



GOLDFIELDS GAS PIPELINE

Access Arrangement Revision Proposal

Supporting Information

PUBLIC VERSION

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Overview and summary

The Goldfields Gas Transmission Joint Venture (GGT JV) participants, Southern Cross Pipelines Australia Pty Ltd, Southern Cross Pipelines (NPL) Australia Pty Ltd and Alinta Energy GGT Pty Ltd, and the pipeline manager, Goldfields Gas Transmission Pty Ltd (GGT), have prepared and submitted to the Western Australian Economic Regulation Authority (ERA), proposed revisions to the Access Arrangement for the Goldfields Gas Pipeline (GGP Access Arrangement).

These proposed revisions are for that part of the Goldfields Gas Pipeline (GGP) which is covered by the access regulatory regime of the National Gas Law (NGL) and the National Gas Rules (NGR). At the time of preparation of the proposed revisions, some GGP assets are uncovered. Those parts of the GGP which are covered are referred to as the Covered Pipeline.

The revisions are for the access arrangement period which is expected to be the period from 1 January 2020 to 31 December 2024.

Pipeline services and reference service

The GGP can be used to provide:

- (a) firm transportation service;
- (b) park service;
- (c) loan service;
- (d) interruptible transportation service; and
- (e) in-pipe trade service.

The GGP does not provide backhaul service, and is not configured to provide bi-directional service.

All of the current gas transportation agreements with users of the Covered Pipeline are agreements for the provision of firm transportation service.

The reference service of the GGP Access Arrangement is firm transportation service (firm service).

Demand for pipeline services

The demand for pipeline services provided using the Covered Pipeline is dependent on conditions in international commodity markets, principally the markets for iron ore, gold and nickel.

Despite lower prices for iron ore, Australian production and export volumes have remained high. Gold exploration expenditures have grown since their low point in

mid-2014, and Australian production, principally from Western Australia, remains high. There is currently strong demand for nickel ore for the manufacture of the nickel compounds used in lithium ion batteries and energy storage device. In these circumstances, all of the existing capacity available for firm service provision using the Covered Pipeline is expected to be contracted to users during the access arrangement period.

Some gas is transported for power generation in regional communities, and a small quantity is delivered into the Kalgoorlie distribution system for commercial and residential use in the city. The commercial and residential market for gas in Kalgoorlie is small and unlikely to grow significantly during the access arrangement period.

Forecast capital expenditure

Forecast capital expenditure for the access arrangement period is largely for replacement of items of plant and equipment on a pipeline which is now some 25 years old. No expansion of pipeline capacity is planned during the access arrangement period.

Forecast conforming capital expenditure: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million
Forecast CAPEX: 2020-2024	7.389	2.558	2.187	1.857	3.162

Rate of return

A rate of return of 5.56% has been used in calculating the total revenue from which the revised reference tariff has been determined.

Rate of return determination has followed the revised Final Rate of Return Guidelines (2018) which were issued by the ERA on 18 December 2018.

Total revenue and reference tariff

The proposed revised reference tariff for the Covered Pipeline is shown in the table below.

Proposed revised reference tariff: 2020-2024

Toll tariff	\$/GJ MDQ	0.139646
Capacity reservation tariff	\$/GJ MDQ km	0.000846
Throughput tariff	\$/GJ km	0.000231

The structure of the reference tariff, and the way in which the total revenue has been allocated to the components of the tariff, have not been changed.

Operating expenditures are expected to remain relatively stable. No significant cost increases are expected during the access arrangement period.

Forecast operating expenditure: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million
Forecast OPEX: 2020-2024	19.606	20.028	20.619	21.219	21.852

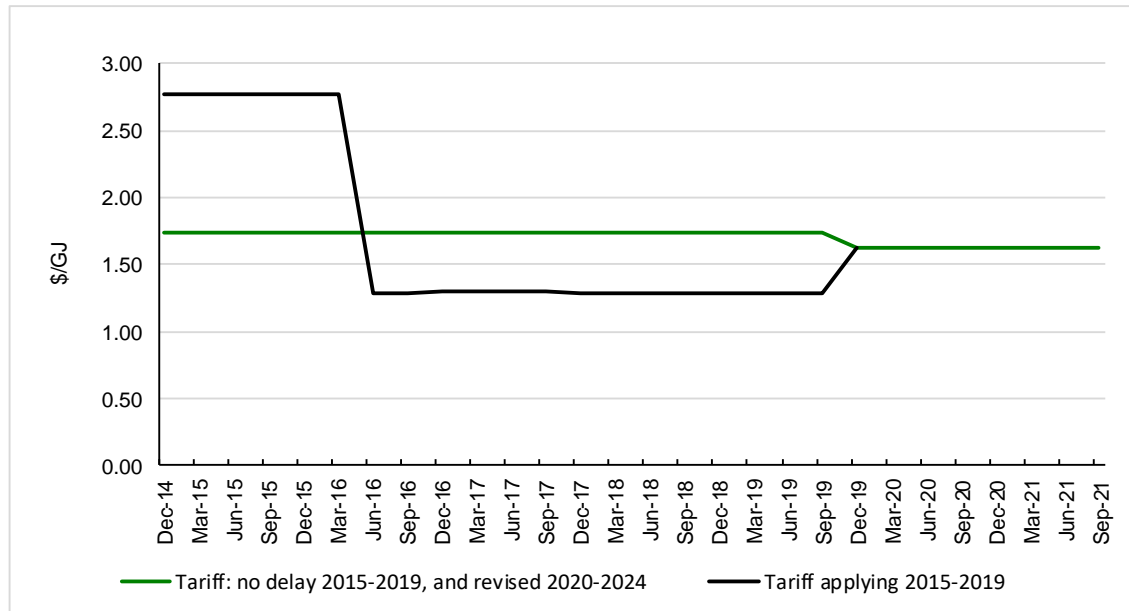
The total revenue, from which the revised reference tariff has been determined, is shown in the following table.

Forecast total revenue: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million
Return on equity	11.045	11.130	11.043	10.931	10.797
Return on debt	10.131	10.209	10.130	10.027	9.904
Depreciation	4.453	5.548	6.043	6.473	5.770
Operating expenditure	19.606	20.028	20.619	21.219	21.852
Cost of tax	5.261	5.053	4.964	4.793	4.803
Value of imputation credits	-2.631	-2.527	-2.482	-2.396	-2.402
Total revenue: 2020-2024	47.865	49.441	50.317	51.046	50.725

A final decision was made on the last proposed revisions to the GGP Access Arrangement in June 2016. Those revisions were to have come into effect on 1 January 2015 and, during the interval of delay (1 January 2015 to 30 June 2016), the higher December 2014 reference tariff continued to apply in accordance with the requirements of NGR rule 92(3). This was taken into account by the ERA when setting the reference tariff for the June 2016 Final Decision. The black line in the graph below shows the time path of the tariff which applied between December 2014 and December 2018, and which is expected to apply during 2019.

Reference tariff 2015-2019 and proposed revised tariff (Kalgoorlie, load factor =1.0)



The reference tariff for the period 2020-2024 is about 26% higher than the tariff applying from 1 July 2016 to 31 December 2019, but that is a direct consequence of the depression of the tariff during the period following the interval of delay (during the period July 2016 to December 2019).

If there had been no interval of delay, the tariff for the period 2015 to 2019 would have been lower (shown by the green line in the graph above), and the reference tariff for 2020 to 2024 would have been around 6% lower than that lower tariff.

Access Arrangement and terms and conditions

No major change to the GGP Access Arrangement, or to the terms and conditions applying to the reference service (which are in Schedule D to the Access Arrangement), has been proposed.

Current uncertainty

Significant uncertainty is arising from:

- (a) changes which are being made to the access regulatory regime of the NGL and the NGR, but which have not been implemented at date on which the GGP Access Arrangement revisions proposal was submitted;
- (b) market development.

Changes to the regulatory regime which are in progress are:

- (a) amendments to the core regulatory regime of Parts 8 to 12 of the NGR, which were recommended by the Australian Energy Market Commission in July 2018, and which are now being implemented by the Council of Australian Governments Energy Council;
- (b) introduction of a binding rate of return instrument into the regulatory regime of the NGL and the NGR, and its being given effect through rate of return guidelines revisions which were only recently completed by the ERA;
- (c) a review of the regulatory treatment of the cost of tax, currently being undertaken by the Australian Energy Regulator, which will lead to changes in total revenue determination, changes which are expected to be implemented through amendments to the national regulator's Post Tax Revenue Model, during the first half of 2019.

If the NGL and the NGR are amended before a final decision on the GGP Access Arrangement revision proposal is made, the ERA may not be able to approve the proposal as submitted without additional information.

Should this be the case, the GGT JV participants will submit amendments to the proposal to allow ERA approval of revisions consistent with the requirements of the NGL and the NGR as they are at the time of a final decision.

Uncertainty is also arising from market development.

During 2018, a number of potential users of GGP capacity were identified. Meeting their needs would require pipeline expansion and, on 1 September 2018, the GGP Access Arrangement process for co-ordinating capacity development was initiated. At the time of submission of the access arrangement revision proposal, the GGT JV participants did not have a firm pipeline expansion plan and associated costing which could be taken into account when determining a proposed revised reference tariff.

1 Introduction

In April 1993, a joint venture, the Goldfields Gas Transmission Joint Venture (GGT JV), was created to respond to a call, by the Government of Western Australia, for expressions of interest in the construction of a transmission pipeline to deliver gas into the Pilbara and Goldfields regions of the State.

Construction of the pipeline, the Goldfields Gas Pipeline (GGP), and its subsequent operation, were facilitated by an agreement between the GGT JV participants and the State of Western Australia (GGP State Agreement), which was ratified by the Goldfields Gas Pipeline Agreement Act 1994.

The original joint venture participants were Wesminco Oil Pty Ltd, Normandy Pipelines Pty Ltd and BHP Minerals Pty Ltd.

The current joint venture participants, and their shares in the GGT JV, are:

- (a) Southern Cross Pipelines Australia Pty Ltd (62.664%);
- (b) Southern Cross Pipelines (NPL) Australia Pty Ltd (25.493%); and
- (c) Alinta Energy GGT Pty Ltd (11.843%).

Southern Cross Pipelines Australia Pty Ltd and Southern Cross Pipelines (NPL) Australia Pty Ltd are APA Group companies. Alinta Energy GGT Pty Ltd is a company within the Alinta Energy group.

Under the GGP State Agreement, the GGT JV participants have access to the capacity of the GGP for their own use. The Joint Venture participants are to provide third parties with access to such capacity, including developable capacity, as may from time to time not be contracted or utilised (GGP State Agreement, Clause 20(1)).

The parties to the GGP State Agreement contemplated uniform laws or subsidiary legislation being promulgated for gas pipeline operation in Western Australia. The terms and conditions of third party access to the GGP were to be subject to and in accordance with these uniform laws (GGP State Agreement, Clauses 20(2) and 21(2)).

Uniform laws were subsequently promulgated in the form of the Gas Pipelines Access (Western Australia) Act 1998, which implemented the access regulatory regime of the National Third Party Access Code for Natural Gas Pipeline Systems (Code) in Western Australia. The relevant regulator was the Western Australian Independent Gas Pipelines Access Regulator.

In January 2010, the National Gas Access (WA) Act 2009 came into effect, replacing the Code with the regime of the National Gas Law (NGL) and the National Gas Rules

(NGR). A transmission pipeline which was covered under the Code (an “old scheme covered transmission pipeline”) was deemed, by clause 6 of Schedule 3 to the NGL, to be a covered pipeline on commencement of the NGL.

The GGP was a covered pipeline under the regime of the Code and, on commencement of the NGL in Western Australia, became a covered pipeline under the access regulatory regime of the NGL and the NGR. Terms and conditions of third party access to the GGP are now subject to and in accordance with the regime of the NGL and the NGR as it applies in Western Australia.

The National Gas Access (WA) Act 2009 assigns the economic regulatory functions and powers of the NGL to the Western Australian Economic Regulation Authority (ERA).

1.1 Revisions to the GGP Access Arrangement

Section 132 of NGL requires that a covered pipeline service provider submit, for approval by the ERA under the NGR, in the circumstances and within the time period specified by the NGR, revisions to a full access arrangement.

The Access Arrangement for the GGP – a full access arrangement – which was approved by the ERA in accordance with the requirements of the NGR, and dated 30 June 2016, required that further revisions be submitted to the regulator on or before 1 January 2019.

Accordingly, an access arrangement revision proposal for the GGP Access Arrangement was submitted to the ERA on 21 December 2018.

As required by rule 52 of the NGR, the access arrangement revision proposal:

- (a) set out the amendments to the access arrangement that the service providers propose for the access arrangement period; and
- (b) incorporated the text of the access arrangement in the revised form.¹

The access arrangement revision proposal also included the access arrangement information (GGP Access Arrangement Information) required by rule 43(1) to assist users and prospective users of the GGP understand the background to the proposal.

¹ In the access arrangement revision proposal, and in this Supporting Information:

- (a) **access arrangement period** means the period during which the proposed revisions are to apply; this period is expected to be 1 January 2020 to 31 December 2024; and
- (b) **earlier access arrangement period** means the period during which the current access arrangement is expected to apply; that period is expected to end on 31 December 2019.

The revisions to the GGP Access Arrangement provide for price regulation as required by the NGR, and address all of the other matters for which the NGR require provision be made in a full access arrangement.

1.2 The Covered Pipeline

The GGP is the gas transmission pipeline system defined in Pipeline Licence PL 24 issued under the Petroleum Pipelines Act 1969 (WA).

The gas transmission pipeline system defined in PL 24, as it was at the time the Gas Pipelines Access (Western Australia) Act came into effect (in 1999), was a covered pipeline. It was subject to the scheme of access regulation of the Code.

Some of the assets subsequently constructed to add to the gas transportation capacity of the GGP became parts of the covered pipeline. Other assets were uncovered.

PL 24 was varied, in November 2000, to include a compressor station at Wiluna. That compressor station was constructed during 2000 and 2001, and became part of the covered pipeline. PL 24 was again varied in July 2003 to incorporate a compressor unit at Paraburdoo. Paraburdoo Compressor Unit 1, which was installed during 2003 and 2004, also became part of the covered pipeline.

Section 10.3(c) of the GGP Access Arrangement approved by the ERA on 14 July 2005 allowed GGT to elect whether an expansion of the pipeline was to be covered, subject only to GGT notifying the regulator of this fact prior to the expansion coming into operation.

In 2006, the capacity of the GGP was increased by installing a second compressor at Paraburdoo. On 3 October 2006, GGT elected, under section 10.3(c) of the GGP Access Arrangement, that Paraburdoo Compressor Unit 2 not be covered. On 20 November 2006, the ERA issued a notice acknowledging GGT's advice of its election that the compressor unit not be covered, and noting that the cost of the unit would not be included in the capital base when the GGP Access Arrangement was next revised.

In 2009, compressors were installed at Wyloo West and Ned's Creek, further increasing the capacity of the pipeline. GGT elected that these compressors not be covered, and notified the ERA (on 1 April 2009, and on 31 July 2009, respectively). These elections were acknowledged by the regulator in notices issued on 22 April 2009 (Wyloo West) and 21 August 2009 (Ned's Creek).

On 30 March 2012, following a decision by the Western Australian Electricity Review Board in Application No. 1 of 2010 (*Application for review of the decision by the Western Australian Economic Regulation Authority published on 5 August 2010 to approve its own revised Access Arrangement for the Goldfields Gas Pipeline*),

section 10 of the GGP Access Arrangement was substantially amended, and GGT's right to unilaterally elect that an expansion not be covered was removed. New section 10.2(a) required that GGT elect that an expansion or extension of the GGP be treated as part of the covered pipeline, or not be treated as part of the covered pipeline, and that GGT's election have the ERA's consent. In the event of that consent being withheld, the ERA was to make an express determination whether the proposed expansion or extension was to be treated as part of the covered pipeline, or was not be treated as part of the covered pipeline (GGP Access Arrangement, section 10.2(b)).

On 4 November 2013, GGT notified the ERA that it was expanding the capacity of the GGP to deliver gas to iron ore mining operations in the Pilbara. The expansion comprised additional compressor units at Yarraloola and Paraburdoo, a new compressor station at Turee Creek, and custody transfer meter stations at Boonamichi Well and Yarnima. GGT advised that, pursuant to section 10.2(a) of the GGP Access Arrangement, it was electing not to treat the expansion as part of the covered pipeline. The ERA determined, on 30 May 2014, that the expansion not be covered.

The following parts of the pipeline system defined in PL 24 were covered at 1 January 2019:

- (a) the pipeline between the meter station located at the eastern end of the Varanus Island to DBNGP Onshore Pipeline (PL 17) and the Yarraloola Compressor Station (Varanus-GGP Interconnect Pipeline);
- (b) part of the DBNGP-GGP Interconnect Pipeline upstream of the Yarraloola Compressor Station;
- (c) the GGP mainline between the Yarraloola Compressor Station and the inlet to the Newman Lateral;
- (d) Compressor Units 1 and 2 at Yarraloola, and Compressor Unit 1 at Paraburdoo;
- (e) the Newman Lateral (the lateral pipeline which extends from the GGP mainline to Newman);
- (f) compressor stations at Ilgarari and Wiluna; and
- (e) the GGP mainline between the inlet to the Newman Lateral and the delivery point at Kalgoorlie South.

GGT refers to these parts of the pipeline system defined in PL 24, which were covered at 1 January 2019, as the Covered Pipeline.

None of the lateral pipelines extending from the GGP mainline, other than the Newman Lateral, is part of the pipeline system defined in PL 24. (PL 24 does not include the delivery station facilities located at the Newman Power Station.)

1.3 Service provider and covered pipeline service provider

A service provider is a person who:

- (a) owns, controls or operates; or
- (b) intends to own, control or operate,

a pipeline or scheme pipeline, or any part of a pipeline or scheme pipeline (NGL, s. 8(1)).

The current GGT JV participants, Southern Cross Pipelines Australia Pty Limited, Southern Cross Pipelines (NPL) Australia Pty Ltd and Alinta Energy GGT Pty Ltd, own the GGP. They are service providers for the GGP.

The GGT JV Agreement assigns the tasks of developing and operating the GGP to a manager.

Unless the Joint Venture participants agree otherwise, the manager is to be a company whose issued share capital is to be owned by one or more of the participants, or by related body corporates of one or more of the participants. The manager was initially (in 1994), and continues to be, Goldfields Gas Transmission Pty Ltd (GGT). GGT is now a wholly owned entity within APA Group.

GGT is also a service provider for the Covered Pipeline.

GGT, Southern Cross Pipelines Australia Pty Limited, Southern Cross Pipelines (NPL) Australia Pty Ltd, and Alinta Energy GGT Pty Ltd comprise a service provider group in respect of the GGP.

Each of Southern Cross Pipelines Australia Pty Limited, Southern Cross Pipelines (NPL) Australia Pty Ltd and Alinta Energy Pty Ltd has given its written permission for GGT to act on behalf of the service provider group in respect of service provider requirements under the NGL and the NGR.² GGT is, then, in accordance with s. 10(2) of the NGL, the complying service provider for the service provider group which owns or controls the GGP.

² At the meeting of the Goldfields Gas Transmission Joint Venture Management Committee held on 23 February 2018 (Meeting No. 67/18), the Joint Venture participants approved GGT acting as complying service provider for the purpose of revising the GGP Access Arrangement. This approval was recorded in the minutes of that meeting.

GGT has, as the complying service provider, submitted to the ERA, for approval under the NGR, proposed revisions to the GGP Access Arrangement in accordance with the requirement of s. 132 of NGL.

1.4 Current uncertainty

Significant uncertainty is arising from:

- (a) changes which are being made to the access regulatory regime of the NGL and the NGR, but which have not been implemented at date on which the GGP Access Arrangement revisions proposal was submitted;
- (b) market development.

Uncertainty arising from market development is discussed in section 2.3 of the Supporting Information.

Changes to the regulatory regime which are in progress are:

- (a) amendments to the core regulatory regime of Parts 8 to 12 of the NGR, which were recommended by the Australian Energy Market Commission (AEMC) in July 2018, and which are now being implemented by the Council of Australian Governments (COAG) Energy Council;
- (b) introduction of a binding rate of return instrument into the regulatory regime of the NGL and the NGR, and its being given effect through rate of return guidelines revisions which were only recently completed by the ERA;
- (c) a review of the regulatory treatment of the cost of tax, currently being undertaken by the Australian Energy Regulator, which will lead to changes in total revenue determination, changes which are expected to be implemented through amendments to the national regulator's Post Tax Revenue Model, during the first half of 2019.

1.4.1 Proposed amendments to the NGL and the NGR

In August 2016, the COAG Energy Council released a package of policy initiatives intended to further reform the Australian gas market. One of these initiatives was a review of the core regulatory regime of Parts 8 to 12 of the NGR. This review was to be carried by the AEMC.

On 3 July 2018, the AEMC published a final report from its review, which foreshadowed amendments to the NGL and the NGR.³ In particular, amendments were recommended which would effect coverage of the uncovered parts of otherwise covered pipelines. Coverage would be effected by having currently uncovered assets included in the existing access arrangement for the covered pipeline at the next access arrangement revision.

If implemented, this recommendation would require substantial changes to the GGP Access Arrangement.

Most of the recommendations of the AEMC's July 2018 final report have been accepted by the COAG Energy Council. A rule change proposal, which the Energy Council has submitted to the AEMC as rule-maker, is to be progressed under the NGL procedure for "fast track" rule changes, but completion of the process is not expected before 14 March 2019.⁴

The coverage of the currently uncovered parts of otherwise covered pipelines requires more than a change to the NGR; it requires a change to the NGL. The Energy Council has initiated a separate process through which its Senior Committee of Officials is to consider further options for law and rule changes, and to develop and evaluate them through a regulatory impact assessment. The timing and scope of the regulatory impact assessment are to be established before the end of 2018, but the process initiated by the Energy Council is unlikely to be completed until well into 2019.⁵

In these circumstances, the GGP Access Arrangement revision proposal has been prepared within the legal framework provided by the NGL and the NGR as they were on 1 January 2019.

If changes to the NGL and the NGR are made before the ERA makes a final decision on the revision proposal, the ERA may not be able to approve the proposal as submitted. The ERA is likely to require additional information before it can approve a revision proposal consistent with the changes to the NGL and the NGR which have been foreshadowed by the AEMC.

Should this be the case, the GGT JV participants will submit amendments to the revision proposal to allow ERA approval of revisions to the GGP Access Arrangement which are consistent with the requirements of the NGL and the NGR as they are at the time of a final decision.

³ AEMC, *Final Report: Review into the scope of economic regulation applied to covered pipelines*, 3 July 2018.

⁴ See <https://www.aemc.gov.au/rule-changes/regulation-covered-pipelines>.

⁵ COAG Energy Council, *Gas Market Reform Bulletin No. 3*, August 2018.

1.4.2 Binding rate of return instrument

GGT has prepared the GGP Access Arrangement revision proposal assuming:

- (a) a binding rate of return instrument will come into effect in Western Australia late in 2018, or early in 2019;
- (b) the binding rate of return instrument will apply in relation to any ERA economic regulatory decision made after the date of commencement of the relevant amendments to the NGL in Western Australia, even if the process leading to that regulatory decision commenced before that date; and
- (c) the rate of return specified in the binding instrument will be the rate of return which the ERA determines from the Final Rate of Return Guidelines (2018).

GGT's assumption that the binding rate of return instrument will apply, even though, the GGP Access Arrangement revisions proposal was submitted before the date on which the relevant amendments to the NGL came into effect in Western Australia, is based on sections 12 and 21 of the South Australian Statutes Amendment (National Energy Laws) (Binding Rate of Return Instrument) Act 2018.

GGT has used, in determining the total revenue and the revised reference tariff for the GGP Access Arrangement revision proposal, the rate of return obtained by applying the principles and parameter values set out in the Final Rate Return Guidelines (2018) issued by the ERA on 18 December 2018.

Should the Government of Western Australia decide not to implement amendments to the NGL to require a binding rate of return instrument in the State, GGT will make further submissions to the ERA on the rate of return which should be used in revising the GGP Access Arrangement.

The binding rate of return instrument, for which provision has now been made in the NGL, is also to set a value to be attributed to imputation credits, or specify the way in which that value is to be calculated.

Should the Government of Western Australia decide not to implement amendments to the NGL to require a binding rate of return instrument in the State, GGT will make further submissions to the ERA on an estimate of the value to be attributed to imputation credits for use in revising the reference tariff of the GGP Access Arrangement.

1.4.3 Review of the regulatory treatment of the cost of tax

In May 2018, the Commonwealth Minister for the Environment and Energy directed the Australian Energy Regulator (AER) to undertake a review of the way tax is treated for regulatory purposes. The AER was to provide a final report from its review, with recommendations, to the COAG Energy Council in December 2018.

In a final report released on 17 December 2018, the AER pointed to a number of ways in which the regulatory tax approach might be better aligned with tax practice, and advised that it was proposing to implement these through amendments to its Post Tax Revenue Model, early in 2019. Changes to the NGR were not required.

GGT understands that the ERA intends to adopt the changes which follow from the AER's review, once they have been finalised.

However, for the GGP Access Arrangement revision proposal, GGT has estimated of the cost of tax for total revenue and reference tariff determination in a way consistent with previous ERA regulatory decisions. In particular, GGT has estimated the cost of tax using straight line depreciation of the tax asset base. GGT has not used the diminishing value method, as is now proposed by the AER.

1.5 Supporting Information

This Supporting Information provides additional information to assist the ERA in its process of approving GGT's full access arrangement proposal for the GGP in accordance with the requirements of the NGL and the NGR.

The Supporting Information provides additional information on:

- (a) demand for pipeline services (section 2);
- (b) nominal total revenue determination (section 3);
- (c) cost allocation (section 4);
- (d) roll forward of the capital base (section 5);
- (e) projected capital base (section 6);
- (f) return on the projected capital base (section 7);
- (g) forecast operating expenditure (section 8);
- (h) estimation of the cost of corporate income tax (section 9);
- (i) operation of an incentive mechanism (section 10);
- (j) total revenue, proposed revised reference tariff and reference tariff variation mechanism (section 11); and
- (k) proposed changes to the GGP Access Arrangement (section 12).

The following attachments are part of the Supporting Information.

- Attachment 1: CAPEX business cases
- Attachment 2: KPMG, *Corporate Cost Benchmarking*, 19 December 2018

Attachment 2 is a confidential document. KPMG's report includes information purchased from specialist firms which provide benchmarking data to clients. Those data were provided to KPMG on terms which limit their disclosure. KPMG has used the data in its corporate costs benchmarking report on the basis of GGT agreeing to maintain its confidentiality within the limits prescribed by KPMG's suppliers. GGT is able to provide KPMG's report to the ERA on a confidential basis, but is unable to provide a public version of the report.

- Attachment 3: Capital and operating expenditure schedules for 2015-2017: auditor review reports

The operating expenditure schedules contain information which is commercially sensitive and confidential in accordance with the terms of various agreements between GGT and the providers of technical (operations and engineering) services to the Covered Pipeline, and the providers of commercial services to the gas transportation business based on the Covered Pipeline. This information is presented in aggregated form in subsequent sections of the Supporting Information (and in the OPEX model provided as Attachment 4).

- Attachment 4: *GGP CONFIDENTIAL Attachment 4 Forecast OPEX 20181221(1-Jan-2019).xlsx*

Attachment 4 is a Microsoft Excel spreadsheet model. The model provided to the ERA on 21 December 2018 included information which is commercially sensitive and confidential in accordance with the terms of various agreements between GGT and the providers of technical (operations and engineering) services to the Covered Pipeline, and the providers of commercial services to the gas transportation business based on the Covered Pipeline. A public version of that model, *GGP PUBLIC AA SI Attachment 4 OPEX model (1-Jan-2019).xlsx*, is provided with this version of the Supporting information. In this version of the model, commercially sensitive and confidential information has been aggregated, but model functionality has been retained. The model generates the OPEX forecast used in determining the total revenue and revised reference tariff of the GGP Access Arrangement revision proposal.

2 Demand for pipeline services

The proposed revisions to the GGP Access Arrangement are to apply from 1 January 2020 to 31 December 2024. Proposed revised reference tariffs have been calculated from estimates of the costs expected to be incurred in providing pipeline services using the GGP, and from a forecast of the demand for those pipeline services, during that period.

The principal pipeline service provided using the GGP is firm service. The reference service for the Covered Pipeline is firm service.

During the period 2020 to 2024, all of the existing capacity of the GGP available for firm service provision is expected to be utilised by users (the GGT JV participants and third parties).

No spare capacity is expected to be available, and GGT has initiated the process for developing capacity set out in section 5.3 of the GGP Access Arrangement.

This section of the Supporting Information sets out GGT's view of demand for pipeline services during the period 2020 to 2024, and its specific forecasts of capacity and throughput for the Covered Pipeline.

2.1 Pipeline services and reference service

Pipeline services are services provided by means of a pipeline, and include:

- (a) haulage services (firm haulage, interruptible haulage, spot haulage and backhaul); and
- (b) services providing for, or facilitating, the interconnection of pipelines.⁶

Pipeline services also include services ancillary to haulage and interconnection, but do not include the production, sale or purchase of natural gas.

The haulage and ancillary services which can be provided using the GGP are:

- (a) firm transportation service (firm service): a service whereby the pipeline operator receives from a user, at the receipt point, on a day, a quantity of gas not exceeding the maximum daily quantity (MDQ) specified in the user's gas transportation agreement, and delivers to the user, at one or more delivery points, on that day, a quantity of gas not exceeding the user's MDQ, without interruption or curtailment, except in the specific and limited circumstances set out in the user's gas transportation agreement;

⁶ NGL, section 2.

- (b) park service: receipt and “parking” or storing of gas in the pipeline;
- (c) loan service: loan of gas from the pipeline;
- (d) interruptible transportation service: receipt and delivery of gas at specified points, if scheduled, on an interruptible basis; and
- (e) in-pipe trade service: receipt and delivery of gas to or from a notional point within the pipeline to facilitate trade of gas between users at specified locations.

The GGP does not have any receipt points which are downstream of delivery points, and does not provide backhaul service. The only receipt points are at Yarraloola, at the northern end of the pipeline.

The GGP is not configured to provide bi-directional service.

Inquiries from prospective users of the GGP have usually been for access to firm service (although different prospective users have sought different terms and conditions on which that service is to be provided).

If there is insufficient spare capacity in the Covered Pipeline to meet a prospective user's requirement for firm service, section 2.3 of the GGP Access Arrangement requires that the prospective user be offered interruptible service for the remainder of its requirement in excess of the capacity that is available for firm service provision. If spare capacity subsequently becomes available, the user is obliged to contract for firm service provided using that capacity, and to reduce its requirement for interruptible service accordingly.

All of the current gas transportation agreements with users of the Covered Pipeline are agreements for the provision of firm service.

The reference service of the Covered Pipeline is firm service.

2.2 Demand for firm service

The end-users of gas delivered using the firm service of the Covered Pipeline are mostly companies with mining and mineral processing operations in the Pilbara, Mid West and Goldfields-Esperance regions of Western Australia, producing iron ore, gold and nickel for sale in international markets. Some gas is transported for power generation in regional communities, and a small quantity is delivered, via the Parkeston Lateral (PL 28, and not part of the Covered Pipeline), into the Kalgoorlie distribution system for commercial and residential use in the city.

Despite lower prices for iron ore, Australian production and export volumes have remained high.⁷ Gold exploration expenditures have grown since their low point in mid-2014, and Australian production, principally from Western Australia, remains high. In recent years, prices for nickel (which is used in the manufacture of stainless steels) have fluctuated, and this has resulted in fluctuations in production volumes. However, there is now strong demand for nickel ore for the manufacture of the nickel compounds used in lithium ion batteries and energy storage devices.

ATCO Gas Australia, the owner and operator of the Kalgoorlie distribution system, and Alinta Energy, which retails gas in city, were consulted during preparation of the GGP Access Arrangement revision proposal. Both the distributor and the retailer characterised the Kalgoorlie commercial and residential market as small and relatively static market. That market is unlikely to grow significantly during the access arrangement period, but it is not expected to contract.

In these circumstances, all of the existing capacity available for firm service provision using the Covered Pipeline is expected to be contracted to users during the access arrangement period.

2.3 New demand for pipeline services

During the last year, GGT commercial staff have been involved in around 10 continuing discussions with prospective users of the GGP.⁸ Most of these prospective users, would, if they chose to use gas, have relatively small requirements for pipeline capacity (in the order of 1 TJ/d to 5 TJ/d). None of these requirements would, on its own, justify pipeline expansion but, collectively, the requirements of a number of

⁷ See Department of Industry, Innovation and Science, Resources and Energy Quarterly, September 2018. The market for iron ore is discussed on pages 23-29; the market for gold is discussed on pages 68-74, and the market for nickel is discussed on pages 89-93.

⁸ A user's primary purchase of gas transportation service is typically not a spot transaction. For the mining and minerals processing businesses which are the principal end-users of gas transported in the GGP, the requirements for service provision include the location of the delivery point, the minimum pressure and minimum temperature at which gas is to be delivered at the delivery point, the permitted imbalance allowance, and the maximum hourly flow rate which the pipeline operator can guarantee, and on which the user can rely. These specific requirements are determined by the nature and scale of the downstream facilities into which gas is to be delivered. User-specific requirements also determine whether new pipeline facilities must be constructed to serve the user, and the scale, type and location of those facilities (including, for example, additional compression, a new offtake from the pipeline, the scale and type of metering which must be used, and communications and data transfer facilities which provide the user with information to manage obligations in both its gas purchase and gas transportation agreements). Increasingly, prospective users will examine energy supply options other than the pipeline transportation of gas. A prospective user will not make a decision on whether to proceed with a gas transportation agreement until it has evaluated those other options, which include use of diesel, small scale LNG, combined diesel and renewables generation (solar PV), and electricity supplied via transmission line. There is, then, usually an extended period of exploration of the user's requirements, and of the way in which GGT is able to meet them, before the prospective user is ready to make a formal application for pipeline capacity, or to sign a gas transportation agreement.

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prospective users might support the large investment in looping and compression which would be needed to provide new capacity in the GGP.

To coordinate the requirements of these prospective users, so as to be able provide the capacity they have indicated that they require, GGT initiated the process for the development of capacity set out in section 5.3 of the GGP Access Arrangement.

In accordance with section 5.3.1 (b), a notice (Developable Capacity Notice) was placed in each of a local newspaper (*The West Australian*, on 1 September 2018) and a national newspaper (*The Australian*, on 4 September 2018). The notice advised that GGT may commence investigations into the development of pipeline capacity, and sought, from prospective users of services which might be provided using that capacity, registration of interest in accordance with section 5.1 of the GGP Access Arrangement within 20 days.

GGT also advised, by letter, each of the prospective users with whom it had been in discussions about pipeline capacity, that the user should consider lodging a registration of interest.

By 1 October 2018 (and after the 20 days limit in section 5.3.1 (b) had passed), GGT had received only four expressions of interest. These were as shown in Table 1.

Table 1: GGP prospective users

Prospective user	Capacity (TJ/d)	Conditions
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Commercially sensitive information pertaining to individual prospective users

The total capacity sought was between 10 TJ/d and 18.5 TJ/d, and was required between October 2019 and June 2020. In each case, interest was conditional on a decision to proceed with a project which would use gas.

At the date of submission of the access arrangement revision proposal, there was insufficient commitment among prospective users for advancement of the process under section 5.3 of the GGP Access Arrangement. The revision proposal, therefore, does not include in its forecast of demand, the use of any capacity which might be made available by the development of pipeline capacity, and does not include the cost of capacity development in its estimates of costs.

2.4 Capacity and throughput forecasts

The capacity forecasts used to determine the reference tariff of the GGP Access Arrangement revision proposal were taken to be the user capacities under existing gas transportation agreements.

These forecasts – for the GGT JV participants (Alinta Energy GGT, Southern Cross Pipelines Australia, and Southern Cross Pipelines (NPL) Australia), and for third party users of the pipeline – are shown in Table 2.



Throughput forecasts are shown in Table 3. Other than for [REDACTED], they have been derived, from actual capacity and throughput data for the period January 2015 to December 2017. The [REDACTED] transportation agreements were all new at the time of preparation of the GGP Access Arrangement revision proposal. In each case, [REDACTED] GGT has assumed that the user will use, each day, all of its capacity.

The capacity and throughput forecasts are summarised in the tariff model, *GGP PUBLIC AA tariff model 1-Jan-2019.xlsx*, which is Attachment 4 to the Supporting Information.



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Table 2: Goldfields Gas Pipeline: capacity forecast: 2020-2024

User	End user	Delivery point	GTA End	2020 TJ/d	2021 TJ/d	2022 TJ/d	2023 TJ/d	2024 TJ/d
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Commercially sensitive information pertaining to individual users

Capacity forecast: 2020-2024				110.28	110.28	110.28	110.28	110.28
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Table 3: Goldfields Gas Pipeline: throughput forecast: 2020-2024

User	End user	Delivery point	2020 TJ/d	2021 TJ/d	2022 TJ/d	2023 TJ/d	2024 TJ/d
<i>Commercially sensitive information pertaining to individual users</i>							
Throughput forecast: 2020-2024			93.53	93.53	93.53	93.53	93.53

3 Nominal total revenue and forecast inflation

The tariff for a reference service provided using a gas transmission pipeline is to be designed in such a way that the revenue earned from the provision of that service is to be the portion of the total revenue referable to the service (NGR, rule 95(1)).

NGR rule 76 defines the total revenue for a covered pipeline. In each year of an access arrangement period, the total revenue is to be determined as the sum of:

- (a) the return on the projected capital base for the year;
- (b) depreciation on the projected capital base for the year;
- (c) the estimated cost of corporate income tax for the year; and
- (d) a forecast of operating expenditure for the year.

The “building blocks” of total revenue are financial. They are values which can be “measured” in nominal terms, at current prices, or in real terms, at constant prices.

The requirement of the ERA's Final Rate of Return Guidelines (2018), that the rate of return be estimated as a nominal (vanilla) weighted average of rates of return on equity and debt imposes, in effect, a requirement that the total revenue from which reference tariffs are determined be in nominal terms (at current prices).⁹

Financial information used in calculation of the total revenue, and in calculation of the proposed revised reference tariff, has therefore been provided on a nominal basis (NGR, rule 73(1)). All financial information has been provided (including in the Supporting Information), and all calculations have been made, consistently on the same basis (NGR, rule 73(3)).

Making a forecast of financial information expressed in nominal terms requires a forecast of inflation.

The ERA's Final Rate of Return Guidelines (2018) require that expected inflation be estimated from the yields on nominal and indexed Commonwealth Government bonds using the Fisher equation.¹⁰ The estimate obtained in this way, using September 2018 yields, was 1.87%.

GGT has used a forecast of inflation of 1.87% in preparing the GGP Access Arrangement revision proposal, but expects this inflation forecast to be updated prior to a final decision by the ERA.

⁹ Depreciation, being the arbitrary allocation, over time, of a previously sunk cost, is not strictly nominal (even if the current cost accounting method is used).

¹⁰ Economic Regulation Authority, *Final Rate of Return Guidelines (2018)*, 18 December 2018, paragraphs 219-230.

4 Cost allocation

The allocation of the total revenue to reference services and other services for the purpose of reference tariff determination and, ultimately, for cost recovery via reference tariffs, is governed by rules 93 and 95 of the NGR.

For the GGP, the principal allocation issue is the allocation of costs between services provided using the Covered Pipeline, and services provided using the uncovered GGP assets. When preparing the access arrangement revision proposal, GGT has applied the allocation principles of the ERA's July 2016 Final Decision.

The cost allocation requirements of the NGR, and the principles which GGT has applied in preparing the access arrangement revision proposal are set out in this section of the Supporting Information.

4.1 Rules 93 and 95, and their application in 2016

The total revenue is to be allocated between reference and other services in the ratio in which costs are allocated between reference and other services (NGR, rule 93(1)).

Costs are to be allocated between reference and other services as follows:

- (a) costs directly attributable to reference services are to be allocated to those services (NGR, rule 93(2)(a));
- (b) costs directly attributable to pipeline services which are not reference services are to be allocated to those services (NGR, rule 93(2)(b)); and
- (c) other costs are to be allocated between reference and other services on a basis (which must be consistent with the revenue and pricing principles) determined or approved by the regulator (NGR, rule 93(2)(c)).

That portion of the total revenue which is allocated to the provision of reference services is to be allocated between each of the reference services which the service provider proposes to provide by:

- (a) allocating directly attributable costs to the provision of each service (NGR, rule 95(2)(a)); and
- (b) allocating other costs attributable to the provision of reference services between them on a basis (which must be consistent with the revenue and pricing principles) approved by the regulator (NGR, rule 95(2)(b)).

That portion of the total revenue which is allocated to the provision of a particular reference service is to be allocated to a particular user or class of users by:

- (a) allocating costs directly attributable to supplying the user or class of users to the relevant user or class (NGR, rule 95(3)(a)); and
- (b) allocating other costs between the users or class of users and other users or classes of users on a basis (which must be consistent with the revenue and pricing principles) approved by the regulator (NGR, rule 95(3)(b)).

When the GGP Access Arrangement was last revised in June 2016, the total revenue used in determining the reference tariff was calculated as the total cost of providing pipeline services using the Covered Pipeline. In calculating the total cost of the Covered Pipeline, the ERA required:

- (a) exclusion of the incremental capital and operating costs associated with the uncovered GGP assets;
- (b) allocation of a part of the projected capital expenditure on the Covered Pipeline to the provision of services using the uncovered GGP assets; and
- (c) allocation of a part of the forecast costs of operating the Covered Pipeline to the provision of services using the uncovered GGP assets.

GGT has adopted this cost allocation scheme for:

- (a) establishing actual capital and operating expenditures for the Covered Pipeline for the period 1 January 2015 to 30 June 2018; and
- (b) forecasting capital expenditures for the Covered Pipeline for the remainder of the earlier access arrangement period (1 July 2018 to 31 December 2019), and for the period 1 January 2020 to 31 December 2024.

The specific cost allocation principles which GGT has used are described in sections 4.2 and 4.3 below.

4.2 Cost allocation: CAPEX

The ERA's June 2016 Final Decision was clear in its requirement that no part of any capital expenditure on the uncovered GGP assets was to be allocated to services provided using the Covered Pipeline.

Where there were both covered and uncovered compressor units installed at a compressor station (as at Yarraloola and Paraburdoo), and capital expenditure could not be attributed to a specific compressor unit (and, in consequence, could not be attributed to either services provided using the Covered Pipeline, or to services provided using uncovered GGP assets), the June 2016 Final Decision

required the allocation of the expenditure between services provided using the Covered Pipeline and services provided using the uncovered GGP assets. The proportion of the capital expenditure at a particular compressor station to be allocated the Covered Pipeline was to be the ratio of the number of Covered Pipeline compressor units at that station to the total number of compressor units at the station.¹¹

Capital expenditures on maintenance bases, on compressor station accommodation and on minor items of plant and equipment were, the June 2016 Final Decision required, to be allocated to the Covered Pipeline in the ratio of number of TJ km/d of contracted capacity provided using the Covered Pipeline during the year in which the expenditure is made to the number of TJ km/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) in that year.¹²

GGT has used these allocation rules when determining:

- (a) actual capital expenditure for the period 2015 to 2019 for the purpose of rolling forward the capital base of the Covered Pipeline; and
- (b) the projected capital base for the period 2020 to 2024.

The allocation principles for capital expenditure in the ERA's June 2016 Final Decision were not comprehensive. They did not need to be. GGT has, therefore, allocated those capital expenditures which were outside the scope of the June 2016 allocation principles to the Covered Pipeline in the ratio of number of TJ km/d of contracted capacity provided using the Covered Pipeline during the year in which the expenditure was made to the number of TJ km/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) in that year.

4.3 Cost allocation: OPEX

GGP operating expenditures are classified as

- (a) pipeline operating expenditure (APA operations expenditures, excluding expenditures on major expenditure jobs, and GGT operations expenditures);
- (b) expenditures associated with major expenditure jobs;
- (c) commercial operations expenditure (excluding regulatory expenditure);

¹¹ Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline*, 30 June 2016 (As amended on 21 July 2016), paragraphs 533 and 542.

¹² Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline*, 30 June 2016 (As amended on 21 July 2016), paragraphs 546 and 640.

(d) regulatory expenditure; and

(d) corporate costs.¹³

In its June 2016 Final Decision, the ERA required the allocation of APA operations expenditures, GGT operations expenditures, and commercial operations expenditures between services provided using the Covered Pipeline, and services provided using the uncovered GGP assets. The specific allocation rules which the ERA required are set out in Table 4, Table 5 and Table 6 below.

GGT has adopted the allocation principles in Tables 4, 5 and 6 when determining, for the Covered Pipeline, actual operating expenditure for the period 1 January 2015 to 30 June 2018.

This actual operating expenditure has been used to forecast operating expenditure for the access arrangement period in the way explained in section 8 of the Supporting Information.

In the June 2016 Final Decision, the ERA allocated GGP corporate costs in the ratio of the number of TJ/d of contracted capacity provided using the Covered Pipeline during the year in which the costs were incurred to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) in that year. As discussed in section 8.6.5 below, GGT has estimated corporate costs for the GGP, and then allocated those costs between services provided using the Covered Pipeline, and services provided using the uncovered GGP assets, in the way required by the ERA in the June 2016 Final Decision.

¹³ This classification of operating expenditures is further explained in section 8 of the Supporting Information.

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Table 4: allocation of APA operations expenditures to Covered Pipeline

Expenditure category	Allocation	Source
Administration (business services)	Ratio of number of TJ/d of contracted capacity provided using the Covered Pipeline during year to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) during year.	June 2016 Final Decision, paragraph 422
Engineering	Engineering expenditure to be allocated to the Covered Pipeline in the same ratio as Field Services expenditure (see below).	June 2016 Final Decision, paragraph 424
Field services	In general, field services expenditures are identifiable as associated with the Covered Pipeline (or as associated with the uncovered GGT assets). The exceptions are expenditures on Paraburdoo Compressor Unit 1 (PAC1, Covered Pipeline) and Paraburdoo Compressor Unit 2 (PAC2, uncovered GGT asset); they are not separately identifiable. Expenditures on PAC1/PAC2 are to be allocated 50% to the Covered Pipeline (and 50% to the uncovered GGP assets).	June 2016 Final Decision, paragraphs 404, 420

Table 5: allocation of GGT operations expenditures to Covered Pipeline

Expenditure category	Allocation	Source
Administration	Ratio of number of TJ/d of contracted capacity provided using the Covered Pipeline during year to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) during year.	June 2016 Final Decision, paragraph 431
APA operations recoverable	Ratio of number of TJ/d of contracted capacity provided using the Covered Pipeline during year to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) during year.	June 2016 Final Decision, paragraph 431
Marketing	Ratio of number of TJ/d of contracted capacity provided using the Covered Pipeline during year to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) during year.	June 2016 Final Decision, paragraph 431
Public relations	Ratio of number of TJ/d of contracted capacity provided using the Covered Pipeline during year to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) during year.	June 2016 Final Decision, paragraph 431
Technical regulatory	75% of expenditure of total GGP technical regulatory expenditures during year to be allocated to Covered Pipeline.	June 2016 Final Decision, paragraph 432

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Table 6: allocation of commercial operations expenditures to Covered Pipeline

Expenditure category	Allocation	Source
Legal	Ratio of number of TJ/d of contracted capacity provided using the Covered Pipeline during year to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) during year.	June 2016 Final Decision, paragraph 441
Public relations	Ratio of number of TJ/d of contracted capacity provided using the Covered Pipeline during year to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) during year.	June 2016 Final Decision, paragraph 441
Regulatory: other	75% of expenditure of other GGP regulatory expenditures during year to be allocated to Covered Pipeline.	June 2016 Final Decision, paragraph 442
Communications equipment lease and maintenance	Ratio of number of TJ/d of contracted capacity provided using the Covered Pipeline during year to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) during year.	June 2016 Final Decision, paragraph 441
Insurance	Ratio of number of TJ/d of contracted capacity provided using the Covered Pipeline during year to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets) during year.	June 2016 Final Decision, paragraph 441

5 Roll forward of the capital base

The projected capital base for the access arrangement period is to be established from the capital base set at the commencement of the earlier access arrangement period and approved by the regulator for use in determining the reference tariff for that period.

Conforming capital expenditures made during the earlier access arrangement period are to be added to the capital base set at the commencement of that period, and depreciation during the period – the return of capital – is to be subtracted. If appropriate:

- (a) amounts may be added in accordance with NGR rules 82 (capital contributions), 84 (speculative capital expenditure) and 86 (re-use of redundant assets); and
- (b) the value of redundant assets, and of pipeline asset disposals, is to be subtracted.

Through this process of “roll forward”, the opening capital base for the next access arrangement period is established.

The projected capital base is then established in a similar way, by adding conforming capital expenditure forecast for the access arrangement period, subtracting forecast depreciation for that period, and adjusting for forecast asset disposals.

In this section of the Supporting Information, GGT:

- (a) notes the rules governing roll forward of the capital base;
- (b) summarises capital expenditure and depreciation over the earlier access arrangement period (2015 to 2019); and
- (c) sets out its roll forward of the capital base to commencement of the access arrangement period (that is, to 1 January 2020).

5.1 Rules governing roll forward of the capital base

When an access arrangement period follows immediately on the conclusion of the preceding access arrangement period, the opening capital base at the commencement of the later period is to be (in accordance with NGR rule 77(2)):

- (a) the opening capital base at the commencement of the preceding access arrangement period, adjusted for any difference between estimated and actual capital expenditure included in that opening capital base; plus

- (b) conforming capital expenditure made or to be made during the preceding access arrangement period; plus
- (c) any amounts for capital expenditure to which a user has contributed, previously non-conforming (speculative) capital expenditures which have become conforming, and the value of any previously redundant assets now able to be re-used; less
- (d) depreciation over the preceding access arrangement period; less
- (e) the value of redundant assets identified during the preceding period; and less
- (f) the value of any pipeline asset disposals during the preceding period.

Conforming capital expenditure which is made during the preceding access arrangement period must satisfy the following criteria:

- (a) the expenditure must be such as would be incurred by a prudent service provider acting efficiently in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services (NGR rule 79(1)(a)); and
- (b) the capital expenditure must be justified on one of the following grounds:
 - (i) the overall economic value of the expenditure is positive (NGR rule 79(2)(a));
 - (ii) the present value of the expected incremental revenue to be generated exceeds the present value of the capital expenditure (NGR rule 79(2)(b));
 - (iii) the capital expenditure is necessary:
 - (A) to maintain and improve the safety of the services; or
 - (B) to maintain the integrity of the services; or
 - (C) to comply with a regulatory obligation or requirement; or
 - (D) to maintain the capability to meet levels of demand for service at the time the expenditure is made (NGR rule 79(2)(c)).

5.2 Capital base at commencement of earlier access arrangement period

The opening capital base at the intended date of commencement of the earlier access arrangement period was the opening capital base established for the Covered Pipeline at 1 January 2015. That opening capital base was \$390.362 million.¹⁴

All of the capital expenditure incurred during the period which preceded the earlier access arrangement period was known at the time this opening capital base was set in the ERA's June 2016 Final Decision. There was no forecast of expenditure included in the opening capital base for which an adjustment must now be made.

The opening capital base at 1 January 2015 is shown in Table 7.

Table 7: Capital base: 1 January 2015

	\$ million
Pipeline and laterals	337.209
Main line valve and scraper stations	6.104
Compressor stations	33.769
Receipt and delivery point facilities	1.851
SCADA and communications	1.876
Cathodic protection	0.504
Maintenance bases and depots	6.461
Other depreciable assets	-1.235
Non-depreciable assets	3.823
Opening capital base: 1 January 2015	390.362

Source: ERA, GGT Tariff Model, June 2016 [Final Decision] (as amended 21 July 2016)

5.3 Capital expenditure over the preceding access arrangement period

Capital expenditures during the period 1 January 2015 to 31 December 2019 are summarised in Table 8.

Capital expenditures in the table are those incurred in relation to, or allocated to, the Covered Pipeline only. The expenditures for 2015 to 2017 are actual expenditures. The expenditures for 2018 and 2019 are forecasts.

¹⁴ Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline*, 30 June 2016 (As amended on 21 July 2016), paragraph 564.

Table 8: Capital expenditure by asset class: 2015-2019

	2015 \$ million Actual	2016 \$ million Actual	2017 \$ million Actual	2018 \$ million Forecast	2019 \$ million Forecast	Total \$ million
Pipeline and laterals	1.766	0.492	0.276	0.065	0.000	2.599
Main line valve and scraper stations	0.110	0.001	0.000	0.000	0.000	0.111
Compressor stations	-0.015	0.000	0.966	0.521	1.024	2.496
Receipt and delivery points	0.412	-0.395	0.001	0.188	0.126	0.331
SCADA, communications and electronic equipment ¹ .	0.970	0.990	0.065	0.110	0.000	2.135
Cathodic protection	0.000	0.000	0.000	0.000	0.075	0.075
Maintenance bases and depots	0.025	0.000	0.000	0.019	0.313	0.357
Other depreciable assets	0.067	0.321	0.124	0.122	0.224	0.858
Non-depreciable assets	0.000	0.000	0.000	0.000	0.000	0.000
CAPEX: 2015-2019	3.334	1.409	1.432	1.025	1.762	8.962

1. This asset class was previously "SCADA and communications". During the access arrangement period GGT expects to replace certain electronic equipment (including programmable logic controllers, flow computers and remote terminal units) which has an expected economic life of 10 years, the same as SCADA and communications equipment. The forecast expenditure for this electronic equipment will be included in the re-named asset class "SCADA, communications and electronic equipment".

The items which make up the expenditures in Table 8, and the reasons why those expenditures are conforming capital expenditures (in accordance with the requirements of NGR rule 79), are set out in the following subsections of the Supporting Information.

5.4 Major capital projects 2015-2019

5.4.1 Inline inspection (Business Case 01)

As part of the last access arrangement revision proposal for the Covered Pipeline, GGT proposed undertaking inline integrity assessment ("pigging") of the mainline and the Newman lateral. As noted in the business case accompanying that proposal (Business Case 01), this work, and the associated expenditure, were necessary to assess the ongoing integrity of the pipeline, and to identify potential areas of corrosion or defect for further assessment or intervention. Furthermore, inline inspection was a requirement of pipeline licence PL 24. The expenditure, then, was necessary to ensure the ongoing safety and reliability of the pipeline, and was consistent with requirements of NGR rules 79 (2)(c)(i), (ii) and (iv).

Inline inspection is carried out by experienced contractors with the necessary inspection equipment (“intelligent pigs”). A contractor was selected through a tender process. Data gathered from the inspection were then analysed, for GGT, by APA pipeline engineering experts. This approach is common in the pipeline industry.

The experienced contractor used was able to deliver efficiencies which were passed on through the contract pricing. In consequence, the actual expenditure on inline inspection was less than forecast.

Inline inspection was, consistent with NGR rule 79(1)(a), prudent and efficient.

The actual and forecast expenditures are set out in Table 9 below.

Table 9: Capital expenditure: 2015-2019: inline inspection

	2015 \$ million	2016 \$ million	2017 \$ million	2018 \$ million	2019 \$ million	Total \$ million
Actual Expenditure	1.608	0.351	0.005	0.000	0.000	1.964
Forecast Expenditure	2.459	0.246	0.000	0.000	0.000	2.705
Difference	-0.851	0.105	0.005	0.000	0.000	-0.741

5.4.2 SCADA strategy (Business Case 25)

Speedcast, the vendor, was no longer supporting the previous SCADA system software used in Western Australia. The IT and communications equipment supporting the SCADA system was also experiencing failures. Upgrading was therefore required at 45 sites across the State.

In addition, in 2016, the vendor of the satellite services used for SCADA data communications advised that the satellite (NSS6) used to transfer the data would cease to operate from December 2018. Satellite services were to be “repointed” to the Optus D2 satellite.¹⁵

The loss of both software and hardware supporting SCADA in Western Australia meant that the SCADA work carried out was of much greater scope than had been intended in the SCADA project proposed as part of the previous access arrangement revision proposal for the GGT.

APA Group elected to move all Western Australian operational control to its common SCADA system. There were a number of benefits that would be provided by commonality.

¹⁵ For reliability reasons two sites were also “repointed” to the Thaicom4 satellite.

The cost of SCADA services is shared across the APA pipeline portfolio, which means a cost to GGT that is lower than the cost of a stand-alone GGP SCADA system. The use of a common (national) control room also provides a depth of expertise for operation of the GGP.

Furthermore, IT support and cybersecurity are more effectively maintained for a single system operated across multiple pipelines, than for multiple systems across individual pipelines. Reliability and integrity are provided by the single system.

The SCADA system is the basis for communication to and from facilities on the GGP. If the SCADA system fails, data collection from the pipeline, and pipeline control are directly and adversely affected. SCADA system maintenance is necessary to ensure the ongoing safety and integrity of the service. This is consistent with the requirements of NGR rules 79(2)(c)(i) and (ii).

The actual and forecast expenditures are set out in Table 10 below.

Table 10: Capital expenditure: 2015-2019: SCADA satellite replacement strategy

	2015 \$ million	2016 \$ million	2017 \$ million	2018 \$ million	2019 \$ million	Total \$ million
Actual Expenditure	0.799	0.917	0.064	0.110	0.000	1.890
Forecast Expenditure	0.094	0.107	0.000	0.000	0.000	0.201
Difference	0.705	0.810	0.064	0.110	0.000	1.689

5.4.3 Wiluna compressor controls replacement

Wiluna Compressor Station was commissioned in May 2000 and is located at Kilometre Point 864 on the GGP. The compressor station consists of a Saturn 20 gas turbine engine driving a Solar C160R centrifugal compressor. The station is designed to raise the downstream line pressure by 2,300 kPa.

The compressor control system at the Wiluna is now obsolete. The "cards" which carry the control system electronics are no longer being manufactured. GGT has been able to extend the life of the existing system by replacing defective cards with second-hand cards it has been able to source from the Northern Territory. However, that has become unsustainable: additional second hand cards are no longer available. Replacement of the control system was necessary to keep the Wiluna Compressor Station in operation.

Failure to replace would have resulted in the failure of the compressor, with adverse consequences for the reliability and safety of gas transportation service on the GGP.

Replacement of the Wiluna compressor controls, and the associated expenditure, are consistent with the requirements of NGR rules 79(2)(c)(i),(ii) and (iv).

Table 11: Capital expenditure: 2015-2019: Wiluna compressor controls replacement

	2015 \$ million	2016 \$ million	2017 \$ million	2018 \$ million	2019 \$ million	Total \$ million
Actual Expenditure	0.000	0.000	0.914	0.302	0.000	1.216
Forecast Expenditure	0.000	0.000	0.000	0.000	0.000	0.000
Difference	0.000	0.000	0.914	0.302	0.000	1.216

5.4.4 Custody transfer flow computer upgrading (Business Case 21)

A flow computer takes gas composition outputs from a gas chromatograph, and gas flow volumes from a meter, and computes the energy flow for system operation and the billing of users.

As noted in the business case provided as part of the last GGP Access Arrangement revision proposal, a number of flow computers on the pipeline were obsolete and no longer supported by the manufacturer. With spares parts and the expertise needed to complete repairs becoming hard to locate, there was increased risk of these units failing. There is no duplication of flow computers at custody transfer sites, and failure of a unit would result in a loss of metering capability.

The upgrading of custody transfer flow computers commenced in 2015 and was completed in 2018. The forecast and actual capital expenditure associated with project is set out in Table 12.

Table 12: Capital expenditure: 2015-2019: Custody transfer flow computer upgrading

	2015 \$ million	2016 \$ million	2017 \$ million	2018 \$ million	2019 \$ million	Total \$ million
Actual Expenditure	0.263	0.049	0.003	0.147	0.000	0.462
Forecast Expenditure	0.215	0.000	0.332	0.000	0.000	0.547
Difference	0.048	0.049	-0.329	0.147	0.000	-0.085

This work was necessary to maintain the integrity of the pipeline, consistent with the requirements of National Gas Rule 79(2)(c)(ii).

5.4.5 Heavy commercial vehicle replacement

Four trucks are used in maintenance activities along the GGP. They have been modified to carry equipment required specifically for transmission pipeline maintenance, including Hiab cranes.

The existing trucks are reaching the ends of their working lives. Furthermore, corporate policy is to replace heavy commercial vehicles every 10 years. There are a number of reasons for this policy including:

- (a) the older the truck, the greater the ongoing maintenance that is required to keep it in operating condition;
- (b) new vehicles come with upgraded safety features; and
- (c) standards for vehicles change over time to reflect lessons during the lifetime of the current equipment (vehicles with cranes are now required to have remote control systems for operation and physical restrictions that prevent the crane from passing over the cabin of the truck; the trucks replaced did not meet this requirement).

GGT, as prudent operator, requires equipment which is safe in use.

As they are necessary to support the ongoing maintenance of the GGP, replacement of the trucks and the associated expenditures are consistent with the requirements of NGR rules 79(2)(c)(i), (ii) and (iv).

GGT tenders for supply of the trucks, and consider alternative brands. The expenditure (Table 13) is prudent and efficient in accordance with NGR rule 79(1).

Table 13: Capital expenditure: 2015-2019: Heavy commercial vehicle replacement

	2015 \$ million	2016 \$ million	2017 \$ million	2018 \$ million	2019 \$ million	Total \$ million
Actual Expenditure	0.000	0.317	0.000	0.027	0.082	0.426
Forecast Expenditure	0.000	0.000	0.000	0.000	0.000	0.000
Difference	0.000	0.317	0.000	0.027	0.082	0.426

5.4.6 Inline inspection verification digs (Business Case 17)

Verification digs are part of the maintenance of integrity and safety on all gas transmission pipelines in Australia. The number and location of verification digs are guided by the results of inline inspection.

The purpose of a verification dig is to verify the results of the inline inspection. It does this in two ways:

- (a) it verifies that the features identified in the inline inspection are correct in terms of size and location; and
- (b) it verifies that deterioration rates indicated by inline inspection and corrosion growth modelling are accurate.

Verification digs must be undertaken at a sufficient number locations to ensure the statistical reliability and robustness of the pattern of potential defects identified by inline inspection. On average, 6 digs are carried out per pipeline section (pig launcher to next pig receiver); the number varies because section length varies.

GGT models the flaws detected by inline inspection to calculate rates of deterioration. The results of the verification dig verify and increase the accuracy of these rates, which are used in corrosion modelling to determine requirements for ongoing intervention to maintain pipeline integrity.

A verification dig involves excavation to remove the soil surrounding a pipeline, removal of the pipeline coating, assessment of the condition of the pipeline, undertaking repairs where needed, recoating of the pipeline, and replacement of the covering soil.

Verification digs are consistent with the requirements of NGR rules 79(2)(c)(i) and (ii). If they were not undertaken, the pipeline would be much more susceptible to rupture.

In 2016, there were 12 verification digs on the GGP. There were a further 25 in 2017. The expenditure is shown in Table 14.

Table 14: Capital expenditure: 2015-2019: inline inspection verification digs

	2015	2016	2017	2018	2019	Total
	\$ million	\$ million	\$ million	\$ million	\$ million	\$ million
Actual Expenditure	0.000	0.075	0.274	0.001	0.000	0.350
Forecast Expenditure	0.000	1.073	0.000	0.000	0.000	1.073
Difference	0.000	-0.998	0.274	0.001	0.000	-0.723

5.4.7 Site accommodation upgrade program

Due to its length and remote location, the GGP has a number of locations at which accommodation is provided for employees tasked with maintaining and operating the pipeline. This accommodation is no longer fit for purpose.

GGP commenced upgrading the accommodation in the earlier access arrangement period (2015-2019). However, the majority of the work – and much of the expenditure - will be in the access arrangement period (2020-2024). A fuller description and justification, in the context of capital expenditure forecast for the access period, is in section 6.2.1 below.

5.4.8 Condition-based replacement

In Business Case 08, submitted as part of the last GGP Access Arrangement revision proposal, GGT noted that some equipment installed when the GGP was constructed is now about 25 years old, at the end of its useful life, and requires replacement. The replacement of individual large items of equipment is dealt with in specific business cases for those items. There is, however, an ongoing requirement for expenditure on the replacement of minor items as they fail or reach the ends of their useful lives. The replacement of turbine meters with ultrasonic meters at Yarraloola is an example of this “condition-based replacement”.

Condition-based replacement expenditures are capital in nature, and are necessary for the maintenance pipeline integrity, safety, in some cases in with occupational health and environmental regulatory obligations. They are therefore consistent with the requirements of NGR rules 79(2)(c)(i) and (ii).

Table 15: Capital expenditure: 2015-2019: condition-based replacement

	2015 \$ million	2016 \$ million	2017 \$ million	2018 \$ million	2019 \$ million	Total \$ million
Actual Expenditure	0.064	0.000	0.017	0.059	0.073	0.213
Forecast Expenditure	0.025	0.026	0.036	0.026	0.027	0.140
Difference	0.039	-0.026	-0.019	0.033	0.046	0.073

5.4.9 Hazardous area upgrades

Under the requirements of Australian Standard AS60079, GGT is required to undertake regular periodic inspection, or continuous supervision, to ensure that all installations are maintained in satisfactory condition for continued use within a hazardous area.

Hazardous area inspections were last undertaken at Paraburdoo, Ilgarari and Wiluna in 2015. Yarraloola was inspected in 2018.

A number of corrective actions were identified from these inspections. For example, inspection of a fuel gas trace heater at Wiluna identified 14 non-conformances, and the unit was replaced.

However, the expenditure associated with these actions were either expensed or were captured in other capital projects and were not separately identified for the purposes of hazardous area upgrade capital expenditure. They have not been separately identified for the purposes of hazardous area upgrade capital expenditure.

5.4.10 Compressor unit major overhaul (Business Case 23)

Routine checks are performed weekly on compressor unit gas turbine drivers, and oil sampling is carried out monthly. Minor services are performed at 4,000 operating hours or yearly, and medium services are performed at 8,000 hours or 5 yearly. Condition assessment commences at 32,000 operating hours, and is subsequently carried out every 4,000 hours, with a unit major overhaul at 50,000 hours.

Major overhaul of a gas turbine at 50,000 operating hours is consistent with original equipment manufacturer (Solar Turbines) recommendations.

Paraburdoo Compressor Unit 1, which was expected to have logged 50,000 operating hours during the earlier access arrangement period, and to be overhauled, did not reach that limit, and the planned major overhaul was not required.

Compressor unit drivers at Wiluna and Yarraloola reached the requisite operating hours for major overhaul, although this was not expected at the time of the last revision of the GGP Access Arrangement. Failure to undertake the work would have increased the likelihood of failure, the loss of a compressor, and the capacity and reliability it provides.

Capital expenditure on compressor unit major overhaul is shown in Table 16.

Table 16: Capital expenditure: 2015-2019: compressor unit major overhaul

	2015 \$ million	2016 \$ million	2017 \$ million	2018 \$ million	2019 \$ million	Total \$ million
Actual Expenditure	0.000	0.000	0.042	0.180	0.000	0.222
Forecast Expenditure	0.000	0.504	0.000	0.000	0.000	0.504
Difference	0.000	-0.504	0.042	0.180	0.000	-0.282

5.4.11 Karratha maintenance base rebuild (Business Case 22)

Karratha Maintenance Base supports field operations for the northern end of the GGP. The base is a small building, approximately 15 metres square, and adjacent warehouse, which was developed at the time of initial pipeline construction. It was intended to be a long term location for staff.

The office walls at the Karratha Maintenance Base had cracked to an extent that suggested the foundations had failed and some settlement had occurred. An inspection was carried out in June 2014 and significant repairs were deemed necessary. The building was considered safe for continued occupancy at that time.

The growth in cracks in the building has slowed, and GGT has been able to delay rectification of the office. However, remedial action is required for continued use of the building over the longer term, and the work is planned for 2019.

The proposed remediation and expenditure addresses a safety risk that would be posed to employees and visitors if the building were to continue to deteriorate.

The work will be conducted in a remote location with limited qualified personnel available to undertake the work. The forecast expenditure [REDACTED] satisfies the requirements of NGR rule 79(1).

Table 17: Capital expenditure: 2015-2020: Karratha Maintenance Base rebuild

	2015 \$ million	2016 \$ million	2017 \$ million	2018 \$ million	2019 \$ million	Total \$ million
Actual Expenditure	-0.022	0.000	0.000	0.000	0.297	0.275
Forecast Expenditure	0.167	0.000	0.000	0.000	0.000	0.167
Difference	-0.189	0.000	0.000	0.000	0.297	0.108

5.4.12 Capital expenditure: other: 2015-2019

The projects listed above account for 84% of the total capital expenditure during the earlier access arrangement period. Other projects undertaken have incurred relatively small expenditures to maintain the ongoing gas transportation capacity of the GGP. These other projects have included:

- (a) Lighting tower replacement;
- (b) Compressor station programmable logic controller (PLC) upgrades;
- (c) Newman Lateral corrosion protection unit (CPU) relocation; and
- (d) Leinster Base workshop recladding.

5.5 Projects forecast but expenditure not incurred 2015-2019

5.5.1 Enterprise asset management

APA has developed an Enterprise Asset Management for the management of all of the infrastructure assets which it owns, operates or maintains. The total cost of developing this system has, to date, been some \$60 million.

In 2014, when the last GGP Access Arrangement revision proposal was prepared, work on the Enterprise Asset Management system was at an early stage, and there was an expectation that a part of the system development cost would be allocated to the GGP and to the Covered Pipeline.

No allocation was subsequently made, either to the GGP, or to any other individual asset. GGT now has the benefits of more efficient and effective asset management provided by the Enterprise Asset Management through provision of services to the GGP under the Operating Agreement (see section 8.2.1 below).

5.5.2 Gas engine alternator major overhauls

A gas engine alternator (GEA) should be overhauled after a specified number of hours in service, the number of hours being the manufacturer's recommendation. GEAs providing power for Yarraloola Compressor Unit 2 and Ilgarari Compressor Unit 1 were expected to have been in service for a number of hours during the earlier access arrangement period sufficient to require major overhaul. However, compressor usage was less than forecast, the GEAs did not run for the requisite number of hours, and major overhaul was not required in the period.

5.6 Depreciation

5.6.1 Rules governing depreciation

NGR rules 88 and 89 govern depreciation.

Rule 88 requires a depreciation schedule for the purpose of determining a reference tariff. The depreciation schedule is to set out the basis on which the pipeline assets constituting the capital base are to be depreciated for the purpose of determining the reference tariff, and may comprise a number of separate schedules, each relating to a particular asset or class of assets.

Rule 89(1) sets out broad criteria which guide the design of the depreciation schedule. The schedule is to be designed:

- (a) so that reference tariffs will vary, over time, in a way that promotes efficient growth in the market for reference services;
- (b) so that each asset or group of assets is depreciated over the economic life of that asset or group of assets;
- (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;
- (d) so that (subject to the rules about capital redundancy), an asset is depreciated only once (that is, that the amount by which the asset is depreciated over its economic life does not exceed the value of the asset at the time of its inclusion in the capital base (adjusted, if the accounting method approved by the ERA permits, for inflation)); and

- (e) so as to allow for the service provider's reasonable needs for cash flow to meet financing, non-capital and other costs.

Rule 89(2) provides for the deferral of depreciation where:

- (a) the present market for pipeline services is relatively immature;
- (b) the reference tariff has been calculated on the assumption of significant market growth; and
- (c) the pipeline has been designed and constructed so as to accommodate future growth in demand.

GGT has adopted a depreciation schedule whereby, for the purpose of determining the reference tariff for the Covered Pipeline, depreciation is calculated for each of eight classes of depreciable assets.

For the assets in each of the eight classes, depreciation is determined for the period of the expected economic life of those assets by applying, to the value of assets in the class, from the time of their inclusion in the capital base, the current cost accounting method.

For any year beyond the expected economic life, depreciation is zero.

5.6.2 Asset classes and asset lives

The asset classes, and the expected economic lives over which assets are depreciated, are shown in Table 18.

Table 18: Depreciation: asset classes and expected economic lives

Asset class	Economic life (years)
Pipeline and laterals	70
Main line valve and scraper stations	50
Compressor stations	30
Receipt and delivery point facilities	30
SCADA, communications and electronic equipment	10
Cathodic protection	15
Maintenance bases and depots	50
Other depreciable assets	10

5.6.3 Current cost accounting method and compliance with rules governing depreciation

In its June 2016 Final Decision on the last proposed revisions to the GGP Access Arrangement, the ERA required that depreciation be calculated as indexed straight line depreciation using the current cost accounting method. Furthermore, when rolling forward the capital base, depreciation for the period 2015 to 2019 was to be calculated from the ERA's forecast of capital expenditure for that period, and not from the actual capital expenditure.

Section 3.5 of the current GGP Access Arrangement states:

The depreciation schedule for establishing the Opening Capital Base at 1 January 2020 will be based on forecast capital expenditure.

For the calculation of the nominal Opening Capital Base for the GGP for the Next Access Arrangement Period, for the purposes of rule 77(2)(d) of the NGR, depreciation over the Current Access Arrangement Period is to be calculated in accordance with the current cost accounting depreciation method, consistent with the Australian Energy Regulator's Post Tax Revenue Model method – where first, the real opening capital base in any year is divided by the remaining asset life to calculate the real depreciation for the regulatory year, second, indexation is applied to the real depreciation to convert it to nominal terms, and third, the nominal depreciation is adjusted for the resulting double count of inflation by subtracting the value ascribed to inflation from the opening regulatory asset base for that regulatory year, and is to be the sum of:

- 1) *depreciation on the Opening Capital Base over the Current Access Arrangement Period; and*
- 2) *depreciation of the forecast Capital Expenditure for the Current Access Arrangement Period (being the amount of forecast Capital Expenditure used for the purpose of determining Tariffs for the Current Access Arrangement Period).*

Indexing and adjustment for inflation should be calculated consistent with the rate of inflation as measured by the CPI All Groups, Weighted Average of Eight Capital Cities as at 31 December of each year of the regulatory period.

GGT has calculated depreciation for roll forward of the capital base to 31 December 2019 using the current cost accounting method.

Use of a depreciation schedule based on the current cost accounting method of depreciation meets the requirement of NGR rule 89(1)(a) for reference tariff variation over time in a way which promotes efficient growth in the market for reference services. The ERA's June 2016 Final decision on the last revisions to the GGP Access Arrangement advised:

1802. *In contrast to the HCA method, the Authority concludes that the CCA method meets the requirements of NGR 89(1)(a), as it:*
- *provides signals for efficient use, which reflect the opportunity cost of the capital employed in the pipeline;*
 - *allows for efficient use of the pipeline by upstream and downstream consumers both now and in the future, thereby contributing to the efficient growth in the market of reference services;*
 - *signals efficient production and investment decisions by the service provider and consumers of natural gas, thereby contributing to the efficient growth in the market of reference services;*
 - *avoids price shocks for consumers, both for the forthcoming access arrangement period, and also at the end of the economic lives of major assets, given that the tariff path remains relatively stable through time, thereby contributing to the efficient growth in the market of reference services; and*
 - *discourages inefficient replacement investment before the end of the useful life of the assets.*
1803. *The CCA method also meets the requirements of the NGO and RPP, by:*
- *allocating capital costs more evenly between current and future customers, resulting in price paths that reflect the opportunity costs of the pipeline;*
 - *avoiding imposition of costs on current consumers which flow to the benefit of future consumers, thereby ensuring outcomes that are in the long term interests of consumers with respect to price;*
 - *balancing the requirement for the service provider to have reasonable opportunity to recover the efficient costs of providing reference services, with the need to address the long term interests of consumers, including current and future consumers;*
 - *encouraging more efficient asset utilisation, which strengthens the long term security and reliability of gas supply.¹⁶*

¹⁶ Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline*, 30 June 2016 (As amended on 21 July 2016), paragraphs 1802 and 1803.

GGT's use of a depreciation schedule whereby assets are depreciated using the current cost accounting method provides for the return of investment on an asset or group of assets, over the economic life of that asset or group of assets, in accordance with the requirement of NGR rule 89(1)(b).

Use of the current cost accounting method starts with the initial value of an asset or group of assets (the value of the asset or group of assets at the time of its inclusion in the capital base) and, in each year during the expected economic life, subtracts an amount equal to:

- (a) straight line depreciation of the initial value of the asset or group of assets in question, adjusted for inflation; less
- (b) the change in the value of that asset or group of assets in the capital base at the beginning of each year resulting from the inflation for that year

The initial value of the asset or group of assets is progressively reduced, year by year, by a series of amounts which are, in total over the expected economic life, equal to the initial value of the asset or group of assets. With a depreciation schedule based on the current cost accounting method, an asset or group of assets is depreciated "only once". Use of a current cost accounting depreciation schedule is in accordance with the requirement of NGR rule 89(1)(d).

Using the current cost accounting method, the depreciation schedule can be adjusted, by adjusting the remaining economic life an assets or group of assets, to reflect any changes in expected economic life. Use of a current cost accounting depreciation schedule is consistent with the requirement of NGR rule 89(1)(c).

A depreciation schedule based on the current cost accounting method may allow for the service provider's reasonable needs for cash flow to meet financing, non-capital and other costs.

Commercial practice is, however, to use straight line depreciation to provide a business with a constant cash flow over the life of an asset or group of assets for the return of investment, thereby facilitating the management of debt repayment. In this respect, straight line depreciation is superior to the current cost accounting method, which artificially defers the return of investment to later years of asset life, and defers the cash flow required for debt servicing.

The market for pipeline services provided using the Covered Pipeline is a relatively mature market, and GGT has not sought to defer depreciation in the way permitted by NGR rule 89(2).

5.6.4 Depreciation 2015-2019

Table 19 shows the depreciation used in GGT's roll forward of the capital base of the Covered Pipeline to 31 December 2019.

Depreciation has been calculated from the forecast of capital expenditure used in determining the reference tariff for the period 2015 to 2019 (and not from actual capital expenditure for that period).

Indexation, in the application of the current cost accounting method, has used actual inflation as measured by the CPI All Groups, Weighted Average of Eight Capital Cities, as at 31 December, for 2015, 2016 and 2017. The forecast of inflation noted in section 3 above has been used for 2018 and 2019.

Table 19: Depreciation of capital base 2015-2019

	2015 \$ million	2016 \$ million	2017 \$ million	2018 \$ million	2019 \$ million	Total \$ million
Pipeline and laterals	1.148	2.068	0.770	1.050	1.208	6.243
Main line valve and scraper stations	0.102	0.125	0.106	0.115	0.121	0.569
Compressor stations	1.752	2.293	2.259	2.367	2.468	11.138
Receipt and delivery points	0.069	0.103	0.098	0.110	0.119	0.500
SCADA, communications and electronic equipment	-0.097	0.353	0.341	0.344	0.238	1.179
Cathodic protection	-0.529	0.113	0.114	0.121	0.126	-0.055
Maintenance bases and depots	0.094	0.115	0.093	0.101	0.107	0.510
Other depreciable assets	-1.965	0.200	0.184	0.163	0.138	-1.280
Depreciation: 2015-2019	0.573	5.369	3.966	4.371	4.525	18.804

Full details of the depreciation calculations are provided in the tariff model, *GGP PUBLIC AA tariff model 1-Jan-2019.xlsx*, which is Attachment 4 to the Supporting Information.

5.7 Capital contributions, speculative capital expenditure, re-use of redundant assets and asset disposals

During the period 1 January 2015 to 31 December 2019:

- (a) there was no capital expenditure, in respect of which a user contributed, which should now be approved for roll in to the capital base in accordance with NGR rule 82;
- (b) there was no capital expenditure which should now be added to a speculative capital expenditure account in accordance with NGR rule 84;

- (c) there were no assets which had previously been identified as redundant and removed from the capital base which should now be returned to the capital base in accordance with NGR rule 86; and
- (d) there was no value of pipeline asset disposals between 1 January 2015 and 30 June 2018, and no value of disposals is forecast for the remainder of the earlier access arrangement period (1 July 2018 to 31 December 2019).

5.8 Roll forward to commencement of access arrangement period

The roll forward of the capital base from 1 January 2015 to 31 December 2019 is summarised in Table 20.

Table 20: Roll forward of capital base

	2015 \$ million	2016 \$ million	2017 \$ million	2018 \$ million	2019 \$ million
Capital base	390.362	393.124	389.164	386.631	383.285
CAPEX	3.334	1.409	1.432	1.025	1.762
Amounts added under rules 82, 84, 86	0.000	0.000	0.000	0.000	0.000
Depreciation	0.573	5.369	3.966	4.371	4.525
Asset disposal	0.000	0.000	0.000	0.000	0.000
Closing asset value	393.124	389.164	386.631	383.285	380.521

Again, full details are provided in the tariff model, *GGP PUBLIC AA tariff model 1-Jan-2019.xlsx*, which forms part of GGT's access arrangement revision proposal.

6 Projected capital base

GGT has determined the projected capital base of the Covered Pipeline in accordance with NGR rule 77(2).

First, the capital base at the commencement of the access arrangement period has been determined, in the way described in the previous section of the Supporting Information, by rolling forward the capital base of the Covered Pipeline from the commencement of the earlier access arrangement period.

The projected capital base for the access arrangement period is, then, in accordance with NGR rule 78:

- (a) the opening capital base rolled forward to the commencement of the access arrangement period; plus
- (b) forecast conforming capital expenditure for the period; less
- (c) forecast depreciation for the period; and less
- (d) the forecast value of any pipeline asset disposals during the period.

These components of the projected capital base, and the projection made using them, are discussed in the following subsections of the Supporting Information.

6.1 Forecast conforming capital expenditure

Forecast capital expenditure on the Covered Pipeline during the period 1 January 2020 to 31 December 2024 is summarised in Table 21.

Table 21: Forecast capital expenditure by asset class 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million	Total \$ million
Pipeline and laterals	0.400	0.000	0.000	0.000	0.224	0.623
Main line valve and scraper stations	0.000	0.000	0.000	0.000	0.000	0.000
Compressor stations	1.764	0.344	1.185	0.230	2.028	5.551
Receipt and delivery points	0.000	0.000	0.000	0.000	0.000	0.000
SCADA, communications and electronic equipment	0.990	1.690	0.653	1.144	0.848	5.325
Cathodic protection	0.240	0.186	0.350	0.483	0.061	1.320
Maintenance bases and depots	3.995	0.338	0.000	0.000	0.000	4.334
Other depreciable assets	0.000	0.000	0.000	0.000	0.000	0.000
Non-depreciable assets	0.000	0.000	0.000	0.000	0.000	0.000
Forecast CAPEX: 2020-2024	7.389	2.558	2.187	1.857	3.162	17.153

6.2 Major capital projects 2020-2024

6.2.1 Site accommodation upgrade program

Due to the remoteness of the GGP, there are four locations where accommodation is provided to enable staff to remain relatively close to specific work sites when working on the pipeline.

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Providing accommodation close to work sites reduces potentially large travel time losses when work is carried out over multiple days, and reduces the significant safety risk to which employees are exposed if they must travel long distances to and from remote sites to the nearest commercially-available accommodation.

The existing accommodation at Ilgarari and Wiluna was constructed at the time of compressor station construction (1996 and 2001, respectively). It has not been refurbished since.

In the Pilbara and Goldfields-Esperance regions, GGT competes for skilled labour with companies in the mining sector. Competition plays out in both pay and working conditions. Potential employees have increased expectations for their living conditions when "on site".

Recognition of occupational health and safety concerns about working in remote areas, including concerns about the mental health of "Fly in fly out" employees, has led GGT to ensure that its remote accommodation facilities are of the high standards now expected.

A recent Enterprise Bargaining Agreement, with which GGT must comply, has the following requirements for accommodation:

- (a) single person per room;
- (b) each room to have a TV;
- (c) each room to have a telephone or access to a mobile phone;
- (d) each room to have a bathroom facility;
- (e) room to be in good condition and secure;
- (f) meals to be available in the building, or at a restaurant within a local town; and
- (g) air conditioning.¹⁷

Accommodation at Ilgarari and Wiluna is to be upgraded to meet these requirements.

Upgrading will involve:

- (a) removal and disposal of existing demountable accommodation (including removal of footings, electrical connections, freshwater supply and black water discharge);

¹⁷ Additional allowances are payable for sub-standard situations

- (b) upgrading of existing accommodation attached to workshops at Ilgarari:
 - (i) removal and replacement of flooring, curtains and soft furnishings;
 - (ii) industrial cleaning/refurbishment of workshop accommodation bathroom;
 - (iii) installation of upgraded water supply to showers and sinks;
 - (iv) installation of new split system air conditioners in the rooms
 - (v) installation of new satellite TV and internet cable to/from new accommodation block; and
 - (vi) repainting and re-fit of workshop based accommodation;
- (c) supply and installation of a new accommodation block at Wiluna with:
 - (i) 4 king single bedrooms;
 - (ii) room access to internet;
 - (iii) satellite TV connections in rooms and lounge area; and
 - (iv) commercial fit/finish kitchen.

The provision of the accommodation will be subject to competitive tender. However, given the work is being undertaken at remote locations, construction costs will be higher than for similar work undertaken close to the Perth metropolitan area.

Table 22: Forecast CAPEX: site accommodation upgrade program: 2020-2024

	2020	2021	2022	2023	2024	Total
	\$ million	\$ million	\$ million	\$ million	\$ million	\$ million
Forecast CAPEX: 2020-2024	3.840	0.338	0.000	0.000	0.000	4.178

Upgrading of the accommodation at Ilgarari and Wiluna is necessary for ensuring GGT's access to the skilled labour resources needed to maintain provision of a reliable gas transport service using the GGP, and is important for ensuring the safety and wellbeing of employees working in remote areas. The planned expenditure is necessary to maintain and improve the safety and integrity of services (NGR rules 79(2)(c)(i) and (ii)).

The costs are based on previous experience at similar – remote – locations, and are expected to be those that would be incurred by a prudent service provider acting efficiently in accordance with good industry practice to achieve the lowest sustainable cost of providing service (NGR, rule 79(1)(a)).

6.2.2 Reliability replacement program

The GGP has experienced equipment failures of some of its compressor stations. These have the potential to reduce transportation service reliability, and investigations into the possible causes are being carried out. The investigations are focusing on:

- (a) power systems (gas engine alternators, switching gear, battery supplies);
- (b) air seals on compressors (not applicable to Covered Pipeline compressors, which have wet seals);
- (c) the Solar Turbines "package" (compressor, gas turbine driver and ancillary equipment supplied by Solar Turbines)(not relevant to the Covered Pipeline); and
- (d) Integrated Operations Control facilities, including SCADA and pipeline controller software interfaces.

The largest number of failures has been in power systems, with 10 failures at Yarraloola Compressor Station over the last 12 months.

The power system at Yarraloola, and the power systems at the compressor stations at Ilgarari and Wiluna, are all over 20 years old.

The loss of a compressor station reduces the capacity of the pipeline available for reference services. As such expenditure to ensure reliability of the gas transportation operation is consistent with NGR rule 79(2)(c)(iv).

Investigations are continuing, and there is still work being undertaken to confirm the most prudent and efficient solutions to the reliability issue. Nevertheless, the work to date has shown that replacement of the gas engine alternators (GEAs) at the Yarraloola, and Ilgarari compressor stations would be prudent.

The current best estimate of the capital expenditure required for GEA replacement is shown in Table 23.

Table 23: Forecast CAPEX: compressor station reliability: 2020-2024

	2020	2021	2022	2023	2024	Total
	\$ million	\$ million	\$ million	\$ million	\$ million	\$ million
Forecast CAPEX: 2020-2024	1.557	0.000	0.969	0.000	1.676	4.196

The expenditure is based on a quote from a qualified supplier of the equipment, and is considered to be the cost that would be incurred by a prudent service provider acting efficiently in accordance with good industry practice to achieve the lowest sustainable cost of providing service (NGR, rule 79(1)(a)).

6.2.3 Remote terminal unit replacement

A remote terminal unit is a microprocessor-controlled electronic device that interfaces objects in the physical world (for example, a compressor) to a SCADA (supervisory control and data acquisition) system. Information about the state of the physical object is collected by the remote terminal unit, and transmitted by telemetry to the control system, where it can then be used to control the operation of the physical object using instructions communicated through the terminal unit.

There are currently 16 remote terminal units on the Covered Pipeline.

At the time of the last GGP Access Arrangement revision proposal, GGT had determined that obsolescence of the software used in the devices required replacement of the remote terminal units. Changes to 10 of the units was planned. However, with maintenance, including the use of second-hand cards (see section 5.4.3 above), the units were kept in operation, and the replacement program was temporarily suspended.

Schneider, the manufacturer of the Modicon remote terminal units used on the GGP, has informed GGT that these units will be obsolete, and no longer supported, from 2018. As finding spare parts becomes increasingly difficult, GGT will cease maintaining the existing Modicon units, and will commence their replacement. Replacement of some of the units will “release” parts which can be used as spares for the units remaining in service.

As part of the replacement program, GGT proposes to install separate remote terminal units for cathodic protection.

The GGP has the unusual arrangement whereby cathodic protection is controlled through remote terminal units which also control compressor and other operations critical to gas transportation. Physical and electronic access to remote terminal units used to control critical operations is restricted for both operational security and cybersecurity reasons, precluding more frequent access to cathodic protection data which can facilitate the fine tuning of corrosion protection and the enhancement of pipeline integrity.

Cathodic protection does not require high levels of security. Installation of separate cathodic protection terminal units will allow cathodic protection technicians to source additional data from cathodic protection units, and make adjustments to the electrical currents delivered by cathodic protection, without the currently required site visits, and without compromising security.

Cost savings can be achieved by installing cathodic protection remote terminal units (and removing existing cathodic protection control from compressor station units) at the same time as station units are replaced.

Table 24: Forecast CAPEX: remote terminal unit replacement: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million	Total \$ million
Forecast CAPEX: 2020-2024	0.577	0.540	0.437	1.144	0.848	3.546

Failure of a remote terminal unit would result in a loss of communication to the site, and loss of control at that site, reducing the reliability of the gas transportation operation. Replacement of the remote terminal units is necessary to maintain the integrity of services (NGR rule 79(2) (c)(ii)).

The expenditure estimate is based on a quote from a qualified supplier of the equipment, and is considered to be the cost that would be incurred by a prudent service provider acting efficiently in accordance with good industry practice to achieve the lowest sustainable cost of providing service (NGR, rule 79(1)(a)).

6.2.4 Cathodic protection unit replacement program

Cathodic protection uses electric current to protect a pipeline from corrosion which impairs the integrity of the pipe itself. If the cathodic protection is not continuously maintained, there is an increased risk of undetected corrosion resulting in a loss of integrity with significant increases in safety and reliability risks.

Cathodic protection at major sites on the GGP (including compressor stations and scraper stations) is from multiple cathodic protection units installed at those sites.

The manufacturer of these cathodic protection units is no longer in business. GGT has able to maintain the units drawing on “in-house” knowledge and skills. However, as staff turn over, and as the sourcing of components becomes increasingly difficult, this is ceasing to be sustainable, and replacement of the existing cathodic protection units is necessary.

Planned expenditure on cathodic protection unit replacement is shown in Table 25.

Table 25: Forecast CAPEX: CPU replacement program: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million	Total \$ million
Forecast CAPEX: 2020-2024	0.240	0.186	0.350	0.483	0.061	1.320

The expenditure is necessary for improving the safety and integrity of the pipeline service (NGR rules 79(2)(c)(i) and (ii)).

The expenditure forecast is based on the rates of failure rates of the existing cathodic protection units, and a cost of replacement units from a new vendor. The forecast is considered to be the cost that would be incurred by a prudent service provider acting efficiently in accordance with good industry practice to achieve the lowest sustainable cost of providing service (NGR, rule 79(1)(a)).

6.2.5 Flow computer upgrades

GGT replaced flow computers used in custody transfer metering during the period 2015 to 2019. The reasons for this replacement are noted in section 5.4.4 above.

Flow computers which compute fuel gas energy flows are experiencing the same problems as those used in custody transfer metering. The software they use is no longer supported by the vendor, and the sourcing of spare parts for their repair is becoming increasingly difficult. This is increasing the risk of sudden and irreversible flow computer failure.

Furthermore, the outputs from the flow computers are incompatible with other IT systems, and this requires manual manipulation of the data, and introduces the possibility of measurement error.

Table 26: Forecast CAPEX: flow computer upgrades: 2020-2024

	2020	2021	2022	2023	2024	Total
	\$ million	\$ million	\$ million	\$ million	\$ million	\$ million
Forecast CAPEX: 2020-2024	0.205	0.628	0.000	0.000	0.000	0.833

The expenditure is necessary for maintaining the integrity of the pipeline service (NGR rule 79(2)(c)(ii)).

The expenditure forecast is based on the cost of flow computers recently installed at other locations. The forecast is considered to be the cost that would be incurred by a prudent service provider acting efficiently in accordance with good industry practice to achieve the lowest sustainable cost of providing service (NGR, rule 79(1)(a)).

6.2.6 Gas chromatograph replacement

Gas chromatographs are instruments for measuring the chemical composition and energy content of gases.

They are used in a pipeline system to ensure that gas received into the system, and gas delivered from the system, meets the relevant gas specifications. They also provide measurements of energy content which are used (by flow computers) to calculate the energy flows into and out of the system. In Australia, the supply of gas is billed in terms of energy units (\$/GJ) and not in terms of physical volumes.

There are seven Daniels GC500 gas chromatographs at five locations on the GGP. With the exception of the chromatograph at Kalgoorlie South, the units are old, having been installed at the time the facility at which they are located was constructed. These old units are now experiencing failures, and some 13 corrective maintenance interventions were required in the last 12 months.

At Yarraloola and Newman there are duplicate gas chromatographs, but at other sites there is no redundancy. When a gas chromatograph fails measurements must be taken from the nearest operating chromatograph. The more remote the alternative source of data, the greater the risk of measurement and billing error.

The outputs from older gas chromatographs, like the outputs from older flow computers, are is incompatible with the other IT systems used in pipeline operation, with the possibility of error arising from manual data handling.

Table 27: Forecast CAPEX: gas chromatograph replacement: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million	Total \$ million
Forecast CAPEX: 2020-2024	0.208	0.522	0.215	0.000	0.000	0.945

Without replacement of the chromatographs, GGT's ability to accurately bill customers will be compromised undermining the integrity of the gas transportation service. The expenditure is necessary for maintaining the integrity of the pipeline service (NGR rule 79(2)(c)(ii)).

6.2.7 Hazardous area rectification

All electrical equipment installed in a hazardous area (an area where gas may be present) must be recorded in a Hazardous Area Verification Dossier, in accordance with the requirements of Australian Standards AS60079 and AS2381. The dossier must to be maintained and periodically reviewed. In the process, the condition of the electrical equipment is assessed to identify non-conformance with the standards. Rectification work must be carried out in respect of these non-conformances.

Planned expenditure on hazardous area rectification work during the access arrangement period is summarised in Table 28.

Table 28: Forecast CAPEX: hazardous area rectification: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million	TOTAL \$ million
Forecast CAPEX: 2020-2024	0.208	0.106	0.215	0.110	0.224	0.863

This expenditure is necessary to compliance with the relevant standards, and to maintaining a safe working environment on the pipeline (NGR rules 79(2)(c)(i) and (iii)).

Precise estimation of the costs is difficult until the prerequisite hazardous area inspections have been completed, however reasonable forecasts can be made from past experience.

6.2.8 Pipeline integrity assessment

As noted in section 5.4.1, inline integrity assessment is undertaken to assess the structural integrity of a pipeline. The Western Australian Department of Mines, Industry Regulation and Safety, has agreed to a ten-year inline inspection cycle for the GGP.

Magnetic Flux Leakage (MFL) inline inspection is scheduled to be undertaken on the Quadrant Interconnect and part of the GGP mainline in 2025. Preparatory work, including liaison with landowners, easement preparation, flow confirmation, procedure development, risk assessment and mitigation, is to be completed during 2024.

In particular, the easement will need to be repaired so that it can support the heavy vehicles used in the pigging operation. The GGP easement is subject to damage from regular cyclonic rains which also cause significant degradation of access tracks preventing access to the pipeline. Inspection and repair of the easement is necessary for safe working along the pipeline.

Following inline inspection, verification digs are undertaken. The pipeline is exposed, its coating removed, and assessment is made of the condition of the pipe. Visual inspection is required to verify the results of the inline inspection.

Nine verification digs are to be undertaken in 2020. The number has been determined from modelling flaw deterioration rates using data from the last inline inspection of the GGP.

Forecast expenditure on pipeline integrity assessment during the access arrangement period is shown in Table 29.

Table 29: Forecast CAPEX: pipeline integrity assessment: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million	Total \$ million
Verification digs	0.400	0.000	0.000	0.000	0.000	0.400
Inline inspection preparation	0.000	0.000	0.000	0.000	0.224	0.224
Forecast CAPEX: 2020-2024	0.400	0.000	0.000	0.000	0.224	0.624

As noted in section 5.4.1, this work is necessary for the ongoing safety and reliability of the GGP (NGR rule 79(2)(c)).

The expenditure forecast is based on the costs of previous work preliminary to inline inspection, and previous costs of verification digs. The forecast is considered to be the cost that would be incurred by a prudent service provider acting efficiently in accordance with good industry practice to achieve the lowest sustainable cost of providing service (NGR, rule 79(1)(a)).

6.2.9 Gas engine alternator overhauls

GGP compressor stations are in remote locations, and cannot be supplied with power from a network. Electricity is generated on site, using gas as fuel, in gas engine alternators (GEAs).

GEA manufacturers recommend overhaul of the units they supply after a specified number of operating hours. Following the manufacturers' recommendations, GGT overhauls GEAs after 60,000 hours in service.

The following GEAs units on the GGP are expected to have completed 60,000 hours in service during the access arrangement period:

- (a) Paraburdoo GEA 1;
- (b) Paraburdoo GEA 2;
- (c) Wiluna GEA A;
- (d) Wiluna GEA B;
- (e) Ilgarari GEA A;
- (f) Ilgarari GEA B; and
- (g) Yarraloola GEA B.

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However, as part of the reliability replacement program, GGT is expecting to replace:

- (a) Ilgarari GEA A;
- (b) Ilgarari GEA B; and
- (c) Yarraloola GEA B.

Overhaul these units has, therefore, not been included in the forecast of expenditure.

Table 30: Forecast CAPEX: gas engine alternator overhauls: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million	Total \$ million
Forecast CAPEX: 2020-2024	0.000	0.238	0.000	0.121	0.129	0.488

Failure to undertake an overhaul results in an increased risk of compressor station failure. The expenditure is necessary for maintaining the integrity of the pipeline service (NGR rule 79(2)(c)(ii)).

The forecast is based on previous experience with GEA overhauls, and is considered to be the cost that would be incurred by a prudent service provider acting efficiently in accordance with good industry practice to achieve the lowest sustainable cost of providing service (NGR, rule 79(1)(a)).

6.3 Forecast depreciation 2020-2024

Forecast depreciation during the period 2020-2024 is summarised in Table 31.

Table 31: Forecast depreciation 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million	Total \$ million
Pipeline and laterals	1.377	1.544	1.718	1.898	2.084	8.619
Main line valve and scraper stations	0.125	0.134	0.141	0.148	0.155	0.702
Compressor stations	2.471	2.713	2.828	2.959	2.065	13.036
Receipt and delivery points	-0.285	0.128	0.134	0.139	0.107	0.224
SCADA, communications and electronic equipment	0.505	0.607	0.772	0.842	0.928	3.655
Cathodic protection	0.091	0.140	0.154	0.175	0.158	0.717
Maintenance bases and depots	0.114	0.127	0.136	0.144	0.153	0.674
Other depreciable assets	0.054	0.156	0.162	0.168	0.120	0.660
Forecast depreciation: 2020-2024	4.453	5.548	6.043	6.473	5.770	28.288

The depreciation in Table 31 comprises:

- (a) depreciation on the initial capital base, and on the assets created by the capital expenditures which were added to that initial capital base during the period from 2000 to 2019; and
- (b) depreciation on the assets expected to be created by the capital expenditure forecast to be made during the period 2020 to 2024.

Each of these two components of depreciation has been calculated using the current cost accounting method. All of the depreciation calculations are in the worksheet *Capital base* of the tariff model, *GGP PUBLIC AA tariff model 1-Jan-2019.xlsx*.

6.4 Forecast asset disposals

No value of pipeline asset disposals has been forecast for the period 1 January 2020 to 31 December 2024.

6.5 Projected capital base

The projection of the capital base forward from 1 January 2020 is summarised in Table 32.

Table 32: Projected capital base 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million
Capital base	380.521	383.457	380.467	376.611	371.995
CAPEX	7.389	2.558	2.187	1.857	3.162
Amounts added under rules 82, 84, 86	0.000	0.000	0.000	0.000	0.000
Depreciation	4.453	5.548	6.043	6.473	5.770
Asset disposal	0.000	0.000	0.000	0.000	0.000
Closing asset value	383.457	380.467	376.611	371.995	369.387

Full details of the projection of the capital base forward from 1 January 2020 are provided in the tariff model, *GGP PUBLIC AA tariff model 1-Jan-2019.xlsx*, which is Attachment 4 to the Supporting Information.

7 Return on the projected capital base

For total revenue and reference tariff determination, GGT has calculated the return on the projected capital base for each year of the access arrangement period as the product of a rate of return and the beginning of year projected capital base.

GGT has used a rate of return of 5.56% determined in accordance with the ERA Final Rate of Return Guidelines (2018).

7.1 Nominal “vanilla” weighted average of rates of return on equity and debt

GGT has estimated the rate of return as a nominal “vanilla” weighted average of a rate of return on equity and a rate of return on debt.

The Final Rate of Return Guidelines (2018) advise that the weighted average is to be a weighted average of the expected rate of return on equity, and the expected rate of return on debt (and not an average of actual rates of return on equity and debt.)¹⁸

The weight to be given to the expected rate of return on equity when calculating this weighted average is to be the proportion of equity in the total financing of a relevant benchmark efficient entity (which is assumed to be financed by equity and debt). The weight to be given to the expected rate of return on debt – the gearing – is to be the proportion of debt in the total capital of the benchmark efficient entity.

This weighted average cost of capital for a benchmark efficient entity is to be calculated as:

$$WACC_{\text{vanilla}} = E(r_e) \frac{E}{V} + E(r_d) \frac{D}{V}$$

where:

- (a) $E(r_e)$ is the expected rate of return on equity;
- (b) $E(r_d)$ is the expected rate of return on debt;
- (c) E/V is the proportion of equity in the total financing (comprising equity and debt) of the benchmark entity; and
- (d) D/V is the proportion of debt in the total financing of the benchmark entity.

$V = E + D$, and the ratio D/V is the gearing.¹⁹

¹⁸ Economic Regulation Authority, *Final Rate of Return Guidelines (2018)*, 18 December 2018, paragraph 60.

¹⁹ Economic Regulation Authority, *Final Rate of Return Guidelines (2018)*, 18 December 2018, paragraph 76.

7.2 Gearing

The weight to be applied to the expected rate of return on debt, in the weighted average cost of capital which is to be taken as the rate of return is, the Final Rate of Return Guidelines (2018) advise, to be the gearing of benchmark efficient business (and not the actual gearing of the service provider). That gearing is 55%.²⁰

GGT has used gearing of 55% when calculating the weighted average of returns on equity and debt used as the rate of return for determining the total revenue and calculating the reference tariff of the GGP Access Arrangement revision proposal.

7.3 Rate of return on equity

In accordance with the Final Rate of Return Guidelines (2018), GGT has estimated the rate of return on equity component of the rate of return ($E(r_e)$) using the Sharp-Lintner Capital Asset Pricing Model (SL CAPM).

The SL CAPM provides an estimate of the expected return on equity ($E(r_e)$) from the following relationship:

$$E(r_e) = r_f + \beta \times [E(r_M) - r_f].$$

r_f is the rate of return on a riskless asset (risk free rate).

$E(r_M)$ is the expected rate of return on the market portfolio, and the difference, $E(r_M) - r_f$, is the market risk premium (MRP).

β (beta) is the ratio of:

- (a) the covariance of the return on the assets for which an expected rate of return is to be estimated and the return on the market portfolio; and
- (b) the variance of the return on the market portfolio.

7.3.1 Risk free rate

The risk free rate of return is to be estimated, for the purpose of estimating the rate of return on equity, using yields on Commonwealth Government Securities with terms to maturity of five years.²¹

GGT understands that the estimate of the risk free rate will be updated during the ERA's revisions approval process, and updated again for the ERA's final decision on the proposed revisions to the GGP Access Arrangement.

²⁰ Economic Regulation Authority, *Rate of Return Guidelines (2018)*, 18 December 2018, paragraph 83.

²¹ Economic Regulation Authority, *Rate of Return Guidelines (2018)*, 18 December 2018, paragraphs 112 and 114.

For the GGP access Arrangement revision proposal, GGT has estimated the risk free rate as an average of the yields on Commonwealth Government Securities with terms to maturity of five years over a period of 20 trading days to 28 September 2018.

GGT's estimate of the risk free rate is 2.25%.

7.3.2 Market risk premium

An estimate of the market risk premium (MRP) of 6.0% is set in the Final Rate of Return Guidelines (2018).²² This estimate, the Guidelines advise, has been obtained after giving consideration to the historic market risk premium, dividend growth model estimates, and consideration of the values of a number of conditioning variables.²³

GGT has used the MRP estimate of 6.0% when applying the SL CAPM to estimate the rate of return on equity for the GGP Access Arrangement revision proposal.

7.3.3 Beta

An estimate of beta of 0.7 is set in the Final Rate of Return Guidelines (2018). This estimate, the Guidelines advise, has been obtained using well-established statistical methods and a data set updated to include share price and other data from 2017.²⁴

GGT has used the beta estimate of 0.7 when applying the SL CAPM to estimate the rate of return on equity for the GGP Access Arrangement revision proposal.

7.3.4 Rate of return on equity estimate

GGT's estimate of the rate of return on equity for the GGP Access Arrangement revision proposal is 6.45% (= 2.25% + 0.7 x 6.0%).

7.4 Rate of return on debt

The estimate of the return on debt ($E(r_d)$), the Final Rate of Return Guidelines (2018) advise, is to comprise a premium for risk over above a base rate, plus allowances for debt raising and hedging costs.

7.4.1 Base rate

The base rate for rate of return on debt estimation is to be the average, over a period of 20 trading days, of the bank bill swap rate with term of 5 years.²⁵

²² Economic Regulation Authority, *Final Rate of Return Guidelines (2018)*, 18 December 2018, paragraphs 193 and 194.

²³ Economic Regulation Authority, *Final Rate of Return Guidelines (2018)*, 18 December 2018, paragraph 187.

²⁴ Economic Regulation Authority, *Final Rate of Return Guidelines (2018)*, 18 December 2018, paragraphs 199 to 205, and paragraph 206.

²⁵ Economic Regulation Authority, *Final Rate of Return Guidelines (2018)*, 18 December 2018, paragraphs 193 and 117.

This base rate is to be set using observed yields over an averaging period immediately prior to the commencement of the access arrangement period. The averaging period is to be nominated by the service provider in advance of the ERA's final decision on the access arrangement revision proposal.

For the revisions proposal for the GGP Access Arrangement, GGT has used, as the base rate for rate of return on debt estimation, the average of bank bill swap rates for terms of 5 years for the 20 trading days ended on 28 September 2018.

That average – GGT's estimate of the base rate for rate of return on debt estimation – is 2.31%.

GGT understands that this rate will be updated during the ERA's revisions approval process, and updated again for the ERA's final decision on the proposed revisions to the GGP Access Arrangement.

7.4.2 Debt risk premium

Rate of return on debt estimation, in accordance with the Final Rate of Return Guidelines (2018), is to use a debt risk premium calculated as a 10 years trailing average, which is updated annually by removing the oldest term from the average and adding in a new premium for the year ahead (maintaining an average over a period of 10 years).

The new premium, for the year ahead, is to be estimated from the yields on the bonds in sample of issues by comparable firms with terms of 10 years and with credit ratings similar the ERA's benchmark rating. That benchmark credit rating is, the Guidelines advise, BBB+.

For the GGP Access Arrangement revisions proposal, GGT has estimated a debt risk premium from bond yield data available at the end of September 2018. This premium has been used as a forecast for 2019 and for 2020 (the first year of the access arrangement period).

GGT's current estimate of the debt risk premium is 1.62%.

GGT understands that this estimate of the debt risk premium will be updated during the ERA's revisions approval process, and updated again for the ERA's final decision on the proposed revisions to the GGP Access Arrangement

With this current estimate of the debt risk premium, the trailing average of historical risk premiums required for estimation of the rate of return on debt is 2.32%. The calculation of the trailing average is shown in Table 33.

In Table 33, the debt risk premiums for the period of 10 years from 2006 to 2015 are from the ERA's June 2016 Final Decision tariff model (as amended 21 July 2016). The subsequent "current estimates", for 2016, 2017, 2018 and 2019, are those used in the

annual variations of the GGP reference tariff. The 2019 estimate of the debt risk premium has been taken as the estimate for 2020.

Table 33: 10 years trailing average debt risk premium

	2015	2016	2017	2018	2019	2020
2020						1.62%
2019					1.62%	1.62%
2018				1.86%	1.86%	1.86%
2017			2.55%	2.55%	2.55%	2.55%
2016		2.58%	2.58%	2.58%	2.58%	2.58%
2015	2.07%	2.07%	2.07%	2.07%	2.07%	2.07%
2014	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%
2013	3.04%	3.04%	3.04%	3.04%	3.04%	3.04%
2012	3.17%	3.17%	3.17%	3.17%	3.17%	3.17%
2011	2.38%	2.38%	2.38%	2.38%	2.38%	2.38%
2010	2.13%	2.13%	2.13%	2.13%	2.13%	
2009	4.62%	4.62%	4.62%	4.62%		
2008	3.76%	3.76%	3.76%			
2007	1.13%	1.13%				
2006	0.71%					
Average	2.53%	2.71%	2.86%	2.67%	2.37%	2.32%

7.4.3 Debt raising and hedging costs

Allowances for debt raising and hedging costs are set in the Final Rate of Return Guidelines (2018). They are 0.100%, and 0.114%, respectively.²⁶

GGT has used these allowances in estimating the rate of return on debt for the GGP Access Arrangement revision proposal.

7.4.4 Rate of return on debt estimate

GGT's estimate of the rate of return on debt is 4.84%.

The estimation of the rate of return on debt is summarised in Table 34.

²⁶ Economic Regulation Authority, *Final Rate of Return Guidelines (2018)*, 18 December 2018, paragraphs 214 and 216.

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Table 34: Rate of return on debt estimate

Base rate	2.31%
Trailing average debt risk premium	2.32%
Debt raising costs	0.10%
Hedging costs	0.11%
Rate of return on debt	4.84%

7.5 Rate of return

GGT's estimate of the rate of return for the GGP Access Arrangement revision proposal is 5.56% (see Table 35 below).

This is the weighted average of GGT's estimate of the rate of return on equity of 6.45%, and its estimate of the rate of return on debt of 4.84%. The weight given to the rate return on debt in this weighted average is the benchmark gearing of 55%. (The rate of return on equity is weighted 45%.)

Table 35: Rate of return

Component		Value
Rate of return on equity		
Risk free rate	r_f	2.25%
Beta		0.70
Market risk premium		6.00%
Rate of return on equity	$E(r_e) = r_f + \beta \times [E(r_M) - r_f]$	6.45% = 2.25% + 0.70 x 6.00%
Rate of return on debt		
Base rate		2.31%
Debt risk premium	DRP	2.32%
Debt raising costs		0.10%
Hedging costs		0.11%
Rate of return on debt	$E(r_d)$	4.84% = 2.31% + 2.32% + 0.10% + 0.11%
Gearing	g	55%
Rate of return	$WACC = E(r_e) \times (1 - g) + E(r_d) \times g$	5.56% = 6.45% x (1 - 0.55) + 4.84% x 0.55

7.6 Averaging periods

The risk free rate of return and the base rate used in estimating the rate of return on debt are to be calculated from current market data. Those data are to be for:

- (a) a period of 20 consecutive trading days;
- (b) a period which is as close as possible to commencement of the access arrangement period; and
- (c) a period which has not commenced at the time of its nomination.

GGT nominates the periods of 20 days shown in Table 36 in as “averaging periods” for estimation of the components of the rate of return used in the GGP Access Arrangement.

Table 36: Averaging periods

Regulatory year	Averaging period
-----------------	------------------

Commercially sensitive information

8 Forecast operating expenditure

GGT's forecast of expenditure expected to be incurred in operating and maintaining the Covered Pipeline during the period 2020 to 2024 is set out and explained in this section of the Supporting Information.

After noting the rules governing operating expenditure, the section sets out:

- (a) the components of Covered Pipeline operating expenditure;
- (b) operating expenditure during the earlier access arrangement period;
- (c) operating expenditure forecasting method;
- (d) base operating expenditure for the Covered Pipeline;
- (e) forecasting operating expenditure for the access arrangement period; and
- (f) the forecast of operating expenditure 2020-2024.

8.1 Rules governing operating expenditure

NGR rule 69 defines operating expenditure for the purpose of price and revenue regulation as "operating, maintenance and other costs and expenditure of a non-capital nature incurred in providing pipeline services and includes expenditure incurred in increasing long-term demand for pipeline services and otherwise developing the market for pipeline services".

The forecast of operating expenditure used in establishing the total revenue for an access arrangement period should be an estimate of the expenditure that would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services (NGR rule 91(1)).

Rule 74(2) further requires that a forecast, including a forecast of operating expenditure:

- (a) be arrived at on a reasonable basis; and
- (b) represents the best forecast possible in the circumstances.

8.2 Covered Pipeline operating expenditure

Covered Pipeline operating expenditure comprises:

- (a) pipeline operating expenditure;
- (b) expenditures associated with major expenditure jobs;
- (c) commercial operations expenditure;
- (d) regulatory expenditure; and
- (e) corporate costs.

These categories of expenditure are described in the following subsections of the Supporting Information.

8.2.1 Pipeline operations

GGT, as manager appointed under the GGT JV Agreement, is responsible for the development, operation and maintenance of the GGP. The GGT JV participants intended that the manager be a small entity which obtained resources from the participants, and GGT is a company with only three employees (General Manager, Office Manager and Management Accountant). Resources for the day-to-day operation and management of the GGP are provided by others.

The GGT JV Agreement authorises GGT, as manager, to delegate the operation and maintenance of the GGP to an operator via an operating agreement. In 2003, GGT and the GGT Joint Venture participants entered into an agreement, the Operating Agreement, with APT Pipelines Ltd and APT Pipelines (WA) Pty Limited for provision of the services required for the "proper and efficient operation" of the GGP. The operation and maintenance of the pipeline continues to be in accordance with the terms of this agreement although the ownership of the Joint Venture participants has changed since the agreement was executed.

The costs of operating and maintaining the GGP incurred under the Operating Agreement, portions of which are allocated to the Covered Pipeline in the ways noted in section 4 above, are classified as:

- (a) administration (business services) expenditures;²⁷
- (b) engineering expenditures; and
- (c) field services expenditures.

²⁷ The subcategory "administration" appears in three of the five major categories of operating expenditure. The expenditures are incurred in the management of the activities of three different entities, performing different activities, in three different contexts. There is no "double counting" of expenditure on administrative functions.

The suppliers of services under the Operating Agreement also undertake those large scale, non-recurrent maintenance activities referred to as major expenditure jobs.

The activities which give rise to each of these elements of cost incurred in operating and maintaining the GGP under the Operating Agreement are explained below.

GGT not only incurs the costs of services provided under the Operating Agreement. GGT incurs directly, and not via a services agreement, certain costs of operating and maintaining the pipeline.²⁸ These costs directly incurred by GGT, which are also explained below, are:

- (a) administration (GGT) expenditures;
- (b) APA operations recoverable expenditures;
- (c) APA operations management expenditures;
- (d) APA commercial management expenditures;
- (e) marketing expenditures;
- (f) Newman Lateral expenditures;
- (g) projects/operations expenditures;
- (h) public relations expenditures; and
- (i) technical regulatory expenditures.

Administration (business services)

Administration (business services) is the administrative and office services support for the provision of pipeline engineering and field services to the Covered Pipeline.

Engineering

Engineering is the professional engineering support provided to pipeline operation and maintenance, and includes integrity assurance and management; risk assessment and mitigation; maintenance of mechanical and rotating equipment; maintenance of electrical equipment, control systems and instrumentation; data communications engineering; corrosion protection; and technical compliance management and reporting.

²⁸ GGT also incurs the costs of commercial operation of the gas transportation business based on the GGP. Services required for commercial operation of the transportation business are provided under a Commercial Services Agreement; see section 8.2.2 below.

Field services

Field services activities include overall monitoring and control of the pipeline, operation and routine maintenance of field plant and equipment, operational and statutory monitoring and inspections, maintenance and patrolling of the pipeline easement, liaison with the technical staff of users taking delivery of gas, liaison with landowners and related public relations, warehousing and spares inventory management, vehicle fleet management, and record keeping and reporting.

Administration (GGT)

Administration (GGT) is certain administrative services supporting the overall management of the GGP. Expenditures in this category are rents paid for business premises, pipeline licence fees and the safety levy payable to the Western Australian Department of Mines, Industry Regulation and Safety.

APA operations recoverable

The principal providers of services to the Covered Pipeline are APT Pipelines Ltd and APT Pipelines (WA) Pty Limited (providers of engineering and field services under the Operating Agreement), and APT Goldfields Pty Ltd (provider of commercial operations services under the Commercial Services Agreement; see section 8.2.2 below). Personnel employed by each of these companies work in business premises rented by GGT, and GGT recovers a portion of the rent its pays from each of the two service providers. This recovery of premises rent is accounted for as a reduction in the total cost of operating the GGP.

APA operations management

APA operations management expenditure is the amount payable by GGT for the management of engineering and fields services under the Operating Agreement with APT Pipelines Ltd and APT Pipelines (WA) Pty Limited.

APA commercial management

APA commercial management expenditure is the amount payable by GGT, under the Commercial Services Agreement with APT Goldfields Pty Ltd, for the management of commercial operations associated with the gas transportation business based on the GGP.

Marketing (GGT operations)

Marketing services are largely provided to GGT by APT Goldfields Pty Ltd. However, from time to time, GGT has undertaken some marketing activity itself as part of its operation of the GGP.

These marketing costs directly incurred by GGT have been small. Some \$2,467 was incurred during the period 1 January 2015 to 30 June 2018, and none is expected to be incurred during the period 1 July 2018 to 31 December 2019, or during the access arrangement period (1 January 2020 to 31 December 2024).

Marketing expenditure has been removed from the classification of costs which GGT incurs directly in operating and maintaining the Covered Pipeline when forecasting operating expenditure for the access arrangement period.

Newman Lateral

The Newman Lateral is some 48 kilometres of 200 millimetre (nominal) diameter pipeline, which provides a connection between the GGP main line and gas-fired power generation facilities located close to the town of Newman.

GGT uses a contractor to provide field services for the operation and maintenance of the Newman Lateral. The amount paid annually to the contractor depends on the work to be done on the lateral.

Projects/operations

Projects/operations activities are operations-related activities associated with the repair of damage to the pipeline easement, and to surface facilities which are part of the GGP, as a result of tropical cyclones which regularly cross the route of the GGT.

Public relations (GGT operations)

Public relations activities are largely provided to GGT by APT Goldfields Pty Ltd. However, from time to time, GGT has undertaken those activities directly (sometimes with the assistance of external public relations advisors) as part of its operation of the GGP.

Public relations costs directly incurred by GGT have been small. None was incurred during the period 1 January 2015 to 30 June 2018, and none is expected to be incurred during the period 1 July 2018 to 31 December 2019, or during the access arrangement period.

Public relations expenditure has been removed from the classification of costs which GGT incurs directly in operating and maintaining the Covered Pipeline when forecasting operating expenditure for the access arrangement period.

Technical regulatory

The GGP is subject to a scheme of technical regulation under the Petroleum Pipelines Act 1969, implemented via the conditions of pipeline licence PL 24 issued under the Act, and currently administered by the Department of Mines, Industry Regulation and Safety.

Technical regulatory compliance activities are largely carried out by APT Pipelines Ltd and APT Pipelines (WA) Pty Limited as part of services they provide under the Operating Agreement. Costs incurred directly by GGT in ensuring technical regulatory compliance have been small, and none has been reported during the period 1 January 2015 to 30 June 2018. Furthermore GGT does not expect to directly incur costs in relation to GGP technical regulation during the period 1 July 2018 to 31 December 2019, or during the access arrangement period (1 January 2020 to 31 December 2024).

Technical regulatory expenditure has been removed from the classification of costs which GGT incurs directly in operating and maintaining the Covered Pipeline when forecasting operating expenditure for the access arrangement period.

8.2.2 Commercial operations

In 2003, GGT, as manager appointed by the GGT JV participants, and the participants themselves, entered into an agreement, the Commercial Services Agreement, with APT Goldfields Pty Ltd for the provision of services which support commercial operation of the gas transportation business based on the GGP.²⁹ The services provided by APT Goldfields include marketing of the services of the Covered Pipeline, identification of new business opportunities, negotiation of gas transportation agreements, and the ongoing administration of those agreements. APT Goldfields also manages public relations, including relationships with industry associations, with local governments and with the Government of Western Australia.

The costs of these commercial support activities are classified as:

- (a) administration (commercial operations);
- (b) legal;
- (c) marketing;
- (d) public relations;
- (e) regulatory;
- (f) carbon liability;
- (g) communications equipment lease and maintenance; and
- (h) insurance.

²⁹ The current Commercial Services Agreement was initially with service provider CMS Goldfields Gas Transmission of Australia Pty Ltd. This agreement replaced an earlier Commercial Services Agreement between GGT and CMS Goldfields Gas Transmission dated September 1999.

Administration (commercial operations)

Administration (commercial operations) is the administrative services supporting commercial operation of the GGP.

Legal

Legal services are an important input into the commercial operation of the GGP. Services provided using the pipeline are provided to users under long term gas transportation agreements, and legal advice is required when those agreements are negotiated, when they are modified or extended, and when contractual matters are in dispute or a user defaults.

Legal services for commercial operations are obtained mainly from APA Group's General Counsel's office, and the associated expenditure is part of corporate costs.

Some legal services are, however, sourced externally. The associated expenditure is relatively minor, and has been combined with the Administration (commercial operations) when forecasting operating expenditure for the access arrangement period.

Marketing (commercial operations)

Marketing activities are focused on generating new business for the GGP, and on securing the retention of existing users.

Marketing is an increasingly important part of commercial operations. Prospective users, and smaller existing users with gas transportation agreements due for renewal, now have as many as three options, in addition to gas delivered by pipeline, for meeting their future energy needs. These options are diesel, liquefied natural gas, and compressed natural gas.

Public relations (commercial operations)

Expenditures classified specifically as public relations are contributions to community development programs in remote areas.

These expenditures have been small (see Table 37 below). They have been included in administration (commercial operations) expenditure when forecasting for the access arrangement period.

Regulatory

Current regulatory activity is only in relation to the Covered Pipeline. Regulatory expenditure comprises:

- (a) the standing and other charges levied by the ERA on the Covered Pipeline; and
- (b) GGT regulatory expenditure: expenditure incurred by GGT in managing the economic regulation of the Covered Pipeline.

Carbon liability

Carbon emissions, including carbon dioxide releases in the operation of gas transmission pipelines, were taxed by the Australian Government in July 2012, and GGT paid the tax on emissions from the GGP. The tax was repealed, with effect from 1 July 2014.

Carbon liability has been removed from the classification of Covered Pipeline operating expenditures when forecasting expenditure for the access arrangement period.

Communications equipment lease and maintenance

Certain items of electronic communications equipment, including equipment for communication, via satellite, of the data generated and used by the GGP SCADA system, were leased.

The leases, apart from two leases of telecommunications lines, have terminated. The lease costs of the two telecommunications lines (about \$4,000 per month) have been included in administration (commercial operations) expenditure when forecasting for the access arrangement period.

Insurance

The cost of insurance attributable to the GGP is a portion of the APA Group cost of insuring the assets of its component infrastructure businesses. A portion of the insurance costs attributable to the GGP is, in turn, attributable to the provision of pipeline services using the Covered Pipeline.

Corporate insurance includes policies for industrial special risks, public and product liability, fidelity guarantee, motor vehicles, marine transit and workers' compensation.

Corporate costs

GGT itself, is part of a larger corporate group, and relies on the “corporate centre” for the provision of a range of “corporate”, or “headquarters”, functions. The costs incurred in providing these corporate functions are costs attributable to the provision of services using the GGP, and a portion of these costs attributable to the GGP is, in turn, attributable to the provision of pipeline services using the Covered Pipeline.

The corporate functions which the corporate centre performs include:

- (a) executive management and administration (including board of directors, chief executive officer, head office administration and human resources);
- (b) legal and corporate affairs (including general counsel, company secretarial, risk management and investor relations);
- (c) finance (including, treasury, general financial accounting, general management accounting, financial reporting, the provision of financial services such accounts payable and accounts receivable, and tax);
- (d) information and communications technology services (including the development and maintenance of company-wide compatible IT and communications systems, and maintaining IT systems security);
- (e) external relations (including government relations, business strategy and planning); and
- (f) contract management.

8.3 Operating expenditure 2015-2019

Table 37 shows operating expenditure for the Covered Pipeline, for the period 1 January 2015 to 31 December 2019. The expenditures shown in the table for the period 2015 to 2017 are actual expenditures. The expenditures for 2018 and 2019 are forecasts.

The expenditures shown in Table 37 are nominal expenditures; they include the effects of inflation. To facilitate comparison between these expenditures and the forecast operating expenditures shown in Table 42, the expenditures in Table 37 have been converted to real expenditures at the prices prevailing in December 2018. These real 2018 expenditures are shown in Table 38.

The operating expenditures in Table 37 are reported in the major categories which GGT has previously used in reporting actual and forecast expenditures for the Covered Pipeline. These major categories are:

- (a) Pipeline operations;
- (b) Major expenditure jobs;
- (c) GGT operations;
- (d) Commercial operations; and
- (e) Corporate costs.

Although these categories have been used previously, prior expenditures are not directly comparable with those reported for years before 2015. The allocation of costs between services provided using the Covered Pipeline and services provided using the uncovered GGP assets has, from 2015, followed the principles of cost allocation required by the ERA's June 2016 Final Decision on the last proposed revisions to the GGP Access Arrangement (see section 4 above). These principles of cost allocation are different from those which applied previously.

Table 37: Operating expenditure: 2015-2019

	2015 Actual \$ million	2016 Actual \$ million	2017 Actual \$ million	2018 Forecast \$ million	2019 Forecast \$ million
Pipeline operations					
	<i>Commercially sensitive and confidential information</i>				
	12.529	12.331	11.870	11.720	11.670
Major expenditure jobs	0.528	0.044	0.322	0.402	0.491
	13.057	12.375	12.192	12.122	12.161
	<i>Commercially sensitive and confidential information</i>				
Commercial operations	1.034	0.755	0.597	0.589	0.587
	<i>Commercially sensitive and confidential information</i>				
Regulatory	0.526	0.697	0.313	0.844	0.865
	<i>Commercially sensitive and confidential information</i>				
	1.560	1.452	0.910	1.433	1.451
Corporate costs	6.466	4.458	2.883	4.789	4.789
OPEX: 2015-2019	21.084	18.285	15.985	18.344	18.402

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Table 38: Operating expenditure: 2015-2019: \$ real Dec-2018

	2015 Actual \$ million	2016 Actual \$ million	2017 Actual \$ million	2018 Forecast \$ million	2019 Forecast \$ million
Pipeline operations					
	<i>Commercially sensitive and confidential information</i>				
	13.199	12.801	12.092	11.720	11.456
Major expenditure jobs	0.556	0.046	0.328	0.402	0.482
	13.756	12.847	12.420	12.122	11.938
	<i>Commercially sensitive and confidential information</i>				
Commercial operations	1.089	0.784	0.608	0.589	0.576
	<i>Commercially sensitive and confidential information</i>				
Regulatory	0.554	0.724	0.319	0.844	0.849
	<i>Commercially sensitive and confidential information</i>				
	1.644	1.508	0.927	1.433	1.425
Corporate costs	6.812	4.628	2.937	4.789	4.701
OPEX: 2015-2019	22.212	18.983	16.283	18.344	18.064

The operating expenditures for the Covered Pipeline in 2015, 2016 and 2017, which are allocations of the corresponding operating expenditures for the GGP made using the principles set out in section 4, have been reviewed by GGT's external auditor. The auditor's review reports are provided in Attachment 3 to the Supporting Information.

The corporate costs for 2015, 2016 and 2017 shown in Table 37 and Table 38 are allocations of APA Group corporate costs. They are not consistent with the forecast of corporate costs which GGT has used in preparing the GGP Access Arrangement revision proposal, and which has been used in making the forecasts for 2018 and 2019 shown in the two tables. GGT's forecast of corporate costs is discussed in section 8.6.5 below.

8.4 Forecasting method

GGT has forecast operating expenditure for the access arrangement period (1 January 2020 to 31 December 2020) using the "base, step and trend" method. This method provides a forecast which is consistent with the requirements of NGR rule 91(1).

GGT's application of the base, step and trend method is described in the following subsections of the Supporting Information.

The operators of a number of regulated gas transmission pipelines use the base, step and trend method for forecasting operating expenditure. Their rationale for this is that, in a price cap regime (with a CPI - X price cap), revealed operating costs are efficient. A forecast made using base, step and trend is, then, a forecast likely to meet the requirements of rule 91(1).

The AER advises, albeit in the context of electricity transmission network service providers:

For recurrent expenditure, we prefer to use revealed (past actual) costs as the starting point for assessing and determining efficient forecasts. If a TNSP operated under an effective incentive framework, actual past expenditure should be a good indicator of the efficient expenditure the NSP requires in the future. The ex-ante incentive regime provides an incentive to improve efficiency (that is, by spending less than the AER's allowance) because TNSPs can retain a portion of cost savings made during the regulatory control period.³⁰

The forecasting of operating expenditures using base, step and trend is described, by the AER, using the formula:

³⁰ Australian Energy Regulator, *Expenditure Forecast Assessment Guideline for Electricity Transmission*, November 2013, pages 7-8.

$$\text{Opex}_t = \prod_{i=1}^t (1 + \text{rate of change}_i) \times (A_t^* - \text{efficiency adjustment}) \pm \text{step changes}_t^{31}$$

We are unsure why operating expenditure in year t (Opex_t) should be a product of factors from $t = 1$ to t , but the intention is clear. Operating expenditure in any given year is to be estimated from base operating expenditure (A_t^*), which is to be expenditure in the most recent year for which complete actual expenditure is available. This actual expenditure is to be adjusted, if necessary, for efficiency changes, and for rate of change estimated as output growth plus real price increase less productivity change. Step changes are then added (or subtracted) for costs not captured in the base operating expenditure or in the rate of change.

8.5 Base operating expenditure for the Covered Pipeline

The base year used in applying the base, step and trend method to forecast operating expenditure for the Covered Pipeline is calendar year 2017. This was, at the time of preparation of the GGP Access Arrangement revision proposal, the most recent calendar year for which complete financial information was available.

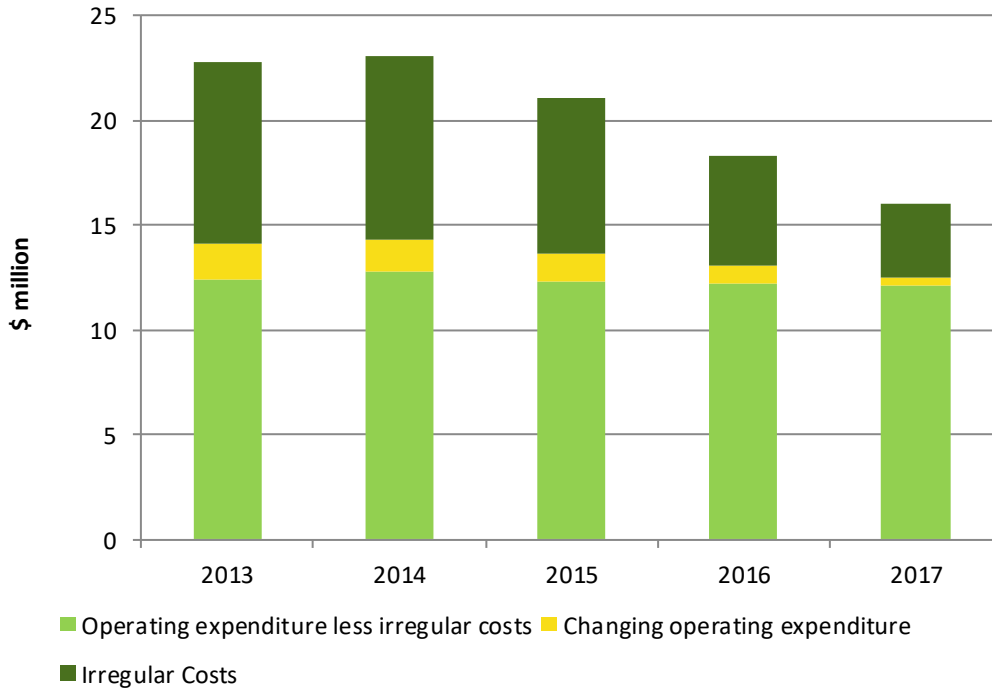
Before applying the base, step and trend method, GGT has allocated the components of base year operating expenditure for the GGP to the Covered Pipeline using the cost allocation principles set out in section 4 above.

GGT has then reviewed that allocation of base year expenditure to ascertain whether the simple extrapolation of the base, step and trend method is appropriate for forecasting operating expenditure for the Covered Pipeline.

Figure 1 shows actual operating expenditures for the Covered Pipeline for the period 2013 to 2017.

³¹ Australian Energy Regulator, *Expenditure Forecast Assessment Guideline for Electricity Transmission*, November 2013, page 22.

Figure 1: Actual operating expenditure: 2013-2017



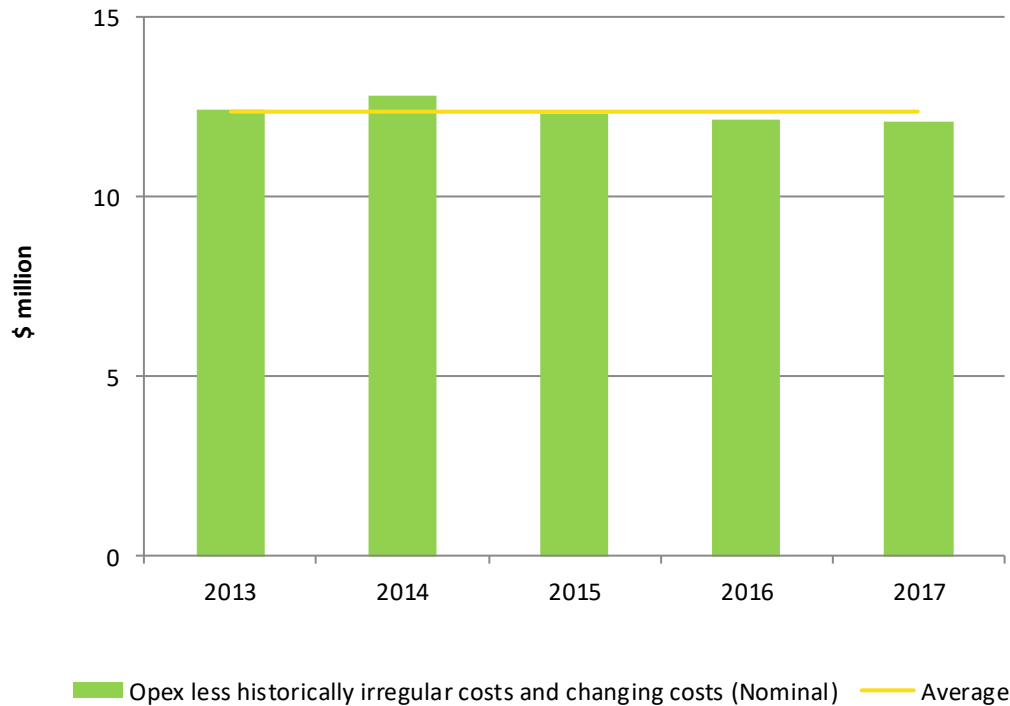
Irregular costs – expenditures on major expenditure jobs, regulatory costs, carbon liability costs and corporate costs – all show variability which precludes simple extrapolation. These components of total operating expenditure, with the exception of carbon liability costs (which are no longer incurred), have been separately forecast.

When expenditures showing time variability, and expenditures that show significant reductions over time (changing operating expenditure) are removed, Covered Pipeline operating expenditures have been relatively stable over time (see Figure 2). Relative to the base year (2017), the largest variation in adjusted operating expenditure is 5.7%. That variation is for 2014, and may be partly explained by a different approach to allocating costs between the Covered Pipeline and the uncovered GGP assets prior to 2015.³²

The stability in the adjusted expenditure indicates that it can be forecast using a simple extrapolation method. Use of a more resource intensive “bottom up” method is not necessary for production of a reasonable forecast.

³² GGT has not “re-allocated” GGP operating costs incurred prior to 2015 to accord with the change in allocation principles required by the ERA’s June 2016 Final Decision on the last proposed revisions to the GGP Access Arrangement.

Figure 2: Adjusted total operating expenditure: 2013-2017



8.6 Forecasting operating expenditure 2020-2024

GGT's forecasting of operating expenditure starts from the base operating expenditure for the Covered Pipeline.

Consideration is given to those components of base expenditure identified as changing operating expenditure.

Irregular costs are then removed from the base (to be forecast separately), and the adjusted base operating expenditure is expressed in real terms at December 2018 prices.

The result is the underlying stable operating expenditure on the Covered Pipeline. This stable expenditure, unchanged, is the base for the forecast of operating expenditure for the access arrangement period. The underlying stable component of base operating expenditure, and its projection forward, are in real terms (in the case of the Covered Pipeline, at December quarter 2018 prices).

Separate forecasts, for the access arrangement period, are then made for the irregular costs (all in real terms, at December quarter 2018 prices), and these are added to the underlying stable expenditure.

The separate forecasting of the irregular costs is consistent with the requirements of rule 74(2) for forecasts which have been arrived at on reasonable bases and which represents the best forecasts possible in the circumstances.

If necessary, adjustments, up or down, are then made for step changes in expenditure. (In the case of the Covered Pipeline, step changes were not required.)

The resulting forecast of expenditure is then adjusted for any real change in the price of labour.

The result is the forecast of operating expenditure for the access arrangement period, expressed in real terms.

Each step in this process is discussed in the paragraphs which follow.

8.6.1 Changing operating expenditure

Changing operating expenditure refers to those components of operating expenditure that show significant reductions over time. For the Covered Pipeline, they are the expenditures shown in Table 39.

Table 39: Changing operating expenditure components: 2013-2017 (\$ real Dec-2018)

	2013 \$ million	2014 \$ million	2015 \$ million	2016 \$ million	2017 \$ million
<i>Commercially sensitive and confidential information</i>					
Total	1.661	1.455	1.280	0.911	0.344

[Redacted]

[Redacted]

[Redacted]

[Redacted]

Using 2017 expenditure as the base, rather than expenditure in 2016, or in an earlier year, will result in a lower forecast consistent with the requirement of NGR rule 91(1) for achieving the lowest sustainable cost of delivering pipeline service.

In forecasting operating expenditure for the access arrangement period, GGT has not adjusted the field services component in the base operating expenditure.

Commercial operations administration and marketing costs appear to have declined since 2013, but the changes are relatively small after 2015. This may be

partly explained by the change in the way these costs have been allocated between the Covered Pipeline and the uncovered GGP assets.

In forecasting operating expenditure for the access arrangement period, GGT has not adjusted the commercial operations administration and marketing components in the base operating expenditure.

Insurance premiums tend to follow the economic cycle and, in recent years, premiums for property and liability insurance have fallen. This has contributed to the lower insurance costs charged to the GGP in 2017. However, comparison with earlier years (in particular, 2013 and 2014) may be distorted by the use of different allocations between the Covered Pipeline and uncovered GGP assets in those earlier years.

In forecasting operating expenditure for the access arrangement period, GGT has not adjusted the insurance component in the base operating expenditure.

8.6.2 Major expenditure jobs

Major expenditure jobs are activities incurring large non-recurrent operating expenditures. The costs of major expenditure jobs must be forecast “bottom up”, from the type and scope of activities that are expected to occur in each year of the access arrangement period.

The major expenditure jobs forecast for 2020 to 2024 are shown in Table 40.

Table 40: Major expenditure jobs forecast (\$ real Dec-2018)

	2020	2021	2022	2023	2024
	\$ million	\$ million	\$ million	\$ million	\$ million
Easement line of sight maintenance	0.200	0.200	0.200	0.200	0.200
Easement marker sign replacement	0.080	0.080	0.080	0.080	0.080
Pipeline Integrity Management Plan	0.000	0.000	0.055	0.000	0.000
Safety Management System Review	0.055	0.000	0.000	0.000	0.000
MLV and scraper station above ground recoating	0.000	0.000	0.075	0.050	0.150
MLV and scraper station bolted flange joint integrity program	0.000	0.000	0.035	0.070	0.070
Compressor station above ground recoating	0.175	0.300	0.175	0.000	0.000
Compressor station bolted flange joint integrity program	0.050	0.100	0.050	0.000	0.000
Major expenditure jobs: 2020-2024	0.560	0.680	0.670	0.400	0.500

The major expenditure jobs expected during the access arrangement period are as follows.

Easement line of sight maintenance

GGT must maintain line of sight visibility from one pipeline marker sign to the next along the GGP easement in accordance with Australian Standard AS 2885.3. Compliance with the standard is a requirement of pipeline licence PL 24, and a clear line of sight is necessary for safe working along the easement.

Line of sight visibility is restricted by the growth of vegetation along the easement, and vegetation growth is accelerated by rains from the tropical cyclones which cross the easement during each cyclone season.

Monthly aerial patrols are conducted along the easement to identify and monitor areas of rapid growth of vegetation which will require clearing and rectification.

Clearing and rectification, when required, are carried out by a small crew with the necessary heavy equipment (bulldozer or grader). The work is usually undertaken by contractors, although sometimes landowners along the pipeline route have the capability and equipment to carry out the work and use it to supplement their incomes.

The estimate of costs is based on historical costs of easement maintenance.

Easement marker sign replacement

Pipeline marker signs are required for safety along the easement of a transmission pipeline. They are intended to prevent "third party" encroachment into the easement, and damage to the pipe itself.

The signs indicate the location of a high gas pressure pipeline, advise that there is to be no digging in its vicinity, and provide an emergency contact telephone number. The spacing of the signs is determined by the location class of the pipeline (which may vary along its length). On the GGP easement, these signs are around 200 metres apart. They are mounted on posts, with each post carrying two signs facing in opposite directions.

Over time, the signs fade. They cease to be compliant with Australian Standard AS 3145, and must be replaced to ensure that the conditions of the pipeline Safety Management Study are satisfied. Sign replacement is part of prudent and efficient pipeline operation, in accordance with good industry practice.

The estimate of cost is based on a unit cost of replacement signage from a sign supplier. Sign replacement is undertaken by APA field services staff as part of their normal maintenance activities. The annual volumes of signs purchased have been limited to the numbers which can be replaced by field services staff.

Pipeline Integrity Management Plan

GGT must comply with Australian Standard AS 2885 in accordance with the conditions of pipeline licence PL 24. AS2885.3, section 5A, requires a Pipeline Integrity Management Plan for a pipeline and associated facilities, and review of the plan every five years. The activity is part of prudent and efficient pipeline operation, in accordance with good industry practice.

The estimate is for the cost of the time of APA staff assigned to carry out the review.

Safety Management Study review

To ensure the continued safe operation of a pipeline system, Australian Standard AS2885.1 requires a Safety Management Study which is to be reviewed at five-yearly intervals. GGP must comply with the standard as a condition of pipeline licence PL 24.

In a Safety Management Study review, all threats to a pipeline which have the potential to result in hazardous events to the public, environmental impacts, or which impact on the security of the gas supply, are reviewed, as is the effectiveness of relevant physical and procedural controls.

The estimate is for the cost of the time of APA staff assigned to carry out the review.

MLV and scraper station above ground recoating

Compressor station above ground recoating

Above ground pipework and other facilities at main line valve sites, at scraper stations and at compressor stations must be coated with an epoxy resin coating to prevent corrosion. This coating deteriorates over time and, when necessary, is repaired as part of routine field services activity. Eventually, these "spot repairs" are insufficient, and the facility must be recoated.

Many GGP facilities have not been recoated since initial coating at pipeline construction. To now recoat is part of prudent and efficient pipeline operation, in accordance with good industry practice.

Recoating is usually undertaken by a suitably experienced painting contractor, who will sandblast, tape flanges and studs, prime with an etch primer, and recoat.

The estimate of costs is based on recent experience, including experience at Ilgarari Compressor Station where recoating required between 4 and 5 painters on site for approximately one month.

MLV and scraper station bolted flange joint integrity program

Compressor station bolted flange joint integrity program

The studs and nuts which were used to bolt together the flanges of the pipework at mainline valve sites, at scraper stations and at compressor stations when the GGP was constructed had no protective coatings to prevent corrosion. In the intervening 25 years, they have corroded, and are creating sites for moisture pooling which accelerates corrosion around the studs and nuts.

This corrosion may now be putting at risk the integrity of the pipeline, and these programs have been designed to ensure the systematic replacement of the existing studs and nuts, prior to integrity being compromised, with new corrosion-protected studs and nuts. The programs are part of prudent and efficient pipeline operation, in accordance with good industry practice.

The estimates of costs have been based on the costs of a similar stud and nut replacement program recently undertaken at the Mondarra Gas Storage Facility.

8.6.3 Regulatory costs

GGP regulatory costs comprise GGT's internal regulatory costs, and the ERA's standing and service charges.

GGT's internal regulatory costs, and the ERA's service charges are high during periods of access arrangement revision, and are lower at other times during the typical access arrangement period of five years. They were relatively low in 2017 following the ERA's Final Decision on the last proposed revisions to the GGP Access Arrangement in June 2016. Extrapolation of the base year (2017) expenditure may not, in these circumstances, lead to a forecast consistent with the requirements of NGR rule 91(1), or the requirement under Rule 24.

GGT has, therefore, forecast its regulatory costs in two parts. The ERA standing and service charges have been forecast from the pattern of those costs in previous years. GGT's internal regulatory costs have been forecast as part of estimation of corporate costs for a stand-alone business based on the GGP by KPMG (see section 8.6.5 below).

GGT added its estimates of ERA costs to the KPMG estimate of internal regulatory costs to obtain the regulatory cost component of the forecast of operating expenditure used in the GGP Access Arrangement revision proposal.

8.6.4 Carbon liability

As noted above, the Australian Government tax on carbon emissions was repealed, with effect from 1 July 2014, and carbon liability has been removed from the classification of GGP operating expenditures when forecasting expenditure for the access arrangement period.

8.6.5 Corporate costs

In its financial accounting for the GGT JV, GGT records, as corporate costs, an allocation of APA Group corporate costs made using the revenues of the entities within the Group as the basis of allocation. This allocation of corporate costs is further allocated between services provided using the Covered Pipeline and services provided using the uncovered GGP assets using pipeline capacity (measured in TJ/d) as the basis for allocation.

As revenues have varied among the entities in the Group, those allocations have varied, and have become more difficult to rationalise as group structure has become more complex.

In its June 2016 Final Decision on the last proposed revisions to the GGP Access Arrangement, the ERA agreed that the provision of corporate services by a corporate "centre" was a necessary function of the prudent operation of a large business, and that the costs of providing those services should be taken into account when forecasting the operating expenditure of the Covered Pipeline. The ERA made an estimate of the corporate costs for the gas transportation business based on the GGP, and allocated a portion of those costs (TJ/d of contracted capacity as the basis for allocation) to the Covered Pipeline. When making the estimate of corporate costs, the ERA relied, not on GGT's reported allocation of APA Group corporate costs to the business based on the GGP, but on estimates of stand-alone corporate costs for that business (which GGT had provided), and advice from its technical consultant on the appropriate level of those costs.

An estimate of corporate costs for a stand-alone business with characteristics similar to the gas transportation business based on the GGP was seen as meeting the requirements of NGR rule 91(1) for operating expenditure such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services. An allocation of head office costs, made arbitrarily on the basis of the revenues of businesses of different scales operating in different sectors, and factored through a complex corporate structure, could not provide an estimate of those costs which would meet this requirement.

The ERA's June 2016 Final Decision concluded:

... the Authority considers that the reasonable efficient forecast of Corporate Costs on a standalone basis for the covered pipeline should be based on the EMCa determined benchmarked Corporate Costs for a standalone business based on the KPMG report.³³

³³ Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline*, 30 June 2016 (As amended on 21 July 2016), paragraph 474.

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GGT has, in these circumstances, asked KPMG to again estimate benchmark corporate costs for a stand-alone business based on the GGP. KPMG's report is Attachment 3 to the Supporting Information.

KPMG has estimated costs for:

- (a) executive management and administration (including board of directors, chief executive officer, head office administration and human resources);
- (b) legal and corporate affairs (including general counsel, company secretarial, risk management and investor relations);
- (c) finance (including treasury, general financial accounting, general management accounting, financial reporting, the provision of financial services such accounts payable and accounts receivable, and tax);
- (d) information and communications technology services (including the development and maintenance of company-wide compatible IT and communications systems, and maintaining IT systems security);
- (e) external relations (including government relations, business strategy and planning);
- (f) contract management; and
- (g) economic and market regulation.

The available benchmarks indicate a range of values for each of these components of corporate cost and, in its report, KPMG establishes a range for the corporate costs of a stand-alone business based on the GGP.

GGT has used, in the GGP Access Arrangement revision proposal, the median value of KPMG's range of benchmarked corporate costs.

As noted above, GGT has removed from the KPMG corporate costs the estimated cost of economic and market regulation, which is treated separately in the forecast of operating expenditure used for access arrangement revision.

The remainder has then been allocated between services provided using the Covered Pipeline and services provided using the uncovered GGP assets, in the ratio of the number of TJ/d of contracted capacity provided using the Covered Pipeline to the number of TJ/d of contracted capacity provided using the GGP (the Covered Pipeline plus the uncovered GGP assets), in the way required in the ERA's June 2016 Final Decision.

8.6.6 Labour cost escalation

Labour costs typically vary in ways different from the change in the general level of prices (inflation) as prices for labour services vary reflecting conditions of supply and demand in the labour market. In the past, there have been significant differences between rates of change in Western Australian prices for labour services and inflation.

GGT has, therefore, adjusted its operating expenditure for forecast changes in labour prices relative to expected inflation.

The ERA's recent Final Decision on proposed revisions to the access arrangement for the Western Power electricity transmission and distribution network advised:

The ERA has used publically available Australian Bureau of Statistics data to determine a premium for the electricity, gas, water and waste water services industry wages growth Australia-wide over all industries Australia-wide. This premium is then added to the annual average of the Western Australian WPI over the AA4 period which is obtained from WA Treasury forecasts. Table 50 below sets out the ERA's determined labour escalation for the AA4 period.³⁴

GGT has adopted the ERA's method of determining real labour price changes for the GGP Access Arrangement revision proposal. The real price changes are shown in Table 41.

Table 41: Real labour price change

	2020	2021	2022	2023	2024
Treasury forecast WPI growth (1/2 year lag)	1.50%	1.75%	2.75%	3.00%	3.25%
plus premium of EGWWS WPI over Australian All industries	0.48%	0.48%	0.48%	0.48%	0.48%
Equals: nominal labour escalation forecast	1.98%	2.23%	3.23%	3.48%	3.73%
Less: forecast inflation	1.87%	1.87%	1.87%	1.87%	1.87%
Equals: ERA consistent labour escalation factor	0.11%	0.36%	1.36%	1.61%	1.86%
Labour escalation factor	0.11%	0.36%	1.36%	1.61%	1.86%
Index of real labour price change	1.00	1.00	1.02	1.03	1.05

For its forecast of operating expenditure for the access arrangement period, GGT has identified the proportion of 2017 base expenditure which was labour-related, and has adjusted this proportion of expenditure in its expenditure forecasts by the labour price changes shown in Table 41.

³⁴ Economic Regulation Authority, *Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network 2017/18 – 2021/22*, 18 September 2018, paragraph 412.

8.7 Operating expenditure forecast

GGT's forecasting of operating expenditure for the Covered Pipeline, in the way described above, is carried out in a separate spreadsheet model, GGP CONFIDENTIAL Attachment 4 Forecast OPEX 20181221.xlsx, which is Attachment 4 to the Supporting Information.

GGT's operating expenditure forecast is summarised in Table 42. The forecast is in real terms at the prices prevailing in the December quarter 2018.

Table 42: Forecast operating expenditure: 2020-2024 (\$ real Dec-2018)

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million
Pipeline operations	<i>Commercially sensitive and confidential information</i>				
	11.742	11.792	11.993	12.436	12.542
Major expenditure jobs	0.560	0.680	0.670	0.400	0.500
	12.302	12.472	12.663	12.836	13.042
	<i>Commercially sensitive and confidential information</i>				
Commercial operations	0.591	0.593	0.603	0.625	0.631
	<i>Commercially sensitive and confidential information</i>				
Regulatory	1.211	1.091	1.091	1.091	1.091
	<i>Commercially sensitive and confidential information</i>				
	1.802	1.684	1.694	1.716	1.722
Corporate costs	4.789	4.789	4.789	4.789	4.789
OPEX: 2020-2024	18.893	18.945	19.147	19.341	19.553

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Conversion to nominal expenditures for the purpose of total revenue modelling is carried out in the tariff model, *GGP Confidential AA tariff model 1-Jan-2019.xlsx*, which forms part of GGT's access arrangement revision proposal. In the tariff model, the real expenditures of Table 42 are escalated at the constant rate of inflation of 1.87% assumed during the access arrangement period (see section 3 above).

GGT's forecast of nominal operating expenditures is shown in Table 43.

Table 43: Forecast operating expenditure: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million
Pipeline operations	<i>Commercially sensitive and confidential information</i>				
	12.186	12.466	12.916	13.643	14.017
Major expenditure jobs	0.581	0.719	0.722	0.439	0.559
	12.767	13.185	13.638	14.082	14.576
	<i>Commercially sensitive and confidential information</i>				
Commercial operations	0.613	0.627	0.650	0.686	0.705
	<i>Commercially sensitive and confidential information</i>				
Regulatory	1.257	1.153	1.175	1.197	1.219
	<i>Commercially sensitive and confidential information</i>				
	1.870	1.780	1.824	1.883	1.924
Corporate costs	4.970	5.063	5.157	5.254	5.352
OPEX: 2020-2024	19.606	20.028	20.619	21.219	21.852

9 Cost of corporate income tax

The way in which GGT has estimated the cost of corporate income tax for determination of the reference tariff of the GGP Access Arrangement revision proposal is explained in this section of the Supporting Information.

GGT has estimated the cost tax in the way indicated by section 87A of the NGR. This section requires that the estimate of the cost of tax included in the total revenue be reduced to ensure that equity investors are not overcompensated via the imputation credits that are available to them under Australian taxation law. GGT notes, in subsection 9.3 below, the value it has attributed to those imputation credits.

GGT's estimation of the cost of tax, and of the value to be attributed to imputation credits, for the access arrangement period (2020-2024), are set out in the tariff model, *GGP PUBLIC AA tariff model 1-Jan-2019.xlsx*, which forms part of GGP Access Arrangement revision proposal.

9.1 Rules governing estimation of the cost of corporate income tax

For the purpose of total revenue determination, a service provider's cost of corporate income tax in each year of an access arrangement period is to be estimated using the formula:

$$ETC_t = ETI_t \times r_t \times (1 - \gamma)$$

where

- (a) ETC_t is the estimate of the cost of tax in regulatory year t ;
- (b) ETI_t is an estimate of taxable income for regulatory year t ;
- (c) r_t is the expected statutory income tax rate; and
- (d) γ (gamma) is an estimate of the value to be attributed to imputation credits.

ETI_t is to be an estimate of the taxable income of a benchmark efficient entity which operates the business of the service provider to provide reference services.

9.2 Estimation of the cost of tax

GGT has estimated the cost of tax, ETC_t , in each regulatory year t , by multiplying an estimate of annual taxable income, ETI_t , by the expected statutory income tax rate, r_t .

Annual taxable income has been estimated as total revenue in each regulatory year less expenses allowed for income tax purposes. These expenses are:

- (a) the cost of debt financing – the return on debt from the total revenue calculation;
- (b) operating expenses – the forecasts of operating expenditure from the total revenue calculation; and
- (c) tax depreciation – depreciation on the historical cost of the assets comprising the GGP which may be depreciated for tax purposes (the tax asset base), calculated using the straight line method with the asset lives determined for taxation purposes by the Australian Taxation Office.

The cost of tax has been estimated from taxable income estimated, in turn, as the difference between:

- (a) the total revenue, which would be the revenue earned by a benchmark efficient service provider which uses the Covered Pipeline to provide reference services; and
- (b) expenses allowed for income tax purposes which are:
 - (i) in the case of the cost of debt financing and operating expenses, the costs used to determine the total revenue of the benchmark efficient service provider; and
 - (ii) in the case of tax depreciation, calculated by applying the rules for depreciation established by the Australian Taxation Office to a tax asset base determined using the capital expenditures of the benchmark efficient service provider.

The current corporate rate, 30%, has been used as the expected statutory income tax rate.

The taxable income from which GGT has estimated the cost of tax has been determined from efficient costs and efficient levels of revenue for provision of the reference service using the Covered Pipeline. It is the taxable income of an efficient entity providing reference services, as required by rule 87A, and not the taxable income of the service provider.

9.3 Value attributed to imputation credits

Under Australian taxation law, company profits are taxed, and dividends paid from the after-tax profits are also taxable as income accruing to Australian resident tax payers. So that a given income stream from company profits is not taxed twice, the law provides for imputation or franking credits to be distributed to equity investors when dividends are paid, providing those investors with a potential offset against their personal tax liabilities.

The estimated cost of corporate income tax is, therefore, to be reduced by an amount which represents the value of those imputation or franking credits.

The value to be attributed to imputation credits – the estimate of the factor γ – is set in the Final Rate of Return Guidelines (2018): $\gamma = 0.5$.³⁵ GGT has used this estimate of γ in preparing the GGT Access Arrangement revision proposal.

9.4 Estimated cost of tax and value of imputation credits

GGT's estimation of the cost of tax during the access arrangement period, and its estimation of the value of imputation credits, in the ways described in sections 9.2 and 9.3 above, are summarised in Table 44.

Table 44: Estimated cost of tax and value of imputation credits

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million
Forecast revenue from reference service	49.880	49.744	49.744	49.744	49.880
Tax expenses					
Return on debt	10.131	10.209	10.130	10.027	9.904
Tax depreciation	2.605	2.663	2.449	2.522	2.113
Operating expenditure	19.606	20.028	20.619	21.219	21.852
	32.342	32.899	33.198	33.767	33.869
Net income	17.538	16.845	16.546	15.977	16.012
Tax loss carried forward	0.000	0.000	0.000	0.000	0.000
Taxable income	17.538	16.845	16.546	15.977	16.012
Estimated cost of tax (tax rate = 30%)	5.261	5.053	4.964	4.793	4.803
Value of imputation credits ($\gamma = 0.5$)	2.631	2.527	2.482	2.396	2.402

³⁵

Economic Regulation Authority, *Final Rate of Return Guidelines (2018)*, 18 December 2018, paragraph 241.

10 Operation of an incentive mechanism

The GGP Access Arrangement imposes a cap on the price (reference tariff) at which GGT can provide the single reference service offered using the Covered Pipeline. This price cap provides an incentive for GGT to pursue efficiency gains during an access arrangement period.

The GGP Access Arrangement does not include a more specific incentive mechanism and, in consequence, there are no increments for efficiency gains from the operation of such a mechanism in the previous access arrangement period, and no decrements for efficiency losses, which are to be carried over into the total revenue for the period 1 January 2020 to 31 December 2024.

11 Total revenue, proposed revised reference tariff and reference tariff variation mechanism

In preceding sections of the Supporting Information GGT has summarised and explained the way in which it has determined the components of total revenue for the Covered Pipeline.

In this section, GGT:

- (a) summarises its calculation of the total revenue, and explains the way in which it has determined the reference tariff of the GGP Access Arrangement revision proposal;
- (b) notes the rules governing variation of the reference tariff during the access arrangement period; and
- (c) describes the reference tariff variation mechanism of the proposed revised access arrangement.

11.1 Total revenue for the Covered Pipeline

The total revenue for the covered pipeline, for the period 2020 to 2024, is summarised in Table 45.

Table 45: Total revenue: 2020-2024

	2020 \$ million	2021 \$ million	2022 \$ million	2023 \$ million	2024 \$ million	Total \$ million
Return on equity	11.045	11.130	11.043	10.931	10.797	54.946
Return on debt	10.131	10.209	10.130	10.027	9.904	50.400
Depreciation	4.453	5.548	6.043	6.473	5.770	28.288
Operating expenditure	19.606	20.028	20.619	21.219	21.852	103.324
Cost of tax	5.261	5.053	4.964	4.793	4.803	24.875
Value of imputation credits	-2.631	-2.527	-2.482	-2.396	-2.402	-12.437
Total revenue: 2020-2024	47.865	49.441	50.317	51.046	50.725	249.395

The return on equity shown in Table 45 has been calculated by multiplying the equity portion (45%) of the projected capital base at the beginning of each year (shown in Table 32 above) by the rate of return on equity component (6.45%) of the rate of return. The return on debt has, similarly, been calculated as the product of the gearing (55%), the projected capital base at the beginning of each year, and the rate of return on debt component (4.84%) of the rate of return.

Depreciation is as shown above, in Table 31.

GGT's forecast of operating expenditure was discussed in section 8 of the Supporting Information, and the amounts shown in Table 45 are the totals from Table 43 in section 8.7.

The cost of tax shown in Table 45 has been estimated in the way described in section 9. The value of imputation credits in each year of the access arrangement period is the product of the estimate of γ , 0.5, and the estimated cost of tax.

11.2 Reference tariff determination

The revised reference tariff has been determined from the total revenue, and the forecasts of capacity and throughput, for the Covered Pipeline.

GGT has included all of the capacity which might become available for reference service provision in the forecast of capacity used to determine the capacity-related component of the proposed revised reference tariff. A forecast of the utilisation of that capacity (the throughput forecast) has been used to determine the throughput-related component of the proposed revised reference tariff. Loosely speaking, GGT has determined the proposed revised reference tariff by dividing the forecast total revenue by the total volume of the services forecast to be provided using the Covered Pipeline.

GGT offers a single reference service (firm service) using the Covered Pipeline. There is, therefore, no requirement to allocate the total revenue among multiple services in determining the revised reference tariff of the GGP Access Arrangement revision proposal.

11.3 GGP reference tariff

GGT is proposing to retain the three-part reference tariff which has been in place since the GGP Access Arrangement was approved by the ERA in 2005. This three-part tariff comprises:

- (a) toll tariff (a price per GJ of contracted capacity (MDQ));
- (b) capacity reservation tariff (a price per GJ MDQ kilometre); and
- (c) throughput tariff (a price per GJ kilometre).

The toll tariff and the capacity reservation tariff are effectively access fees recovering the fixed costs of the Covered Pipeline. The throughput charge recovers variable costs.

By structuring the capacity reservation and throughput tariffs as distance-related prices, GGT has sought to make the reference tariff reflective of the costs of the resources used to provide pipeline services to individual users at different locations along the GGP.

The reference tariffs applying in preceding access arrangement periods were established assuming allocation of the total revenue to the components of the reference tariff in the proportions shown in Table 46.

Table 46: Allocation of total revenue to reference tariff components

	Proportion of total revenue
Toll tariff	11.3%
Capacity reservation tariff	72.2%
Throughput tariff	16.5%

GGT has not changed the proportions shown in Table 46 when determining the revised reference tariff of the GGP Access Arrangement revision proposal.

The toll charge of the proposed reference tariff has been calculated as the price during the period 2020 to 2024 which sets the present value of the forecast revenue from the tariff equal to 11.3% of the present value of the total revenue. For tariff calculation, the forecast revenue has been calculated using the forecast of MDQ shown in Table 2 above. The discount rate used in calculating the present values of the forecast revenue and the total revenue is the rate of return (5.56%).

Similarly:

- (a) the capacity reservation tariff has been calculated as the price during the period 2020 to 2024 which sets the present value of the forecast revenue from the tariff equal to 72.2% of the present value of the total revenue; and
- (b) the throughput tariff has been calculated as the price during the period 2020 to 2024 which sets the present value of the forecast revenue from the tariff (determined using the throughput forecast of Table 3) equal to 16.5% of the present value of the total revenue.

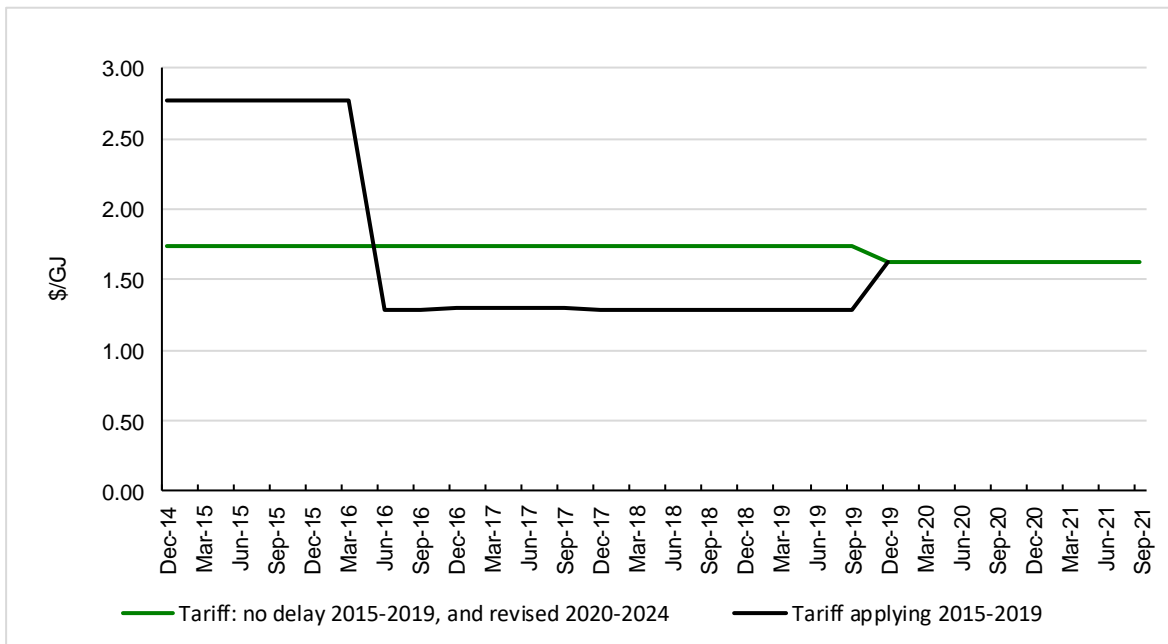
The revised reference tariff of the GGP Access Arrangement revision proposal is shown in Table 47.

Table 47: Proposed revised reference tariff

Toll tariff	\$/GJ MDQ	0.139646
Capacity reservation tariff	\$/GJ MDQ km	0.000846
Throughput tariff	\$/GJ km	0.000231

The proposed revised reference tariff is about 26% higher than the tariff applying during the period 1 July 2016 to 31 December 2019 (see Figure 3). This is a consequence of the higher (December 2014) tariff continuing to apply until 30 June 2016, when the ERA made its Final Decision on the last proposed revisions to the GGP Access Arrangement. If there had been no interval of delay (1 January 2015 to 30 June 2016), the reference tariff for the period 2015 to 2019 would have been lower, and the tariff for 2020 to 2024 would have been around 10% lower than that lower tariff. That is, if there had been no interval of delay, the GGP reference tariff would have fallen, in real terms, by about 6%.

Figure 3: Reference tariff 2015-2019 and proposed revised tariff (Kalgoorlie, load factor =1.0)



The reference tariff is to vary over the course of the access arrangement period in accordance with the reference tariff variation mechanism of the proposed revised GGP Access Arrangement. The rationale for this reference tariff variation mechanism is set out in the next section of the Supporting Information.

11.4 Reference tariff variation mechanism

GGT is proposing to simplify the reference tariff variation mechanism of the GGP Access Arrangement.

In this section of the Supporting Information GGT notes the rules which govern the reference tariff variation, and sets out the rationale for the simplified mechanism of the proposed revised access arrangement.

11.4.1 Rules governing the reference tariff variation mechanism

A full access arrangement is to include a mechanism (reference tariff variation mechanism) for variation of a reference tariff over the course of an access arrangement period (NGR rule 92(1)).

The reference tariff variation mechanism may provide for variation of the reference tariff:

- (a) in accordance with a schedule of fixed tariffs (NGR rule 97(1)(a));
- (b) in accordance with a formula set out in the access arrangement (NGR rule 97(1)(b));
- (c) as a result of a cost pass through for a defined event (NGR rule 97(1)(c)); and
- (d) by a combination of (a) to (c) above (NGR rule 97(1)(d)).

Rule 97(2) states that, where reference tariff variation is by a formula, the formula may provide for:

- (a) variable caps on the revenue to be derived from a particular combination of reference services;
- (b) tariff basket price control;
- (c) revenue yield control; or
- (d) any combination of (a) to (c).

The mechanism itself must also provide for the ERA's adequate oversight or powers of approval over variation of the reference tariff (NGR rule 97(4)).

In deciding whether a particular reference tariff variation mechanism is appropriate to a particular access arrangement, the ERA must, in accordance with NGR rule 97(3), have regard to:

- (a) the need for efficient tariff structures;
- (b) the possible effects of the reference tariff variation mechanism on the administrative costs of the regulator, the service provider, and users or potential users;
- (c) the regulatory arrangements (if any) applicable to the relevant reference services before the commencement of the proposed reference tariff variation mechanism; and
- (d) the desirability of consistency between regulatory arrangements for similar services (both within and beyond the relevant jurisdiction).

The ERA may also have regard to any other relevant factor in deciding on the appropriateness of a particular reference tariff variation mechanism (NGR rule 97(3)(e)).

11.4.2 GGP reference tariff variation mechanism

During the earlier access arrangement period (2015-2019), the reference tariff variation mechanism of the GGP Access Arrangement comprises two parts:

- (a) a scheduled reference tariff variation mechanism; and
- (b) a cost pass-through variation of the reference tariff.

The scheduled reference tariff variation mechanism provides for:

- (a) quarterly scheduled variation of the reference tariff; and
- (b) annual scheduled variation of the reference tariff.

For the access arrangement period (2020-2024), GGP is proposing to:

- (a) remove the quarterly scheduled variation of the reference tariff; but
- (b) retain the annual scheduled variation and cost pass-through variation mechanisms.

11.4.3 Removal of the quarterly scheduled variation of the reference tariff

The provision for quarterly scheduled variation of the reference tariff which is currently in the GGP Access Arrangement permits adjustment of each of the reference tariff components by the factor:

$$\frac{1}{(1 + K)} \times \frac{CPI_{t-2}}{CPI_{t-3}}$$

where:

- (a) $K = (1 + Z)^{0.25} - 1$, and Z is the forecast of annual inflation used in the ERA's Final Decision on the last proposed revision of the GGP Access Arrangement;
- (c) CPI_{t-2} is the All Groups, Weighted Average of Eight Capital Cities, Consumer Price Index for the quarter commencing six months prior to the quarter for which the reference tariff is to be varied; and
- (d) CPI_{t-3} is the All Groups, Weighted Average of Eight Capital Cities, Consumer Price Index for the quarter commencing nine months prior to the quarter for which the reference tariff is to be varied.

This factor by which each of the components of the reference tariff may be adjusted quarterly effectively:

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- (a) removes from the reference tariff the inflation for the quarter assumed at the time of reference tariff determination (by division by $(1 + K)$); and
- (a) adds back inflation for the quarter at the current rate estimated as CPI_{t-2}/CPI_{t-3} .

If, during the access arrangement period, inflation is not expected to rise or fall significantly from the level assumed at the time of reference tariff determination, CPI_{t-2}/CPI_{t-3} will be approximately equal to $(1 + K)$, and the factor by which each reference tariff component may be adjusted quarterly will be approximately equal to 1. That is, quarterly adjustment of the reference tariff components will be unnecessary.

To the extent that inflation drifts way from level assumed at the time of reference tariff determination, the reference tariff will be varied for the effect of that drift through the inflation adjustment in the annual scheduled variation.

During the past year, the Reserve Bank of Australia has been forecasting fairly stable inflation for the two years ahead. The Bank's August 2018 Statement on Monetary Policy advises that inflation is expected to increase gradually, from its current level of around 2.0%, to 2.25 per cent by mid-2020.³⁶

In these circumstances, GGT proposes relying only on the inflation adjustment of the GGP reference tariff "built-in" to the annual scheduled variation of the reference tariff.

If approved by the ERA, this removal of quarterly variation from the reference tariff variation mechanism should:

- (a) not change the efficiency of the GGP tariff structure – adjustment for price change will continue to be made but less frequently, recognising the current expectation of a relatively slow change in the general level of prices;
- (b) somewhat reduce administrative costs for GGT, the ERA, and pipeline users – the GGP reference tariff will be adjusted once annually for inflation, and not (as is currently the case) on four occasions;
- (c) align reference tariff variation with the annual variation of tariffs for negotiated services provided using the GGP; and
- (d) align reference tariff variation for the GGP with the variation of tariffs for reference services provided using the Dampier to Bunbury Natural Gas Pipeline (from which gas is delivered into the GGP).

³⁶

Reserve bank of Australia, *Statement on Monetary Policy*, August 2018, page 63.

11.4.4 Annual scheduled variation of the GGP reference tariff

Operation of the annual scheduled reference tariff variation mechanism, at the commencement of each year during the access arrangement period:

- (a) effects an annual inflation adjustment of the reference tariff;
- (b) allows GGT flexibility to vary the individual components of the reference tariff, by up to 2.0%, within a constraint on the overall revenue which might be earned at the reference tariff (the weighted average tariff basket); and
- (c) effects a change in the reference tariff following annual adjustment of the rate of return on debt in the way required by the ERA's Rate of Return Guidelines.

GGT is not proposing to change this general scheme of annual reference tariff variation.

If, however, revisions to the GGP Access Arrangement come into effect, as is currently expected, on 1 January 2020 (the current revisions commencement date), the formulae through which the annual tariff variation are given effect can be simplified. Those formulae, which are in Schedule A to the Access Arrangement, currently incorporate terms to accommodate an initial regulatory period of 6 months, from July to December 2016, resulting from a June 2016 Final Decision on the last access arrangement revision proposal for the GGP. These terms in the annual tariff variation formulae can be removed, as can some of the associated description of their meaning and operation.

The description of the way in which the GGP reference tariff is to be changed following annual updating of the rate return on debt can also be simplified. The updating process is clearly specified in the ERA's Rate of Return Guidelines.

11.4.5 Cost pass-through variation of reference tariff

The GGP Access Arrangement includes a cost pass-through variation mechanism which adjusts the reference tariff for a change in law, or a change in tax, which has the effect of materially increasing or decreasing the cost of reference service provision during the access arrangement period.

GGT is not proposing to change this mechanism for variation of the GGP reference tariff for cost pass-through.

12 GGP Access Arrangement

The proposed revisions to the GGP Access Arrangement are revisions to an applicable access arrangement that is a full access arrangement in respect of the pipeline services which the service provider provides or intends to provide in the circumstances specified by the NGR. In accordance with rule 48, a full access arrangement must:

- (a) identify the pipeline to which the access arrangement relates and include a reference to a website at which a description of the pipeline can be inspected;
- (b) describe the pipeline services the service provider proposes to offer to provide by means of the pipeline;
- (c) specify the reference services;
- (d) specify for each reference service:
 - (i) the reference tariff; and
 - (ii) the other terms and conditions on which the reference service will be provided;
- (e) in the case of a transmission pipeline, set out the queuing requirements;
- (f) set out the capacity trading requirements;
- (g) set out the extension and expansion requirements;
- (h) state the terms and conditions for changing receipt and delivery points; and
- (i) state the review submission date and the revision commencement date.

The GGP Access Arrangement currently includes each of these matters specified in rule 48. GGT's access arrangement revision proposal does not change the broad compliance of the GGP Access Arrangement with the requirements of rule 48. It does, however, provide for a number of changes, principally to the reference tariff and, to a lesser extent, to the terms and conditions on which the reference service will be provided.

All of the proposed changes to the GGP Access Arrangement itself, including changes to the terms and conditions on which its firm service reference service will be provided, and the reasons for these changes, are set out in Table 48.

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Table 48: Proposed changes to the GGP Access Arrangement and to the terms and conditions applying to the firm service

Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
1.1	Its changed to Pipeline	Replacement of abstract "Its" with specific "Pipeline".
1.2	Change of website address	The APA Group website has been "refreshed" since the last revisions to the GGP Access Arrangement. Pipeline details, including a map, are now on a new "page" of the website.
1.4	Identification of each of the GGP service providers	Clarification: pipeline owners, Southern Cross Pipelines Australia Pty Ltd, Southern Cross Pipelines (NPL) Australia Pty Ltd, and Alinta Energy GGT Pty Ltd, are identified as service providers; GGT is identified as a party controlling and operating the GGP, and as a service provider. GGT is complying service provider.
1.5	Capacity added to heading	Clarification of heading.
1.7	2019 changed to 2024 ; 2020 changed to 2025	New review submissions date, new revisions commencement date.
1.9	Adjustment changed to Variation	The term Reference Tariff Variation Mechanism (not Reference Tariff Adjustment Mechanism) is used in the NGR.
2.1.2	Part changed to Section	The clauses of the GGP Access Arrangement are referred to as sections (not parts).
2.2.1	at Yarraloola deleted	The definition of Receipt Point has been substantially revised (see below), making the reference to Yarraloola redundant. As the revised definition makes clear, there are two receipt points at the northern end of the GGP.
2.2.1	Sections (d), (e), (g), (h) removed	These sections are redundant; the information they contain is in sections (a), (b), (c) and (f).

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
2.2.2(a) and (b)	Changes to wording to recognise that specification of MDQ and MHQ is in user's gas transportation agreement.	MDQ and MHQ are specified in a User's gas transportation agreement; they are not specified at the commencement of that agreement.
2.2.2(c)	Parentheses around MDQ ÷ 24	Parentheses added for clarification.
2.2.3(e)	of 4:00 pm on the day before the relevant Gas Day deleted	The words deleted form part of the defined term Nomination Deadline.
2.2.7(a), (b), (c) and (e)	Receipt points changed to Receipt Point	The GGP receipt points have been clarified; see definition of Receipt Point.
2.2.7(e)	the intention of the Parties expressed in deleted	The Access Arrangement does not express the intention of the parties to the gas transportation agreement.
2.2.7(e)	the receipt Point changed to a receipt point	See new definition of Receipt Point.
2.2.8 heading	Linepack changed to Line Pack	Line Pack (two words) is used in the definitions.
2.2.9	0 changed to 4	Cross referencing "fixed".
2.3(a)	at Yarraloola deleted	New definition of Receipt Point does not require qualification "at Yarraloola".
2.3(d)	or As Available Service deleted	An As Available Service using the GGP is not offered. Such a service is a form of Interruptible Service, which can be provided as a non-reference service.
3.1	Part changed to Section	The clauses of the GGP Access Arrangement are referred to as sections (not parts).
3.1	Paragraph deleted	Rate of return now governed by Binding Rate of Return Instrument.

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
3.5 heading	next access arrangement period changed to Next Access Arrangement Period	Next Access Arrangement Period is now a defined term.
3.5	2020 changed to 2025 nominal deleted Current deleted where used with Access Arrangement Period Definition of Current Cost Accounting Depreciation Method transferred to Definitions (C.1) Indexation for inflation modified to refer to defined terms CPI and Current Cost Accounting Depreciation Method	Date updated for revised access arrangement. "Nominal" is redundant. "Current" is redundant; Access Arrangement Period is a defined term.
4.1	Service deleted from section heading	"Service" is redundant.
4.1.1	applicable changed to Applicable	"Applicable Toll Tariff" now defined.
4.1.2	0 changed to 4.3	Incorrect referencing of section.
4.1.2	applicable changed to Applicable the Receipt Point changed to Kilometre Point 0	"Applicable Capacity Reservation Tariff" now defined. Pipeline kilometres are measured from Kilometre Point 0, and not from the Receipt Point. Kilometre Point 0 is a new defined term.
4.1.3	0 changed to 4.3	Incorrect referencing of section.
4.1.3	applicable changed to Applicable the Receipt Point changed to Kilometre Point 0	"Applicable Throughput Tariff" now defined. Pipeline kilometres are measured from Kilometre Point 0, and not from the Receipt Point. Kilometre Point 0 is a new defined term.

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
4.2.2	A different charge applies changed to Different rates apply	Plural rather than singular required; overrun charges are determined by applying the overrun rates set out in A Details.
4.2.3	Exceed changed to exceeds	Reference is to singular "absolute value of Unauthorised Imbalance".
4.2.4(c)(i)	a changed to the	Reference is being made to a specific Receipt Point.
4.2.4(d)	each relevant added	Clarification.
4.2.6	of changed to or	Correction of error.
4.3	Distances calculated from Kilometre Point 0	Kilometre Point 0 is a new defined term.
4.4	the changed to a	Clarification, following adoption of new definition of Receipt Point.
4.5	Quarter changed to Year	In the GGP Access Arrangement revision proposal, GGT proposes to remove quarterly variation of the reference tariff and rely only on annual variation.
4.5.2(f)	Reference Tariff changed to Service Provider	Correction of error.
4.5.2(f), (g) and (i)		Changes to wording intended to clarify.
4.6	2019 changed to 2024 ; 2020 changed to 2025	Dates updated for revised Access Arrangement.
5.1.1(a)	BB changed to B	Correction of error.
5.2.2(b)	Open Season Spare Capacity Closing Date deleted	There is no further reference to the date in question which would require the definition currently intended by the words which have been deleted.

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
5.2.3(d)	complete and deleted	The instruction is to a prospective user. The requirement for a completed application registration is in 5.2.3(d)(i).
5.2.4(d)	Service Provider deleted	"Service Provider" is redundant here.
5.2.5(a)	Space inserted.	
5.2.5(b)	Corrections to formatting	
5.3.1 (a)(ii)	Space inserted	
5.3.1 (b)	Full stop replaced with comma; space inserted.	
5.3.1 (c)	Consistent use of singular rather than plural	Grammatical change which clarifies meaning.
5.2.5(e), (f), (g) and (h)	Investigations changed to investigations	The service provider carries out investigations. The term is not defined, and does not require an initial capital.

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
A Details		
Reference Tariff, rates and allowances	<p>Dates changed from 1 July 2016 to 1 January 2020.</p> <p>Toll Tariff, Capacity Reservation Tariff and Throughput Tariff at 1 July 2016 replaced by proposed tariffs at 1 January 2020.</p> <p>Tariffs referred to in Authorised Overrun Rate, Imbalance Rate, and Daily Variance Rate are the Applicable Toll Tariff, Applicable Capacity Reservation Tariff and Applicable Throughput Tariff. The terms Applicable Toll Tariff, Applicable Capacity Reservation Tariff and Applicable Throughput Tariff are now defined.</p> <p>Unauthorised Overrun Rate 250% of Applicable Toll Tariff + Applicable Capacity Reservation Tariff + Applicable Throughput Tariff</p>	<p>Dates and tariffs updated for revised Access Arrangement.</p> <p>Clause 2.2.3(a) of the Access Arrangement provides for unauthorised overrun, clause 2.2.3(j) sets out user liability to pay charges, and clause 4.2.2(d) notes that the Unauthorised Overrun Rate is set of in the Details.</p> <p>In its December 2015 Draft Decision, the ERA advised that the Unauthorised Overrun Rate had been omitted from the details. This omission was not rectified in GGT's response to the Draft Decision, or in the subsequently revised Access Arrangement. GGT has now rectified omission of the Unauthorised Overrun Rate..</p>
Notes on Tariffs	Note 1: tariffs replaced by Tariffs	"Tariffs" defined.
A1 Scheduled Reference Tariff Variation Mechanism	Deleted	In the GGP Access Arrangement revision proposal, GGT proposes removal of the quarterly variation of the reference tariff and reliance only on annual variation.
A2 (now A1) Annual Scheduled Variation of Reference Tariffs (heading)	Tariffs replaced by Tariff in heading.	No longer a need for the formulae to take into account a half-year (1 July 2016 to 31 December 2017)

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
A2 (now A1) Annual Scheduled Variation of Reference Tariffs	<p>The formulae for Annual Scheduled Variation of the Reference Tariff have been modified to apply from the beginning of the Access Arrangement Period (and not from a date part-way through the period), and during the Access Arrangement Period.</p> <p>The text has been amended to reflect these modifications</p> <p>approved Tariff Model changed to Tariff Model</p> <p>The paragraph describing the first annual updates of the debt risk premium and the rate of return on debt has been deleted</p> <p>The paragraph requiring nomination of averaging periods has been deleted</p>	<p>Update for new access arrangement period. The changes are not intended to change, in principle, the operation of the reference tariff variation mechanism.</p> <p>A new term, Tariff Model, has been included in the definitions.</p> <p>The annual updates of the debt risk premium and the rate of return on debt will be governed by the Binding Rate of Return Instrument.</p> <p>Averaging periods (which are confidential) have been nominated in the confidential version of the Supporting Information</p>
A5 (now A4) Automatic Formulas for Updating Debt Risk Premium	Text modified	Updated for Access Arrangement Period and ERA (2018) Rate of Return Guidelines.
C Definitions and Interpretation		
C.1 Definitions		
Access Arrangement Period	2015 changed to 2020	Date updated for Access Arrangement Period.
As Available Service	Deleted	An As Available Service using the GGP is not offered. Such a service is a form of Interruptible Service, which can be provided as a non-reference service.
Applicable Capacity Reservation Tariff	New definition	Added to make clear that the tariff which applies is tariff as varied from time to time in accordance with the Reference Tariff Variation Mechanism.
Applicable Throughput Tariff	New definition	Added to make clear that the tariff which applies is tariff as varied from time to time in accordance with the Reference Tariff Variation Mechanism.

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
Applicable Toll Tariff	New definition	Added to make clear that the tariff which applies is tariff as varied from time to time in accordance with the Reference Tariff Variation Mechanism.
Current Cost Accounting Depreciation Method	New definition	Text specifying Current Cost Accounting Depreciation Method removed from section 3.5 and consolidated in new definition.
Delivery Point MDQ	Order Form/Form of replaced by Transportation	Delivery point MDQ is specified in the User's Transportation Agreement.
Extension	Definition of Firm MDQ deleted	Incorrectly placed duplicate definition.
Firm MHQ	Parentheses around MDQ ÷ 24	Parentheses added for clarification.
Kilometre Point 0	New definition	<p>Distances, in pipeline kilometres, have not previously been clearly defined in the GGP Access Arrangement.</p> <p>Kilometres Point 0, from which measurements of pipeline kilometres are made, is a point on the Dampier to Bunbury Natural Gas Pipeline (DBNGP).</p> <p>Early planning for the GGP assumed interconnection with the DBNGP at this point, and the interconnection route was surveyed. The survey line identifies Kilometre Point 0 and the original planned connection into the GGP at the Yarraloola Compressor Station.</p> <p>The original planned connection did not proceed. Instead, the GGP was initially connected to the Varanus Island-DBNGP Onshore Pipeline, at the meter station at the eastern end of that pipeline (see new definition of Receipt Point). However, distances along the GGP continued to be measured from Kilometre Point 0 (and continue to be measured from that point).</p>

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
Reasonable and prudent pipeline operator	reasonable changed to Reasonable	Consistent use of capitals.
Receipt Point	Definition extended to clarify that there are two GGP receipt points, both located upstream of the Yarraloola Compressor Station.	Accuracy and clarification.
Receipt Point MHQ	Parentheses around MHQ ÷ 24	Parentheses added for clarification.
Next Access Arrangement Period	New definition	Specifies the period which follows the Access Arrangement Period (The period for which the current GGP Access Arrangement revision proposal has been submitted).
Nomination Deadline	4:00 replaced by 2:00 the day to added	Nominations are to be made by 2:00 pm in Western Australia, corresponding to national nominations close of 4:00 pm, AEST. Words added are missing from the definition.
Reference Tariff	Components of the Reference Tariff are also tariffs, and not charges.	Correction of wording.
Relevant Date	15 August 2014 changed to 1 January 2019	Date on which last revisions were submitted updated to date of current revisions submission.
D Terms and Conditions applying to the Firm Servicer		
D.8 A.4	D.5.45 changed to D.5.5	Correction of clause reference.
D.8 A.5	request changed to requests	Grammatical: singular form required.
D.9.2	applicable Toll Tariff changed to Applicable Toll Tariff	Applicable Toll Tariff now a term defined in the GGP Access Arrangement.

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
D.9.3	applicable Capacity Reservation Tariff changed to Applicable Capacity Reservation Tariff	Applicable Capacity Reservation Tariff now a term defined in the GGP Access Arrangement.
D.9.4	applicable Throughput Tariff changed to Applicable Throughput Tariff	Applicable Throughput Tariff now a term defined in the GGP Access Arrangement.
D.9.5	Deleted	This clause is made redundant by the new definitions of Applicable Toll Tariff, Applicable Capacity Reservation Tariff and Applicable Throughput Tariff in the GGP Access Arrangement.
D.12.1(b)	Space inserted.	
D.24.5	Deleted	This clause is made redundant by the new definition of Receipt Point in the GGP Access Arrangement.
D.25.4	at the Receipt Facilities referred to in clause D.24.5 deleted	Clause D.24.5 is redundant, as is this reference to it.
D.32.2(e)	Non-existent referencing error deleted	
D.34.3	D.34.8 changed to D.34.7	Updated cross referencing of clauses.
D.34.5	Deleted	Redundant; see clause D.42.
D.40	Include provision for notices by email	Email has largely replaced mail and facsimiles for communication.
D.48	New provision	Allows the Transportation Agreement to be executed in counterparts.

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
T C1 Definitions and Interpretation		
T C1.1 Definitions		
Applicable Capacity Reservation Tariff	New definition	Repeats new definition in GGP Access Arrangement.
Applicable Throughput Tariff	New definition	Repeats new definition in GGP Access Arrangement.
Applicable Toll Tariff	New definition	Repeats new definition in GGP Access Arrangement.
As Available Service	Deleted	An As Available Service using the GGP is not offered. Such a service is a form of Interruptible Service, which can be provided as a non-reference service.
Delivery Point MDQ	Order Form/Form of replaced by Transportation	Delivery point MDQ is specified in the User's Transportation Agreement.
Extension	Definition of Firm MDQ deleted	Incorrectly placed duplicate definition.
Firm MDQ	Order Form/Form of replaced by Transportation	MDQ is specified in the User's Transportation Agreement.
Firm MHQ	Order Form/Form of replaced by Transportation	MHQ is specified in the User's Transportation Agreement.
Receipt Point	Definition extended to clarify that there are two GGP receipt points, both located upstream of the Yarraloola Compressor Station.	As in GGP Access Arrangement; change for greater accuracy and clarification.
Receipt Point MDQ	Order Form/Form of replaced by Transportation	Receipt point MDQ is specified in the User's gas transportation agreement.
Receipt Point MHQ	Parentheses around MHQ ÷ 24	Parentheses added for clarification.

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Section in current access arrangement	Description of proposed change to current access arrangement	Reason for change
Relevant Date	15 August 2014 changed to 1 January 2019	As in the GGP Access Arrangement, the date on which last revisions were submitted has been updated to correspond with the current review submission date.

