2020} + E_{2021} + E_{2022}$
2024	$E_{2019} + E_{2020} + E_{2021} + E_{2022}$
2025	$E_{2020} + E_{2021} + E_{2022}$
2026	$E_{2021} + E_{2022}$
2027	E_{2022}

(c) The efficiency gain for 2018 is to be calculated in accordance with the following formula:

$$E_{2018} = (F_{2018} - A_{2018}) - (F_{2017} - A_{2017}) + (F_{2016} - A_{2016})$$

where:

E_{2018} is the Service Provider's efficiency gain in 2018

F_{2018} is the Service Provider's forecast operating costs for 2018 as specified in section 3.6(h)

A_{2018} is the Service Provider's actual operating costs for 2018 as specified in section 3.6(g)

F_{2017} is the Service Provider's forecast operating costs for 2017 as specified in section 3.6(h)

A_{2017} is the Service Provider's actual operating costs for 2017 as specified in section 3.6(g)

F_{2016} is the Service Provider's forecast operating costs for 2016 as specified in section 3.6(h)

A_{2016} is the Service Provider's actual operating costs for 2016 as

specified in section 3.6(g).

(d) The efficiency gains or losses (E_t) for each of 2019, 2020, 2021 and 2022 are calculated in accordance with the following formula:

$$E_t = (F_t - A_t) - (F_{t-1} - A_{t-1})$$

where:

F_t is the Service Provider's forecast operating costs for year (t) as specified in section 3.6(h)

A_t is the Service Provider's actual operating costs for year (t) as specified in section 3.6(g)

F_{t-1} is the Service Provider's forecast operating costs for the year prior to year (t) as specified in section 3.6(h)

A_{t-1} is the Service Provider's actual operating costs for the year prior to year (t) as specified in section 3.6(g)

(e) Actual operating expenditure in 2022 is to be estimated using:

$$A^*_{2022} = F_{2022} - (F_b - A_b) + non\text{-}recurrent\ efficiency\ gain_b$$

where

A^*_{2022} is the estimate of opex for the final year of the access arrangement. -

F_{2022} is the forecast opex for the final year of the access arrangement period.

F_b is the forecast opex for the base year used to forecast opex in the access arrangement period following this access arrangement as specified in section 3.6(h)

A_b is the actual opex for the base year used to forecast opex in the access arrangement period following this access arrangement as specified in section 3.6(g)

$Non\text{-}recurrent\ efficiency\ gain_b$ is the adjustment made to base year opex used to forecast opex for the access arrangement period expected to commence 1 January 2023 to account for opex associated with one-off factors.

(f) To ensure efficiency gains or losses made in 2022 are retained for five years, opex for the access arrangement period commencing on 1 January 2023 should be forecast in a manner consistent with the estimate for opex in 2022, A^*_{2022}, in paragraph (e) above. This provides the Service Provider the same reward had the expenditure level in 2022 been known.

(g) In each case, the Service Provider's actual operating costs for any year must:

i. be determined using the same cost categories and method used to calculate the approved forecast opex as specified in section 3.6(h);

ii. be determined without adjustments for volume;

iii. exclude any cost category that is not forecast using a single year revealed cost approach in the access arrangement period following this Access Arrangement Period (intended to commence 1 January 2023). These costs to be excluded may include debt raising costs.

(h) The Service Provider's forecast operating costs for any year, are equal to:

i. the forecast operating costs for that year as shown in the table below; plus

ii. the aggregate of all costs associated with a Cost Pass-through Event with respect to that year; plus or minus

iii. any adjustment required so that the forecast expenditures are consistent with any capitalisation policy changes, where APA changes its approach to classifying costs as either capital expenditure or operating expenditure during the access arrangement period.

Approved forecast opex for the opex incentive mechanism ($ million, 2017)

	2016	2017	2018	2019	2020	2021	2022
Approved forecast opex	25.2	26.3	25.7	25.7	25.7	26.7	26.9

Note: Excludes debt raising costs.

(i) If there is a change in APA's approach to classifying costs as either capital expenditure or operating expenditure, APA must provide to the AER a detailed description of the change and a calculation of its impact on forecast and actual operating expenditure.

(j) For the purposes of calculating the benefit sharing allowance (B_t) in the years 2023 to 2027, the actual and forecast operating costs in 2018 to 2022 must be in real dollars. The price indices used in this calculation are to be consistent with those used to forecast opex for the access arrangement period following this Access Arrangement Period (expected to commence 1 January 2023).

Revision 9.3

In section 4.7 of the proposed access arrangement, remove the number 8.2 and replace it with the number 3.6.

The AER's draft decision approves the application of an Efficiency Benefit Sharing Scheme (EBSS) to the VTS, but also includes amendments to the EBSS compared to that which applied in the earlier period, to reflect

'improvements' in the scheme released in November 2013 for electricity service providers.[3]

As described by the AER, these changes:

- Give APA VTS flexibility in the choice of base year it uses to forecast operating expenditure;
- Will not adjust forecast operating expenditure for operating and maintenance costs associated with extensions and expansions that were not included in APA VTS's capex allowance; and
- From 1 January 2023, mean that elements of the operating expenditure forecast that are derived using a methodology other than a base year revealed cost methodology will be excluded from the actual operating expenditure amounts used to calculate the benefit sharing allowance. This is intended to ensure that service providers do not experience a windfall gain or loss associated with elements forecast on a basis not related to their revealed costs.

APA response

In line with AER draft decision revisions 9.1 and 9.2, APA VTS has replaced the existing text in section 3.6 of the access arrangement with the details of the EBSS scheme to apply. APA VTS is unconcerned about the location of this text in the access arrangement document, however it does not accept the position put by the AER to remove the EBSS provisions from the list of fixed principles. This is discussed in section 2.2.2 below.

APA VTS has incorporated the AER's draft decisions that have the effect of giving APA VTS flexibility in the choice of base year it uses to forecast operating expenditure, as well as to exclude elements of the operating expenditure forecast that are derived using a methodology other than a base year revealed cost methodology for the subsequent access arrangement period.

APA VTS does not accept the AER's draft decision to revise the existing EBSS applying to APA VTS such that it no longer excludes operating expenditure

[3] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 9 – Opex incentive mechanism*, p 9-9

associated with unforecast extensions and expansions from calculations of efficiency gains and losses under the EBSS.

The design of the EBSS contains an implicit assumption that the risk of changes in operating expenditure is symmetrical. That is, that there is the same risk of overspending as underspending across a period, and any change in spending is associated with an efficiency loss (in respect of an overspend) or an efficiency gain (in respect of an underspend). This is shown in the AER's statement that its change of approach in respect of operating expenditure associated with unforecast extensions and expansions will be shared between APA and consumers 'in the same way as any efficiency gain or loss'.[4]

As a general principle this may be appropriate, but it is also important to ensure that the scheme is not rewarding or penalising the business for events that are unrelated to efficiency gains or losses, or which are not symmetrical – events that are far more likely to operate in one direction rather than the other.

APA VTS considers that treating increases in operating expenditure associated with unforecast extensions or expansions as efficiency losses under the EBSS is not symmetrical, and operates to penalise the business for increased operating costs that are unavoidable and unrelated to efficiency.

There are already well recognised barriers to investment in the VTS due to its market carriage structure and the rigidities of the access arrangement revision cycle. The AER's decision to further penalise unforecast investment imposes additional barriers to the timely management of additional investment needs that emerge during the period. This is an unnecessary and unjustified additional burden on investment in the VTS.

Gas transmission sector investment differs from distribution sector investment in that it can be very lumpy. Extensions and expansions are significant and discrete projects – they bear little resemblance distribution sector investments in new connections or minor system augmentation that can number in their thousands across a period. Variation in distribution forecasts can be characterised as forecasting error and may indeed be symmetrical. By

[4] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 9 – Opex incentive mechanism*, p 9-9

contrast, emerging needs for transmission system extension or expansion are not forecasting errors – they are genuinely new requirements not anticipated at the time of submission.

It is worth noting that unforecast extensions and expansions already face barriers within the VTS as contractual arrangements are generally unavailable to support investment before they are rolled into the asset base. The further burden of a five-year penalty from a supposed efficiency loss through the operation of the EBSS is not justified, and APA VTS notes that the AER have made no attempt to provide justification for its application to APA VTS other than for consistency with other regulated businesses that bear no resemblance in respect of market structure or investment profile to APA VTS.

APA VTS has not incorporated this aspect of the AER's draft decision in its revised proposal. APA VTS believes that the AER should give further consideration as to the specific incentives this aspect of its decision will create in respect of investment within the VTS, as well as the defining features of gas transmission investment that make this decision inappropriate.

2.2.2 *Fixed principles*

The AER's draft decision is to remove the provisions associated with the EBSS from the fixed provisions under the access arrangement. The AER's stated reason for this is alignment with other access arrangements where EBSS rules are not fixed principles.[5]

The purpose of fixed principles is to provide certainty to service providers that certain parts of the access arrangement will apply across access arrangement periods, and not be subject to change by the regulator. This provides certainty to the service provider, and in respect of the rules associated with the EBSS, that the regulator will not change the incentives applying to the business in a way that has retrospective effect.

While APA recognises that the AER generally seeks to provide this certainty and stability in its decision-making, whether it does so is a matter of discretion. The service provider has no real certainty that the regulator will

[5] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 9 – Opex incentive mechanism*, p 9-9

act in this way. The fixed principles provide this certainty, and this is the purpose of fixed principles in the gas access regime.

If the AER intends that its approach to the EBSS applying to the forecast period will be honoured at the next revision, then there is no reason why the AER would not accept these rules as fixed principles. This ensures that any changes to the EBSS are forward looking.

APA VTS has retained the provisions relevant to the EBSS, now located in section 3.6 of the access arrangement, as fixed principles. This is achieved through reference to section 3.6 as a fixed principle in section 8.2 of the revised access arrangement.

APA VTS further notes that it has corrected a minor error in the chapeau for Part 8 of the access arrangement to refer to the Sixth Access Arrangement period as the one following the forecast period.

3 Pipeline demand and utilisation

Revision 13.1

Make all necessary revisions to reflect this draft decision, as set out in Table 3-1.

Table 13-1 Draft decision alternative forecast of annual VTS withdrawal volumes for the 2018–22 access arrangement period.

	2018	2019	2020	2021	2022	Total
Annual (PJ)						
Tariffs V&D	181.6	179.6	177.5	176.7	175.0	890.4
GPG	5.3	1.8	1.9	0.6	0.8	10.3
Culcairn	29.6	29.6	29.6	29.6	29.6	148.0
VicHub	0.0	0.0	0.0	0.0	0.0	0.0
Sub-total	**216.5**	**211.0**	**209.0**	**206.9**	**205.4**	**1048.8**
UGS/LNG refill	18.3	17.5	17.5	17.5	17.5	88.2
Total	**234.7**	**228.5**	**226.4**	**224.4**	**222.9**	**1137.0**
1-in-2 Peak (TJ/day)						
Tariffs V&D	1151.1	1142.3	1131.4	1123.6	1115.1	
GPG	8.3	5.3	7.3	8.7	14.0	
Culcairn	57.5	57.5	57.5	57.5	57.5	
VicHub	0.0	0.0	0.0	0.0	0.0	
UGS/LNG refill	0.0	0.0	0.0	0.0	0.0	
Total	**1216.9**	**1205.1**	**1196.2**	**1189.7**	**1186.6**	
1-in-20 Peak (TJ/day)						
Per AEMO advice	1258.2	1249.1	1237.7	1229.0	1220.1	

Source: AER analysis

The AER has largely accepted APA VTS's demand forecast for the next access arrangement period, with the exception of two elements:

- Tariff-V demand; and
- Storage refill volumes.

3.1 Tariff-V demand

The AER notes that APA VTS based its forecast for tariff-V customers on the combined forecasts of the distribution businesses. The AER accepted APA VTS's methodology associated with its forecast, however it did not accept the distribution business forecasts as filed.

In line with its acceptance of APA VTS's methodology to use the combined distribution business forecasts, the AER's draft decision is to revise APA VTS's forecast to match that which it approved for those businesses.[6]

APA VTS notes the AER's expectation that APA VTS will further update its demand forecast where revised values are available. APA VTS advises that no further update became available between the AER's draft decision and APA VTS's revised proposal that were relevant to its forecast.

APA VTS has adopted the AER's revisions to tariff-V in its revised proposal without update.

3.2 Storage refill volumes

The AER's draft decision is not to accept APA VTS's forecast for gas flows to the Iona UGS facility. While the AER accepted APA VTS's methodology for forecasting these volumes, the AER updated the values with more recent data made available by AEMO.[7]

APA VTS has adopted the AER's revisions to Iona UGS refill volumes-V in its revised proposal.

[6] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 13 – Demand*, p 13-11
[7] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 13 – Demand*, p 13-12

APA VTS notes the AER's view that Iona UGS refill volumes will increase following completion of the WORM.[8] APA VTS agrees that the WORM will make it easier to refill Iona during the summer months, but it does not necessarily follow that more gas volumes will flow. The primary driver for expanding the capacity of the South West Pipeline (SWP) was to support refill volumes, which have become peakier. Constraints on the SWP have made it difficult to ensure that sufficient capacity will be available each day for an orderly refill schedule over the summer, making refill, particularly early in the summer, a more urgent affair. This change in demand profile has largely driven the expansion needs.

In respect of whether increased peak capacity for storage injections will lead to additional volumes, however, it is worth noting that the expansion plans for Iona UGS are not yet confirmed, but they do not include plans to expand the storage capacity of the facility – all expansion plans discussed by Lochard Energy relate to the rate of refill and injection, not total gas storage.[9] It therefore does not follow that there will be further refill volumes (in addition to those forecast) in the period. Any suggestion of increased volumes would be highly speculative, and would put at risk APA VTS's ability to recover its revenue requirement should they not be met. APA VTS has therefore not identified cause to revise its forecast refill volumes beyond those currently forecast by AEMO and adopted in this revision proposal.

[8] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 13 – Demand*, p 13-12

[9] Australian Energy Market Operator 2017, *Victorian Gas Planning Report*, March pp 30-31

4 Capital expenditure

This chapter addresses the AER's draft decision in respect of capital expenditure in the current and forecast access arrangement periods.

4.1 Inline inspection

The AER has rejected some of APA's capital expenditure related to its inline inspection (ILI) program in the current access arrangement period and the forecast access arrangement period for the VTS.

It is worth putting the APA ILI approach in context as consideration of it in isolation can lead to perverse outcomes.

Natural gas pipelines are subject to deterioration as they age as a result of the conditions in which they operate. Factors affecting the safety and integrity of the pipeline include corrosion, dents and cracks.

There are a number of actions taken by pipeline operators to protect pipelines from the damage inflicted on them by their environment. Broadly, these protections fall into three categories:

1. Coating
2. Cathodic protection
3. Identification and repair.

Coating is where the pipeline is covered by a protective material to reduce the impact of corrosives and other environmental factors. Coating can get damaged or deteriorates as it ages resulting in defects. The pipe will corrode at these defect locations if not for cathodic protection.

Cathodic protection is a technique used to control the corrosion of a metal surface by making it the cathode of an electrochemical cell. For structures such as pipelines, where passive galvanic cathodic protection is not adequate, an external electrical power source is used to provide sufficient current. Interference from other electrical sources or physical blockages can result in cathodic protection not covering the length of the pipeline.

Identification and repair is where the pipeline operator undertakes analysis of the condition of the pipeline and, where they identify areas of corrosion, dents or cracking, undertake the appropriate repairs.

Each form of protection is necessary because of imperfections in the other forms of protection.

In relation to identification and repair, there are a number of different approaches that can be taken to the identification of corrosion, dents and cracks on natural gas pipelines.

The most common of these for use on pipelines in the developed nations is Inline Inspection or ILI (also called pigging). This is because of two factors. ILI can be conducted over significant distances and, more importantly for the purposes of the AER's decision making on APA VTS's proposal, is more reliable at detecting faults on the pipeline than any other form.[10]

The other method of searching for metal loss is to search for coating defects with Direct Current Voltage Gradient (DCVG) surveys. Put simply, DCVG assesses for electricity leaking through defects in the coating.

A fuller explanation for each of these elements of pipeline safety can be found in the Bruce Ackland and Associates report (Attachment C.1)

Bruce Ackland & Associates are one of Australia's leading experts on pipeline protection. This report outlines the need for ILI to be undertaken on pipelines and those conditions that must be present whereby ILI is not required as a means of managing risk.

In particular, APA VTS draw the AER's attention to the following elements of the report

- Exploratory excavations and visual examinations without proof of metal loss are impractical; and
- It is considered good engineering and economic practice to install ILI facilities on pipelines which are considered important but which do not at present have such facilities.

The report notes that ILI is preferable to direct assessment in a number of circumstances as DCVG has limitations, in particular in relation to certain types of coating defects and in certain locations.

[10] With the exception of excavation and visual inspection which has the drawback of requiring the pipe to be dug up and exposed which limits the capability of the methodology monitoring pipeline condition on only short sections of the pipeline.

APA VTS notes that DCVG is not capable of determining coating defects at locations where there are incorrectly applied heat shrink sleeves. This is because the heat shrink sleeve shields the cathodic protection system and thus denies any electrical current from expelling from the pipeline at that location, however more than likely will give some indication of failed coating on other parts of the heat shrink sleeve. The result is the detection of many coating defects, whereby ascertaining which defect is adjacent to a shielding sleeve is impossible to determine.

Heat shrink sleeves incorrectly applied by Gas and Fuel Victoria are the dominant cause of the most severe incidents of pipe corrosion found on the VTS. All of those severe incidents of metal loss were detected with ILI. To quantify the problem, for many years the Gas and Fuel Corporation repaired every coating defect with a heat shrink sleeve. A recently surveyed pipeline of 5.4 kilometres in length had over 50 coating defects or one per 102 metres of pipe. It is likely that there are hundreds of poorly applied heat shrink sleeves across the VTS with no reliable and accurate method of determining their location and condition. Therefore the use of ILI is paramount.

ILI is a relatively new and evolving technology. This means that many older pipes were not constructed in such a way as to facilitate undertaking ILI. This means "Pig traps", those facilities to enable insertion and withdrawal of the pig (the tool used to undertake ILI), need to be added to the pipeline. There may also need to be additional work undertaken to enable the passage of the pig along the pipeline.

Over time, APA has refined its approach to the installation of pig traps. APA VTS outlined in its business case the factors it takes into account when determining whether to install pig traps on an existing pipeline that doesn't already have them.

The APA strategy is to undertake ILI on these pipelines where:

- Rectification for ILI is practically possible;
- Pipeline operating at a stress level of ≥30 per cent of specified minimum yield strength; and
- The consequence of a pipeline failure is significant.

This is consistent with the findings of Bruce Ackland & Associates that ILI should be installed where practical on important pipelines.[11]

The consequence of pipeline failure is considered to be significant where the pipeline passes through a High Consequence Area or customer detriment would be significant from an interruption to service. This is consistent with the AS2885 risk assessment matrix which covers safety, security of supply and environmental risks.

Where these conditions are not met, APA VTS does not install pig traps as the cost is not warranted.

As these considerations demonstrate, APA VTS's consideration of the installation of pig traps is focused on risk and practicality as well as cost. Given the role of inspection and repair it is important that the risk mitigation capability of ILI is taken into account in the decision to install pig traps.

The AER's consideration also needs to take into account more recent developments in pig capabilities. The recent development of pigs that can detect stress corrosion cracking has heavily weighted the risk argument in favour of pigging over other techniques.

APA VTS notes that the Sleeman Consulting analysis omitted consideration of risk when comparing ILI with "direct assessment" (a combination of DCVG and excavations), and focused solely on cost. This omission is surprising as the risks associated with the failure to detect a material defect using direct assessment techniques compared to ILI are material, and Sleeman Consulting acknowledged the inferiority of other approaches compared to ILI in its report.[12] In practice, Sleeman Consulting assumed that the techniques were functionally equivalent by reducing a decision over which technique to use to a simple analysis of relative cost.

So while recognising it is valid to consider the cost of the installation, as APA VTS does, in the decision on whether to install pig traps, it is not valid to

[11] Bruce Ackland & Associates, Opinion regarding in line inspection and alternative methods for detecting metal loss in pipelines, 13 August 2017, p7

[12] Roland Sleeman 2017, *Victorian Transmission System Access Arrangement 2018-2022: Review of Forecast Capex for Selected Projects: Report to the Australian Energy Regulator*, 27 April, p 8

ignore the role of risk in the decision on whether to proceed with the introduction of ILI on an existing pipeline.

4.2 Capital expenditure in the 2013-17 access arrangement period

Revision 6.1

Make all necessary amendments to reflect our draft decision on conforming capex for 2013–17, as set out in Table 6.1.

Table 6.1 AER approved capex, 2013 to 2017 ($million, 2017)

Category	2013	2014	2015	2016	2017[f]	Total (2013–17)
Augmentation	12.3	112.4	74.6	92.1	52.3	**343.8**
Replacement & Upgrade	1.6	7.5	14.2	10.5	2.1	**35.9**
Non-System	1.7	4.2	5.7	2.3	8.6	**22.6**
TOTAL CAPEX	**15.6**	**124.2**	**94.5**	**105.0**	**63.0**	**402.3**

Source: AER analysis.
Totals may not add due to rounding.

The AER has accepted APA VTS's capital expenditure over the earlier access arrangement period, with the exception of part of the ILI program. The AER did not approve the installation of pig traps on four pipelines to allow ILI consistent with APA VTS's metal loss inline inspection frequency policy.

The AER did not approve these elements on the following basis:

- The expenditure on these works was significantly more than the approved forecast;
- The expenditure did not appear consistent with the costs of similar works on other pipelines; and
- The AER understood that the works (scheduled for 2017) had not yet been expended.

On this basis, the AER reached a draft decision that the forecast expenditure for works in 2017 had not been arrived at on a reasonable basis, and therefore was not expenditure that would be incurred by a prudent service

provider acting efficiently, in accordance with accepted good industry practice.

4.2.1 *Installing Pig Traps*

The AER state:

> *The capex model included with the 2018–2022 access arrangement submission indicates that as of 2016, pig trap installation works were complete on only one of the pipelines (PL 124) and had commenced on another pipeline (PL129)….The capex model indicates that work had not commenced, and is not planned to be undertaken in the 2013–17 access arrangement, on 4 other pipelines (PL 36, PL 67, PL 68 and PL162).*[13]

At the last access arrangement determination the AER approved the installation of pig traps on seven pipelines as part of the current access arrangement:

- Pipeline 108 to Newport install (PL 124)
- Dandenong to Princes Highway (PL 129)
- Laverton North (PL 162)
- Pakenham (PL 68)
- Princes Highway to Regent Street (PL 36)
- Somerton (PL 238)
- Tyers to Maryvale (PL 67)

With the exception of the Somerton pipeline (PL 238) they were all forecast to occur in the last two years of the current access arrangement period.

At the end of December 2016 (the information provided to the AER) APA VTS had incurred capital expenditure to install pig traps on two of the pipelines (PL 124 and 129). Since December, APA VTS has also completed the installation of pig traps on Dandenong to Princes Highway (PL129).

[13] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 6 – Capital expenditure*, p 6-15– 6-16

Pipeline 108 to Newport (PL124) services the Newport Power Station. The installation of pig traps on this line was targeted for an 8 week shut down of the power station scheduled for August 2016. APA VTS bought the fittings including 450NB and 150NB valves, hot tap fittings, line pipe and fittings in preparation of that date.

The location provided a challenging environment in particular the high water table and unknown soil conditions and underground services in the area. The tender results for civil works at this location came in substantially above expectation. APA VTS is currently assessing how to progress this project in light of this development. Any work to progress this matter will need to target the scheduled shut downs of the Newport Power Station which occur every 18 months or so. The fittings we have purchased are in storage and have retained their value as they can be reused either in this project or a different future project.

The Laverton North (PL 162), Pakenham (PL 68), Somerton (238) and Princes Highway to Regent Street (PL 36) pipelines do not operate above 30 per cent specified minimum yield strength. As per the APA ILI strategy discussed in section 4.1 above, APA VTS will not be pursuing ILI on these pipelines.

APA is currently expecting to undertake the installation of pig traps on the Tyers Maryvale pipeline (PL67) in 2018 in the forecast access period (see section 4.3.2).

The AER also notes:

> *APA forecast that a further $1.5 million is required to complete the pig trap installation works on this pipeline (PL 129), taking the total cost to more than triple the original forecast.*
>
> *Work is scheduled for completion on another pipeline (PL 238) in 2017, with the cost of this work also substantially higher than the initial estimates.*[14]

As noted above APA VTS has now completed the installation of pig traps on Dandenong to Princes Highway (PL 129). The total cost of this project was $1.3 million. The original estimate provide to the AER was an underestimate

[14] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 6 – Capital expenditure*, p 6-15– 6-16

of the cost of undertaking the installation of pig traps. The estimate did not reflect the large size of the pipeline (750mm) so underestimated the costs of steel, fittings and contractors.

The table below summarises APA's position with regard to the pig trap installations forecast.

Table 4-1 - Pig trap installation forecast in current AA period

Pipeline	Outcome
Pipeline 108 to Newport install (PL 124)	Ongoing
Dandenong to Princes Highway (PL 129)	Complete
Tyers to Maryvale (PL 67)	Forecast 2018
Laverton North (PL 162)	Avoided cost
Pakenham (PL 68)	Avoided cost
Princes Highway to Regent Street (PL 36)	Avoided cost
Somerton (PL 238)	Avoided cost

4.2.2 *Inline inspection program*

The AER state:

> *For the pigging program, at the end of 2016, work was complete on three of the pipelines (PL74, PL 56 and PL 92). The pigging program on the T1 pipeline is scheduled to commence later in 2017 at a forecast cost of $3 million, almost 6 times the initial budget. APA has not explained why the forecast costs for 2017 are higher than the initial budget.*[15]

The AER note that the current forecast for 2017 ILI was $0.6 million. APA VTS is now estimating that this pigging will cost $2.0 million for that year. The difference is the AER's cost estimate did not include the cost of EMAT ILI which was not forecast at the time of the last access arrangement determination. EMAT ILI is undertaken by Rosen, which is the only company

[15] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 6 – Capital expenditure*, p 6-15

with a pig capable of undertaking EMAT ILI on a pipeline of this size. As noted above EMAT ILI is the only ILI capable of detecting stress corrosion cracking

4.2.3 *Revised timing for the SWP to Anglesea Pipeline*

Since submitting its original proposal in January 2017, a material change in timing for the South West Pipeline (SWP) to Anglesea Pipeline has emerged. APA VTS's January 2017 proposal included the SWP to Anglesea Pipeline to be started in 2017 (final year of the current access arrangement period) and finished in 2018. The project, and its timing, was approved by the AER in its draft decision.

While the project is still necessary, advice from the interconnected distribution network operator (AusNet Services) is that a delay in completion of the project by one year can be accommodated as recent low pressures and outages in the Torquay area has led AusNet Services to urgently augment the lateral currently supplying these areas with a 15 kilometre 180 mm PE pipeline from south of Geelong to Torquay. This temporary solution has meant that the new pipeline can be delayed by 12 months, and now must be completed by winter 2019. To be clear, the need for the new pipeline is still critical by winter 2019, even with the emergency works undertaken by AusNet Services.

APA VTS notes that this revision to the timing of this project involves a change to the estimate of capital expenditure for the final year of the current access arrangement period, and a commensurate increase in capital expenditure for the forecast period. While the AER had previously accepted the timing for this project, the AER should equally accept the revision to its timing (and associated forecasts) as:

- This is an efficient deferral of this project, that will lead to lower overall costs for consumers;
- The project must still be completed by winter 2019 to ensure security of supply for the Torquay region; and
- Recent changes to Rule 77(2)(a) of the National Gas Rules provides strong incentives for service providers to ensure that their estimated expenditure in the final year of the period is as accurate as possible.

Failure to update the forecast capital expenditure for this project deferral would mean that APA VTS would be unfairly penalised for the efficient deferral of a project that the AER has otherwise approved as necessary and consistent with the Rules. In light of the specific rules that relate to expenditure that falls across access arrangement periods, it is important for the AER to recognise that normal and prudent project rescheduling, of the kind described here, must be accommodated in the access arrangement revision process, notwithstanding the stage of the decision making process.

Were this expenditure to 'fall through the cracks' between revising the final year expenditure estimate to remove this project, while not updating the forecast expenditure for the new timing of this project, APA VTS would not receive its efficient costs in providing reference services as required under the revenue and pricing principles.

Notwithstanding the AER's acceptance of this project and its timing in the draft decision, APA VTS further revises the timing of this project in this revised access arrangement proposal to move the expenditure entirely within the forecast period. This is a response to the changing needs for the project, the incentives provided by Rule 77(2)(a) to ensure that the final year estimate is as accurate as possible, and the clear need to compete this project by winter 2019.

4.2.4 *Other actual capital expenditure*

APA VTS notes that the AER has made a draft decision that the remainder of APA VTS's capital expenditure incurred in the 2013-17 access arrangement period is conforming capital expenditure.

APA VTS set out total capital expenditure for the current access arrangement period in line with the discussion above. All other projects have in included as per the AER's draft decision, and set out in Table 4-2 and Table 4-3 below.

Table 4-2 – Actual capital expenditure by driver for the current access arrangement period (nominal $m)

$m nominal	2013	2014	2015	2016	2017(e)	Total
Augmentation	12.3	112.4	74.6	92.1	43.1	**334.5**
Refurbishment and upgrade	1.6	7.5	14.2	10.7	8.3	**42.3**

$m nominal	2013	2014	2015	2016	2017(e)	Total
Non-system	1.7	4.2	5.7	2.2	7.1	**21.0**
Total	**15.6**	**124.2**	**94.5**	**105.0**	**58.5**	**397.8**

Table 4-3 – Actual capital expenditure by asset class for the current access arrangement period (nominal $m)

$m nominal	2013	2014	2015	2016(e)	2017(f)	Total
Pipelines	4.1	85.8	72.1	93.3	43.3	**298.5**
Compressors	8.4	27.8	7.8	6.3	1.0	**51.2**
City Gates & Field Regs	1.1	5.1	8.4	1.5	2.9	**19.0**
Odourant Plants	-	-	-	-	-	**-**
Gas Quality	-	0.1	0.3	0.4	0.1	**0.8**
Other	1.9	5.1	5.0	3.5	11.2	**26.8**
Buildings	0.0	0.2	1.0	0.1	0.0	**1.4**
General Land	-	-	-	-	-	**-**
Total	**15.6**	**124.2**	**94.5**	**105.0**	**58.5**	**397.8**

4.3 Capital expenditure in the 2018-2022 access arrangement period

Revision 6.2

Make all necessary amendments to reflect our draft decision on conforming capex for 2018–22, as set out in Table 6.2.

Table 6.2 AER approved capex, 2018–22 ($million, 2017)

Category	2018	2019	2020	2021	2022	Total
Augmentation	44.4	46.8	59.8	-	-	**151.0**
Replacement and Upgrade	12.5	6.5	9.3	10.2	8.6	**47.1**
Non-System	4.2	3.6	3.3	3.6	2.3	**16.9**
TOTAL CAPEX	**61.1**	**56.9**	**72.3**	**13.7**	**10.9**	**215.0**

Source: AER analysis.
Totals may not add due to rounding.

The AER has accepted APA VTS's capital expenditure over the forecast access arrangement period, with the exception of the following:

- Part of the proposed expenditure for the Warragul lateral expansion;
- Part of proposed pipeline integrity management activities;
- Safety Management: High consequence areas expenditure;
- Wollert Compressor Station Turbine overhauls; and
- Coogee decommissioning.

APA VTS discusses each of these projects below.

4.3.1 *Warragul lateral expansion*

While accepting the need for the Warragul lateral expansion project, the AER did not accept APA VTS's forecast expenditure for this project, as discussed below.

Project management and commissioning costs

The AER noted that APA VTS's forecast project management and commissioning costs were significantly higher than that included in the initial forecast for the Warragul works approved for the 2013-17 access

arrangement period, and above the 'handbook figure' of 15 per cent of total project costs for this element.

The AER's draft decision was to substitute APA VTS's value of $1.96 million with $0.8 million, representing 15 per cent of the AER's revised total project costs. The AER reached this draft decision on the basis that APA has not presented any evidence to justify a departure from applying the average project management and commissioning costs for this project.[16]

APA VTS provides the following additional information to the AER in support of its forecast project management and commissioning costs of $1.96 million.

The handbook rate, which the AER correctly identifies as 15 per cent of project costs, is an appropriate measure to use in the early stages of project planning, where detailed information is not yet available as to the specific engineering tasks that will be required for a particular project. Once additional information is available, this 'average' project rate is appropriately substituted with a higher or lower estimate as per the specific details of the project.

At the time of its original submission for the 2013-17 access arrangement period, APA VTS had not undertaken detailed project and site analysis as part of its forecast – as noted by the AER, the previous forecast was largely a desktop forecast. This is typical for projects that are scheduled for completion some years in the future – it is not efficient or prudent to undertake detailed FEED or design works too long before a project is actually scheduled to occur as the prior works are often outdated (for example by local development) by the time the project is due to be started.

During the 2013-17 access arrangement period, APA VTS undertook detailed planning for the Warragul looping project with the intent to complete the project in that period. As highlighted in APA VTS's January 2017 submission, the significantly increased expected costs for the project, compared to forecast, led APA VTS to defer the project in an attempt to identify lower cost options. These have proved elusive, and the project is now urgent.[17]

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[16] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 6 – Capital expenditure*, p 6-19

[17] APA VTS 2017, *Victorian Transmission System access arrangement submission*, 3 January, p 70

Detailed project design has led to an upward revision to the estimate for project management and commissioning costs. APA VTS's revised project management and commissioning costs, as included in its January 2017 proposal, are the best estimates possible in the circumstances. They are based on detailed and up to date information of the project and what it entails. They are certainly more accurate than using a handbook estimate that is only suitable when detailed information is not available.

APA VTS's project management costs include project administration and management activities, scheduling, contract management, reporting and supervision. APA VTS has determined the project management costs by:

(a) preparing a schedule to determine activity durations and sequencing required to perform the works;

(b) identifying roles required to manage and supervise the project;

(c) determining the duration and utilisation of the roles by aligning with the schedule;

(d) applying the cost rate ($/time) to the duration for these roles; and

(e) including any other Project Management related non staff costs (for example travel and accommodation where required).

APA VTS's design costs have similarly been determined by identifying the design tasks required to complete the project, aligning the design process with the overall schedule and applying resources and durations to those tasks and applying unit rates ($/time) to determine the costs. Additional design costs also include studies (such as HAZOPs) which will be conducted by third parties.

Commissioning costs are similarly resource based, determined by applying the expected commissioning duration activities to roles and unit rates.

The allocation of project management staff time to this project is set out in Figure 4-1. The profile of staff time to specific project management and commissioning tasks is set out in Figure 4-2.

This analysis shows that the estimated project management and commissioning costs have been derived using detailed analysis of actual project management and commissioning tasks and associated time. The cost estimate for this element of the Warragul lateral expansion project have

been arrived at on the reasonable basis and represent the best estimate possible in the circumstances. They are a better estimate than the handbook figure used by the AER to estimate these costs is its draft decision as they have been derived using specific information associated with the project.

Figure 4-1 – Warragul lateral expansion project management and commissioning staff allocation

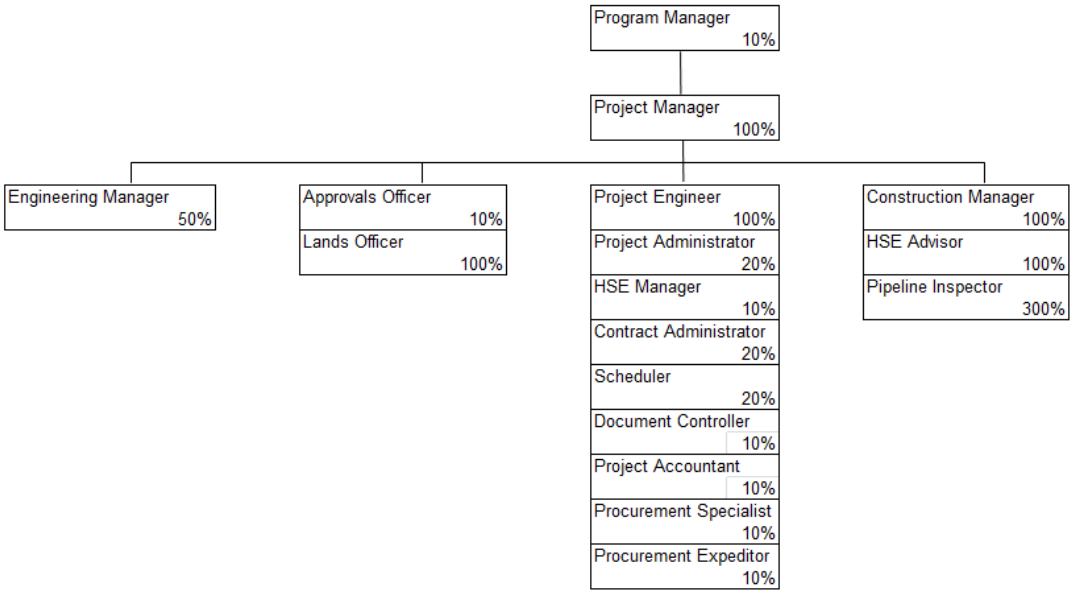
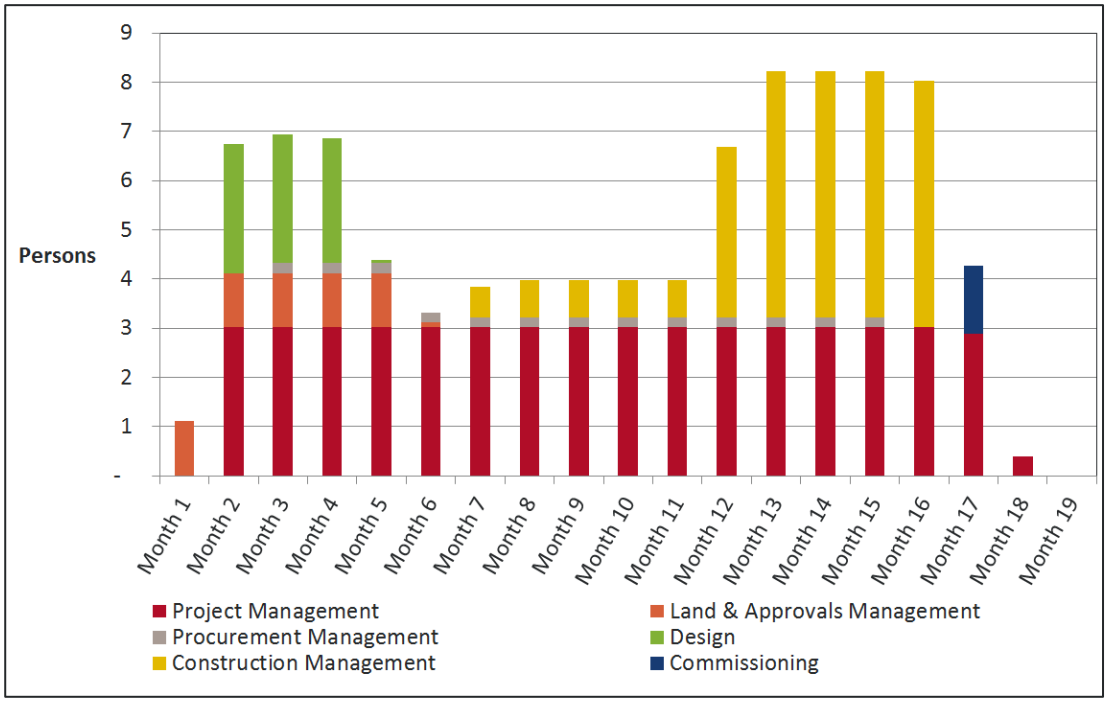


Figure 4-2 – Warragul lateral expansion project management and commissioning works



Land access costs

The AER noted that APA VTS's forecast land access costs were significantly higher than that included in the initial forecast for the Warragul works approved for the 2013-17 access arrangement period. While the AER noted that APA VTS had advised that this increase was due to land rezoning from rural to urban, the AER's draft decision was that it did not consider it appropriate to use residential subdivision land value for the pipeline easement.

The AER reached this draft decision as it assumed that, as the pipeline route has not changed from the original proposal, and the new pipeline would be parallel to the existing pipeline and use the existing easement, or be built along the verge of a major access road, that the costs for land access would be similar to the original proposal.[18]

[18] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 6 – Capital expenditure*, p 6-19

APA VTS provides the following additional information to support its forecast land access costs of $1.6 million.

APA VTS's forecast expenditure for land access costs included in the 2013-17 access arrangement were derived on a desktop basis in line with the AER's expectations: they related to use of an existing easement and road verge.

The forecast included in the 2018-22 access arrangement proposal was developed after more detailed analysis of actual easement requirements for the pipeline.

APA VTS has undertaken a preliminary assessment to identify potential pipeline routes. This preliminary assessment identified constraints surrounding access to existing easements, which in private land are only between 6 and 7 metres wide. In these instances where the pipeline is proposed parallel to the existing pipeline, APA VTS will be required to obtain additional easements. As discussed as part of the submission to the AER, due to the changes in land use associated with the pipeline route, the easement acquisition (and the negotiation of additional construction workspace) will have significantly higher costs than originally identified in the previous access arrangement.

Approximately 50 per cent of the currently proposed pipeline route occurs within the urban growth zone (UGZ). A preliminary review of land prices has identified that broad acre lots within the UGZ are approximately 80 per cent more expensive than lots outside the UGZ and lots less than 2 hectares are 95 per cent more expensive than lots outside the UGZ that are under 2 hectares.

In addition to this, APA VTS has yet to undertake consultation with relevant road authorities to assess the potential to locate the pipeline in road reserves. It has been noted that as part of the Warragul Precinct Structure Plan, Baw Baw Shire Council has identified significant upgrades to a number of local roads and due to these developments, locating the pipeline in road corridors may be constrained. This may require the pipeline to run parallel with the road corridor in adjacent private land. Further, APA VTS through previous site inspections and preliminary environmental reviews has identified significant ecological constraints in some road reserves that should be avoided where possible. This generally relates to mature native vegetation and land that is under the care of a local landcare community group.

Consultation would be required with key stakeholders regarding the placement of the high pressure gas pipeline in road reserves. Due to the higher risks to pipeline integrity from third party strikes associated with locating pipelines in public land, APA VTS prefers to locate high pressure pipelines in private property. Where substantial safety concerns are identified as part of the preliminary safety management study of the pipeline design, there may be a preference for the pipeline to be located in adjacent private land. Due to these factors, APA has made allowance for additional easement acquisition costs and construction workspace/damages.

These factors, which were not part of the assessment in the desktop study that formed the estimated costs for the Warragul project for the 2013-17 period, are the reasons for the additional expected costs for the forecast period. Importantly, these additional costs are not driven by the delay in completing the project – they are the costs of completing the project based on a more detailed analysis of project needs. These needs were identified in the 2013-17 period and led to the deferral of the project in an (ultimately unsuccessful) attempt to find a lower cost option.

The revised estimate is based on better and more specific information than the earlier estimate, and as such it is the best forecast or estimate possible in the circumstances. Certainly, it is a more accurate estimate of land access costs than the earlier study based on desktop analysis.

Construction costs

The AER noted that APA VTS's forecast construction costs were significantly higher than that included in the initial forecast for the Warragul works approved for the 2013-17 access arrangement period. The AER noted that the 2018-22 forecast numbers were derived using 'budget quotes' as opposed to the 'desktop analysis' that made up APA VTS's earlier forecast, however the AER did not consider that APA VTS had substantiated or identified any change in circumstance that would justify the increase. [19]

APA VTS provides the following additional information to support its forecast construction costs of $3.4 million.

[19] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 6 – Capital expenditure*, p 6-19

The construction cost portion of the estimate is broken up into three components:

(a) Pipeline Construction ($3.175M). This is based on the mid-range quote obtained by APA VTS from pipeline contractors for this project (prices ranges from ($4.3M down to $2.8M).

At this stage of project development, APA VTS uses mid-range quotes as the best estimate of forecast costs because of its experience in how quoted values ultimately translate to competed project costs. In practice, actual construction costs tend to converge to the midrange costs due to unexpected or unscoped items, making the midrange quote the best estimate of expected project costs available at this time.

Note that this pipeline is significantly higher on a $/inch-km basis due a number of factors:

- Relatively short distance – benchmark rates of $/in-km apply for pipelines over longer distances and mobilisation and demobilisation, which are essentially fixed costs are diluted along the length on a longer pipeline when applying the rate;
- Crossing of the Princes Freeway requiring trenchless techniques over a significant length. This method of construction is a requirement of VicRoads for crossing major highways and was not considered in the 2013-17 submission; and
- Change in land use and road improvements. There has been recent significant development in the area. This has resulted in:
  - More restrictive construction methods around public areas, reducing open trench length and overall pipe laying productivity;
  - Additional restoration costs along road reserves that consisted of previously unsealed or 'paper' roads;
  - Negotiating additional services which have been recently installed (such as stormwater on new roads); and

- Narrowing of construction corridor around new facilities – most notably the new leisure centre.

(b) Hot Tap costs of $80K is based on recent project costs for similar works. This has not changed significantly since the prior submission.

(c) Station Construction costs of $102K have been prepared from the more progressed design development and budget quotes from the construction contractors. Note that the $102K amount is from the contractor who provided the $3.175M budget price for the pipeline. If the project were to proceed, APA VTS expects that it would contract the pipeline and station construction works in one package.

These detailed design elements and budget quotes were not available at the time of the 2013-17 access arrangement proposal. The forecast costs for this project has been developed using better, more recent and more accurate information, and therefore forms a better forecast or estimate than that included in the earlier proposal. Where possible, these estimates have been market tested, and have otherwise been built up using sophisticated project management and costing methodologies. They are the best forecast or estimate possible in the circumstances in relation to the Warragul looping project.

Expected timing for the Warragul lateral expansion

APA VTS had forecast expenditure for the Warragul lateral expansion in line with the expansion coming into service by winter 2020. This timing reflected the expected need for further expenditure to accommodate growing demand in Warragul as identified in the AEMO 2016 Victorian Gas Planning Report Update.[20]

Since this time, AEMO has revised its Warragul peak demand forecast and issued a system security notice, stating that a breach in minimum pressure is likely if a peak day occurs in winter 2019.[21]

This increase in the peak demand forecast brings forward the need to complete the Warragul lateral expansion to 2018 and 2019, from the current

[20] AEMO 2016, Victorian Gas Planning Report Update, p 30

[21] AEMO 2017, Notice of a threat to System Security, 10 March

timing of 2019 and 2020. This revised timing for this project is reflected in APA VTS's forecast expenditure for the project as set out below.

Table 4-4 – Warragul lateral expansion (real 2017 $m)

$m real 2017	2018	2019	2020	2021	2022	Total
Capex	5.6	2.1	-	-	-	**7.7**

4.3.2 *Pipeline integrity management activities*

The AER did not approve part of APA VTS's proposed pipeline integrity management program associated with modification of three pipelines to enable inline inspection, and the associated forecast inline inspection expenditure.

The AER did not approve this expenditure on the basis that APA VTS had not provided a cost benefit analysis to show why inline inspection was more cost effective than continuing to apply direct inspection techniques, consistent with advice provided to the AER by its consultant, Sleeman Consulting.

APA addresses each of the projects the AER rejected below.

Truganina to Plumpton pipeline

This pipeline requires ILI on or before 2022 and currently does not have an ILI receiver. Since the original submission in January, the supplementary submission included the WORM. The WORM will connect directly to the Truganina to Plumpton pipeline at Plumpton and therefore the ILI receiver at Plumpton will not be required. This capital expenditure has been removed from the capital expenditure forecast.

Tyers to Maryvale

The primary reason for the need to perform ILI on this pipeline is due to risk. APA VTS proposes to install pig traps on this pipeline.

Tyers to Maryvale pipeline operates at above 30 per cent specified minimum yield strength (SMYS). This means that the pipeline is capable or rupture, as defined in AS2885. Rupture is the most catastrophic failure mode for a gas pipeline. The consequence of major failure of this pipeline is the largest consumer of gas in Victoria, Australian Paper, will be out of gas for a sustained period of time. In addition, depending on the location of the

pipeline failure, fatality could occur. Australian Paper is a 24 hour 360 day a year operation.

In addition, depending on the location of the pipeline failure, fatality could occur. The likelihood of pipeline failure is higher on this pipeline because of its history. As discussed in BC257, 258, 259, the Gas and Fuel Corporation incorrectly applied heat shrink repair sleeves during the 1970s and 1980s. We have some evidence strongly suggesting that there are heat shrink sleeves on the Maryvale pipeline, but the exact location of the sleeves is unknown.

The most severe form of corrosion likely on the Maryvale pipeline is corrosion under poorly applied heat shrink sleeves. Based on APA VTS's experience elsewhere on the VTS, the corrosion will continue without mitigation as the failed sleeves shield the cathodic protection system from being effective at that location.

In June 2017, a DCVG survey was conducted on the Maryvale pipeline and detected 53 defects. That is an average of 1 coating defect per 102 metres of pipeline.

The T1 Morwell to Dandenong pipeline is a similar pipeline in terms of age and construction. The recent ILI revealed corrosion induced metal loss features at an average rate of one metal loss feature every two kilometres. Based on the similarities between the pipelines APA VTS expects that the Maryvale pipeline will have a similar rate of metal loss features. Maryvale is approximately 5½ kilometres long. APA therefore expects to find two to three metal loss defects on the Maryvale pipeline.

As discussed in the opinion expressed by Bruce Ackland and Associates, these coating surveys cannot identify if there is corrosion occuring beneath the disbonded coating. Thus, there is no method of determining which defects are causing corrosion or not, without excavation. The cost to excavate 53 coating defects, at an average of $28,000 per defect is $1,484,000. Alternatively APA VTS can install the pig traps and undertake ILI, identify and repair the 2 or 3 metal loss defects and avoid the unnecessary 50 other digups.

A recent ILI feasibility study conducted on the Maryvale pipeline has shown that the bends are capable of traversing an ILI tool, the velocities required are possible, the launcher can be constructed without shutting down the pipeline and the receiving end already has some preliminary works to

enable a receiver to be installed easily. The result of this study is that pig launcher and receivers can be installed for $668,378.

APA VTS maintains that its expenditure for enabling ILI for the Tyers to Maryvale pipeline is efficient and prudent and has retained it in its revised proposal.

James St

The James St pipeline passes through a High Consequence Area, it operates at greater than 30 per cent specified minimum yield strength and pigging is possible. This makes it consistent with APA's ILI strategy.

This pipeline was constructed to supply the gas fired power station and traverses a region where large earth potential rise and alternating current (AC) induction is a credible threat. For those reasons the pipeline is coated with a trilaminate coating, the only VTS pipeline with this coating type. Other pipelines which traverse past electrical terminal stations and parallel to high voltage powerlines generally have coal tar enamel.

The AC energy that is induced into the pipeline by its proximity to the generator, powerline and terminal station will be discharged somewhere along the pipeline at a coating defect. While, given its age of only 11 years, the trilaminate coating is likely to have defects, the expectation is that given the nature of the material there will be fewer defects than would be on a coal tar enamel pipelines. Coal tar enamel typically has many large coating defects.

The fewer the defects will then have a higher level of current discharge per coating defect. This in turn means the higher the level of metal loss per defect. This makes the risk of failure of the pipeline greater than it would be for similar pipelines with a different coating. ILI provides a higher probability of detecting the fault prior to it becoming severe.

The Sleeman Consulting report assumes that DCVG and coating repair is a valid long term solution. The opinion expressed by Bruce Ackland and Associates discussed the limitations of coating defect surveys and their inability to determine if metal loss is occuring at a defect or not. The opinion goes on to say "If an unambiguous assessment of the presence of metal loss due to corrosion were needed then every one of the coating defects would need to be excavated and repaired." As this pipeline ages the rate of coating disbondment will increase and thus the costs of the direct

assessment program will also increase. The cost benefit of installing pig traps increases with the age of the pipeline and provides further benefits as to reducing risk profile. This fact was not applied in Sleeman Consulting's cost benefit analysis, nor did the analysis appreciate the expected life of the asset is significantly greater than 20 years and should be extended to the expected life of the original design which is 42 years thus 32 years remaining.

The cost benefit analysis in the Sleeman Consulting report used incorrect inputs of pig trap costs, incorrect asset life, and did not apply risk mitigation factors for the vastly superior performance of ILI over DCVG.

As stated in the Bruce Ackland and associates report, and consistent with the actions of pipeline operators world-wide, inline inspection can detect other defects such as dents, cracks, gauges and pipe wall faults that cannot be detected by other means.

APA VTS maintains that its expenditure for enabling ILI for the James St pipeline is efficient and prudent and has retained it in its revised proposal.

Table 4-5 – Inline inspection forecast capital expenditure (real 2017 $m)

$m real 2017	2018	2019	2020	2021	2022	Total
Capex	2.9	2.5	0.6	4.7	4.5	**15.1**

4.3.3 *Safety Management: High consequence areas*

While agreeing that APA VTS must manage the risk of rupture associated with pipeline encroachment, the AER concludes that the timing of APA VTS's proposed slabbing program should be more closely associated with actual land development activity. In making this assessment, the AER's draft decision was not to approve APA VTS's safety management program, while inviting APA to respond with an alternative slabbing program that is consistent with the rate of urban development over the three pipelines.[22]

APA disagrees with the AER position that there is scope for efficiencies by delaying slabbing until other utilities are working in the area. The risk of other utilities striking an APA pipeline is one of the highest threats to the assets.

[22] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 6 – Capital expenditure*, p 6-27

In our submission APA VTS outlined three pipelines it was intending to slab. Each of these is discussed below.

Brooklyn to Corio pipeline

In APA VTS's original proposal we proposed slabbing 7 kilometres of the Brooklyn to Corio Pipeline (BCP) through high consequence areas. Since that submission a number of additional capital expenditure projects have been proposed.[23] An additional benefit of those projects is they enable the pressure on the BCP to be lowered to 5,100 kPa permanently without significantly increasing the threat to network reliability. AEMO has agreed to amendment of the Service Envelope Agreement meaning this pressure lowering can be legally implemented.

This pressure reduction is expected to be implemented within two months of the BCS reconfiguration project being completed.

The pressure reduction will remove the need to construct slabbing protection for the 7 kilometres proposed in the draft submission.

The BCP pressure lowering can be implemented with zero capital expenditure. An operational cost of approximately $30K will be incurred.

The construction of the WORM will not affect this project.

Wollert to Wodonga pipeline

The APA VTS business case supplied with the original proposal included protective slabbing for protecting the Wollert to Wodonga pipeline from various threats.

APA VTS recognises it is ideal that slabbing occur no earlier than is necessary. However there are no mechanisms that require a developer to inform APA as to when they will develop the land. This means that APA must anticipate when land is about to be developed. The strongest indicator of that timing is the Victorian Planning Authority's schedule for Precinct Structure Plans (PSPs).

The PSP 67 & 96 (Donnybrook and Woodstock) Safety Management Studies (SMS) have been concluded. These urban areas will have suitable easement

[23] The reconfiguration of Brooklyn Compressor Station

and physical protection that will negate the need for any further work. These areas constitute approximately 5 kilometres of the pipeline.

PSP 1063 (Northern Freight) is not yet on the Victorian Planning Authority Schedule. Given the schedule currently extends to June 2020, APA speculates that no urbanisation of PSP 1063 is expected before 2022.

PSP 69 (Northern Quarries) has just been split in two. One subordinate plan area is called Shenstone Park PSP and is located south of Donnybrook Road. The Victorian Planning Authority has indicated the PSP will be finalised and ready for development or "shovel ready" by December 2018.

The Shenstone Park PSP includes an Employment, Residential and Conservation precinct directly over the top of the T74 pipeline. The T74 pipeline traverses this PSP for approximately 3 kilometres and of this length, 2 kilometres are expected to require protective slabbing. The original submission had a unit rate of $579/metre for this pipeline, creating a proposed capex of $1.2 million to be spent by 2019.

Table 4-6 – Summary of slabbing requirements by Precinct Structure Plan – Wollert to Wodonga Pipeline

PSP	Name	Resolution
67	Donnybrook	Sufficient easement and physical protection currently in place. No additional capital expenditure necessary
96	Woodstock	Sufficient easement and physical protection currently in place. No additional capital expenditure necessary
1063	Northern Freight	Not in VPA planning schedule to 2020. Development not expected prior to 2022
69	Shenstone Park	VPA indicated that PSP ready for development from 2018. Two kilometres of slabbing required to meet requirements of AS2885.

Brooklyn Lara

The APA VTS Business Case number 230, submitted with the original January 2017 proposal, demonstrates the many PSPs that overlay the pipeline. Table

4-7 sets out a list of PSPs and their expected date for approved plan from the Victorian Planning Authority.

Table 4-7 - Summary of slabbing requirements by Precinct Structure Plan – Brooklyn Lara Pipeline

PSP	Name	Expected PSP complete	Length affecting pipeline
41	Manor Lakes	Post 2020	1.5
42.1	Blackforest Road North	Post 2020	1.5
1085	Tarneit Plains	2017	4
1086	Chartwell East	Post 2020	4.5
1088	Oakbank	Post 2020	3
1092	Westbrook	Post 2020	3
1093.1	Mambourin East	Post 2020	3

As the PSP is in the final stages of approach, APA VTS expects the Tarneit Plains PSP to be constructed earlier in the forecast access arrangement period. An expected cost for 4 kilometres of slabbing is $2.5 million to be spent by 2019 for Tarneit Plains.

Given the number and location of the PSPs there is a high likelihood that at least one other PSP scheduled for completion by 2020, will have started construction by 2022. APA VTS expects 3 kilometres of slabbing for $1.9 million will be required by 2022. The combined total of both projects is $4.36 million over the access arrangement period.

Table 4-8 – Safety Management - High Consequence Areas forecast capital expenditure (real 2017 $m)

$m real 2017	2018	2019	2020	2021	2022	Total
Capex	1.2	2.6	-	-	1.9	**5.7**

4.3.4 *Wollert Compressor Station Turbine overhauls*

The AER's draft decision was not to approve APA VTS's proposed expenditure for the Wollert Compressor Station turbine overhaul on the basis that the:

- activity was not capital expenditure, and was more appropriately classified as operating expenditure; and
- expenditure was part of APA VTS's business as usual expense that APA can prioritise within it existing base operating expenditure forecast. [24]

APA VTS makes the following points in relation to the AER's analysis of this project.

Capital expenditure

The term turbine overhaul is a misnomer. The two key components of a compressor are the turbine and the engine. Under a turbine overhaul the engine is completely removed and replaced with an entirely different engine.[25] This is not a process of repair or minor adjustment.

Importantly for the determination of whether the expenditure is capital expenditure the replacement engine is sourced from the manufacturer and meets original specification and comes with a new engine warranty. The overhaul extends the life of the asset as it resets the run time for the compressor to zero.

This is consistent with AASB 116 Property Plant and Equipment. APA VTS has reproduced the relevant provision (13) below:

[24] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 6 – Capital expenditure*, p 6-29

[25] Other miscellaneous components are also replaced

> *Parts of some items of property, plant and equipment may require replacement at regular intervals. For example, a furnace may require relining after a specified number of hours of use, or aircraft interiors such as seats and galleys may require replacement several times during the life of the airframe. Items of property, plant and equipment may also be acquired to make a less frequently recurring replacement, such as replacing the interior walls of a building, or to make a nonrecurring replacement. Under the recognition principle in paragraph 7, an entity recognises in the carrying amount of an item of property, plant and equipment the cost of replacing part of such an item when that cost is incurred if the recognition criteria are met. The carrying amount of those parts that are replaced is derecognised in accordance with the derecognition provisions of this Standard (see paragraphs 67–72).*

This similarity between the replacement of the compressor's engine with those examples given in the standard demonstrate that APT VTS's treatment of this expenditure as capital expenditure is completely consistent with Australian Accounting Standards. This is why the AER has in the past recognised turbine overhauls as capital expenditure.

The AER's draft decision to treat this expenditure as operating expenditure is inconsistent with previous AER practice, accounting standards and the regulatory framework.

Overhaul expenditure can't be prioritised within operating expenditure

APA VTS does not accept the characterisation of this asset as operating expenditure. However, even in the event a determination is made that this expenditure is operating expenditure. The AER has erred in the suggestion made with no supporting evidence that:

> *We consider base opex, trended forward by the forecast rate of change, is sufficient for APA to continue to meet its existing regulatory obligations. APA have many assets requiring maintenance and there can be lumpiness in scheduling of maintenance on individual assets.*[26]

APA VTS's operating expenditure is made up of items than are unrelated to the APA VTS's level of activity, for example licence fees, insurance and the corporate overhead allocation. When these items are excluded APA VTS's

[26] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 6 – Capital expenditure*, p 6-28

asset operation and management operating expenditure is $19.1 million in 2022, when $3.8 million of the turbine overhaul expenditure is expected to be incurred. In this case the turbine overhaul would be an increase of 19 per cent on the operating expenditure in that year.

Given the relatively stable nature of direct operating expenditure on a transmission pipeline, infrequent, periodic expenditure of this size cannot be managed within the current allowance.

This means that if the AER determined that this expenditure was operating expenditure (a decision that APA VTS considers would be inconsistent with previous AER practice, accounting standards and the regulatory framework), the AER would need to include it in the forecast operating expenditure as a one-off (non-recurrent) item to be consistent with pricing principles under the National Gas Law requiring the AER to provide the service provider with a reasonable opportunity to recover at least the efficient costs incurred in providing the reference services.[27]

4.3.5 Coogee decommissioning

The AER's draft decision was not to approve APA VTS proposed expenditure associated with decommissioning the Coogee pipeline on the basis that there was uncertainty over the future of the plant, and given this uncertainty the inclusion of the expenditure in the access arrangement was premature.

APA VTS expects it will need to decommission this pipeline in the forecast access arrangement period for the reasons outlined in the access arrangement proposal but has no new information to persuade the AER. APA VTS has not included the Coogee decommissioning in the capital expenditure forecast.

4.4 Other forecast capital expenditure

APA VTS notes that the AER has made a draft decision that the remainder of APA VTS's capital expenditure incurred in the 2013-17 access arrangement period, and forecast for the 2018-22 access arrangement period, is conforming capital expenditure.

[27] National Gas Law section 24

4.4.1 *Revised timing for the SWP to Anglesea Pipeline*

As described above in section 4.2.3, a material change in timing for the SWP to Anglesea Pipeline has emerged, leading to a change in the estimate for expenditure in 2017, and commensurate increase in expenditure for the forecast period.

The revisions to the SWP to Anglesea pipeline project relate only to timing, leading to a 12 month deferral of expenditure, which is still expenditure to be undertaken with the same profile. The revised timing is set out in Table 4-9 below.

Table 4-9 – Revised SWP to Anglesea project expenditure timing (real 2017 $m)

$m real 2017	2018	2019	2020	2021	2022	Total
Capex	14.1	12.7	0	0	0	**26.8**

4.4.2 *Summary of forecast capital expenditure in the 2018-22 access arrangement period*

The following table sets out APA VTS's revised forecast capital expenditure over the 2018-22 access arrangement period, reflecting the discussion above.

Table 4-10 – Forecast Capital Expenditure for the VTS (real 2017 $m)

$m real 2017	2018	2019	2020	2021	2022	Total
Augmentation	49.4	59.0	58.9	-	-	**167.4**
Refurbishment and Upgrade	12.0	11.2	9.5	12.9	14.2	**60.0**
Non-System	4.3	3.6	3.3	3.6	2.3	**16.9**
Total	**65.7**	**73.8**	**71.8**	**16.5**	**16.5**	**244.3**

5 Capital base

5.1 Treatment of inflation in the access arrangement

The draft decision advises Reserve Bank of Australia (RBA) forecasts of inflation and the target band approach are likely to result in the best forecast of inflation possible in the circumstances. The methods used to calculate the impact of inflation, forecast in this way, on regulated revenues and asset values are, then, the AER contends, the methods in the roll forward model (RFM) and the post-tax revenue model (PTRM). The use of these methods for calculating the impact of inflation on regulated revenues and asset values will, in the view of the AER, achieve the national gas objective. [28]

The AER does not, therefore, accept APA VTS's proposal for the treatment of inflation in the RFM and the PTRM.

APA VTS is of the view that the methods which the AER uses to calculate the impact of inflation on regulated revenues and asset values, the methods in the RFM and the PTRM, together with the actual inflation adjustment of the reference tariff variation mechanism of the VTS Access Arrangement, deliver appropriate compensation for inflation when forecast and actual inflation are the same.

However, making accurate forecasts of inflation over an extended period (the five years of an access arrangement period) is difficult. Any forecast – including a forecast made using the available RBA forecasts and the target band approach – is very likely to be different from actual inflation. In these circumstances, the treatment of inflation within the RFM, PTRM and the tariff variation mechanism should be such that the effects of differences between forecast and actual inflation are minimised by correction of those differences wherever possible.

When forecast and actual inflation are different, the RFM and the PTRM, together with the inflation adjustment of the reference tariff variation mechanism, do not deliver appropriate compensation for inflation. Reference tariffs are either too low or too high and, in consequence, do not provide effective incentives for the promotion of efficiency, including

[28] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 3 – Rate of return*, pp 3-154

efficient investment, efficient provision of pipeline services, and efficient pipeline use. They do not provide incentives for efficient investment in, and the efficient operation and use of, natural gas services for the long term interests of consumers of natural gas.

The proposal in APA VTS's revisions to the VTS access arrangement is for a series of corrections, some of which would be made only once, and others which would be applied going forward, to provide the approximately correct compensation for inflation.[29] The result is a reference tariff which is an approximately correct outcome for both the service provider and users of the pipeline system. APA VTS is of the view conditions for the ideal outcome, achieved when forecast and actual inflation are the same, are never likely to be realised. APA VTS's proposal provides a better outcome than is currently achieved with the methods of the RFM, the PTRM and the reference tariff variation mechanism.

The AER disagrees. The AER is of the view that the proposal which APA VTS has put forward in its revisions to the access arrangement:

- overlooks the effect of inflation on other building blocks within the PTRM;
- overlooks the effects of annual pricing adjustments within the access arrangement period which effectively remove the forecast inflation used in the PTRM and apply actual inflation each year;
- does not consider the alignment between inflation in the return on capital building block and inflation deducted from the return of capital building block, an alignment which is crucial because the inflation adjustment included in the regulatory depreciation is directly linked to the method used to calculate the return on capital building block;
- does not give consideration to the change it calls for, which would see the service provider receive a fixed nominal rate of return (for the 2013-17 access arrangement period), and an annually updated real rate of return for the 2018-2022 access arrangement period; and

[29] The nature of the inflation adjustments, their timing, and the timing of the release of inflation statistics, preclude exact compensation for inflation.

- does not align APA's lagged actual inflation update in the PTRM with actual inflation used in the tariff variation mechanism, or with inflation in the RFM.[30]

APA VTS's concerns arise from the discrepancy which arises when actual inflation is used in applying the RFM, at the end of an access arrangement period, to roll forward the capital base after having previously established an allowance for return of capital using a forecast of inflation in the PTRM at the commencement of that period. Other things being equal, if the actual inflation used in the RFM is different from the forecast of inflation which was previously used in the PTRM, then the return of capital via reference tariffs will not be the same as the return of capital assumed when rolling forward the capital base. There will be either an over-recovery or under-recovery of the capital base. Neither over-recovery, nor under-recovery, is conducive to efficient investment in the pipeline system, or to the efficient operation and use of the system; neither is it in the long term interests of consumers of natural gas.

This is easily demonstrated, and APA VTS showed the effect of the difference in its access arrangement revisions proposal.

The AER contends that APA VTS overlooked the effects of annual pricing adjustments within the access arrangement period, which effectively removes the forecast inflation used in the PTRM and applies actual inflation each year.

Certainly, APA VTS did not deal with the implications of the reference tariff variation mechanism in the proposed treatment of inflation in the VTS Access Arrangement revisions. APA VTS has, nevertheless, examined the question of whether over-recovery or under-recovery of the service provider's investment is corrected through the operation of the tariff variation mechanism. It is not.

If actual inflation is lower than forecast inflation, then the return of capital would be accelerated and depreciation in the RFM would be higher than depreciation in the PTRM when it was applied in determining reference tariffs for the same regulatory period. The return of capital through the allowed

[30] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 2 – Capital Base*, pp 2-22 – 2-23

revenue of the PTRM would be too low. This would not be corrected through the operation of the reference tariff variation mechanism of the VTS Access Arrangement. That mechanism operates to lower the revenue earned by the service provider when inflation is lower. When actual inflation is lower than forecast inflation, and the return of capital should increase, the tariff adjustment of the reference tariff variation mechanism works in the opposite direction to lower revenue and to lower the recovery of capital.

Conversely, if actual inflation were higher than forecast inflation, the return of capital would be deferred, and depreciation in the RFM would be lower than depreciation in the PTRM: the return of capital through the allowed revenue of the PTRM would be too high. Again, this would not be corrected through the operation of the VTS reference tariff variation mechanism. That mechanism would operate to increase the revenue earned by the service provider, and increase the recovery of capital.

There is no reason to not use actual inflation in the RFM. But if actual inflation is used in that model, then an adjustment is required, either to the PTRM or to the reference tariff variation mechanism, or to both, to ensure that the recovery of capital effected through tariffs subsequently matches the recovery of capital assumed in capital base roll forward. APA VTS has proposed making this adjustment in the PTRM by using the updating mechanism now included for the rate of return on debt to also update for changes in inflation. If the PTRM uses inflation updated in the way APA VTS proposes, there will be an approximate match between the capital recovery effected through reference tariffs and the capital recovery assumed in the RFM. The RFM will produce the correct opening capital base going forward.

This "once-off" initial correction of error arising from differences between forecast and actual inflation, and subsequent ongoing correction of those differences between actual and forecast inflation will not introduce any systematic bias towards overcompensation of the service provider as the AER suggests. Correction of error, in the way APA VTS proposes, is not the ex post selection to which the AER refers in section 2.5.2.1 of Attachment 2 to the draft decision.

The draft decision advises that APA VTS's proposal for inflation and depreciation does not consider the alignment between inflation in the return on capital building block and inflation deducted from the return of capital building block, an alignment which, the AER says, is crucial because the

inflation adjustment included in the regulatory depreciation is directly linked to the method used to calculate the return on capital building block. APA VTS is, in effect, overlooking the effect of inflation on other building blocks within the PTRM.

There is, APA VTS acknowledges, an alignment between inflation in the return on capital building block and in the return of capital building block. That alignment is achieved through the use of a single forecast of inflation at the time total revenue and reference tariffs are determined for an access arrangement period. Once that initial determination has been made, the "alignment" is broken through the application of the reference tariff variation mechanism which effectively replaces the single forecast of inflation used at the time of total revenue and reference tariff determination with actual inflation year by year. To the extent that there is alignment, it is not as crucial as the draft decision indicates. The inflation in the return on capital building block does not need to be the same as the inflation in the return of capital building block. The post-tax revenue model anticipates delivery of a nominal rate of return on an original cost asset base and, ultimately, a return of that asset base. This outcome is unaffected by an inflation assumption made for the depreciation calculations of the post-tax revenue model which is different from the inflation assumed to be embedded in the model's nominal rate of return. It is easily demonstrated using an extended PTRM. It is a particular instance of the well-known "depreciation invariance" result: if the regulated business is allowed to earn its nominal cost of capital on a depreciated original cost asset base, and actual earnings are equal to allowed earnings, then NPV is zero for any method of calculating depreciation.[31] APA VTS does not, in effect, overlook the effect of inflation in other building blocks within the PTRM.

APA VTS's proposal, the draft decision notes, does not give consideration to the service provider receiving a fixed nominal rate of return for the 2013-2017 access arrangement period, and an annually updated real rate of return for the 2018-2022 access arrangement period. This seems, to APA VTS, not to be correct. In the period 2013-2017, the service provider is ultimately returned, via the scheme of the PTRM and the reference tariff variation mechanism, an

[31] See, for example, Richard Schmalensee (1989), "An Expository Note on Depreciation and Profitability under Rate-of-Return Regulation", Journal of Regulatory Economics, 1: pages 293-298.

annually updated rate of return on equity. APA VTS's proposal for 2018 onwards does not significantly change this. A part of the inflation adjustment is made through the PTRM, via the annual updating process. To the extent that the inflation in the PTRM does not match actual inflation, a further adjustment is made via the reference tariff variation mechanism. Whether the rate of return on equity is an updated real rate of return is open to question: the rate of return of rule 87 is to be a nominal rate.

In its January 2017 proposal, APA VTS proposed to:

- apply the forecast of inflation used in reference tariff determination for the earlier access arrangement period (2013-2017), and not actual inflation, in the roll forward model to establish the correct value of the VTS capital base at the start of the next access arrangement period (2018-2022);
- use, in the PTRM, for calculation of the total revenue for the period 2018-2022, a forecast of inflation which is equal to actual inflation immediately prior to the start of the period;
- annually update this forecast of inflation during the access arrangement period, using actual inflation, and progressively incorporate the effects of the changes in depreciation in the reference tariffs through changes to the Scheduled Reference Tariff Variation Mechanism of the VTS access arrangement;
- specifically, update the year-on-year forecast of inflation using the change in the June quarter Consumer Price Index (CPI):
    - for the regulatory year 2018, the estimate of expected inflation would be the change in the CPI from June 2016 to June 2017;
    - for the regulatory year 2019, the estimate of expected inflation would be the change in the CPI from June 2017 to June 2018;
    - for the regulatory year 2020, the estimate of expected inflation would be the change in the CPI from June 2018 to June 2019; and
    - and so on; and
- apply actual inflation in the roll forward model when establishing the VTS capital base at the start of subsequent access arrangement periods.

APA VTS has applied the elements of this approach in responding to the Draft Decision.

As APA VTS is of the view that the AER's roll forward of the VTS capital base using actual inflation in the roll forward model leads to reference tariffs which are either too low, or too high, those tariffs, in consequence, do not provide effective incentives for the promotion of efficiency, including efficient investment, efficient provision of pipeline services, and efficient pipeline use. They do not provide incentives for efficient investment in, and the efficient operation and use of, natural gas services for the long terms interests of consumers of natural gas. In responding to the draft decision APA VTS has substituted, for the AER's current approach, its earlier proposal which corrects the deficiencies in that current approach.

5.2 Capital base roll forward for the earlier access arrangement period

Revision 2.1

Make all necessary amendments to reflect this draft decision on the roll forward of the capital base over the 2013–17 access arrangement period, as set out in Table 2.1.

Table 2.1 AER draft decision on APA's capital base roll forward for the 2013–17 access arrangement period ($million, nominal)

	2013	2014	2015	2016	2017
Opening capital base	634.0	649.8	762.5	842.7	931.7
Net capex	15.9	127.9	97.4	108.1	65.0
Indexation of capital base	12.3	11.2	12.9	12.4	18.6
Less: straight-line depreciation	12.4	26.4	30.2	31.6	29.8
Closing capital base	649.8	762.5	842.7	931.7	985.5
Opening capital base as at 1 January 2018					**985.5[a]**

Source: AER analysis.

(a) The adjustment to account for any difference between actual and estimated capex in the final 'year' of the previous access arrangement period (in this case, 1 January 2012 to 31 December 2012 and the additional six months from 1 January 2013 to 30 June 2013) is not required for APA because actual capex was included in APA's 2013 approved opening capital base. This occurred as part of the amendments to the 2013–17 access arrangement that followed a decision by the Australian Competition Tribunal.

5.2.1 *Opening capital base for the current access arrangement period*

The opening capital base for the current access arrangement period was determined based on actual expenditure to 30 June 2013 so no adjustment was required to account for estimates in the previous period.

5.2.2 *Conforming capital expenditure during the current access arrangement period*

The opening capital base is rolled forward for conforming capital expenditure during the current access arrangement period.

The AER adjusted the conforming capital expenditure value included in the roll forward model to reflect its draft decision in respect of ILI expenditure, impacting expenditure in 2017 (the final year of the earlier access arrangement period).

APA VTS's detailed response to this adjustment is set out in sections 4.1 and 4.2 of this submission. APA VTS has not accepted the AER's draft decision in respect of this project, and has revised its estimate of expenditure for 2017. APA VTS does not consider that the AER's decision is consistent with efficient and prudent expenditure on the pipeline as required under Rule 79, and therefore does not deliver a materially better outcome than APA VTS's proposed expenditure.

APA VTS's capital expenditure for the current access arrangement period is set out in Table 4-3 above and is reflected in the capital base roll forward for the current access arrangement period.

5.2.3 *Capital base roll forward 2013-2017*

The opening capital base for the access arrangement period is shown in Table 5-1 below.

Table 5-1 – Capital base roll forward 2013-2017 ($m nominal)

$m nominal	2013	2014	2015	2016	2017
Opening capital base	635.9	646.9	763.8	849.6	944.7
Plus conforming capex	15.9	127.3	97.6	108.6	60.4
Plus speculative capex	-	-	-	-	-
Plus reused redundant assets	-	-	-	-	-
Less depreciation	-12.8	-26.5	-30.5	-33.6	-30.1
Plus indexation	7.9	16.2	18.9	20.1	22.7
Less redundant assets	-	-	-	-	-
Less disposals	-0.0	-0.2	-0.0	-0.0	-0.1
Closing capital base	646.9	763.8	849.6	944.7	997.6

5.3 Projected capital base for the access arrangement period

Revision 2.2

Make all necessary amendments to reflect this draft decision on the roll forward of the capital base over the 2018–22 access arrangement period, as set out in Table 2.2.

Table 2.2 AER's draft decision on APA's projected capital base roll forward for the 2018–22 access arrangement period ($million, nominal)

	2018	2019	2020	2021	2022
Opening capital base	985.5	1037.6	1084.1	1147.3	1143.2
Net capex	63.6	60.7	79.0	15.4	12.5
Indexation of capital base	24.1	25.4	26.6	28.1	28.0
Less: straight-line depreciation	35.7	39.6	42.4	47.6	45.0
Closing capital base	**1037.6**	**1084.1**	**1147.3**	**1143.2**	**1138.7**

Source: AER analysis.

5.3.1 *Opening capital base in 2018*

The opening capital base as at 1 January 2018 reflects the closing capital base as at 31 December 2017 discussed above.

5.3.2 *Forecast capital expenditure*

Forecast capital expenditure is addressed in section 4.3. In summary, forecast capital expenditure is shown in Table 5-2 below.

Table 5-2 – Forecast capital expenditure ($m 2017)

$m real 2017	2018	2019	2020	2021	2022	Total
Capital expenditure	65.7	73.8	71.8	16.5	16.5	**244.3**

5.3.3 *Depreciation over the access arrangement period*

Revision 5.1

Make all necessary amendments to reflect this draft decision on the regulatory depreciation allowance for the 2018–22 access arrangement period, as set out in table 5.1.

Table 5.1 AER's draft decision on APA's regulatory depreciation allowance for the 2018–22 access arrangement period ($million, nominal)

	2018	2019	2020	2021	2022	Total
Straight-line depreciation	35.7	39.6	42.4	47.6	45.0	210.3
Less: indexation on capital base	24.1	25.4	26.6	28.1	28.0	132.2
Regulatory depreciation	**11.6**	**14.2**	**15.8**	**19.5**	**17.0**	**78.1**

Source: AER analysis.

As alluded above, acceptance of this amendment is contingent on the acceptance of the inputs to the forecast depreciation calculation, including the opening capital base, asset classification, historical and forecast capital expenditure, and remaining lives.

The revised proposal forecast depreciation schedule, reflecting the outworkings of the discussions on these matters above, is presented in Table 5-3.

Table 5-3 – AER forecast depreciation over the earlier access arrangement period ($m nominal)

$m nominal	2013	2014	2015	2016	2017
Pipelines	2.10	4.58	4.23	4.03	2.06
Compressors	1.00	2.00	2.99	3.16	3.33
City gates and field regulators	0.39	0.83	1.19	1.25	1.41
Odourant plants	0.00	0.01	0.01	0.01	0.01
Gas Quality	0.00	0.03	0.06	0.07	0.08
Other	1.42	2.98	3.20	5.04	0.52
General Building	0.01	0.04	0.12	0.09	0.18
General Land	-0.08	-0.16	-0.16	-0.17	-0.17
Total	**4.85**	**10.30**	**11.63**	**13.48**	**7.40**

5.3.4 *Remaining asset lives*

Revision 5.2

Make all necessary amendments to reflect this draft decision on the remaining asset lives as at 1 January 2018, as set out in Table 5.3.

Table 5.3 AER's draft decision on APA's standard and remaining asset lives as at 1 January 2018 (years)

	Standard asset life	Remaining asset life
Pipelines	55.0	37.1
Compressors	30.0	21.9
City gates and field regulators	30.0	21.9
Odorant plants	30.0	18.0
Gas quality	10.0	8.4
Other	5.0	4.1
General buildings	60.0	34.4
General land	n/a	n/a

Source: AER analysis.
n/a Not applicable.

The calculation of the remaining asset lives is a function of all the matters relating to the capital base that are discussed in this submission.

While APA VTS accepts that a revision to asset lives will be required, it has included asset lives that reflect the matters discussed above. These are shown in Table 5-4.

Table 5-4 – Remaining asset lives for depreciation purposes

Asset class	Standard life (years)	Remaining life (years)
Pipelines	55.0	37.6
Compressors	30.0	21.9
City Gates & Field Regulators	30.0	22.5
Odourant Plants	30.0	18.0
Gas Quality	10.0	9.0
Other	5.0	4.2

General Buildings	60.0	34.1
General Land	n/a	n/a

Treatment of depreciation in the 2023-27 access arrangement period

Revision 2.3

Update the access arrangement (section 3.8) to set out the depreciation schedule used for rolling forward the capital base at the commencement of the 2023–27 access arrangement period as follows:

The depreciation schedule (straight-line) for establishing the opening capital base at 1 January 2023 will be based on forecast capital expenditure at the asset class level.

The AER's draft decision requires a change to the access arrangement to state that the depreciation schedule (straight-line) for establishing the opening capital base at 1 January 2023 will be based on forecast capital expenditure at the asset class level.

APA VTS is concerned that this approach to depreciation will require a rigid adherence to asset classification, which may not be appropriate once an additional five years' experience has elapsed. Such a rigid requirement may fall afoul of Rule 89(1)(c):

> 89 Depreciation criteria
>
> (1) The depreciation schedule should be designed:
>
> (c) so as to allow, as far as reasonably practicable, for adjustment reflecting changes in the expected economic life of a particular asset, or a particular group of assets;

APA VTS considers that the AER's required revision in this area will preclude any "adjustment reflecting changes in the expected economic life of a particular asset, or a particular group of assets" at the next access arrangement revision review.

APA VTS submits that its approach to rolling forward the capital base by the total of the previously forecast depreciation, rather than being specifically confined to a rigid roll forward by forecast depreciation by asset class, is more in keeping with the Rules in this area.

APA VTS does not agree that this required revision is either necessary or sensible (or compliant with the Rules), and has not implemented it is its revised access arrangement.

5.3.5 *Forecast inflation*

APA VTS has consistently stated that it does not take issue with the AER's approach to forecasting for the rate of inflation. APA VTS has therefore reflected the AER's forecast level of inflation in the PTRM for the purposes of forecasting the indexation of the capital base over the upcoming access arrangement period.

However, like any forecast, the AER's forecast of inflation is destined to be proven incorrect.

As discussed in section 5.1 above, APA VTS maintains the position, put forward in the December 2016 proposal, that the impact of the inevitable differences between forecast and outturn inflation must be sterilised, to the extent possible, from the calculation of allowed revenues and the future indexation of the capital base. Failure to do so subjects the service provider to uncontrollable inflation risk, which is not compensated through the allowed rate of return.

5.3.6 *Projected capital base over the forecast access arrangement period*

The projected capital base for the access arrangement period is shown in Table 5-5 below.

Table 5-5 – Capital base roll forward 2018-2022 ($m nominal)

$m nominal	2018	2019	2020	2021	2022
Opening capital base	997.6	1,054.1	1,118.3	1,180.5	1,178.5
Plus conforming capex	69.0	79.4	79.1	18.6	19.1
Plus speculative capex	-	-	-	-	-
Plus reused redundant assets	-	-	-	-	-
Less depreciation	-37.0	-41.1	-44.3	-49.5	-47.3
Plus indexation	24.4	25.8	27.4	28.9	28.9

Less redundant assets	-	-	-	-	-
Less disposals	-	-	-	-	-
Closing capital base	**1,054.1**	**1,118.3**	**1,180.5**	**1,178.5**	**1,179.2**

5.4 Tax Asset Base

Revision 8.1 is discussed in section 8.3 of this submission

Revision 8.2

Make all necessary amendments to reflect this draft decision on the opening tax asset base as at 1 January 2018, as set out in Table 8.4.

Table 8.4 AER's draft decision on APA's tax asset base roll forward for the 2013–17 access arrangement period ($million, nominal)

	2013	2014	2015	2016	2017
Opening tax asset base	228.9	221.3	242.5	403.2	389.4
Capex	1.3	39.2	180.9	15.9	154.1
Tax depreciation	8.9	18.0	20.2	29.8	30.8
Closing tax asset base	**221.3**	**242.5**	**403.2**	**389.4**	**512.7**

Source: AER analysis.

APA VTS has rolled forward the TAB in the earlier access arrangement period using the same principles as the normal asset base roll forward. That is, APA VTS has applied the AER's Asset Base Roll Forward Model adopting the opening TAB in the earlier access arrangement period, and rolled it forward using actual capital expenditure using the AER's PTRM methodology. As the TAB is not indexed, it was not necessary to update the roll forward for outturn CPI increases.

As with the matters discussed above, the calculation of the Tax Asset Base will be a function of other amendments. APA VTS has calculated the Tax Asset Base to reflect those amendments. The TAB roll forward to 30 June 2017 is shown in Table 5-6, and the forecast TAB is shown in Table 5-7.

Table 5-6 – Tax Asset Base roll forward 2013-2017 ($m nominal)

$m nominal	2013	2014	2015	2026	2017	2017 (add capex)
Opening TAB	229.0	226.6	323.3	326.3	315.6	301.6
net additions	6.5	114.7	24.6	12.3	9.6	231.1
tax depreciation	-8.8	-18.1	-21.6	-23.0	-23.7	-
Closing TAB	**226.6**	**323.3**	**326.3**	**315.6**	**301.6**	**532.7**

Table 5-7 – Forecast Tax Asset Base ($m nominal)

$m nominal	2018	2019	2020	2021	2022
Opening TAB	532.7	528.6	537.2	651.9	618.7
net additions	31.2	46.3	155.3	15.4	14.1
tax depreciation	-35.2	-37.7	-40.6	-48.6	-50.0
Closing TAB	**528.6**	**537.2**	**651.9**	**618.7**	**582.8**

The tax depreciation of the forecast TAB calculation is then applied to determine the corporate income tax allowance derived for the revenue model as indicated in section 8.3.

5.4.1 Tax asset lives

Revision 8.3

Make all necessary amendments to reflect this draft decision on the remaining tax asset lives for the 2018–22 access arrangement period as set out in Table 8.5.

Table 8.5 AER's draft decision on APA's standard tax asset lives and remaining tax asset lives as at 1 January 2018 for the 2018–22 access arrangement period (year)

Tax asset class	Standard tax asset life	Remaining tax asset life as at 1 January 2018
Pipelines	20.0	17.1
Compressors	20.0	14.1
City gates and field regulators	20.0	13.7
Odorant plants	20.0	13.5
Gas quality	20.0	18.4
Other	7.5	5.9
General buildings	60.0	46.8
General land	n/a	n/a

Source: AER analysis.
n/a Not applicable.

As with the matters discussed above, the calculation of the tax asset lives will be a function of other amendments. APA VTS has calculated the remaining tax asset lives to reflect those amendments:

Table 5-8: Revised proposal Tax Asset Lives

Reference	Remaining tax asset life years)
Pipelines	17.3
Compressors	14.0
City Gates & Field Regulators	14.9
Odourant Plants	13.5
Gas Quality	18.9
Other	6.2
General Building	47.5
General Land	n/a

6 Rate of Return and value of imputation credits

Revision 3.1

Make all the necessary amendments to the access arrangement proposal to give effect to this draft decision.

APA VTS has updated a number of the inputs to its proposal for the allowed rate of return to be used in determining the total revenue and reference tariff of the VTS. APA VTS has not changed the way in which the rate of return on equity and rate of return on debt components of the allowed rate of return are to be estimated.

APA VTS's updated rate of return estimates are set out in *Table 6-1*.

Table 6-1 – Allowed rate of return

	Proposed	Draft Decision	Response to Draft Decision
Risk free rate (nominal)	2.24%	2.60%	2.68%
Equity beta	0.80	0.70	0.80
Market risk premium	7.76%	6.50%	7.70%
Rate of return on equity	8.4%	7.2%	8.8%
Rate of return on debt	7.47%	4.79%	6.91%
Gearing	60.0%	60.0%	60.0%
Allowed rate of return	**7.8%**	**5.75%**	**7.7%**

In section 6.1 below, APA VTS explains why its estimate of the rate of return on equity contributes to the allowed rate of return objective of rule 87(3). In section 6.2, APA VTS explains why the on-the-day method does not lead to an estimate of the return on debt of the benchmark efficient entity of rule 87(3), and explains why the allowed rate of return must be determines using a trailing average method without transition.

APA VTS has used an estimate of gamma (the value of imputation credits) of 0.4 in responding to the Draft Decision. APA VTS's reasons for adopting this

value (and not retaining its initially proposed estimate of 0.25) are discussed in section 6.3.

6.1 Return on equity

The AER rejected the rate of return on equity proposed by APA VTS (8.4%), and required a rate of 7.2%.

APA VTS had used the Sharpe-Lintner Capital Asset Pricing Model (SL CAPM) to estimate the rate of return on equity. This was in accordance with the AER's Rate of Return Guideline.[32] APA VTS also estimated the risk free rate of return for use in the SL CAPM using the method set out in the Rate of Return Guideline. Neither use of the SL CAPM, nor estimation of the risk free rate, is an issue which APA VTS considers further in this response to the Draft Decision.

APA VTS has, however, updated its estimate of the risk free rate since the submission of its access arrangement revisions proposal. APA VTS's updated estimate of the risk free rate is noted below. APA VTS expects that the AER will also update the estimate of the risk free rate as the regulator proceeds to a final decision on the revisions proposal.

The AER did not accept APA VTS's proposed estimate of 0.8 for the equity beta of the SL CAPM, and required a beta estimate of 0.7. The AER was of the view that APA VTS did not provide satisfactory evidence in support of a material change in the estimate of the equity beta which had been proposed in the Rate of Return Guideline. In its access arrangement revisions proposal, APA VTS supported the proposed estimate of beta with information from a number of (then) recent studies, and advised that it would make new estimates of beta and submit the results when responding to the AER's draft decision. APA VTS's reasons for retaining an estimate of 0.8 are discussed in section 6.1.2.

APA VTS's proposed estimate of the market risk premium, the Draft Decision advised, derived from a historical/alternative specification of the SL CAPM, and such specifications had been consistently rejected because they made unrealistic assumptions and were not theoretically justified.[33] The AER did not,

[32] AER, *Rate of Return Guideline*, December 2013.

[33] Draft Decision, Attachment 3 – Rate of return, page 3-54.

therefore, accept APA VTS's proposal for a market risk premium of 7.76%, and required an estimate of 6.50%.

Contrary to the AER's assertion, APA VTS did not submit that the Wright specification of the SL CAPM was relevant material that could inform return on equity estimation through estimation of the market risk premium.[34] APA VTS explained, at length, in the submission accompanying its access arrangement revisions proposal, why its application of the SL CAPM was not use of the Wright specification, in so far as the AER had set out a view on what constituted that specification.

APA VTS also explained why its approach was the conceptually and theoretically correct approach to applying the SL CAPM. In the absence of sound argument that its approach was unorthodox, APA VTS has continued to apply the SL CAPM in a way consistent with the theoretical construction of the model. In particular, APTPPL/APA VTS has continued to estimate the market risk premium of the SL CAPM as the difference between the expected return on the market at the time the model is applied, and the estimate of the risk free rate at that time. This is further discussed in section 6.1.3 below.

6.1.1 Risk free rate of return

For this response to the AER's Draft Decision, APA VTS has estimated the risk free rate as the average of yields on Australian Government securities with terms to maturity of 10 years over the period of 20 consecutive business days ending 31 July 2017.

APA VTS's estimate of the risk free rate of return is 2.68 per cent.

6.1.2 Equity beta

In the Draft Decision, the AER advised that it had reviewed service provider material on equity beta estimates including the report which APA VTS had submitted with the access arrangement revisions proposal for the VTS. The AER acknowledged that the material showed small changes in the empirical estimates, but concluded that these were not sufficient to justify a departure from the range and point estimate of the Rate of Return Guideline. Moreover, the AER had made its own beta estimates, using data to 28 April

[34] Draft Decision, Attachment 3 – Rate of return, page 3-51.

2017, and using the methods which had been established earlier by Professor Henry. The results were, the AER advised, consistent with Professor Henry's results and supported its preferred range and point estimate for beta.[35]

The Draft Decision noted that Professors Partington and Satchell, the AER's rate of return experts, had reviewed the service provider material on equity beta estimation and had concluded that it made a weak case that beta had increased in recent times; there was little evidence of change.[36]

A key issue was the period of the data used in beta estimation. The Draft Decision advised that short-term data were more prone to one-off events, fluctuations and volatilities in the market, which could obscure the true value of beta, and that the AER had the most regard to longer term estimates and a large sample of firms.[37]

On page 3-74 of the Draft Decision, the AER advised that increases in the estimate of beta observed by CEG (in work for Multinet Gas) and by Frontier Economics (in its work for APA VTS) were driven by the use of shorter data series. APA VTS notes that the submission which formed part of its access arrangement revision proposal referred to the work by CEG (which was also undertaken for DBP, the DUET entity which owned the Dampier to Bunbury Natural Gas Pipeline) only for the purpose of pointing to the possibility of an increase in beta, and advising that that possibility warranted further investigation. APA VTS did not put forward the CEG estimates as clear evidence of an increase in beta, and did not rely on those estimates other than to support a decision to commission, from Frontier Economics, the report on beta estimation which was promised in the RBP submission, and which was subsequently provided as part of the VTS submission.

Frontier Economics prepared estimates of beta using short (5 years) data series, but was cautious in making any inferences from those estimates. Frontier Economics advised:

[35] Draft Decision, Attachment 3 – Rate of return, page 3-59.

[36] Draft Decision, Attachment 3 – Rate of return, page 3-54.

[37] Draft Decision, Attachment 3 – Rate of return, page 3-54.

Our view is that a five-year period is generally insufficient to provide sufficient statistical precision, so we also consider estimates from longer (ten-year) periods.[38]

The results reported by Frontier Economics were not, as the AER maintained, driven by the use of shorter term estimates.

Eight reasons for the AER not accepting APT VTS's proposed estimate of the equity beta were set out in the Draft Decision.[39]

Three of these reasons for not accepting an estimate of 0.8 are irrelevant to the justification provided by APA VTS in the submission which formed part of its access arrangement revision proposal:

- since APA VTS did not rely on the ERA's estimates (other than as support for a decision to commission work from Frontier Economics), the fact that the ERA made estimates using data for periods of 5 years is irrelevant to APA VTS's specific estimate for beta of 0.8
- CEG's results were, similarly, a reason for commissioning work from Frontier Economics, and are irrelevant to APA VTS's specific estimate for beta of 0.8
- evidence of a structural break, whether that proposed by CEG, or evidence to the contrary as indicated by the AER's own analysis using data to 28 April 2017, is irrelevant; Frontier Economics did not propose, or carry out statistical tests intended to show, a structural break in a series of estimated betas.

A fourth reason for the AER rejecting an estimate of beta of 0.8 pertains to its own earlier estimate of 0.8. The AER advised that the increase in the number of data points available since the earlier estimate was made gives greater confidence to the range 0.4 to 0.7, and to a beta estimate of 0.7. APA VTS agrees that an increase in the number of data points will increase the precision of a statistical estimate of beta. However, that increase in precision has little direct bearing on the interval 0.4 to 0.7, and no relevance to the AER's decision that the estimate should be 0.8, given a prior decision on the

[38] Frontier Economics, *An equity beta estimate for Australian energy network businesses*, December 2016, page 13.

[39] Draft Decision, Attachment 3 – Rate of return, pages 3-78 to 3-80.

interval. The estimation of beta for a particular project or business without traded shares is imprecise beyond any imprecision associated with a specific statistical estimate. If the AER concluded, in 2013, that, in view of that imprecision, the relative riskiness – the beta – for the VTS was 0.8, then, in the absence of evidence that betas have fallen, there is no reason for now adopting a value of 0.7. An estimate of 0.8 remains the best estimate in the circumstances.

APA VTS has noted above that a fifth reason given by the AER for not accepting an estimate of 0.8 for beta – Frontier Economics' reliance on estimates made using data for 5 years – is not correct. Frontier Economics cautioned against using estimates made with 5 years of data.

A sixth reason given by the AER for rejecting the proposed beta estimate of 0.8 was that the average of Frontier Economics' re-levered firm level beta estimates, 0.48, was lower than the average of Professor Henry's estimates, 0.52, in 2014. The Frontier Economics estimates were made using data for a smaller number of companies than was the case for the Henry estimates. The Henry estimates included estimates for four companies (Alinta, Envestra, GasNet and Hastings Diversified Utilities Fund) for which share price data are no longer available because those companies have been restructured through ownership change and are no longer listed.[40] They also include an estimate for AGL, which is predominantly an energy retail business. The difference to which the AER draws attention throws doubt on the relevance of Professor Henry's estimates. The inclusion of companies, the shares in which have not been traded for a number of years, does not have regard to prevailing conditions in the market for equity funds, and the inclusion of an energy retailer in the sample is not prima facie relevant to a beta estimate for a benchmark efficient entity for gas pipeline service provider.

Given the decline in the number of listed energy network business which provided the date for beta estimation, Frontier Economics proposed looking at the betas for a number of transport infrastructure businesses. These businesses, like the energy networks:

- use very long-lived, tangible infrastructure assets
- are capital intensive

[40] A fifth company, DUET Group, was delisted on 16 May 2017.

- supply an access service to customers, that provides relatively stable cash flows.

The betas for these businesses, estimated using weekly data over a period of 10 years, are higher than those of the energy networks, and are significantly higher than the AER's current starting-point "best statistical" beta estimate for the energy businesses. They provide further evidence that a beta in the range 0.4 to 0.7 is likely to be too low.

The Draft Decision advises that the use of these betas is inappropriate.[41] Their risk characteristics are likely to be different from those of APA VTS. In support of this view, attention is drawn to inclusion of Auckland International Airport among the businesses for which Frontier Economics has estimated betas. The AER comments that the risk characteristics of the airport would be very different to those of the benchmark efficient entity, for example due to demand risk. This is not immediately obvious (but is not examined further in the Draft Decision). Even if it were, removal of Auckland International Airport from the sample of transport infrastructure businesses would remove the company with the lowest beta estimate. The estimates made by Frontier Economics would continue to provide evidence that a beta in the range 0.4 to 0.7 was likely to be too low for the benchmark efficient entity relevant to rate of return estimation for determination of VTS reference tariffs.

The eighth and final reason for the AER not accepting APT VTS's beta estimate of 0.8 was advice from the regulator's rate of return experts, Professors Partington and Satchell. Professors Partington and Satchell advised the AER that estimates for unregulated transport infrastructure should be given negligible weight, but provided no substantial reasoning in support of their advice.[42]

Professors Partington and Satchell also advised the AER:

- there is no statistical test for a significant change in beta

[41] Draft Decision, Attachment 3 – Rate of return, page 3-79.

[42] See Graham Partington and Stephen Satchell, *Report to the AER: Discussion of Submissions on the Cost of Equity*, 8 June 2017, page 44.

- Frontier Economics has acknowledged concerns with the reliability of five year estimates yet continues to use them; this makes its conclusions less compelling
- a comparison of Frontier Economics' five and 10 years estimates shows many overlaps; it is not clear that the 5 years estimates represent a recent increase in beta relative to the more reliable estimates (in Frontier's judgement) for 10 years
- Frontier Economics' 10 years relevered estimates for equally weighted portfolios are very close to the AER's base estimate
- the AER's value of 0.7 is well within the confidence interval from Frontier Economics' rolling average of value weighted portfolio estimates

Frontier Economics has updated its December 2016 report for APA VTS.[43] The more recent estimates continue to point to an increase in beta. APA VTS acknowledges that they "point to an increase in beta"; Frontier Economics has not yet been asked to provide a statistical test of the change in the statistical estimates. As APA VTS noted in the submission accompanying its proposed revisions to the VTS Access Arrangement, there is evidence from Australian and other data that beta is not a constant, but varies over time for reasons which are not yet fully understood. The Frontier Economics estimates continue to point to that variation, and to an increase in beta at the present time. The Frontier Economics estimates are made having regard to prevailing conditions in the market for equity funds. This can no longer be said for the AER's base estimates to which Professors Partington and Satchell refer. Those base estimates were made using a sample which included companies no longer listed. The AER's base estimates are no longer current, and in view of the relatively large proportion of entities which have been restructured and delisted, are questionable bases for estimation of the beta of the benchmark efficient entity of rule 87(3).

In paragraphs above, APA VTS has noted Frontier Economics concerns about the reliability of beta estimates made using data for periods of 5 years, and that Frontier Economics has not relied on those estimates. That Professors Partington and Satchell continue to raise the issue of use of

[43] Frontier Economics, *Updated rate of return parameter estimates: Report prepared for APA Group*, August 2017.

estimates made using data for periods of 5 years is somewhat surprising. Estimating beta from data for periods of five years is market practice. The implication, from the advice provided by Professors Partington and Satchell is that (conceptually and theoretically incorrect) market practice may be relied upon when applying the SL CAPM, but it is not to be relied upon when estimating a key parameter of the model.

In a new report for APA VTS, Frontier Economics concludes that the approach of the AER's Rate of Return Guideline, when applied to the most recent evidence, must produce an estimate of beta of at least 0.7.[44]

APA VTS sees no reason for not now using an estimate of beta 0.8 for the VTS. This was the estimate which the made in 2013. It remains the best estimate in the circumstances.

6.1.3 *Market risk premium*

APA VTS proposed estimating the market risk premium of the SL CAPM as the difference between the expected return on the market and the prevailing risk free rate. This was, APA VTS explained in the submission which was part of its access arrangement revisions proposal, consistent with the conceptual and theoretical basis of that model.

The Draft Decision advised that the AER disagreed.[45] The reasons why the AER disagreed seem to be the following:

- APA VTS proposed using the long term average of the return on the market as the expected return on the market
- APA VTS used the Wright approach to the CAPM
- APA VTS drew support for its proposal from the ERA's 2016 Goldfields Gas Pipeline final decision.

The AER notes that Professors Partington and Satchell advise that it is the risk premium that determines the market portfolio, and that practitioners tend to

[44] Frontier Economics, *Updated rate of return parameter estimates: Report prepared for APA Group*, August 2017, page 2.

[45] Draft Decision, Attachment 3 – Rate of return, page 3-92.

treat the MRP as the exogenous variable to the CAPM instead of the return on the market as suggested by APA VTS.[46]

Yes; practitioners do treat the MRP as the exogenous variable in the SL CAPM, and the practice is endorsed in many finance textbooks. That practice is, however, inconsistent with the conceptual and theoretical foundations of the SL CAPM (as APA VTS explained at length in its submission). Practitioners, it would seem, do not use the SL CAPM. They use an incorrectly estimated single factor model for which there is little or no theoretical or empirical support.

In their advice to the AER, Professors Partington and Satchell do not address the conceptual and theoretical foundations of the SL CAPM, or the implications which these might have for application of the model. They do not address the way in which APA VTS has applied the SL CAPM other than by saying "practitioners do it differently".

We note that Dr Lally has advised the AER:

> *The Sharpe-Lintner CAPM (Sharpe, 1964; Lintner, 1965; Mossin 1966) is a model that specifies the equilibrium expected rate of return on a risky asset (i.e., the expected rate of return that just compensates for risk), and one of the parameters of this model is the risk free rate. One of the assumptions underlying this model is that investors select portfolios based on the Markowitz (1952, 1959) model, in which an investor chooses (at some point in time, T) that portfolio of assets that has the 'best' probability distribution of returns over a period of time from T. One such asset is the risk free asset and the risk free rate in the Sharpe-Lintner model is then the risk free rate prevailing at time T for some future term. This model can be sued to estimate the cost of equity capital for a regulated entity. Doing so requires that the Sharpe-Lintner and regulatory models be aligned. This requires that the risk free rate within the Sharpe-Lintner model must be the prevailing rate at the beginning of the regulatory period. As before, pragmatic considerations lead to choosing a risk free rate averaged over a short period as close as practical to the start of the regulatory period. Furthermore, averaging the risk free rate over a historical period would never be compatible with the Markowitz model (because an investor makes a portfolio decision at*

[46] Draft Decision, Attachment 3 – Rate of return, page 3-93.

a point in time) and therefore would never be compatible with the Sharpe-Lintner model.47

Dr Lally, it may be argued, does not refer to the market risk premium. But he does not need to. The risk free asset is one of the assets available to investors for the formation of portfolios based on the Markowitz model. The rate of return on that asset appears in two places in the SL CAPM – as the "base rate" to which the risk premium, $\beta \times [E(r_M) - r_f]$, must be added, and in the measure of the risk premium itself. There is only one risk free asset and only one risk free rate of return. There is only one risk free rate, although it appears twice in the SL CAPM and, in the in the regulatory context, that rate must be the prevailing rate at the beginning of the regulatory period.

If the SL CAPM is to be used to estimate the return on equity for the purpose of determining revised reference tariffs for the VTS, then, as APA VTS concluded in the submission accompanying its revisions proposal, the term $[E(r_M) - r_f]$ must be treated as comprising two components, the risk free rate and the expected return on the market. Estimates must be made, at the time the SL CAPM is applied, of:

- the rate of return on the risk free asset assumed to be available to investors at that time
- the return those investors expect, at that time, to earn on the market portfolio.

How is the expected return on the market portfolio to be estimated? In the submission accompanying the revisions proposal for the VTS Access Arrangement, APA VTS noted that it was not aware of any expectations data which might be suitable for directly estimating the expected return on the Australian market for risky financial assets. APA VTS therefore relied on two simple, but widely used, models of expectations formation. These are:

- the averaging of past values of the variable for which a forward looking estimate or expected value is required
- the dividend growth model.

APA VTS acknowledges the limitations of historical data – averaging series of past values – when estimating the expected return on the market (and the

[47] Martin Lally, *The risk free Rate and the Present Value Principle*, 22 August 2012, pages 8-9.

market risk premium). Those data are not expectations data. Only the dividend growth model can provide the forward looking estimate of expected return required for application of the SL CAPM.

As part of recent work to update rate of return parameters for APA VTS, Frontier Economics has provided an updated estimate of the expected return on the market made using the AER's dividend growth models. Assuming a dividend growth rate of 4.6%, a two-stage model provides an estimate of the market risk premium of 7.70%. A three-stage model provides an estimate of 7.72%. APA VTS views the AER's dividend growth models as providing an estimate of the market risk premium of approximately 7.7%.

APA VTS's current estimate of the risk free rate of return is 2.68%. In these circumstances, APA VTS has taken, as a current estimate of the rate of return on the market to be used in applying the SL CAPM, an estimate of 10.38%.

6.1.4 *Estimating the rate of return on equity*

The rate of return on equity proposed in the AER's Draft Decision has been estimated using the SL CAPM, an estimate of beta of 0.7, and an estimate of the market risk premium of 6.5%. The AER's estimate of beta is no longer current; it no longer accords with prevailing conditions in the market for equity funds. The AER's direct estimation of the market risk premium using, predominantly, historical data, is conceptually and theoretically incorrect. If the SL CAPM is used to estimate the rate of return on equity, separate estimates must be made of the risk free rate of return and the expected return on the market portfolio at the time the model is applied. Apply the SL CAPM in a way which is conceptually and theoretically incorrect, with parameter estimates which are no longer current, cannot lead to an estimate of the rate of return on equity which can contribute to achievement of the allowed rate of return objective of rule 87(3).

APA VTS has used the SL CAPM to estimate the rate of return on equity in its response to the Draft Decision. However, in applying the model, APA VTS has used a current estimate of beta, and has separately estimated the risk free rate of return and the expected return on the market portfolio. APA VTS has used the (AER's) dividend growth model to estimate the forward looking expected return on the market required for application of the SL CAPM. APA VTS has correctly applied the SL CAPM using current estimates of its key parameters. To the extent that the SL CAPM adequately represents expected equity returns, APA VTS's estimate of the rate of return on equity is

an estimate which can contribute to achievement of the allowed rate of return objective.

6.2 Return on debt

For the purpose of estimating the return on debt, APA VTS assumed that the benchmark efficient entity of rule 87(3) is a BBB+ rated entity which raises debt with a term to maturity of 10 years.[48] Debt raising is staggered so that only a part of the total debt must be refinanced each year, thereby reducing refinancing risk. The benchmark efficient entity for the determination of the allowed rate of return is, then, an entity which has a degree of risk similar to that of APA VTS in its provision of reference services, and which has a staggered portfolio comprising debt issues with terms to maturity of 10 years. Ten per cent of that portfolio is assumed to be refinanced annually, and the rate of return on debt is estimated as a trailing average of the returns on the debt which comprises the staggered portfolio.

A similar view of the benchmark efficient entity, and of rate of return on debt estimation, has been adopted by the AER for the purpose of estimating the rate of return on debt of the Draft Decision.

There is, however, a fundamental difference. The trailing average method proposed by APA VTS was backward looking; the rate of return on debt was estimated as an average of the current rate and rates applying during the past nine years. The trailing average method required by the AER is forward looking; the rate of return in debt is estimated as the current rate, and is to be progressively transitioned into a 10 years trailing average during the next two regulatory periods.

The Draft Decision rejects APA VTS's proposal for immediate implementation of the trailing average method (a trailing average without transition), and requires transition into a trailing average method of estimating the rate of return on debt over a transition period of 10 years.

The rate of return on debt estimated as a trailing average with transition is, the AER advises, 4.79%. APA VTS had proposed a rate of return on debt, estimated as a trailing average without transition, of 7.47%.

[48] Where financial data to be used in estimating the rate of return are not available for entities with that credit rating, APA VTS has used data for BBB rated entities.

The rate of return on debt which is to be a component of the allowed rate of return of rule 87 is to be the rate which contributes to the efficient financing costs of a benchmark efficient entity with a degree of risk similar to that which applies to the service provider in respect of the provision of reference services.

The relevant efficient financing costs are the borrowing costs of a benchmark efficient entity with a BBB+ credit rating which held a portfolio of debt with staggered maturities over the last 10 years. This benchmark efficient entity would have had a cost of debt significantly higher than the allowed 4.79%. This is clear from Table 6-2, which sets out yields on debt by BBB rated non-financial corporations during the period 2008 to 2017. (Yields, as reported by the Reserve Bank of Australia for varying effective tenors close to 10 years, have been extrapolated to provide a single series for debt with a term to maturity of 10 years.)

Table 6-2 – Yields on BBB rated corporate debt with term to maturity of 10 years

July 2008	July 2009	July 2010	July 2011	July 2012	July 2013	July 2014	July 2015	July 2016	July 2017
9.5%	9.2%	7.9%	7.8%	7.3%	7.4%	5.7%	5.1%	4.4%	4.6%

Source: Data from RBA F3 Aggregate Measures of Australian Corporate Bond Spreads and Yields; APA extrapolation to term of 10 years.

The estimated current cost of an equally weighted portfolio of debt with staggered maturities over the past 10 years is 6.91%. This – and not 4.79% – is the efficiently incurred cost of debt of the benchmark efficient entity of rule 87(3). It is the estimate of the rate of return on debt which contributes to the allowed rate of return objective.

The rate return on debt which the AER has allowed is insufficient to cover the efficiently incurred borrowing costs of the benchmark efficient entity.

The rate of return of 4.79% in the Draft Decision is, effectively, a rate of return on debt estimated using the on-the-day method. The on-the-day rate is to be progressively updated, but it will remain insufficient to cover efficiently incurred borrowing costs during the next access arrangement period (and beyond).

In the Draft Decision, the AER summarises its view on estimation of the return on debt:

> *We consider a full transition is required to meet the ARORO because we consider current debt costs in the market reflect efficient financing costs and we consider correct compensation in a present value sense (or an allowance that meets the NPV = 0 condition) is required to meeting the ARORO and to achieve the NGO. In the absence of a full transition the only other approach we have examined that we consider will satisfy the ARORO and achieve the NGO is the continuation of the on-the-day method.*[49]

However, neither the AER, nor its expert advisors on rate of return, explain why, in the context of financing the assets which the AER is called upon to regulate:

- if a trailing average method is to be used to estimate the rate of return on debt, there must be a full transition to that trailing average
- the current cost of debt represents an efficient cost of financing the assets
- the correct compensation for debt financing costs is an allowance which meets the NPV = 0 condition
- an allowance for debt which meets the NPV = 0 condition is required for meeting the allowed rate of return objective and achieving the national gas objective
- in the absence of a full transition, the only other method of estimating the return on debt which will satisfy the allowed rate of return objective and achieve the national gas objective is the on-the-day-method.

In the absence of these explanations, it is not clear that the AER's approach to the return on debt delivers an estimate which contributes to the allowed rate of return objective of rule 87(3).

6.2.1 *Current cost of debt does not represent efficient financing costs*

In this section of this response to the Draft Decision, the primary focus is on the rate of return on debt. The rate of return on debt is one of two

[49] Draft Decision, Attachment 3 - Rate of return, page 3-119.

components of the rate of return of rule 87. In the discussion which follows, APA VTS assumes that the second component – the rate of return on equity – is the on-the-day rate of return on equity: the rate of return on equity is the rate at the commencement of the regulatory period, and that rate is assumed to continue, unchanged, during the period. The on-the-day rate of return on equity may, of course, change from one regulatory period to the next. APA VTS believes these are the assumption made by the AER in its analysis, and in the total revenue modelling of the PTRM, which gives effect to that analysis.

The rate of return which meets the allowed rate of return objective of rule 87 must, the AER advises, provide ex ante efficient compensation for efficient financing costs. This is because the regulatory regime is "forward looking".[50]

The requirement of the allowed rate of return objective for ex ante efficient compensation for efficient financing costs does not, the AER notes, entail compensating for historically incurred costs.[51]

This is not correct. Where costs have been sunk and arrangements have been made to finance those sunk costs over a period which extends into the future then, provided the costs themselves were efficiently incurred, and the financing arrangements were low cost at the time they were entered into, an ex ante regulatory regime which provides the service provider with the opportunity to recover its efficiently incurred costs, will allow compensation for those historically incurred costs.

Ex ante efficient compensation for efficient financing costs is, the AER contends, provided by a rate of return which is the current, or on-the-day, rate of return. The on-the-day rate is the current opportunity cost of capital for investments of similar risk to a benchmark efficient entity which has a degree of risk similar to that of the service provider in its provision of reference services. Estimation of the rate of return as an on-the-day rate should appropriately compensate investors for their investment, and should aim to minimise the long run cost of capital (all else being equal).[52]

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[50] Draft Decision, Attachment 3 - Rate of return, page 3-18.

[51] Draft Decision, Attachment 3 - Rate of return, page 3-127.

[52] Draft Decision, Attachment 3 - Rate of return, page 3-323.

The on-the-day rate of return is, the AER advises, the efficient rate of return expected in a competitive capital market, consistent with models underpinning financial theory on efficient markets.[53]

When this efficient rate of return is applied to the book value of the capital invested in regulated assets as part of determining the capital cash flows (return on and of capital) from those assets, and those cash flows are discounted at that rate of return, the result is the book value of the investment. Moreover, in these circumstances, the book value of the investment will be equal to the market value of that investment. The cash flows give rise to a zero NPV investment in regulated assets.[54]

Under an ex ante regulatory regime, the AER advises, the regulator resets the allowed rate of return at the commencement of each regulatory period. If the allowed rate of return is reset to reflect the prevailing market cost of capital, it provides ex ante efficient compensation over each regulatory period and over the life of the investment.

An allowed rate of return on debt which reflects the prevailing market cost of debt at the time of a regulatory decision is, then, likely to be efficient because:

- a benchmark efficient entity faces competitive prices in financial markets – in raising debt it is likely to be productively efficient
- financial markets are competitive, with many buyers and sellers, so that the prevailing market cost of debt at any given time is likely to reflect investors' opportunity cost – debt raising is likely to be allocatively efficient
- a return on debt that reflects the prevailing market cost of debt provides an appropriate signal for new investment and promotes efficient investment decisions – debt raising is likely to be dynamically efficient.[55]

In a competitive capital market, the AER explains, a benchmark efficient entity is expected to face competitive prices in the market for funds. Efficient debt financing costs are therefore reflected in the prevailing cost of

[53] Draft Decision, Attachment 3 - Rate of return, page 3-324.

[54] Draft Decision, Attachment 3 - Rate of return, page 3-324.

[55] Draft Decision, Attachment 3 - Rate of return, page 3-338 – 3-339.

debt observed in capital markets for investments with a degree of risk similar to that which applies to the service provider in respect of its provision of reference services.[56]

This, the AER notes, has an important implication. Mismatch between a service provider's actual incurred cost of debt and the allowed return on debt is a consequence of the service provider's choice of particular financing arrangements. It does not affect the benchmark efficient entity's opportunity to earn the efficient return on its capital base. The regulator attempts to replicate the competitive market equilibrium which results in zero NPV investments, and which is characterised by product prices, the market value of assets and the prices of securities adjusting to values at which the holders of those securities earn the current – on-the-day – cost of capital.[57]

All of this is supported by advice from the AER's rate of return advisors, Professors Partington and Satchell.

In their advice, Professors Partington and Satchell state that efficient financing costs are to be interpreted as the opportunity cost of capital. The opportunity cost of capital is the discount rate which determines the market value of the benchmark efficient entity. Use of the opportunity cost of capital is also consistent with the criterion that investment in regulated assets should, ex ante, be a zero NPV activity. [58]

Regulated businesses, Professors Partington and Satchell advise, have no market power in financial markets; they are price takers. Allowed revenue determination for those businesses should, in these circumstances, use the on-the-day approach, and the businesses should be left to sort out their financing as they see fit, bearing any costs or accruing any benefits which may arise.[59]

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[56] Draft Decision, Attachment 3 - Rate of return, page 3-319.

[57] Draft Decision, Attachment 3 - Rate of return, page 3-330.

[58] Graham Partington and Stephen Satchell, *Report to the AER: Discussion of the Allowed Cost of Debt*, 5 May 2016, page 15.

[59] Graham Partington and Stephen Satchell, *Report to the AER: Discussion of the Allowed Cost of Debt*, 5 May 2016, page 55.

In particular, if a regulated business chooses not to match its actual cost of debt with the regulatory allowance, it can expect to earn the regulated cash flow on the book value of its capital base, but then equity investors will be exposed to changes in the market value of equity. This exposure can be managed by partially hedging interest rate risk. Hedging is a choice, but not necessarily the best choice. Not all businesses will choose to fully hedge, and some may choose not to hedge at all.[60]

Supported by advice from its expert advisors, the AER is essentially contending:

- the returns on equity and debt which are to comprise the allowed rate of return of rule 87 are to be commensurate with the efficient financing costs of the benchmark efficient entity of that rule
- these financing costs are to be the on-the-day rates of return on equity and debt prevailing in the capital market
- the capital market is competitive (and, like others, regulated businesses are price takers in that market; they have no monopoly power in the capital market)
- the prices at which securities currently trade in a competitive capital market – the market equilibrium prices – and the rates of return on those securities, are those required for efficiency (productive, allocative and dynamic efficiency)
- when determined from the on-the-day rates of return on equity and debt prevailing in the capital market, the return on a pipeline service provider's capital base will be commensurate with the efficient financing costs of the benchmark efficient entity (an entity with a degree of risk similar to that of the service provider in its provision of reference services).

Furthermore, when capital related cash flows are calculated using the efficient on-the-day rates of return on equity and debt, and are discounted at those rates, the book value of regulated assets is equal to their market value. In the conditions which the AER assumes, cash flows determined from the market equilibrium prices of securities (and their rates of return) set in a

[60] Graham Partington and Stephen Satchell, *Report to the AER: Discussion of the Allowed Cost of Debt*, 5 May 2016, page 18.

competitive capital market, and discounted at an equivalent rate of return, are such that "NPV = 0".

The AER's contention that the on-the-day rates of return on equity and debt prevailing in the capital market are the basis for determination of the efficient financing costs of the benchmark efficient entity of rule 87(3), and its adherence to "NPV = 0", across regulatory periods and over the lives of regulated assets, rests firmly on the economic theory of competitive markets.

A large number of specific conditions are required for a market setting in which on-the-day rates of return represent equilibrium prices consistent with efficiency, and in which the NPV = 0 criterion applies. These are set out many textbooks on financial economics.[61] Two of these conditions are important in the circumstances of pipeline service providers. They are:

- there are no transaction costs
- markets are complete

The fundamental difficulty with the AER's contention concerning use of the on-the-day rates of return on equity and debt prevailing in the capital market as the basis for determination of the efficient financing costs of the benchmark efficient entity of rule 87(3), and its adherence to "NPV = 0", is that the AER, service providers, and others, have recognised that service providers face risks in refinancing debt which are not priced in the market, or which are priced high and lead to alternative, lower cost, non-market arrangements for addressing the refinancing issue. Service providers, as the AER and others have recognised, manage refinancing risk through the holding of portfolios of debt with staggered maturities. Where, as in these circumstances, competitive capital markets are imperfect because transaction costs are non-zero, and the market is incomplete, the simple efficiency result from economic theory, on which the AER relies, no longer holds. Moreover, the NPV = 0 criterion may also no longer apply.

Consultants, CEG, saw this when advising AusNet Services, and proposed a practical solution: discount the cash flows over the regulatory period using a nominal WACC with a rate of return on debt component which is a weighted average of the rates of return on debt across the regulatory period

[61] An older, but still useful textbook presentation is in Eugene F. Fama and Merton H. Miller (1972), *The Theory of Finance*, Dryden: Orlando, Florida.

(so that the rate of return on debt in the WACC is equivalent to the historical trailing average rate of return used to estimate the return on debt component of total revenue).

Professors Partington and Satchell referred to the nominal WACC determined using the historical cost of debt (and the current cost of equity) as the "historic WACC". They acknowledge that, if cash flows were determined, where appropriate, using the historic WACC, and those cash flows were discounted at that WACC, then their present value would be equal to the value of the RAB, and the computed NPV is zero.[62] However, they advised:

> *To our knowledge this is not a concept that is supported anywhere in the finance literature. Furthermore, the "present value" so computed is not really a present value since it will not in general be equal to the market value.* [63]

In their advice to the AER, Professors Partington and Satchell did not address the key issue arising from the debate on estimation of the rate of return on debt which has continued since the rule changes made by the AEMC in November 2012 recognised the need for a trailing average approach. Professors Partington and Satchell revert to the standard – but not applicable – textbook arguments for an on-the-day rate of return.

Professors Partington and Satchell make the comment, in their advice to the AER, that what fundamentally drives the return which is required on a firm's portfolio of issued securities is the nature of the assets in which the firm invests.[64] APA VTS agrees, but would go further. The nature of the firm's assets not only determines the returns on the securities which the firm issues to finance those assets; it also determines the structure of the financing.

What has been identified and accepted by the ERA and others is that there are imperfections in the capital market which preclude a business, like the business of a pipeline service provider, which uses a technology based on

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[62] Graham Partington and Stephen Satchell, *Report to the AER: Issues in Relation to the Cost of Debt*, 9 April 2017, page 9.

[63] Ibid., page 9.

[64] See, for example, Graham Partington and Stephen Satchell, *Report to the AER: Discussion of the Allowed Cost of Debt*, 5 May 2016, page 16.

long-lived purpose-specific assets, and consequently incurs large sunk costs, from relying on on-the-day financing arrangements.

The AER's on-the-day method of estimating rates of return and, in particular, of estimating the rate of return on debt, cannot lead to the efficient financing costs of a benchmark efficient entity which has a degree of risk similar to that of the service provider in its provision of reference services. It cannot, as APA VTS has shown above, provide a service provider with the opportunity to recover efficiently incurred borrowing costs.

6.2.2 *There is no justification for a full transition to a trailing average*

The Draft Decision indicates that the on-the-day and the trailing average methods of estimating the rate of return on debt are essentially equivalent. If, then, there were to be an immediate switch from the previously applied on-the-day method to the trailing average method, the AER is of the view that, given the recent history of returns on debt, there would an unwarranted transfer of wealth from users to the service provider. This unwarranted wealth transfer is avoided if, instead of an immediate switch, there is a transition into the trailing average method.

This is not correct.

The on-the-day and the trailing average methods of estimating the rate of return on debt are not, in general, equivalent. They are equivalent in quite specific circumstances; they are equivalent only when rates of return on debt are constant.

When rates of return on debt vary over time, the on-the-day and the trailing average methods are not equivalent. The on-the-day method does not lead to an estimate of the return on debt component of total revenue which is the same as the estimate of the return on debt made using the trailing average method.[65] Use of the on-the-day method either overstates or understates the cost of debt of a benchmark efficient entity which is financed by an equally weighted staggered portfolio of debt. The on-the-

[65] The validity of a proposition like this one is difficult to demonstrate using a mathematical model like the model set out in Appendix J of Attachment 3 to the Draft Decision. It is better demonstrated using a simple spreadsheet model, which can incorporate the assumptions made for the mathematical model.

day method does not lead to an estimate of the return on debt which is the best estimate in the circumstances.

If rates of return on debt in the recent past have been high relative to current rates, the on-the-day method leads to estimates of the return on debt which are less than the return on debt estimates for a benchmark efficient entity which is financed by a staggered portfolio of debt. The on-the-day method of estimating the rate of return on debt does not provide a service provider with an opportunity to recover at least the efficient costs incurred in providing reference services.

The on-the-day method of estimating the rate of return on debt is not equivalent to the trailing average method. The on-the-day method does not lead to an estimate of the return on debt which contributes to the achievement of the allowed rate of return objective, it does not provide an estimate of the return on debt which is the best estimate in the circumstances, and it does not provide the service provider with a reasonable opportunity to recover its efficiently incurred costs.

That the on-the-day method is not equivalent to the trailing average method (which properly compensates the service provider for the efficiently incurred cost of debt), and that the trailing average method is a method which satisfies the relevant requirements of the NGL and the NGR, mean that a change from the on-the-day method to the trailing average method is not a change from one method to another – equivalent – method. It is a change from a method of estimating the rate of return on debt which does not satisfy the relevant requirements of the NGL and the NGR to a method which does satisfies those requirements.

Use of the on-the-day method produced an incorrect estimate of the rate of return on debt. Change to a trailing average method involves recognition of the error, and correction of the return on debt going forward. There is, in these circumstances, no issue of a wealth transfer from users to service providers at the time of a change from one method of estimation to another – equivalent – method. The on-the-day method did not correctly estimate the rate of return on debt of the benchmark efficient entity of rule 87(3). The priori use of that method to estimate the rate of return on debt of a benchmark efficient entity which finances using an equally weighted staggered portfolio of debt was incorrect. The trailing average method correctly estimates the rate of return on debt of the benchmark efficient

entity of rule 87(3), and must now be adopted, without transition, to correct the prior error.

APA VTS acknowledges that, without transition in the way the AER proposes, the NPV = 0 principle will not be satisfied. The AER's proposed transition is a construct which attempts to maintain equivalence with the on-the-day rate of return on debt going forward, and which attempts to ensure that the NPV = 0 principle continues to be satisfied. But this is not correct. Transition into a trailing average may deliver NPV equal to zero over the regulatory periods during which the transition takes place, but once the transition is completed, any change in returns on debt from one year to the next will result in NPV not being equal to zero.

If, as has been recognised, pipeline service providers must finance the sunk costs in the very long-life assets with which they provide reference services with staggered portfolios of debt, then the NPV = 0 criterion may not be satisfied. This is no more than a consequence of the theory of competitive financial markets on which the AER relies for its efficiency contentions, not being strictly applicable in the specific circumstances of those service providers.

6.2.3 Estimating the rate of return on debt

The rate of return on debt proposed in the AER's Draft Decision has been estimated as an on-the-rate in anticipation of subsequent transition into a 10 years trailing average estimate. The AER contends that its on-the-day estimate of the rate of return on debt, and a prospective transition which is purported to maintain equivalence with on-the-day rates, delivers a cost of debt which is the efficient financing cost of the benchmark efficient entity of rule 87(3). It is not. Initial use of the on-the-day rate of return on debt, and the proposed transition, will not allow APA VTS to recover its efficiently incurred costs during the next access arrangement period and beyond.

If APA VTS is to have a reasonable opportunity to recover its efficiently incurred costs of financing its pipeline assets, there must be an immediate adoption of a trailing average (without transition). A rate of return on debt estimated as a trailing average without transition, in the way APA VTS has proposed, is an estimate which can contribute to achievement of the allowed rate of return objective of rule 87.

6.3 Value of imputation credits

In view of the decision of the Federal Court that the AER's preference for one theoretical approach to considering the determination of gamma (relying on an a priori view of the utilisation rate) over another (market-based dividend drop-off studies), was not a reviewable error, APA VTS has adopted the AER's estimate of 0.4 for gamma when responding to the Draft Decision.[66]

Although the Federal Court has found the AER not to be in error in its choice of one approach to estimation of gamma over another, the more basic question about the way in which the capital market values imputation credits remains. Market practitioners continue to assign to those credits little or no value. In these circumstances, a lower estimate of gamma – 0.25 – or even an estimate of zero cannot, at the present time, be rejected. APA VTS expects the debate on the valuation of imputation credits will continue, and an estimate of 0.4 will be no more than another step along the way.

[66] Australian Energy Regulator v Australian Competition Tribunal (No. 2) [2017] FCAFC 79.

7 Operating expenditure

7.1 Forecast operating expenditure

Revision 7.1

We require APA make all necessary amendments to reflect our draft decision on forecast opex for the 2018–12 access arrangement period, as set out in Table 7.2.

Table 7.2 Forecast opex for the 2018–22 access arrangement period ($ million, 2017)

	2018	2019	2020	2021	2022	Total
Total opex excluding debt raising costs and allowance for linepack and spares	25.65	25.74	25.74	26.74	26.93	130.81
Debt raising costs	0.06	0.06	0.07	0.07	0.07	0.32
Linepack and spares	0.24	0.25	0.25	0.26	0.26	1.27
Total opex	**25.95**	**26.06**	**26.06**	**27.07**	**27.26**	**132.40**

Source: APA VTS, *B4 - APA Post Tax Revenue Model revised with WORM.*

APA VTS notes the AER's draft decision to approve APA VTS's forecast operating expenditure allowance, as corrected by APA VTS in response to AER information request 6.

APA VTS has included forecast operating expenditure as per the AER's draft decision (revision 7.1) in its revised proposal, after adjusting debt raising costs to reflect changes to forecast capital expenditure compared to the AER's draft decision.

7.2 Some comments on the AER's operating expenditure assumptions

While the AER accepted APA VTS's operating expenditure forecast, it set out some statements and assumptions that guided their analysis that APA VTS considers require further development.

The AER appears to have sought to apply techniques and assumptions for building an 'alternative' operating expenditure forecast that are more relevant to the assessment of controllable operating expenditure for gas and electricity distribution businesses, than to gas transmission businesses.

In respect of access arrangement costs the AER states:

> *Access arrangement costs are a 'business-as-usual' expense for APA to consider within its existing base opex forecast. Such costs are directly related to a business' regulatory obligations to submit a proposal for the subsequent access arrangement period. We accept that access arrangement costs are non-recurrent on a year-on-year basis and, therefore, may not be reflected in the particular base year chosen. However, they are costs that are typically borne within an access arrangement period. We expect some costs may go up, and some costs may go down—so despite potential volatility in the cost of certain individual opex activities, total opex is generally stable over time. We consider providing a category specific forecast for opex items identified by the business may upwardly bias the total opex forecast. Minimising the number of costs forecast on a category specific basis also helps to simplify our expenditure assessments and allows for greater consistency across our regulatory determinations.*[67]

APA VTS considers that the AER's assumption that base operating expenditure includes provision for category specific items is in fact an empirical question – it may be the case for some businesses or business types, but not for others. APA VTS submits that, in respect of gas transmission businesses, the AER's assumption is likely to be incorrect.

Gas transmission business operating expenditure is characterised by recurrent expenditure, punctuated by major maintenance events. This reflects the nature of the assets – pipeline transmission infrastructure generally involves a small number of asset types with few individual assets in each category, with a maintenance schedule that requires expenditure every few years, sometimes up to 10 or 15 years between recurrence.

The interests of consumer are not met where large lumpy expenditure items incurred in the base year influence future allowances as if they are recurrent. Nor are they met where a service provider is not given opportunity to recover its efficient costs by virtue of the timing of expenditure. APA VTS believes that operating expenditure allowances for non-recurrent expenditure are the best method to deal with this uncertainty.

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[67] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 7 – Operating expenditure*, p 7-16

7.2.1 *Treatment of Wollert Compressor station turbine overhauls*

As discussed in section 4.3.4 above, APA VTS does not consider that the AER's characterisation of the Wollert Compressor Station turbine overhauls as operating expenditure is consistent with previous AER practice, accounting standards or the regulatory framework.

Notwithstanding the above, if the AER determined that this expenditure was operating expenditure, this expenditure needs to be included in forecast operating expenditure as a one-off (non-recurrent) item to be consistent with pricing principles under the National Gas Law requiring the AER to provide the service provider with a reasonable opportunity to recover at least the efficient costs incurred in providing the reference services.[68]

7.3 Total controllable operating expenditure

APA VTS's total controllable operating expenditure forecast is set out in Table 7-1 below.

Table 7-1 – Total controllable operating expenditure forecast (excluding debt raising costs and other allowances) (real 2017 $m)

$m real 2017	2018	2019	2020	2021	2022	Total
Operating Expenditure	25.7	25.7	25.7	26.7	26.9	**130.8**

7.4 Total operating expenditure including allowances

Table 7-2 below is a summary table showing total operating costs, including controllable operating costs described above, as well as all allowances.

Table 7-2 – Total operating expenditure including allowances (real 2017 $m)

$m real 2017	2018	2019	2020	2021	2022	Total
Controllable operating expenditure	25.7	25.7	25.7	26.7	26.9	130.8
Debt raising costs	0.06	0.06	0.06	0.07	0.06	0.3
EBSS adjustments	6.79	4.00	3.27	2.14	-	16.2

[68] National Gas Law section 24

$m real 2017	2018	2019	2020	2021	2022	Total
Other allowances	0.24	0.25	0.25	0.26	0.26	1.3
Total	**32.7**	**30.1**	**29.3**	**29.2**	**27.3**	**148.6**

8 Total revenue

Revision 11.3

D.4 Tariff variation formula

In the revised proposal make all changes necessary, such that the tables referred to for the calculation of VATR, give effect to our draft decision.

This section summarises the building blocks as addressed in the sections above to derive the total allowed revenue for the access arrangement period.

8.1 Return on capital

Applying the rate of return discussed in Chapter 6 to the value of the capital base discussed in chapter 5 yields the rate of return building block as set out in Table 8-1 below.

Table 8-1 – Return on capital (nominal $m)

$m nominal	2018	2019	2020	2021	2022
Regulated asset base	1,054.2	1,118.6	1,180.9	1,179.0	1,179.8
WACC	7.7%	7.7%	7.7%	7.7%	7.7%
Return on Capital	76.5	80.8	85.7	90.5	90.3

8.2 Return of capital

Return of capital (regulatory depreciation) was discussed in chapter 5. In applying these principles, APA VTS calculates a regulatory depreciation allowance in line with Table 8-2.

Table 8-2 – Forecast depreciation over the access arrangement period (nominal $m)

$m nominal	2018	2019	2020	2021	2022
Straight line depreciation	37.0	41.1	44.3	49.5	47.3
Indexation	24.4	25.8	27.4	28.9	28.9
Regulatory depreciation	12.5	15.2	16.9	20.6	18.4

8.3 Corporate income tax

Revision 8.1

Make all necessary amendments to reflect this draft decision on the proposed corporate income tax allowance for the 2018–22 access arrangement period, as set out in table 8.1

Table 8.1 AER's draft decision on corporate income tax allowance for APA over the 2018–22 access arrangement period ($million, nominal)

	2018	2019	2020	2021	2022	Total
Tax payable	2.2	2.5	3.1	2.3	0.8	10.9
Less: value of imputation credits	0.9	1.0	1.2	0.9	0.3	4.4
Net corporate income tax allowance	**1.3**	**1.5**	**1.9**	**1.4**	**0.5**	**6.5**

Source: AER analysis.

Required revisions 8.2 and 8.3, relating to the calculation of the Tax Asset Base and the weighted average remaining tax asset lives, are discussed in sections 5.4 and 5.4.1 respectively.

As with the calculation of the total revenue requirement and tariffs, the allowance for corporate income taxes is a function of the other amendments to the access arrangement. APA VTS's corporate income tax allowance is set out in Table 8-3.

Table 8-3 – Forecast corporate tax allowance (nominal $m)

$m nominal	2018	2019	2020	2021	2022
Corporate tax allowance	2.7	3.2	3.4	3.0	2.2

8.4 Operating expenditure

Operating expenditure is discussed in chapter 7, and yields an allowance as set out in Table 8-4.

Table 8-4 – Operating expenditure (nominal $m)

$m nominal	2018	2019	2020	2021	2022
Operating expenditure	33.5	31.6	31.5	32.2	30.8

8.5 Total revenue requirement

Summarising the above building block components derives the total allowed revenue as shown in Table 8-5.

Table 8-5 – Total revenue requirement (nominal $m)

$m nominal	2018	2019	2020	2021	2022
Return on capital	76.5	80.8	85.7	90.5	90.3
Return of capital	12.5	15.2	16.9	20.6	18.4
plus operating and maintenance	33.5	31.6	31.5	32.2	30.8
plus revenue adjustments	0.0	0.0	0.0	0.0	0.0
plus net tax allowance	2.7	3.2	3.4	3.0	2.2
Building block revenue requirement	**125.3**	**130.8**	**137.6**	**146.2**	**141.7**

9 Revenue allocation and tariffs

This chapter responds to the AER draft decision in respect of total revenue, reference tariff setting and the reference tariff variation mechanism.

9.1 Total revenue requirement

The total revenue requirement derived from the building block approach, revised in accordance with the elements discussed in this revised proposal responding to the AER's draft decision, is set out in Table 9-1 below.

Table 9-1 – Revenue requirement (nominal $m)

$m nominal	2018	2019	2020	2021	2022
Revenue requirement	125.3	130.8	137.6	146.2	141.7

The present value of this revenue requirement stream, discounted at the WACC of 7.67 per cent, is $546 million.

9.1.1 Revenue equalisation and X-factors

The smoothed revenue requirement and X-factors are set out in Table 9-2 and Table 9-3 below. APA VTS has adopted the same tariff path as its January 2017 proposal, which minimises first year tariff changes and delivers a steady rate of tariff change across the period.

Table 9-2 – Smoothed revenue requirement (nominal $m)

$m nominal	2018	2019	2020	2021	2022
Smoothed revenue requirement	119.4	126.0	134.3	143.1	152.9

(smoothed revenue requirement from Price Control Model)

Table 9-3 – X-factors

	2019	2020	2021	2022
X-factors	-6.0%	-6.0%	-6.0%	-6.0%

9.2 Revenue allocation to tariffs

Revision 10.2

Apply the cross-system tariff in addition to the refill tariff to users who ship gas from Longford or Culcairn into Iona storage and later take it out of storage for export to South Australia. Calculate reference tariffs to reflect this change so that no costs are double counted.

9.2.1 *Application of cross system tariff to Iona UGS withdrawals*

The AER's draft decision is to accept, by and large, APA VTS's proposed cost allocation methodology. The AER's draft decision seeks one change to the methodology to apply the cross system tariff in addition to the refill tariff for the Iona facility, for users who ship gas from Longford or Culcairn into Iona storage and later take it out of storage for export to South Australia.[69]

APA VTS understands the AER's rationale for its revision 10.2 is to ensure that users of the VTS contribute their share towards the cost of the VTS and that Victorian gas customers do not subsidise South Australian customers. Both of these principles are consistent with APA VTS's tariff allocation methodology.

APA VTS is aware that significant gas volumes are injected into the Iona refill facility via the South West Pipeline that are not ultimately reinjected back into the VTS. These volumes are instead diverted to South Australia through the SEA Gas Pipeline. This was confirmed in Lochard Energy's submission to the AER, stating that approximately 70TJ/day of gas flows to South Australia from Iona UGS. While not all of this gas will come from Longford, Lochard Energy's depiction of declining Port Campbell production suggests that more of this gas will be sourced from Longford in the future, and therefore not be reinjected into the VTS.[70]

Despite the AER's draft decision approach being consistent with APA VTS's tariff allocation methodology, APA VTS has identified some issues with implementation. APA VTS does not own nor have access to meter data to ascertain gas volumes that are sent to South Australia via the Iona UGS

[69] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 10 – Reference tariff setting,* p 10-22

[70] Lochard Energy 2017, Submission to the AER: APA Victorian Transmission System – Access Arrangement 2018-22, March, pp 3-4

facility. APA VTS has no meaningful way of identifying or measuring gas going to South Australia.

Further, there is a temporal aspect to the AER's draft decision. Gas may flow across the VTS and into the Iona UGS, only to be diverted to South Australia some time later. Aligning billing for Iona refill with South Australian flows may not be possible.

It would also be very difficult to identify whether gas that is sent to South Australia via the Iona UGS facility was originally sourced from Longford or Port Campbell.

These elements means that the AER's draft decision cannot be effectively implemented in practice.

APA VTS has reviewed the AER's discussion of this matter in the draft decision and notes the AER's revision is driven by a principle of user pays. APA VTS considers that a user pays principle would support broader application of the cross system tariff to all Iona refill volumes that are sourced from Longford, as it is these flows that have increased the peak needs for westbound flows on the South West Pipeline that have driven the WORM project. Put simply, all flows from Longford to Iona drive the need for the WORM, not just those that ultimately travel to South Australia.

The cross system tariff is calculated as the metro zone tariff, discounted for indirect cost allocations. In this respect, it is a direct marker for the cost of using the specific assets involved to move across the VTS between Iona and Longford (in either direction). There is therefore a good argument for any gas flows across the system to pay this charge.

APA VTS notes that use of the cross system charge contributes to the recovery of WORM costs, as the WORM is part of the metro zone. As increased Iona refill flows from Longford have largely driven the need for the WORM investment, it would appear consistent with the AER's rationale set out in its draft decision to apply the cross system tariff to all Iona UGS flows, and not just those that subsequently go to South Australia.

Importantly, gas that is ultimately reinjected back into the VTS will contribute to the WORM in line with direct usage of the asset, but only pay one for system common costs. Further, as all revenue from the cross system tariff is returned to customers through the operation of the price control model, APA VTS earns no additional revenue from the application of the cross system

tariff to Longford sourced Iona injections. The only impact is that those that contribute to flow gas across the system, thereby driving part of the need to invest in the WORM, contribute more directly to those costs.

Achieving this change requires limited revisions to section A.3(d) of the access arrangement as follows:

> *(d) Cross System Withdrawal Tariff*
>
> *If:*
>
> *(i) gas is Withdrawn at a Connection Point~~, other than a Connection Point servicing a Storage Facility,~~ located on an Injection Pipeline other than the Interconnect Pipeline; and*
>
> *(ii) that Withdrawal is a Matched Withdrawal with respect to an Injection Zone other than the Injection Zone for that Injection Pipeline,*
>
> *then the Withdrawal is subject to the following Cross System Withdrawal Tariff in addition to the applicable Injection Tariff and Withdrawal Tariff.*

This would mean that the cross system tariff would apply to all gas injected at Longford that was withdrawn at the Iona UGS facility.

APA VTS has made this revision to its revised access arrangement in place of directly implementing AER revision 10.2, which cannot be achieved using metering data.

9.2.2 *Revised tariffs*

Revision 10.1

Re-calculate reference tariffs so that the levels of the tariffs reflect the draft decision forecasts of demand, capex, opex and rate of return.

APA VTS has revised the tariffs included in the access arrangement revision proposal to reflect total revenue and demand as described in this revised proposal.

9.3 Reference tariff variation

The AER draft decision was not to accept some aspects of APA's reference tariff variation mechanism. In particular, the AER did not accept APA VTS's proposal to:

- Delete the list of considerations relevant to pass through applications;

- Include a carbon cost pass through event; and
- Include a new market structure development event.

The AER also requires minor revisions to the definition of a materiality event and the expression of the time limit of assessment of pass through events.

APA VTS addresses each of these below.

9.3.1 *List of considerations relevant to pass through applications*

APA VTS does not accept the AER's rationale for reinserting the list of considerations relevant to pass through applications in the access arrangement. APA VTS maintains its position that these considerations are unnecessary and inconsistent with the National Gas Objective and the Revenue and Pricing Principles. Notwithstanding this position, APA VTS has incorporated this revision in its access arrangement for the 2018-22 period.

9.3.2 *Carbon cost event*

The AER's draft decision is to require deletion of APA VTS's proposed carbon cost pass through event. APA VTS had revised the definition of this event compared to that which applied in the earlier access arrangement period due to changes in legislative arrangements. The earlier definition referred to the now defunct *Clean Energy Act 2011*.

APA VTS does not agree that the existing tax change event or regulatory change event would be sufficient to manage changes in costs associated with a form of carbon cost pricing that may be introduced during the access arrangement period.

APA VTS considers that a future carbon pricing mechanism is very unlikely to take the form of a tax due to the recent political controversy over the imposition of a so-called 'carbon tax'. Further, a pricing mechanism may not satisfy requirements of a regulatory change event, which, under the current drafting, must 'affect the manner in which Service Provider provides the Reference Service'. It is unlikely that a carbon pricing mechanism would change the nature of the service provided – only its cost.

A failure to be able to pass through the effects of a future carbon pricing mechanism would not only put at risk APA VTS's ability to recover the efficient costs of providing reference services, it may also defeat the purpose of the policy. The success of a carbon pricing policy is to use price incentives

to change behaviour. This is also why the carbon cost event is currently, and should remain, outside of the materiality threshold limits.

APA VTS queries the rationale given by the AER that consumer interests are best served by keeping events to a limited range of proven and predictable definitions applying across service providers. The appropriate rationale is surely to ensure that genuine changes in circumstance are managed during the access arrangement period using the most appropriate mechanism available in line with the NGO.

APA VTS notes that the AER's draft decision also states that the pass through event does not refer to a specific carbon management scheme. If the scheme were known, arguably a pass through mechanism may not be required as relevant costs would be included in the forecast. APA VTS notes that the regulatory change event does not refer to a specific piece of legislation or change – specificity of this kind is clearly not a precondition for a pass through event.

Further, the AER states that it cannot assess whether the cost impact of a future scheme will be best managed by a service provider or its customers. APA VTS notes that by removing the proposed carbon cost pass through event, the AER may be removing its ability to take this matter into account at all. If a carbon cost event occurred that was not a regulatory change event or a tax change event, then the AER would not be able to pass through the costs to customers, even where the design of the scheme was intended to expose customers to those costs.

APA VTS has not revised its access arrangement to remove the carbon cost event. APA VTS considers that more consideration is needed as to the purpose of a carbon cost policy and the importance that associated costs are able to be passed through, as well as how a carbon cost policy may be imposed in the future, as part of the need to have a clear and dedicated cost pass through event.

APA VTS has revised its proposed carbon cost event to make it clearer that it relates to government-imposed policies to reduce carbon emissions, as well as to provide decision-making point for the AER in relation to scheme design and the pass through of costs.

9.3.3 *New gas market structure development event*

The AER's draft decision is to reject APA VTS's proposal for a pass through event for the development of a new gas market structure. The AER's discussion of the basis for this rejection is very limited. The discussion refers to concerns raised by the consumer challenge panel that the proposed pass through event would allow pass through of costs associated with advocacy (which it argues is normal business for a network business) and that the pass through event is broad and would "capture all costs associated with developing systems, processes and procedures once a 'decision is made to develop' a new market structure."[71]

APA VTS considers that these conclusions are unfounded based on the drafting of the proposed cost pass through event and the associated discussion of this proposed cost pass through event in APA VTS's January 2017 submission.

The proposed cost pass through event is carefully limited to 'developing and/or implementing systems, processes and procedures made necessary by the decision to develop and/or implement a new gas market structure. [emphasis added]'. By drafting it this way, APA VTS has intentionally inserted a decision point for the AER to decide whether a particular system or process expenditure was driven or made necessary by the decision to implement a new gas market structure in Victoria or not. The concern that the cost pass through event is too broad could only be reached if the AER were to ignore its own role in approving costs to be passed through. APA VTS considers this concern over the drafting of the proposed cost pass through event is unfounded and does not constitute a cogent reason for rejecting the proposed cost pass through event.

In respect of the concern that the costs to be pass through would extend to advocacy expenditure, APA VTS agrees that advocacy expenditure should not be included in any costs to be passed through. This is achieved in the drafting where costs to be passed through are clearly limited to the development and/or implementation of systems, processes and procedures. APA VTS does not consider that this extends to advocacy activities. For the avoidance of doubt, APA VTS has made this exclusion explicit in the

[71] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 11 – Reference tariff variation mechanism,* p 11-21

proposed cost pass through event in its revised access arrangement accompanying this submission.

In rejecting the proposed cost pass through event, the AER states that it believes that 'participating in the development of new market arrangements' is a business as usual activity, and thereby rejects the proposed event.[72] The AER makes no attempt to engage with the actual subject of the cost pass through event, which is the development of systems, processes and procedures made necessary by a decision to develop and/or implement a new market structure – these are actual business expenditures that go beyond participating in the development of the market arrangements. They are in fact expenditures incurred in implementing the decision and making it work.

In reaching its decision, the AER has failed to engage with the actual subject matter and intent of the cost pass through event, and instead chosen a limited interpretation of its scope that is not supported by the actual drafting of the event. A concern that the proposed cost pass through event involves recovery of costs limited to participating in the development of new market arrangements is an unfair and unsupportable characterisation of the cost pass through event as drafted, and as presented by APA VTS in its January 2017 submission, and is not a cogent reason to reject the event.

The AER's draft decision suggests that the events covered by the proposed cost pass through event *may* be covered by the existing regulatory change event as reason for rejecting the event. In doing so, the AER makes no acknowledgement of the APA VTS's January 2017 submission that discusses the potential limitations in the definition of a regulatory change event that might make this assumption incorrect.[73] APA VTS notes that the AER appears unprepared to commit to whether the costs of the kind described in the proposed cost pass through event would quality as a regulatory change

[72] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 11 – Reference tariff variation mechanism,* p 11-22

[73] APA VTS 2017, Victorian Transmission System: Access arrangement submission, 3 January, p 250

event through the use of 'may', rather than 'will', in referring to the potential applicability of the regulatory change event.[74]

In its January 2017 submission, APA VTS set out detailed reasons as to why a regulatory change event may not extend to the costs described in the proposed cost pass through event. These reasons include the timing of the expenditure compared to the definition of the start of a regulatory change event, where the expenditure to prepare for a new market structure must be incurred considerably before the obligation (the new market) comes into effect, as well as the requirements that the costs relate to a *change* in obligation, rather than a *new* obligation. A new market structure could give rise to a wide range of new obligations and tasks – it is unclear whether new obligations are picked up in the drafting of a regulatory change event.

The AER has made no attempt to engage in these concerns raised by APA VTS in its earlier submission – indeed it makes no reference to these concerns at all in asserting that the regulatory change event *may* indeed cover these costs. APA VTS considers that the AER must engage with the discussion and issues raised in the January 2017 submission. A failure to do so is a clear breach of the AER's obligations for fair and transparent decision making.

APA VTS remains of the view that it is appropriate and consistent with the National Gas Objective to include a new cost pass through event in the access arrangement to provide for the recovery of costs incurred in developing and/or implementing systems, processes and procedures made necessary by the decision to develop and/or implement a new gas market structure in Victoria. The development of a new gas market structure is not a common or predictable event – it requires special management within the access arrangement period. APA VTS has made minor revisions to its proposed cost pass through event to make clear that costs to be recovered do not extend to 'advocacy' costs, as suggested by the consumer challenge panel and the AER.

[74] AER 2017, *APA VTS Australia Gas Access Arrangement 2018 to 2022: Draft Decision: Attachment 11 – Reference tariff variation mechanism,* p 11-22

9.3.4 *Materiality threshold*

The AER's draft decision is to amend APA VTS's materiality threshold definition to refer to smoothed revenue as per the AER's final decision, instead of the smoothed revenue included in the Access Arrangement Information.

APA VTS considers that the AER has misunderstood the meaning and intent of the reference in the materiality threshold to the Access Arrangement Information document. As it is drafted, it is intended to refer to the smoothed revenue as approved by the AER in its final decision.

Up until the recent past (and certainly at the time this aspect of the 2013-17 access arrangement revision proposal was accepted by the AER), it was the AER's practice to issue an Access Arrangement Information document with its AER-imposed Access Arrangement (where this was relevant). This practice was consistent with the AER's obligations under Rule 64 where the AER makes its own Access Arrangement on refusing to approve an access arrangement proposal. The approach also gave effect to the intent under the Rules that the Access Arrangement Information set out supporting information for elements in the access arrangement, as well as the requirement under Rule 44 that any requirement to publish an Access Arrangement extends to a requirement to publish an Access Arrangement Information relating to the access arrangement.

In the AER's more recent decisions made under the gas access regime, it appears to have stopped its practice of producing an Access Arrangement Information document that supported its AER-imposed Access Arrangement. To those not familiar with the AER's past practice, this has the effect of making the reference in the materiality threshold appear to refer to the service provider's proposed access arrangement information document. This is not the intent.

While APA VTS accepts the AER's revision, it queries the AER's recent practice not to prepare an Access Arrangement Information document where it imposes its own Access Arrangement. APA VTS considers that the Access Arrangement Information document is required by the operation of Rule 44, and the AER is the only party able to produce this document in compliance with this rule where it imposes its own Access Arrangement under Rule 64.

APA VTS queries whether the AER's recent practice not to prepare and publish an Access Arrangement Information document is a breach of the rules.

9.3.5 *Time limit on assessment*

> **4.6.2 Assessment period**
>
> …
>
> However, the AER must assess a cost pass-through application within 90 business days, ~~including~~ subject to any extension of the decision making time.

The AER draft decision includes minor revisions to the description of the AER's time limit to consider pass through events. APA VTS has included these changes in its revised access arrangement.

9.3.6 *Additional change to access arrangement*

> **D.7 Tariff Variation Formula**
>
> For the calculation of SCA change the year 2023 to 2024. Amend as follows, For inclusion in the building block calculation for 2023 2024, the SCA will be escalated for inflation from December 2017 to December 2024.

Following the submission of our January 2017 proposal, APA VTS advised the AER of a minor error in the access arrangement revision proposal that referred to the wrong year for the application of the second carry forward amount. The AER corrects this error in this required revision, which APA VTS has adopted.

A Summary of APA VTS responses to AER required revisions

Reference	AER required revision	APA VTS response
Services		
	(no revisions required)	No further revisions – see chapter 2
Capital Base		
Revision 2.1:	Make all necessary amendments to reflect this draft decision on the roll forward of the capital base over the 2013–17 access arrangement period, as set out in Table 2.1.	Adopted in part – see chapter 5
Revision 2.2:	Make all necessary amendments to reflect this draft decision on the roll forward of the capital base over the 2018–22 access arrangement period, as set out in Table 2.2.	Adopted in part – see chapter 5
Revision 2.3:	Update the access arrangement (section 3.8) to set out the depreciation schedule used for rolling forward the capital base at the commencement of the 2023–27 access arrangement period as follows: The depreciation schedule (straight-line) for establishing the opening capital base at 1 January 2023 will be based on forecast capital expenditure at the asset class level.	Not adopted – see discussion in section 5.3.3
Rate of Return		
Revision 3.1	Make all the necessary amendments to the access arrangement proposal to give effect to this draft decision.	APA VTS response in chapter 6

Reference	AER required revision	APA VTS response
Depreciation		
Revision 5.1	Make all necessary amendments to reflect this draft decision on the regulatory depreciation allowance for the 2018–22 access arrangement period, as set out in table 5.1.	Adopted in part – see chapter 5
Revision 5.2	Make all necessary amendments to reflect this draft decision on the remaining asset lives as at 1 January 2018, as set out in Table 5.3.	Adopted in part – see chapter 5
Capital Expenditure		
Revision 6.1:	Make all necessary amendments to reflect our draft decision on conforming capex for 2013–17, as set out in Table 6.1.	Adopted in part – see chapter 4
Revision 6.2:	Make all necessary amendments to reflect our draft decision on conforming capex for 2018–22, as set out in Table 6.2.	Adopted in part – see chapter 4
Operating Expenditure		
Revision 7.1	We require APA make all necessary amendments to reflect our draft decision on forecast opex for the 2018–12 access arrangement period, as set out in Table 7.2.	Adopted – see chapter 7
Corporate Income Tax		
Revision 8.1	Make all necessary amendments to reflect this draft decision on the proposed corporate income tax allowance for the 2018–22 access arrangement period, as set out in table 8.1.	See section 5.4
Revision 8.2	Make all necessary amendments to reflect this draft decision on the opening tax asset base as at 1 January 2018, as set out in Table 8.4.	See section 5.4

<table>
<tr><th>Reference</th><th>AER required revision</th><th>APA VTS response</th></tr>
<tr><td>Revision 8.3</td><td>Make all necessary amendments to reflect this draft decision on the remaining tax asset lives for the 2018–22 access arrangement period as set out in Table 8.5.</td><td>See section 5.4</td></tr>
<tr><td>Incentive Mechanisms</td><td></td><td></td></tr>
<tr><td>Revision 9.1</td><td>Remove clause 8.2 of the proposed access arrangement.</td><td>Adopted in part – see section 2.2.1</td></tr>
<tr><td>Revision 9.2</td><td>Remove clause 3.6 of the proposed access arrangement and replace it with the following text:
3.6 Opex incentive mechanism
a) In each of the first five years after 2022, the Reference Tariffs must be determined in a manner that includes, in addition to all other amounts required or permitted under the Rules or Service Provider's Access Arrangement, a benefit sharing allowance calculated in accordance with this section.
b) The benefit sharing allowance (B_t) in each year (t) is equal to the sum of the efficiency gains (E_t) in selected prior years, as given in the following table:
<table>
<tr><th>Year (t)</th><th>B_t</th></tr>
<tr><td>2023</td><td>$E_{2018} + E_{2019} + E_{2020} + E_{2021} + E_{2022}$</td></tr>
<tr><td>2024</td><td>$E_{2019} + E_{2020} + E_{2021} + E_{2022}$</td></tr>
<tr><td>2025</td><td>$E_{2020} + E_{2021} + E_{2022}$</td></tr>
<tr><td>2026</td><td>$E_{2021} + E_{2022}$</td></tr>
</table></td><td>Adopted in part – see section 2.2.1</td></tr>
</table>

Reference	AER required revision		APA VTS response
	2027	E_{2022}	

c) The efficiency gain for 2018 is to be calculated in accordance with the following formula:

$$E_{2018} = (F_{2018} - A_{2018}) - (F_{2017} - A_{2017}) + (F_{2016} - A_{2016})$$

where:

E_{2018} is the Service Provider's efficiency gain in 2018

F_{2018} is the Service Provider's forecast operating costs for 2018 as specified in section 3.6(h)

A_{2018} is the Service Provider's actual operating costs for 2018 as specified in section 3.6(g)

F_{2017} is the Service Provider's forecast operating costs for 2017 as specified in section 3.6(h)

A_{2017} is the Service Provider's actual operating costs for 2017 as specified in section 3.6(g)

F_{2016} is the Service Provider's forecast operating costs for 2016 as specified in section 3.6(h)

A_{2016} is the Service Provider's actual operating costs for 2016 as specified in section 3.6(g).

d) The efficiency gains or losses (E_t) for each of 2019, 2020, 2021 and 2022 are calculated in accordance with the following formula:

$$E_t = (F_t - A_t) - (F_{t-1} - A_{t-1})$$

where:

F_t is the Service Provider's forecast operating costs for year (t) as specified in section 3.6(h)

A_t is the Service Provider's actual operating costs for year (t) as specified in section 3.6(g)

F_{t-1} is the Service Provider's forecast operating costs for the year prior to year (t) as specified in

Reference	AER required revision	APA VTS response
	section 3.6(h) A_{t-1} is the Service Provider's actual operating costs for the year prior to year (t) as specified in section 3.6(g)	
	e) Actual operating expenditure in 2022 is to be estimated using: $$A^*_{2022} = F_{2022} - (F_b - A_b) + non\text{-}recurrent\ efficiency\ gain_b$$ where A^*_{2022} is the estimate of opex for the final year of the access arrangement. - F_{2022} is the forecast opex for the final year of the access arrangement period. F_b is the forecast opex for the base year used to forecast opex in the access arrangement period following this access arrangement as specified in section 3.6(h) A_b is the actual opex for the base year used to forecast opex in the access arrangement period following this access arrangement as specified in section 3.6(g) $Non\text{-}recurrent\ efficiency\ gain_b$ is the adjustment made to base year opex used to forecast opex for the access arrangement period expected to commence 1 January 2023 to account for opex associated with one-off factors. f) To ensure efficiency gains or losses made in 2022 are retained for five years, opex for the access arrangement period commencing on 1 January 2023 should be forecast in a manner consistent with the estimate for opex in 2022, A^*_{2022}, in paragraph (e) above. This provides the Service Provider the same reward had the expenditure level in 2022 been known. g) In each case, the Service Provider's actual operating costs for any year must: i) be determined using the same cost categories and method used to calculate the approved forecast opex as specified in section 3.6(h);	

Reference	AER required revision	APA VTS response

ii) be determined without adjustments for volume;

iii) exclude any cost category that is not forecast using a single year revealed cost approach in the access arrangement period following this Access Arrangement Period (intended to commence 1 January 2023). These costs to be excluded may include debt raising costs.

h) The Service Provider's forecast operating costs for any year, are equal to:

i) the forecast operating costs for that year as shown in the table below; plus

ii) the aggregate of all costs associated with a Cost Pass-through Event with respect to that year; plus or minus

iii) any adjustment required so that the forecast expenditures are consistent with any capitalisation policy changes, where APA changes its approach to classifying costs as either capital expenditure or operating expenditure during the access arrangement period.

Approved forecast opex for the opex incentive mechanism ($ million, 2017)

	2016	2017	2018	2019	2020	2021	2022
Approved forecast opex	**25.2**	**26.3**	**25.7**	**25.7**	**25.7**	**26.7**	**26.9**

Note: Excludes debt raising costs.

i) If there is a change in APA's approach to classifying costs as either capital expenditure or operating expenditure, APA must provide to the AER a detailed description of the change and a calculation of its impact on forecast and actual operating expenditure.

j) For the purposes of calculating the benefit sharing allowance (B_t) in the years 2023 to 2027, the actual and forecast operating costs in 2018 to 2022 must be in real dollars. The price indices used in this calculation are to be consistent with those used to forecast opex for the access arrangement period following this Access Arrangement Period (expected to commence 1 January 2023).

Reference	AER required revision	APA VTS response
Revision 9.3 [sic 9.2]	In section 4.7 of the proposed access arrangement, remove the number 8.2 and replace it with the number 3.6.	Adopted in part – see section 2.2.1
Tariffs		
Revision 10.1	Re-calculate reference tariffs so that the levels of the tariffs reflect the draft decision forecasts of demand, capex, opex and rate of return.	Adopted in part – see section 9.2.2
Revision 10.2	Apply the cross-system tariff in addition to the refill tariff to users who ship gas from Longford or Culcairn into Iona storage and later take it out of storage for export to South Australia. Calculate reference tariffs to reflect this change so that no costs are double counted.	See discussion in section 9.2.1
Tariff Variation		
D.4	Tariff variation formula In the revised proposal make all changes necessary, such that the tables referred to for the calculation of VATR, give effect to our draft decision.	Adopted in part – see chapter 8
D.7	Tariff variation formula For the calculation of SCA change the year 2023 to 2024. Amend as follows, *For inclusion in the building block calculation for 2023 2024, the SCA will be escalated for inflation from December 2017 to December 2024.*	Adopted – see section 9.3.6
4.6.2	Assessment period … However, the AER must assess a cost pass-through application within 90 business days, ~~including~~ subject to any extension of the decision making time.	Adopted – see section 9.3.4

Reference	AER required revision	APA VTS response
4.6.3	Considerations *Restore the following text:* In making its decision on whether to approve the proposed Cost Pass through Event adjustment, the AER must take into account the following: Whether: (a) the costs to be passed through are for the delivery of pipeline services; (b) the costs are incremental to costs already allowed for in reference tariffs; (c) the total costs to be passed through are building block components of Total Revenue; (d) the costs to be passed through meet the relevant National Gas Rules criteria for determining the building block for total revenue in determining Reference Tariffs; (e) the efficiency of Service Provider's decisions and actions in relation to the risk of the Cost Pass-through Event occurring, including whether Service Provider has failed to take any action that could reasonably be taken to reduce the magnitude of the costs incurred as a result of the Cost Pass-through Event and whether Service Provider has taken or omitted to take any reasonable action where such action or omission has increased the magnitude of the costs; and (f) any other factors the AER considers relevant and consistent with the National Gas Rules and National Gas Law.	Adopted – see section 9.3.1
	Carbon cost event *Delete definition and all references to this event from the access arrangement.*	Not adopted – see discussion in section 9.3.6
	New gas market structure development event *Delete definition and all references to this event from the access arrangement.*	Not adopted – see discussion in

Reference	AER required revision	APA VTS response
		section 9.3.3
4.6.4	Materiality *Amend as follows:* … an event is considered to materially increase or materially decrease costs where that event is reasonably expected to have an impact of one per cent of the smoothed forecast revenue specified in the Access Arrangement Information, approved by the AER in its final decision on the Access Arrangement, in the years year of the Access Arrangement Period that the costs are incurred …	Adopted – see section 9.3.4
Demand		
Revision 13.1	Make all necessary revisions to reflect this draft decision, as set out in Table 13 1.	Adopted – see chapter 3

B Supporting financial models

B.1 Revised Post Tax Revenue Model – Public

B.2 Revised Roll Forward Model – Public

B.3 Revised Capital expenditure model – Public

B.4 Revised Operating expenditure model – Public

B.5 Revised Tariff model – Confidential

B.6 Revised Price Control Model – Confidential

B.7 Revised Efficiency Carry Over Model – Public

All provided as separate files

C Supporting expert reports

C.1 Bruce Ackland and Associates: Opinion regarding in line inspection and alternative methods for detecting metal loss in pipelines

C.2 Rate of return parameters update: Report prepared for APA Group, August 2017

These documents are referred to in the submission as supporting documents.

All provided as separate documents