Amadeus Gas Pipeline

2021-26 access arrangement information

1 July 2020

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Contents

Abbreviations

AER	Australian Energy Regulator
AGP	Amadeus Gas Pipeline
APA	APA Group
BGP	Bonaparte Gas Pipeline
Capex	Capital expenditure
GJ	Gigajoule
MDQ	Maximum Daily Quantity
NGR	National Gas Rules
NT	Northern Territory
Opex	Operating expenditure
TJ	Terajoule
TJ/d	Terajoule per day

1 Introduction

1.1 Information requirements

This Access Arrangement Information is part of a revisions proposal for the Access Arrangement for the Amadeus Gas Pipeline (**AGP**). Proposed revisions to the AGP Access Arrangement, to be submitted to the Australian Energy Regulator by 1 July 2020, have been prepared by the service provider for the pipeline, APT Pipelines (NT) Pty Limited (ACN 075 733 336) (**Amadeus**).

Amadeus is a wholly owned entity within APA Group.

The revised access arrangement is expected to commence on 1 July 2021.

The Access Arrangement Information has been prepared, in accordance with r. 42 and r. 43(1) of the National Gas Rules (**NGR**), to provide users and prospective users with sufficient information to:

- to understand the background to the access arrangement revision proposal
- to understand the basis and derivation of the various elements of the access arrangement revision proposal.

This document follows the scheme of NGR, r. 72 in its setting out the access arrangement information for a full access arrangement proposal.

1.2 Basis of information in the access arrangement information

Unless otherwise stated, all information in the access arrangement revision proposal is provided in real June 2021 dollars.

Past values are have been recast to values at June 2021 prices using the Consumer Price Index (CPI), All Groups Weighted Average Eight Capital Cities for the June quarter, published by the Australian Bureau of Statistics.

Forecasts for the period from December 2019 to June 2021 have been made using the CPI forecasts published by the Reserve Bank of Australia in its May 2020 Statement on Monetary Policy.

1.3 Financial models

In April 2020, the AER published, in accordance with NGR r. 75A and r. 75B, the following financial models:

- Roll Forward Model (gas transmission service provider version)
- Post-tax Revenue Model (gas transmission service provider version).

Amadeus has used the Roll Forward Model, without modification, to calculate the opening capital base for the AGP at commencement of the access arrangement period (1 July 2021).

Amadeus has used the Post-tax Revenue Model, without modification, for the calculation of depreciation, the estimated cost of corporate income tax (including adjustment for the value of imputation credits), total revenue, and the X-factors for the path of the AGP reference tariffs.

1.4 Structure of the document

The remaining parts of this Access Arrangement Information are as follows:

- Section 2: Information for the earlier access arrangement period
- Section 3: Opening capital base
- Section 4: Projected capital base
- Section 5: Forecast capacity and utilisation
- Section 6: Forecast operating expenditure
- Section 7: Allowed rate of return
- Section 8: Estimated cost of corporate income tax
- Section 9: Incentive mechanism
- Section 10: Proposed approach to setting reference tariffs
- Section 11: Reference tariff variation mechanism
- Section 12: Incentive mechanisms
- Section 13: Total revenue and reference tariffs.

2 Information for the earlier access arrangement period

2.1 Capital expenditure

Capital expenditure (by asset class), over the earlier access arrangement period (2016-17 to 2020-21) is shown in Table 1. Expenditures for 2016-17, 2017-18 and 2018-19 are actual expenditures. Estimated expenditures are shown for 2019-20 and 2020-21.

Table 1: Capital expenditure by asset class: 2016-17 to 2020-21 ($m, nominal)

		2016-17	2017-18	2018-19	2019-20 est.	2020-21 est.	Total
Pipelines	$m	2.072	0.206	0.666	3.182	0.050	**6.177**
Compressors	$m	0.000	0.000	0.000	0.000	0.000	**0.000**
Meter Station	$m	1.650	0.662	1.905	3.634	1.715	**9.565**
SCADA	$m	0.012	0.095	0.505	0.000	0.632	**1.244**
O&M Facilities	$m	1.594	1.178	1.524	1.636	1.914	**7.846**
Buildings	$m	0.000	0.000	0.000	1.328	0.000	**1.328**
Corporate Assets (IT Software)	$m	0.000	0.000	0.000	0.000	0.000	**0.000**
Land and Easement	$m	0.000	0.000	0.000	0.000	0.000	**0.000**
Capital expenditure	**$m**	**5.327**	**2.141**	**4.601**	**9.779**	**4.311**	**26.159**

2.2 Operating expenditure

Operating expenditure (by category), over the earlier access arrangement period (2016-17 to 2020-21) is shown in Table 2 below. Expenditures for 2016-17, 2017-18 and 2018-19 are actual expenditures. Estimated expenditures are shown for 2019-20 and 2020-21.

2.3 Pipeline usage over the earlier access arrangement period

2.3.1 Minimum, maximum and average demand for each delivery point

The minimum, maximum, average and total demand for each delivery point, during the earlier access arrangement period, are shown in Table 3.

Table 2: Operating expenditure by category: 2016-17 to 2020-21 ($m, real Jun-2021)

		2016-17	2017-18	2018-19	2019-20 est.	2020-21 est.	Total
Base operating expenditure	$m	11.061	8.653	9.385	8.955	7.578	45.631
Category specific forecasts							
Corporate costs	$m	1.453	1.443	1.679	1.679	1.638	7.893
In-line inspection costs	$m	0.005	1.601	0.790	0.486	0.343	3.225
Excavation costs	$m	0.001	0.067	0.001	0.000	0.000	0.069
	$m	1.459	3.111	2.470	2.165	1.981	11.186
Lease payments	$m	0.429	0.433	0.430	0.000	0.000	1.292
Step changes							
Audit costs	$m	0.000	0.000	0.000	0.000	0.120	0.120
Debt raising costs	$m	0.069	0.069	0.068	0.071	0.070	0.347
Operating expenditure	**$m**	**13.017**	**12.267**	**12.354**	**11.190**	**9.748**	**58.576**

Table 3: Actual and estimated minimum, maximum and average demands for each delivery point: 2016-17 to 2020-21

			2016-17 Actual	2017-18 Actual	2018-19 Actual	2019-20 est.	2020-21 est.
Darwin Channel Island	Minimum	TJ/d	19.7	21.0	19.8	19.8	19.8
	Maximum	TJ/d	48.2	48.4	46.0	46.0	46.0
	Average	TJ/d	33.3	33.5	30.2	27.9	28.8
	Total	TJ	12,151.6	12,244.7	11,010.1	10,218.0	10,516.2
Darwin City Gate (distribution system)	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	0.2	0.2	0.2	0.2	0.2
	Average	TJ/d	0.1	0.1	0.1	0.1	0.1
	Total	TJ	18.2	18.6	23.2	22.2	22.2
Darwin City Gate (into Wickham Point Pipeline)	Minimum	TJ/d	0.0	5.1	0.0	1.6	1.6
	Maximum	TJ/d	23.9	35.3	55.1	23.9	23.9
	Average	TJ/d	11.8	16.7	18.6	12.5	12.9
	Total	TJ	4,321.3	6,090.7	6,798.8	4,575.0	4,708.5
Darwin Townend Road	Minimum	TJ/d	0.2	0.1	0.0	0.0	0.0
	Maximum	TJ/d	0.8	0.8	0.7	0.7	0.7
	Average	TJ/d	0.5	0.5	0.2	0.2	0.2
	Total	TJ	188.4	187.6	88.6	69.0	68.8
Pine Creek	Minimum	TJ/d	0.0	0.0	0.6	0.6	0.6
	Maximum	TJ/d	6.0	5.9	6.0	6.0	6.0
	Average	TJ/d	5.2	4.6	4.7	4.6	4.7
	Total	TJ	1,885.9	1,672.9	1,698.4	1,667.6	1,716.2
Katherine	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	6.5	5.2	8.3	8.3	8.3
	Average	TJ/d	1.0	0.8	1.4	1.2	1.3
	Total	TJ	351.5	298.7	524.6	447.6	460.7
Daly Waters	Minimum	TJ/d	1.3	0.5	0.0	0.0	0.0
	Maximum	TJ/d	9.4	9.7	11.0	11.0	11.0
	Average	TJ/d	6.8	7.3	7.6	8.0	8.0
	Total	TJ	2,481.5	2,663.4	2,783.5	2,629.5	2,629.5
Elliot	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	0.2	0.1	0.2	0.2	0.2
	Average	TJ/d	0.1	0.1	0.1	0.1	0.1
	Total	TJ	37.3	34.5	41.7	38.7	38.7
Warrego (NGP)	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	0.0	0.0	94.2	94.2	94.2
	Average	TJ/d	0.0	0.0	52.0	77.1	77.1
	Total	TJ	0.0	0.0	15,750.2	28,218.6	28,141.5
Tennant Creek	Minimum	TJ/d	0.4	0.0	0.6	0.3	0.3
	Maximum	TJ/d	1.7	1.7	1.7	1.7	1.7
	Average	TJ/d	1.1	1.1	1.2	1.1	1.1
	Total	TJ	391.6	394.4	426.7	403.5	403.5
Tanami Road	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	0.0	0.0	8.5	8.5	8.5
	Average	TJ/d	0.0	0.0	3.5	6.6	6.6
	Total	TJ	0.0	0.0	737.7	2,433.5	2,426.8
Palm Valley Interconnect (Alice Springs)	Minimum	TJ/d	2.8	1.8	0.2	0.2	0.2
	Maximum	TJ/d	9.4	7.7	8.3	8.3	8.3
	Average	TJ/d	5.2	5.4	5.3	4.3	4.3
	Total	TJ	1,910.0	1,963.2	1,931.5	1,566.4	1,562.2
Total demand (pipeline usage)		**TJ**	**23,737.2**	**25,569.0**	**41,815.0**	**52,289.7**	**52,694.9**

2.3.2 *User numbers at delivery points*

The numbers of pipeline users at each delivery point over the earlier access arrangement period are presented in Table 4. (The numbers for 2020-21 are estimates.)

Table 4: Numbers of users at delivery points: 2016-17 to 2020-21

Delivery Point	2016-17	2017-18	2018-19	2019-20	2020-21
Channel Island	1	1	1	1	1
Darwin City Gate (to distribution system)	1	1	2	2	2
Darwin City Gate (to Wickham Point Pipeline)	1	1	1	1	1
Townend Road	1	1	1	1	1
Pine Creek	2	2	2	2	2
Katherine	1	1	1	1	1
Mataranka	0	0	0	0	0
Daly Waters	2	2	2	2	2
Elliot	1	1	1	1	1
Warrego (to Northern Gas Pipeline)	0	0	5	5	3
Tennant Creek	1	1	1	1	1
Tanami Road	0	0	1	1	1
Palm Valley interconnect (to Alice Springs)	1	1	1	1	1

3 Opening capital base

The access arrangement period (2021-22 to 2025-26) commences, on 1 July 2021, at the end of the earlier access arrangement period.

The opening capital base at 1 July 2021 has been determined by "rolling forward" the capital base from commencement of the earlier access arrangement period in accordance with NGR, r. 77(2).

The capital base has been rolled forward to 1 July 2021 using the gas transmission service provider version of the AER's Roll Forward Model.

The AER's Roll Forward Model takes, as its starting point, the opening capital base approved by the AER in its 2016 Final Decision on the last proposed revisions to the AGP Access Arrangement.

Key steps in the capital base roll forward are:

- conforming capital expenditure for the earlier access arrangement period, adjusted for any difference between estimated and actual capital expenditure included in that opening capital base, and for any benefit or penalty associated with any difference between the estimated and actual capital expenditure, is added to the capital base
- amounts are added in accordance with r. 82 (capital contributions), r. 84 (speculative capital expenditure) and rule 86 (re-use of redundant assets) - Amadeus has not added any amount in accordance with any of these rules
- regulatory depreciation, calculated within the Roll Forward Model using the AER's indexed straight line method, is subtracted
- the value of any asset disposals is subtracted - Amadeus has subtracted the value of disposals.

The roll forward of the AGP capital base, from 1 July 2016, is shown in Table 5.

Table 5: Roll forward of the AGP capital base ($m, nominal)

		2016-17	2017-18	2018-19	2019-20 (est.)	2020-21 (est.)
Opening capital base	**$m**	**115.817**	**119.354**	**119.722**	**122.574**	**130.560**
Net actual/estimated CAPEX	$m	5.337	1.902	4.724	9.934	4.374
Regulatory depreciation	$m	-1.800	-1.534	-1.872	-1.947	-4.905
Adjustments	$m					-4.713
End of year asset value	$m	119.354	119.722	122.574	130.560	125.317

The asset value at the end of the last year of the earlier access arrangement period, $125.317 million, is the opening capital base for the access arrangement period (2021-22 to 2025-26).

4 Projected capital base

Projection of the capital base forward, over the access arrangement period, is similar to roll forward of the capital base during the earlier access arrangement period:

- forecast conforming capital expenditure is added to the opening capital base (which, for the first year of the access arrangement period, is from the Roll Forward Model)
- if necessary, adjustments are made for capital contributions, speculative capital expenditure and re-use of redundant assets
- regulatory depreciation, calculated using the AER's indexed straight line method, is subtracted from the capital asset base
- the forecast value of any pipeline asset disposal is subtracted from the capital base.

Amadeus's forward projection of the AGP capital base for the period 2021-22 to 2025-26 is summarised in Table 6. The calculations summarised in the table have been made using the gas transmission service provider version of the AER's Post-tax Revenue Model.

Table 6: AGP projected capital base and return on capital base: 2021-22 to 2025-26 ($m, nominal)

		2021-22	2022-23	2023-24	2024-25	2025-26
Projected capital base	**$m**	**125.317**	**126.276**	**126.694**	**127.390**	**128.018**
Net capital expenditure	$m	2.318	1.987	2.454	2.590	2.677
Regulatory depreciation	$m	-1.359	-1.569	-1.758	-1.962	-2.204
Adjustments	$m					
End of year asset value	$m	126.276	126.694	127.390	128.018	128.491
Rate of return		4.79%	4.79%	4.79%	4.79%	4.79%
Return on capital base	**$m**	**6.005**	**6.051**	**6.071**	**6.105**	**6.135**

The return on the projected capital base shown in Table 6 is the product of:

- the projected capital base – the forecast total investment in the pipeline – at the beginning of the year
- the allowed rate of return.

Estimation of the allowed rate of return (4.79%) is explained in the section 7 below.

The forecast of conforming capital expenditure for the access arrangement period, which is the input to the Post-tax Revenue Model, is shown in Table 7.

Table 7: AGP forecast capital expenditure: 2021-22 to 2025-26 ($m, real Jun-2021)

		2021-22	2022-23	2023-24	2024-25	2025-26	Total
Pipelines	$m	0.429	0.429	0.374	0.409	0.258	**1.898**
Compressors	$m	0.000	0.000	0.000	0.000	0.000	**0.000**
Meter Station	$m	0.809	0.838	1.220	0.956	0.842	**4.665**
SCADA	$m	0.000	0.000	0.000	0.000	0.000	**0.000**
O&M Facilities	$m	1.000	0.606	0.666	0.964	1.252	**4.489**
Buildings	$m	0.000	0.000	0.000	0.000	0.000	**0.000**
Corporate Assets (IT Software)	$m	0.000	0.000	0.000	0.000	0.000	**0.000**
Land and Easement	$m	0.000	0.000	0.000	0.000	0.000	**0.000**
	$m	**2.238**	**1.873**	**2.260**	**2.330**	**2.352**	**11.053**

Regulatory depreciation calculated for the purpose of projecting the capital base forward over the access arrangement (as shown in Table 6) has been calculated using the indexed straight line method, which is embedded in the Post-tax Revenue Model. The calculation of depreciation is summarised in Table 8.

Table 8: AGP regulatory depreciation: 2021-22 to 2025-26

		2021-22	2022-23	2023-24	2024-25	2025-26
Expected inflation		2.39%	2.39%	2.39%	2.39%	2.39%
Cumulative expected inflation		1.0239	1.0483	1.0733	1.0990	1.1252
Projected capital base	$m	125.317	126.276	126.694	127.390	128.018
Real straight line depreciation						
Pipelines	$m	1.488	1.494	1.499	1.504	1.509
Compressors	$m	0.370	0.370	0.370	0.370	0.370
Meter Station	$m	0.546	0.562	0.579	0.604	0.623
SCADA	$m	-0.059	-0.059	-0.059	-0.059	-0.059
O&M Facilities	$m	1.418	1.519	1.580	1.647	1.745
Buildings	$m	0.124	0.124	0.124	0.124	0.124
Corporate Assets (IT Software)	$m	0.000	0.000	0.000	0.000	0.000
Land and Easement	$m	0.000	0.000	0.000	0.000	0.000
Leased assets	$m	0.363	0.363	0.363	0.363	0.363
	$m	4.249	4.372	4.456	4.552	4.674
Nominal (indexed) depreciation	$m	4.350	4.583	4.782	5.003	5.260
Inflation on capital base	$m	2.991	3.014	3.024	3.041	3.056
Regulatory depreciation	**$m**	**1.359**	**1.569**	**1.758**	**1.962**	**2.204**

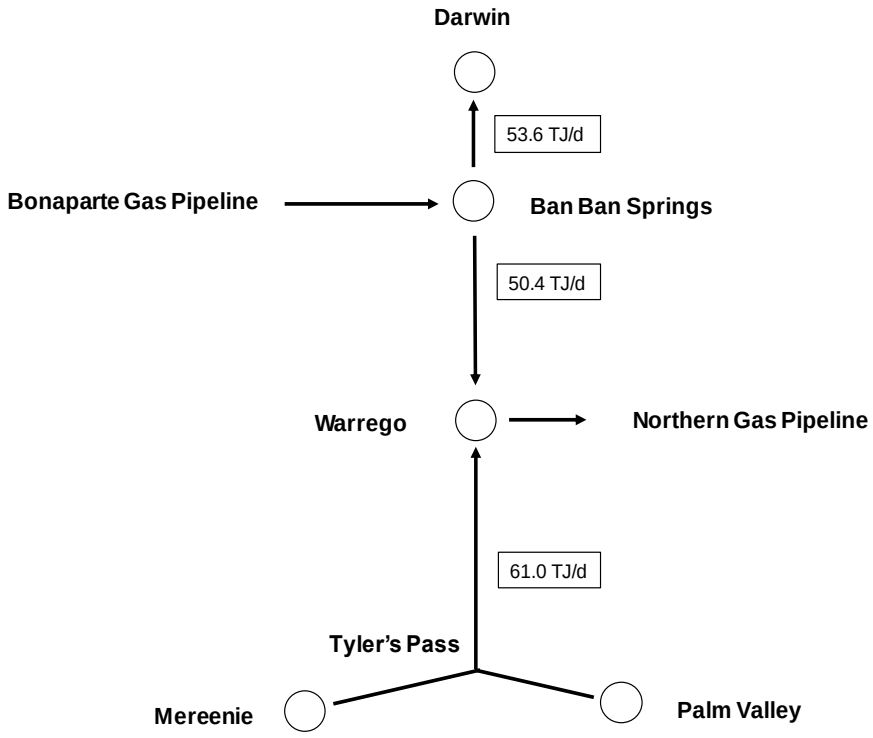
5 Forecast capacity and utilisation

The AGP is a transmission pipeline and user demand is principally a demand for pipeline capacity for the provision of firm transportation service. Demand for the transportation and delivery of volumes of gas derives from users' decisions to use their contracted capacities.

5.1 Forecast pipeline capacity

Interconnection with the Northern Gas Pipeline has segmented the capacity of the AGP in the way shown in Figure 1.

Figure 1: AGP gas flows and capacity for firm transportation service after January 2019



The segment capacities shown in Figure 1 have been used to derive the nameplate rating of the AGP.

The nameplate rating of the AGP – its capacity to provide firm transportation service under the operating conditions in effect since interconnection with the Northern Gas Pipeline in January 2019 – is 165.0 TJ/d.

Forecast capacity for the provision of firm service during the access arrangement period (2021-22 to 2025-26) is shown in Table 9.

Table 9: Firm service capacity forecast: 2021-22 to 2025-26

		2021-22	2022-23	2023-24	2024-25	2025-26
Capacity	TJ/d	145.0	145.0	145.0	145.0	145.0

The capacity of the Northern Gas Pipeline is reported to be 90.0 TJ/d. The capacity of the AGP is, in these circumstances, used to the maximum extent when users with pre-existing agreements have access to capacity of 145.0 TJ/d at AGP receipt points. The segment capacities may total 165.0 TJ/d, but the utilisation of those capacities is constrained by capacity at the delivery point into the Northern Gas Pipeline at Warrego. An aggregate receipt point capacity of 145.0 TJ/d in pre-existing agreements effectively uses all of the capacity available for the provision of firm transportation service in the AGP.

5.2 Minimum, maximum and average demand for each delivery point

Pipeline capacity utilisation – minimum, maximum and average demand at each delivery point – during the access arrangement period 2021-22 to 2025-26 is shown in Table 10 below.

Table 10: Forecast minimum, maximum and average demands and total volume by delivery point: 2021-22 to 2025-26

			2021-22 Forecast	2022-23 Forecast	2023-24 Forecast	2024-25 Forecast	2025-26 Forecast
Darwin Channel Island	Minimum	TJ/d	19.8	19.8	19.8	19.8	19.8
	Maximum	TJ/d	46.0	46.0	46.0	46.0	46.0
	Average	TJ/d	29.7	30.7	31.7	32.7	33.7
	Total	TJ	10,852.7	11,200.0	11,590.1	11,928.3	12,310.0
Darwin City Gate (distribution system)	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	0.2	0.2	0.2	0.2	0.2
	Average	TJ/d	0.1	0.1	0.1	0.1	0.1
	Total	TJ	22.2	22.2	22.2	22.2	22.2
Darwin City Gate (into Wickham Point Pipeline)	Minimum	TJ/d	1.6	1.6	1.6	1.6	1.6
	Maximum	TJ/d	23.9	23.9	23.9	23.9	23.9
	Average	TJ/d	13.3	13.7	14.2	14.6	15.1
	Total	TJ	4,859.2	5,014.7	5,189.3	5,340.7	5,511.6
Darwin Townend Road	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	0.7	0.7	0.7	0.7	0.7
	Average	TJ/d	0.2	0.2	0.2	0.2	0.2
	Total	TJ	68.8	68.8	69.0	68.8	68.8
Pine Creek	Minimum	TJ/d	0.6	0.6	0.6	0.6	0.6
	Maximum	TJ/d	6.0	6.0	6.0	6.0	6.0
	Average	TJ/d	4.9	5.0	5.2	5.3	5.5
	Total	TJ	1,771.1	1,827.8	1,891.5	1,946.7	2,009.0
Katherine	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	8.3	8.3	8.3	8.3	8.3
	Average	TJ/d	1.3	1.3	1.4	1.4	1.5
	Total	TJ	475.4	490.6	507.7	522.5	539.2
Daly Waters	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	11.0	11.0	11.0	11.0	11.0
	Average	TJ/d	8.0	8.0	8.0	8.0	8.0
	Total	TJ	2,629.5	2,629.5	2,629.5	2,629.5	2,629.5
Elliot	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	0.2	0.2	0.2	0.2	0.2
	Average	TJ/d	0.1	0.1	0.1	0.1	0.1
	Total	TJ	38.7	38.7	38.7	38.7	38.7
Warrego (Northern Gas Pipeline)	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	94.2	94.2	94.2	94.2	94.2
	Average	TJ/d	77.1	77.1	77.1	77.1	77.1
	Total	TJ	28,141.5	28,141.5	28,218.6	28,141.5	28,141.5
Tennant Creek	Minimum	TJ/d	0.3	0.3	0.3	0.3	0.3
	Maximum	TJ/d	1.7	1.7	1.7	1.7	1.7
	Average	TJ/d	1.1	1.1	1.1	1.1	1.1
	Total	TJ	403.5	403.5	403.5	403.5	403.5
Tanami Road	Minimum	TJ/d	0.0	0.0	0.0	0.0	0.0
	Maximum	TJ/d	8.5	8.5	8.5	8.5	8.5
	Average	TJ/d	6.6	6.6	6.6	6.6	6.6
	Total	TJ	2,426.8	2,426.8	2,433.5	2,426.8	2,426.8
Palm Valley Interconnect (Alice Springs)	Minimum	TJ/d	0.2	0.2	0.2	0.2	0.2
	Maximum	TJ/d	8.3	8.3	8.3	8.3	8.3
	Average	TJ/d	4.3	4.3	4.3	4.3	4.3
	Total	TJ	1,562.2	1,562.2	1,566.4	1,562.2	1,562.2
Total demand (pipeline usage)		**TJ**	**53,251.7**	**53,826.4**	**54,560.1**	**55,031.5**	**55,663.1**

5.3 Capacity available for interruptible service

Interruptible service can be made available using any unused part of the AGP capacity which has been contracted to users with pre-existing agreements. That capacity can be made available to other users subject to recognition of rights, in the pre-existing agreements, for gas to be scheduled ahead of gas scheduled for others.

The capacity potentially available for the provision of interruptible service using the AGP during the period 2020-21 to 2025-26 is shown in Table 11.

Table 11: AGP capacity available for interruptible service 2021-2026

		2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
Ban Ban Springs - Darwin	TJ/d	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Ban Ban Springs - Warrego	TJ/d	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Capacity: Tyler's Pass - Warrego	TJ/d	61.0	61.0	61.0	61.0	61.0	61.0
Firm transportation service: Tyler's Pass - Warrego	TJ/d	22.6	22.6	22.6	22.6	22.6	22.6
Palm Valley, Mereenie - Warrego	TJ/d	38.4	38.4	38.4	38.4	38.4	38.4
Capacity available for interruptible service	TJ/d	**38.4**	**38.4**	**38.4**	**38.4**	**38.4**	**38.4**

Around 38 TJ/d of capacity is expected to be available for the provision of interruptible service (see Table 11), but the demand for that capacity is uncertain.

Forecast demand for interruptible service during the period 2021-22 to 2025-26 is shown in Table 12.

Table 12: Forecast demand for interruptible service: 2021-22 to 2025-26

		2021-22	2022-23	2023-24	2024-25	2025-26
Interruptible service	TJ/d	15.0	15.0	15.0	15.0	15.0

6 Forecast operating expenditure

Forecast operating expenditure over the access arrangement period is shown in Table 13.

Table 13: Forecast operation expenditure: 2021-22 to 2025-26 ($m, real Jun-2021)

		2021-22	2022-23	2023-24	2024-25	2025-26
Trended base year OPEX	$m	7.565	7.547	7.534	7.521	7.508
Separately forecast costs						
In-line inspection (pigging) costs	$m	0.205	0.358	0.358	0.102	0.113
Excavation costs	$m	0.000	0.000	0.000	0.000	0.000
Step changes						
Annual RIN audit costs	$m	0.120	0.120	0.120	0.120	0.120
Controllable OPEX	$m	7.889	8.025	8.012	7.743	7.741
Corporate costs	$m	1.638	1.638	1.638	1.638	1.638
Debt raising costs	$m	0.061	0.060	0.059	0.058	0.057
Forecast OPEX	**$m**	**9.588**	**9.723**	**9.709**	**9.439**	**9.435**

Amadeus has forecast operating expenditure for the AGP, over the period 2021-22 to 2025-26, using the base, step and trend method.

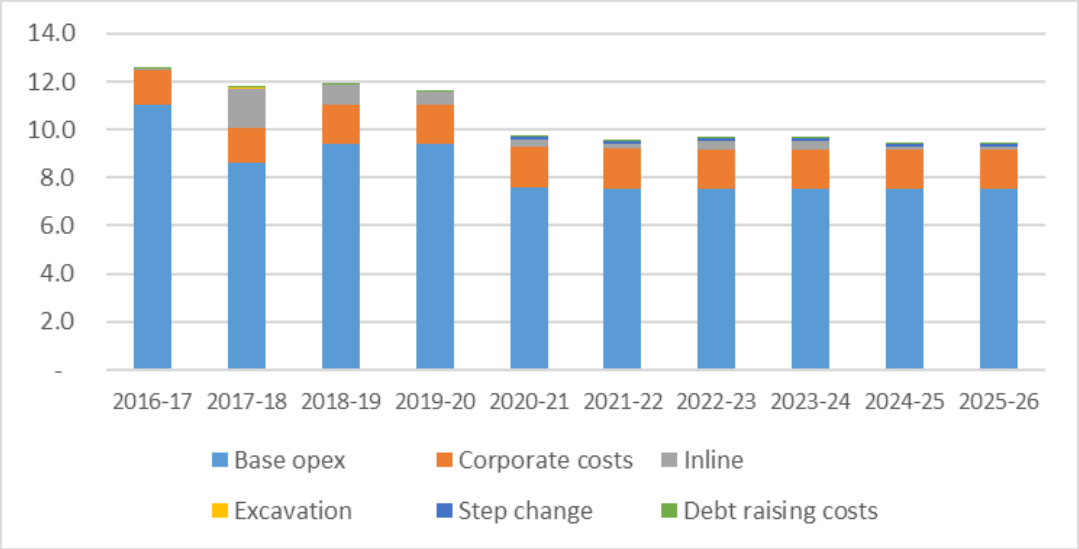
When applying the base, step and trend method, Amadeus has:

- removed from the base year (2017-18) total operating expenditure costs which are non-recurrent, and which must be separately forecast
- trended the recurrent base year costs forward across the access arrangement period (2021-22 to 2025-26), applying a series of indices to reflect expected increases in costs
- adjusted for step changes
- separately forecast, and added to the forecast of recurrent operating expenditure, forecasts for non-recurrent:
  - in-line inspection costs
  - excavation costs
  - corporate costs.

The forecast of total operating expenditure for the period 2021-22 to 2025-26 includes a forecast of debt raising costs. This forecast of debt raising costs is the forecast generated by the Post-tax Revenue Model.

A comparison of operating expenditures over the access arrangement period (2021-22 to 2025-26) and over the earlier access arrangement period is provided in Figure 2.

Figure 2: Actual and forecast operating expenditure from 2016 to 2026 ($m, real Jun-2021)



7 Allowed rate of return

Amadeus has applied the AER's December 2018 Rate of Return Instrument when determining the allowed rate of return.

For the purpose of preparing the access arrangement revision proposal, Amadeus has adopted a 'placeholder' averaging period, and has calculated an indicative rate of return using market data for that period.

Amadeus has taken, as the placeholder averaging period for its indicative rate of return calculation, the period of 20 trading days to 31 December 2019.

7.1 Rate of return

The rate of return is to be a nominal "vanilla" weighted average of a rate of return on equity and a rate of return on debt:

$$k_t = k^e \times (1 - G) + k_t^d \times G$$

where:

- k_t is the rate of return in regulatory year t
- k^e is the rate of return on equity for the access arrangement period
- k_t^d is the rate of return on debt for regulatory year t; and
- G is the gearing ratio.

7.2 Indicative rate of return on equity

In accordance with clause 4 of the Rate of Return Instrument, Amadeus has calculated the rate of return on equity component (k^e) of the indicative rate of return using the asset pricing model:

$$k^e = k^f + \beta \times MRP$$

where:

- k^f is the risk free rate of return for the access arrangement period;
- β (beta) is the equity beta; and
- MRP is the market risk premium.

Amadeus has estimated the risk free rate of return (k^f) as a simple average of the yields on Commonwealth Government Securities with terms to maturity of 10 years over the placeholder averaging period.

The estimate of the risk free rate is 1.21%.

Clause 4 of the Rate of Return Instrument sets a value of beta of 0.6, and a sets the market risk premium at an effective annual rate of 6.1%.

Using these values, and the asset pricing model of clause 4 of the Rate of Return Instrument, the indicative rate of return on equity is 4.87%:

$$1.21\% + 0.6 \times 6.1\% = 4.87\%$$

7.3 Indicative rate of return on debt

The return on debt in regulatory year t of the access arrangement period (k_t^d)), the Rate of Return Instrument advises, is to be a trailing average of rates of return on debt for a period of 10 years.

A transition into the trailing average is required, and the first regulatory year of the transition period for the AGP is the period of 12 months from 1 July 2016.

Amadeus has calculated the trailing average, which is to be the allowed rate of return on debt until that allowed rate is updated, as:

$$k^d_{2021\text{-}22} = \left(5 \times k^d_{2016\text{-}17} + \sum_{i=1}^{5} k_i^d \right)$$

where:

- $k^d_{2016\text{-}17}$ is 5.56%
- k_i^d, i = 1, 2, 3, are the previously updated rates of return on debt for 2017-18, 2018-19 and 2019-20, respectively, 5.09%, 4.50% and 4.26%
- k_i^d, i = 4, 5, are estimates of the on-the-day rate of return on debt for 2020-21 and 2021-22.

Amadeus has calculated the on-the-day rates of return on debt for 2020-21 and 2021-22 in the way required by clauses 10 to 22 of the Rate of Return Instrument, using data for the placeholder averaging period. The on-the-day rates are each 2.90%.

$k^{d}_{2021\text{-}22}$ is, then, 4.75%, and Amadeus has used this percentage as the indicative the rate of return on debt for the access arrangement period.

7.4 Gearing

The Rate of Return Instrument requires that the gearing ratio be set at a value of 0.6, and Amadeus has used this value when calculating an indicative rate of return.

7.5 Indicative rate of return

Amadeus has used, as the indicative rate of return for the access arrangement period, 4.79% (see Table 14 below).

Table 14: Rate of return

Component		Value
Rate of return on equity		
Risk free rate	k^f	1.21%
Beta	β	0.60
Market risk premium	MRP	6.1%
Rate of return on equity	$k^e = k^f + \beta \times MRP$	**4.87%** = 1.21% + 0.60 x 6.1%
Rate of return on debt		
Rate of return on debt	$k^d_{2019\text{-}20}$	**4.75%**
Gearing ratio	G	**0.6**
Rate of return	$k = k^e \times (1 - G) + k^d_{2019\text{-}20} \times G$	**4.79%** = 4.87% x (1 – 0.6) + 4.75% x 0.6

8 Estimated cost of corporate income tax

An estimate of the cost of corporate income tax, adjusted for the value of imputation credits available to certain classes of equity investors, has been included in the total revenue.

Amadeus has calculated the estimated cost of corporate income tax during the access arrangement period using the Post-tax Revenue Model. The model returns an estimated cost of tax, and a net tax allowance. Each is zero in each year of the access arrangement period (Table 15).

Table 15: Estimated cost of corporate income tax and net tax allowance: 2021-22 to 2025-26 ($m, nominal)

		2021-22	2022-23	2023-24	2024-25	2025-26	Total
Tax payable (from PTRM)	$m	0.000	0.000	0.000	0.000	0.000	**0.000**
Value of imputation credits	$m	0.000	0.000	0.000	0.000	0.000	**0.000**
Cost of tax	**$m**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

The net tax allowance is the estimated cost of tax less the value of imputation credits. Those credits have been valued at 58.5% of the cost of tax, in accordance with paragraph 27 of the AER's December 2018 Rate of Return Instrument.

9 Incentive mechanism

Amadeus has applied the efficiency carryover mechanism of section 8 of the AGP Access Arrangement to calculate increments for efficiency gains, and decrements for efficiency losses, for the access arrangement period.

These efficiency gains and losses, which are building blocks of total revenue in each year of the access arrangement period, are summarised in Table 16.

Table 16: Efficiency gains and losses: 2021-22 to 2025-26 ($m, nominal)

		2021-22	2022-23	2023-24	2024-25	2025-26	Total
Efficiency gains and losses	$m	1.322	1.979	-0.699	0.256	0.000	2.859

10 Proposed approach to setting reference tariffs

Amadeus proposes to offer, in accordance with revised AGP Access Arrangement:

- the firm service reference service of the current Access Arrangement
- an interruptible service reference service, as required by the AER's December 2019 reference service proposal decision for the AGP.

Each of these reference services must have a reference tariff.

10.1 Reference tariff structure

Amadeus proposes retaining the existing structure of the firm service tariff. The tariff is a number of $/GJ of contracted capacity for transportation between any receipt point and any delivery point on the AGP.

A simple price per GJ MDQ has been retained because the costs of providing the firm service are the fixed costs of investment in the pipeline, and operating and maintenance costs which do not vary with the volume of gas transported. These costs are appropriately allocated to users on the basis of the capacities they contract for firm service provision.

Amadeus proposes a similar - simple – structure for the reference tariff for the interruptible service. The interruptible tariff is a number of $/GJ for the volume of gas transported between any receipt point and any delivery point on the pipeline.

A simple price per GJ is proposed because the costs of providing the interruptible service are the fixed costs of investment in the pipeline, and operating and maintenance costs which do not vary with the volume of gas transported. These costs are appropriately allocated to users on the basis of the volume of interruptible service they use.

A description of the way in which Amadeus has proposed setting the reference tariffs for the firm and interruptible services, and a demonstration of the relationship between costs and tariffs, is provided in section 13.2.

10.2 Method used to allocate costs

NGR r. 93 requires the allocation of the total revenue between reference and other services in the ratio in which costs are allocated between reference and other services.

R. 95 further requires that a tariff for a transmission pipeline reference service be designed to generate from the provision of each reference service the portion of total revenue referable to that reference service.

The portion of total revenue referable to a particular reference service is to be determined as follows:

- costs directly attributable to each reference service are to be allocated to that service
- other costs attributable to reference services are to be allocated between them on a basis (which must be consistent with the revenue and pricing principles) determined or approved by the AER.

With the AGP, there is a difficulty in applying this guidance.

Services provided under pre-existing agreements use all of the capacity available for the provision of firm transportation (and a small amount of the capacity available for interruptible service).

If, as is the case, no capacity is available for the provision of the firm service reference service, no part of total revenue can be allocated to that service, and no reference can be determined.

To enable users and prospective users to understand the pricing of a firm service reference service, should capacity become available for that service, a firm service reference tariff is calculated for the AGP Access Arrangement by making the assumption that all of the capacity used to provide the firm transportation services of pre-existing agreements is capacity which would otherwise have been used for the firm service reference service.

Amadeus proposes allocating total revenue between the maximum quantity of firm transportation service under pre-existing agreements, and the forecast of the volume of interruptible service which might be expected during the access arrangement period (2021-22 to 2025-26).

Users with pre-existing agreements for firm transportation service have maximum transportation capacity of 145.0 TJ/d under these agreements.

Demand for interruptible services is not expected to exceed 15.0 TJ/d during the next access arrangement period.

Amadeus has used these quantities to allocate the total revenue between the firm service and the interruptible service for the purpose of setting proposed reference tariffs for those services. (All of the total revenue has been attributed to the provision of the reference services. All costs are attributable to the reference services, but no cost is directly attributable to either the firm service or the interruptible service individually.)

Costs are allocated in a way which provides Amadeus with a reasonable opportunity to recover at least the efficient costs expected to be incurred in providing the firm service and the interruptible reference services. Providing Amadeus with a reasonable opportunity to recover at least its efficient costs provides effective incentives for:

- efficient investment in the AGP (the pipeline used to provide the provides reference services)
- the efficient provision of pipeline services.

11 Reference tariff variation mechanism

The reference tariff variation mechanism in the AGP Access Arrangement allows annual variation of the reference tariff for:

- current inflation
- a change in the rate of return on debt (as required by the Rate of Return Instrument)
- a material increase in costs attributable to one or more of a small number of specified events (including regulatory change, tax change, terrorism and natural disaster).

Amadeus proposes retaining this mechanism. It can be applied, essentially unchanged, to vary annually both the firm service reference tariff and the interruptible service reference tariff.

12 Incentive mechanisms

No new incentive mechanism is proposed for the period 2021-22 to 2025-26.

13 Total revenue and reference tariffs

13.1 Total revenue

Total revenue for the AGP, for the access arrangement period (2021-22 to 2025-26), is summarised in Table 17.

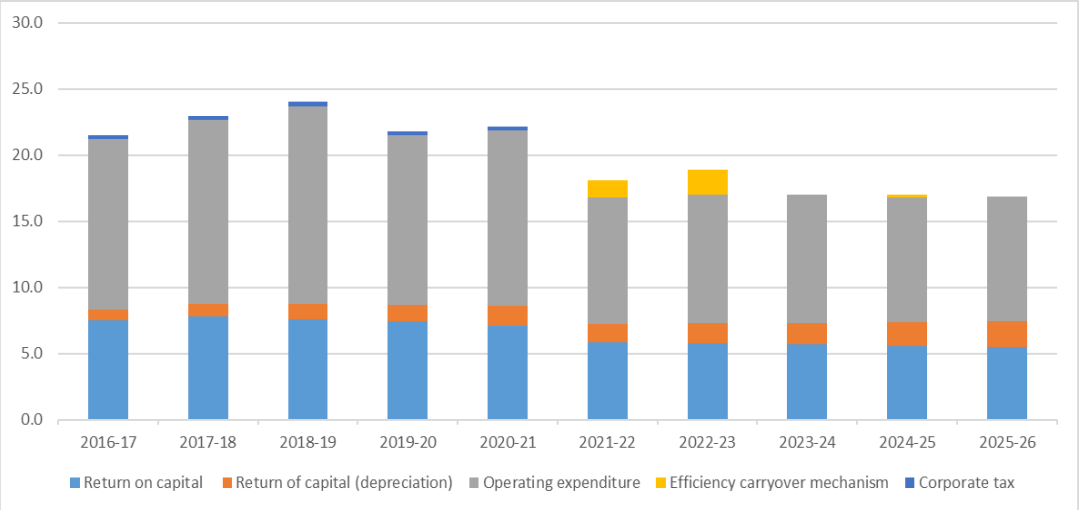
Table 17: AGP total revenue 2021-22 to 2025-26 (nominal)

		2021-22	2022-23	2023-24	2024-25	2025-26
Return on capital base	$m	6.005	6.051	6.071	6.105	6.135
Regulatory depreciation	$m	1.359	1.569	1.758	1.962	2.204
Cost of corporate income tax	$m	0.000	0.000	0.000	0.000	0.000
Efficiency gains and losses	$m	1.322	1.979	-0.699	0.256	0.000
Forecast operating expenditure	$m	9.817	10.192	10.421	10.373	10.616
Total revenue	**$m**	**18.504**	**19.792**	**17.551**	**18.696**	**18.955**
Smoothed total revenue	$m	18.504	18.607	18.711	18.815	18.920
X factor		19.67%	1.79%	1.79%	1.79%	1.79%

Table 17 also shows the smoothed total revenue (which has present value equal to the present value of the total revenue, with the allowed rate of return as the discount rate), and the X factors which effect the smoothing. The smoothed total revenue and the X factors are calculated within the Post-tax Revenue Model.

The components of total revenue for the access arrangement period and compared with the components in the earlier access arrangement period in Figure 3.

Figure 3: AGP total revenue: 2016-17 to 2025-26 ($m, real Jun-2021)



13.2 Reference tariffs

Reference tariffs for the AGP are shown in Table 18.

Table 18: AGP reference tariffs 2021-22 to 2025-26

		2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
Firn service	$/GJ MDQ	0.5740	0.3168	0.3186	0.3195	0.3222	0.3240
Interruptible service	$/GJ	n.a.	0.3168	0.3186	0.3195	0.3222	0.3240

The firm service and interruptible service reference tariffs are nominally identical.

They are, however, substantially different: at the firm service load factor for the Amadeus Gas Pipeline (about 72%), the interruptible tariff represents a discount of about 28% on the firm service cost per GJ of gas delivered.

Reference tariff setting proceeds as follows:

- smoothed total revenue (from the Post-tax Revenue Model) is allocated between the firm service reference service and the interruptible service reference on the basis of the demand forecast
- the existing firm service tariff structure ($/GJ MDQ, postage stamp) is retained

- a postage stamp tariff is adopted for interruptible service, but in the form $/GJ of gas delivered
- the firm service reference tariff in the first year of the access arrangement period is the portion of smoothed total revenue divided by the total firm service capacity (145.0 TJ/d): the tariff is $0.3168/GJ MDQ
- over the access arrangement period, the firm service tariff follows a CPI - X price path: the assumed CPI increase is 2.39%, the X factors are 1.79% as calculated by the Post-tax Revenue Model, and the tariff in the final year of the access arrangement period is forecast to be $0.3240/GJ MDQ
- the interruptible service reference tariff in the first year of the access arrangement period is the portion of smoothed total revenue allocated to interruptible service, divided by the average quantity of interruptible service (15.0 TJ/d): the tariff is $0.3168/GJ
- over the access arrangement period, the interruptible tariff follows a CPI - X price path: the assumed CPI increase is 2.39%, the X factors are 1.79% as calculated by the Post-tax Revenue Model, and the tariff in the final year of the access arrangement period is forecast to be $0.3240/GJ
- forecast revenue from these firm service and interruptible service reference tariffs, over the access arrangement period, has a total present value of $81.436 million (discounted at the Post-tax Revenue Model rate of return of 4.79%); this is the present value of total revenue in the Post-tax Revenue Model, and confirms the internal consistency of the tariff calculations.

These calculation for AGP reference tariff setting are summarised in Table 19.

Table 19: AGP reference tariff setting: 2021-22 to 2025-26 ($m, nominal)

			2021-22 365	2022-23 365	2023-24 366	2024-25 365	2025-26 365
Forecast							
Firm service	TJ/d		145.00	145.00	145.00	145.00	145.00
Interruptible service	TJ/d		15.00	15.00	15.00	15.00	15.00
	TJ/d		160.00	160.00	160.00	160.00	160.00
Firm service	GJ		52,925,000	52,925,000	53,070,000	52,925,000	52,925,000
Interruptible service	GJ		5,475,000	5,475,000	5,490,000	5,475,000	5,475,000
	GJ		58,400,000	58,400,000	58,560,000	58,400,000	58,400,000
Input from Post-tax Revenue Model							
Smoothed total revenue	$m		18.504	18.607	18.711	18.815	18.920
p0, X factors			p0	X02	X03	X04	X05
			19.67%	1.79%	1.79%	1.79%	1.79%
Inflation forecast			2.39%	2.39%	2.39%	2.39%	2.39%
Rate of return		4.79%					
Reference tariff calculation							
Allocation of (smoothed) total revenue to reference services							
Firm service	$m		16.769	16.862	16.957	17.051	17.147
Interruptible service	$m		1.735	1.744	1.754	1.764	1.774
	$m		18.504	18.607	18.711	18.815	18.920
Reference tariff: firm service							
Total revenue allocated to firm	$m		16.769	16.862	16.957	17.051	17.147
Firm service	GJ MDQ		52,925,000	52,925,000	53,070,000	52,925,000	52,925,000
Tariff: firm service	$/GJ MDQ		**0.3168**	**0.3186**	**0.3195**	**0.3222**	**0.3240**
Reference tariff: interruptible service							
Total revenue allocated to interruptible	$m		1.7347	1.7444	1.7541	1.7639	1.7738
Interruptible service	GJ		5,475,000	5,475,000	5,490,000	5,475,000	5,475,000
Tariff: interruptible service	$/GJ		**0.3168**	**0.3186**	**0.3195**	**0.3222**	**0.3240**
Forecast revenue							
Firm service	$m		16.769	16.862	16.957	17.051	17.147
Interruptible service	$m		1.735	1.744	1.754	1.764	1.774
	$m		18.504	18.607	18.711	18.815	18.920
PV(Firm service forecast revenue)	$m	73.801					
PV(Interruptible service forecast revenue)	$m	7.635					
PV(forecast revenue)	$m	81.436					
PV(smoothed total revenue) (from PTRM)	$m	81.436					
PV difference	$m	**0.000**					

As shown in the last rows of Table 19:

- when discounted at the proposed rate of return (4.79%), the forecast revenue from firm service has a present value of $73.801 million, and the forecast revenue from interruptible service has a present value of $7.635 million; the forecast revenue from reference services has a present value of $81.436 million
- this present value ($81.436 million) is the present value of the total revenue (total cost of providing the services) from the Post-tax Revenue Model.

As required by the NGR, costs have been allocated, and reference tariffs set, in a way which provides Amadeus with a reasonable opportunity to recover at least the efficient costs expected to be incurred in providing reference services.