

# DBNGP Forecast Review

DBP

**Final Report**

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## DBNGP Forecast Review

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### Document history and status

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## Contents

<b>Executive Summary</b> .....	<b>3</b>
Summary .....	3
Disclaimer .....	3
<b>1. Introduction</b> .....	<b>5</b>
<b>2. Review of DBP forecast</b> .....	<b>6</b>
2.1 Jacobs' interpretation of the NGR.....	6
2.1.1 Criteria to be met .....	6
2.1.2 The type of forecasts required .....	6
2.2 Assessment of DBP methodology .....	6
2.2.1 Capacity contracted .....	6
2.2.2 Throughput .....	7
2.3 Assessment of DBP assumptions and information .....	7
2.3.1 Introduction .....	7
2.3.2 Capacity contracted .....	7
2.3.2.1 Forward haul .....	7
2.3.2.2 Back haul .....	8
2.3.2.3 Part haul .....	9
2.3.3 Throughput .....	10
2.3.3.1 Overview .....	10
2.3.3.2 Economic and demographic assumptions .....	12
2.3.3.3 Forecast starting point .....	12
2.3.3.4 Other assumptions.....	12
2.4 Summary.....	14

## Appendix A. Abbreviations

## Executive Summary

### Summary

DBNGP (WA) Transmission Pty Ltd (DBP) engaged Jacobs to undertake an independent review of the capacity and throughput forecasts to be proposed in the Dampier Bunbury Natural Gas Pipeline (DBNGP) access arrangement proposal for the 2016 to 2020 regulatory period, assessing DBP's forecasts against the criteria set out by the National Gas Rules (NGR).

NGR rules 74 and 75 provide guidance on preparing forecasts for the purposes of an access arrangement:

NGR 74 Forecasts and estimates

*(1) Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate;*

*(2) A forecast or estimate:*

*(a) must be arrived at on a reasonable basis; and*

*(b) must represent the best forecast or estimate possible in the circumstances.*

NGR 75 Inferred or derivative information

*Information in the nature of an extrapolation or inference must be supported by the primary information on which the extrapolation or inference is based.*

DBP has provided Jacobs with its report entitled: "Throughput and Capacity Forecast, Supporting Submission 11", prepared for inclusion in its revised access arrangement proposal.

Jacobs has undertaken the enquiries (as detailed below) that it believes are desirable and appropriate and no matters of significance to the report have been withheld by Jacobs. Jacobs has reviewed DBP's report and assessed the methodology and assumptions against the NGR criteria, drawing upon its extensive experience in both preparing such forecasts and reviewing forecasts of other parties. Jacobs has also compared DBP's assumptions with those of third parties such as the Independent Market Operator and with assumptions accepted in previous access arrangement submissions. On the basis of these reviews and comparisons Jacobs has concluded that DBP's forecasts satisfy the NGR criteria.

### Disclaimer

The sole purpose of this report and the associated services performed by Jacobs is to review DBP's proposed capacity contract and throughput forecasts in accordance with the scope of services set out in the contract between Jacobs and DBP. That scope of services, as described in this report, was developed with DBP.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by DBP and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

Jacobs derived the data in this report from information sourced from DBP and available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or

implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

Jacobs makes specific note of the fact that in undertaking this review it has not relied upon its own independent forecasts of the parameters considered.

This report has been prepared on behalf of, and for the exclusive use of, DBP and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and DBP. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

## 1. Introduction

DBNGP (WA) Transmission Pty Ltd (DBP) engaged Jacobs to undertake an independent review of the capacity and throughput forecasts to be proposed in the Dampier Bunbury Natural Gas Pipeline (DBNGP) access arrangement proposal for the 2016 to 2020 regulatory period to be lodged with the Economic Regulation Authority of WA no later than 1 January 2015. Jacobs has been asked to review DBP's forecasts of contracted capacity and throughput against the requirement of the National Gas Rules (NGR).

Under the National Gas Access (WA) Act (NGL) and National Gas Rules (NGR), DBP is required to include in the proposal a forecast for capacity and throughput for the next regulatory period from 2016 to 2020. NGR 72(1)(d) requires DBP to include, to the extent that it is practicable to forecast pipeline capacity and utilisation of pipeline capacity over the access arrangement period, a forecast of pipeline capacity and utilisation of pipeline capacity over that period and the basis on which that forecast has been derived.

NGR 74 and 75 provide further, more general, guidance on preparing forecasts for the purposes of the access arrangement. NGR 74 and 75 are as follows:

### NGR 74 Forecasts and estimates

*(1) Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.*

*(2) A forecast or estimate:*

*(a) must be arrived at on a reasonable basis; and*

*(b) must represent the best forecast or estimate possible in the circumstances.*

### NGR 75 Inferred or derivative information

*Information in the nature of an extrapolation or inference must be supported by the primary information on which the extrapolation or inference is based.*

DBP has provided Jacobs with its report entitled: "Throughput and Capacity Forecast, Supporting Submission 11", prepared for inclusion in its revised access arrangement proposal. Jacobs has reviewed DBP's report and drawn conclusions as to whether it meets the above requirements. Jacobs' conclusions are reported in section 2 below.

## 2. Review of DBP forecast

### 2.1 Jacobs' interpretation of the NGR

#### 2.1.1 Criteria to be met

Jacobs interprets the NGR criteria to have two legs – the methodology needs to be reasonable and the assumptions and inputs need to be the best available.

In accordance with this understanding, in developing or reviewing demand forecasts Jacobs has asked the following questions:

- *Is the approach taken the best that could be reasonably expected?*
- *Are the assumptions made the best that could reasonably be expected?*
- *Is the information/data that is used the latest obtainable and are they from credible and independent sources?*
- *Is there a balance between the use of “historical trends” and “key drivers” in forecasting?*
- *Is the approach and methodology unbiased?*
- *Is the methodology validated and properly applied?*

#### 2.1.2 The type of forecasts required

The NGR requires two forecasts, of pipeline capacity and utilisation of pipeline capacity. In Jacobs view this can be interpreted as potentially three items: 1) a statement of the capacity of the pipeline and planned upgrades over the access arrangement period, expressed in terms of the maximum firm capacity that can be contracted; 2) projections of the levels of firm contracting of the available capacity by shippers; 3) and projections of the average utilisation of the firm capacity contracted by shippers. Jacobs notes that in Supporting Submission 11 DBP has provided forecasts of items 2) and 3) and assumes that item 1) will be covered elsewhere in the Revised Access Arrangement.

## 2.2 Assessment of DBP methodology

### 2.2.1 Capacity contracted

DBP's method of forecasting capacity contracted is based on examining individual shipper's current contract, termination and relinquishment rights, and future capacity requirements. Future requirements are judged in relation to shipper throughput and the ideal level of capacity required to meet throughput without incurring unnecessary charges for unused capacity or overrunning capacity. Where they have been expressed, the shippers' views on their requirements are taken into account.

Jacobs views this method as the most suitable for bringing to bear the extensive shipper contract data held by DBP. It allows DBP to forecast short-term excesses or shortfalls of contracted capacity while ensuring that longer term projections conform to the most economically efficient contracting levels.

For more than 85% of contracted capacity DBP has recently re-negotiated shipper requirements until at least December 2020. The renegotiated capacities reflect the shippers' views of their requirements and are the best estimates of the capacity required over the forecast period. The renegotiation significantly reduces the uncertainty in the projection.

The potential for new shippers to require capacity must also be considered. However In view of the lack of growth in throughput, particularly for full haul service, it is reasonable to conclude that new shipper capacity requirements are unlikely.

## 2.2.2 Throughput

DBP's method of forecasting throughput comprises two stages: 1) estimation of historical trends in individual shipper throughput levels; and 2) consideration of external information to determine factors likely to impact shipper growth rates. Information considered includes company specific, industry specific, demographic and economic trends gathered from shippers (in confidence), the IMO GSOO and ESOO, DSD reports, and ABS and BREE reports among others. The two stages of analysis produce annual growth factors for each shipper and hence annual throughput projections.

Combining customer specific and economic information is essential to deriving reasonable forecasts. Jacobs notes that determining the best methodology typically requires analytic comparisons of alternatives to be made. In this regard DBP reports that it has explored various analytic approaches to increasing forecast accuracy and has concluded that the methodology used "provides the best mix of accuracy, computational complexity and model robustness". Jacobs therefore considers that the approach meets the NGR criteria.

## 2.3 Assessment of DBP assumptions and information

### 2.3.1 Introduction

Jacobs' assessment of DBP's assumptions and information is based upon comparisons with other projections: Jacobs has expressed DBP's capacity assumptions as load factors which are then compared with those submitted and approved in previous DBNGP access arrangements; and throughput projections are compared with projections prepared for the GSOO released by the IMO.

### 2.3.2 Capacity contracted

Assumptions that influence DBP's projections of capacity contracted primarily relate to capacity contracted by individual shippers. In the absence of details of each shipper's daily load profile and load matching options including firm capacity, Jacobs is unable to determine the reasonableness of individual shipper projections. Therefore, Jacobs has taken a more aggregate approach of comparing the total load factors, resulting from the capacity and throughput projections, with other relevant load factor projections. This establishes the consistency of the capacity with the throughput projections, which are then assessed in section 2.3.3.

#### 2.3.2.1 Forward haul

The load factor<sup>1</sup> projections for the current access arrangement revision, resulting from DBP's forward haul projections of throughput and capacity contracted, are compared with the forward haul load factor projections associated with the two previous access arrangement revisions in Table 2-1. The capacity relinquishments implied in the recent recontracting result in the load factor rising from 75.6% in 2012 to 84.6 % in 2016 and 86.7% in 2020. The 2010 access arrangement revision suggests that this is a reasonable load factor for the pipeline since it was expanded between 2005 and 2010. The 2005 access arrangement, based on parameters applicable to the unexpanded pipeline prior to 2005, suggests that shippers can operate at higher aggregate load factors if necessary.

In the following section Jacobs has established that the throughput projections appear reasonable and the above finding therefore confirms that the forward haul capacity contracted projections are reasonable and no further capacity contracting is required for the projected level of throughput.

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<sup>1</sup> Load factor = throughput/capacity contracted



Table 2-1 Load factor comparisons, forward haul

Proposed 2015 Access Arrangement Revision										
	2012 <sup>2</sup>	2013	2014	2015	2016	2017	2018	2019	2020	
	75.6%	76.7%	n/a	n/a	84.6%	84.9%	85.4%	86.2%	86.7%	
2010 Access Arrangement Revision										
	2011	2012	2013	2014	2015					
	82.6%	83.6%	83.7%	84.4%	85.1%					
2005 Access Arrangement Revision										
	2005	2006	2007	2008	2009	2010				
	96.4%	96.3%	95.6%	95.8%	95.8%	95.6%				

### 2.3.2.2 Back haul

A similar comparison of back haul load factor projections is presented in Table 2-2. The projections have a very similar pattern to the forward haul projections and Jacobs therefore considers that the back haul capacity contracted projections are reasonable.

Table 2-2 Load factor comparisons, back haul

Proposed 2015 Access Arrangement Revision										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	
	74.1%	77.2%	n/a	n/a	84.4%	84.4%	84.4%	84.4%	84.4%	
2010 Access Arrangement Revision										
	2011	2012	2013	2014	2015					
	88.9%	88.1%	88.1%	88.1%	88.1%					

<sup>2</sup> 2012 and 2013 values in the 2015 forecast are actual values.

2005 Access Arrangement Revision										
	2005	2006	2007	2008	2009	2010				
	94.7%	100.0%	100.0%	100.0%	100.0%	100.0%				

### 2.3.2.3 Part haul

A comparison of part haul load factor projections is presented in Table 2-3. In this case DBP is currently projecting a lower capacity utilisation than in previous forecasts. This appears to be due to the presence of a number of shippers with continuing capacity contracts but zero expected throughput under these contracts. Two have expected throughput under back-haul contracts and the other two have no expected throughput. Jacobs considers this may be due to shippers anticipating gas supply from new sources for which they will require part haul service. The holding cost of part haul service is low and is offset by the value of maintaining this supply option.

Table 2-3 Load factor comparisons, part haul

Proposed 2015 Access Arrangement Revision										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	
	40.2%	37.4%	n/a	n/a	47.6%	51.5%	53.6%	53.8%	53.8%	
2010 Access Arrangement Revision										
	2011	2012	2013	2014	2015					
	86.4%	86.4%	86.4%	86.4%	86.4%					
2005 Access Arrangement Revision										
	2005	2006	2007	2008	2009	2010				
	73.9%	73.8%	73.6%	69.9%	69.9%	69.9%				

## 2.3.3 Throughput

### 2.3.3.1 Overview

Jacobs has undertaken a number of studies of gas and power demand in Western Australia for private clients. While these are confidential and cannot be quoted directly, Jacobs considers that gas demand is likely to be characterised by the following trends:

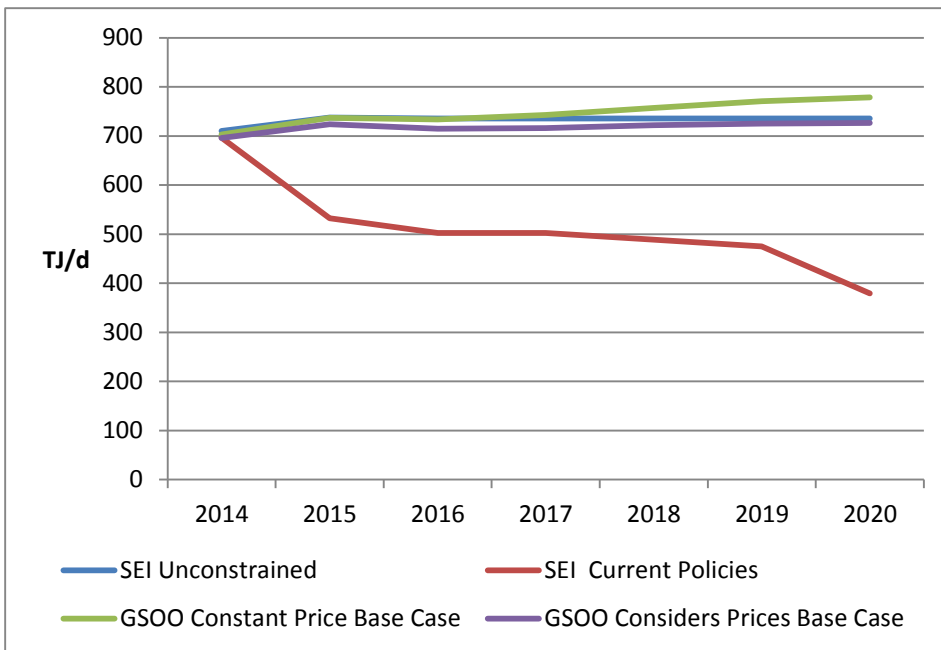
1. In the South West:
  - a. Gas use for generation<sup>3</sup> is likely to decline in the medium term, owing to displacement by new wind capacity constructed to meet the LRET
  - b. Gas use in industry is likely to be constrained by gas availability, with higher prices for new contracts deterring plant expansion; and
  - c. Overall Jacobs would expect to see flat or declining loads in the South West and on DBNGP full haul service. The potential for new shippers to emerge is considered very low.
2. Outside the South West, particularly in the Pilbara:
  - a. Gas demand is largely driven by mining power requirements; and
  - b. Mining growth, particularly iron ore, is likely to stimulate gas demand growth in the medium term

These characteristics are exemplified in two recent gas demand forecasts published as part of the WA Government's Strategic Energy Initiative (SEI) in September 2011 and the IMO Gas Statement of Opportunities (GSOO) in January 2014 respectively. These are the only two independent forecasts that Jacobs is aware of that provide separate projections for the South West and outside the South West. Figure 2-1 shows that both the SEI and GSOO considered there to be very limited upside to demand in the South West but considerable downside potential, as in the SEI Current Policies projection. Figure 2-2 shows that both the SEI and GSOO expected considerable growth outside the South West, though clearly the SEI projections for 2012 and 2013 have not eventuated.

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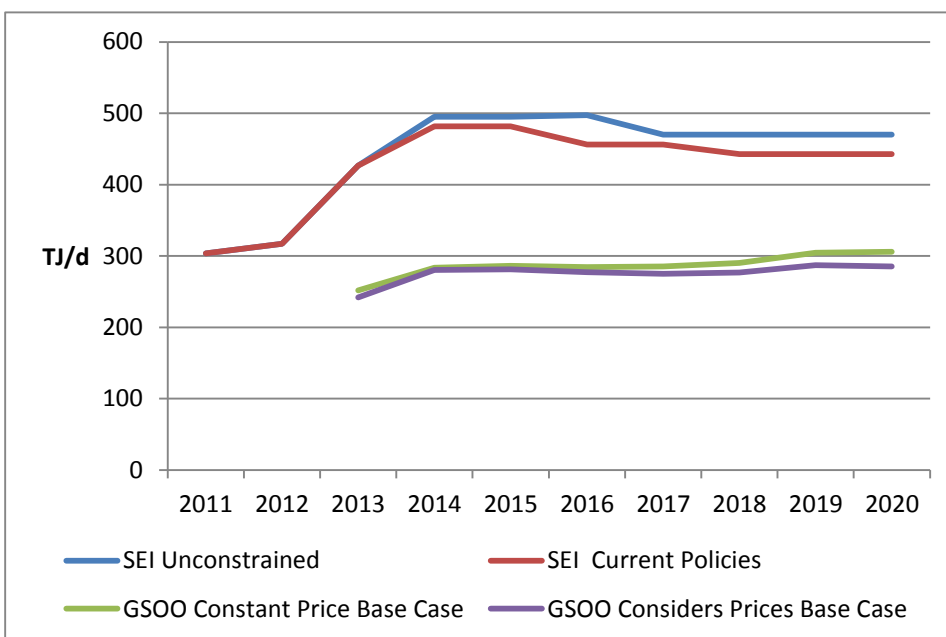
<sup>3</sup> Jacobs uses class-leading power market simulation software called PLEXOS to forecast electricity dispatch in the South West Interconnect System. PLEXOS is used globally for price forecasting, strategic modelling and for generation and transmission capacity expansion planning. The outputs produced by the PLEXOS model are based on the assumption that electricity market participants make economically rational decisions. The model considers short and long run marginal costs of various generation technologies and the nature of electricity demand. Jacob's has verified the accuracy of PLEXOS forecasts using a back casting process by which Jacobs compares the results of the modelling for a specific period against the actual operation of the market in that period.

Figure 2-1 Gas demand projections for the South West



Sources: SEI - "Energy Futures for Western Australia", report by ACIL Tasman prepared for the Office of Energy, Figures 12 and A7; GSOO – Gas Statement of Opportunities, issued by the independent Market Operator January 2014, Tables V, VI, VII and VIII.

Figure 2-2 Gas demand projections for outside the South West



Sources: as for Figure 2-1

### 2.3.3.2 Economic and demographic assumptions

DBP's high level economic and demographic assumptions are compared with those used in the IMO GSOO<sup>4</sup> in Table 2-4. DBP's assumptions are consistent with those used in the GSOO within the levels of uncertainty normally associated with forecasts and Jacobs therefore considers them to meet the criteria in NGR 74 and 75.

**Table 2-4 DBP Economic and Demographic Assumptions – Western Australian Aggregates**

	DBP Assumption	GSOO Base Case Assumption July 2013	GSOO Base Case Assumption January 2014
WA GSP Growth	Ave 3.0% from 2013 to 2022	Ave 3.1% for the next 10 years	Ave 3.3% for the next 10 years <sup>5</sup>
Population Growth	Ave 2.2% from 2014 to 2026	Ave 2.4% from 2014 to 2018, reaching 2.2% in 2018.	Ave 2.4% from 2014 to 2018, reaching 2.2% in 2018 <sup>6</sup> .
Electricity Demand	Flattening, gas displaced by coal	Ave 1.9% for the next 10 years, gas displaced by coal	Ave 1.9% for the next 10 years <sup>7</sup> , gas displaced by coal

### 2.3.3.3 Forecast starting point

Jacobs considers it important to validate the forecast starting point and has therefore used the IMO Gas Bulletin Board (GBB) data to calculate an appropriate starting point for the DBNGP Full Haul + CS7 forecast, which we take to be equivalent to South West or SWIS in the GSOO. Data for the period 1/08/2013 (when the GBB commenced) to 31/12/2013 have been used as this is understood to be the data period used in the GSOO. Using the GBB "end-user" data and including metro, south west and mid-west (CS7) categories, the average GBB value is 658 TJ/day, which strongly supports the DBP figure of 652 TJ/d for 2013.

### 2.3.3.4 Other assumptions

DBP's shipper based assumptions are largely concerned with capacity relinquishment (refer to section 2.2.1 above). With one exception these do not appear to affect [REDACTED]

[REDACTED] To the best of Jacobs' knowledge this information is not used in the GSOO.

Given the consistency of the economic assumptions, it may be expected that comparable DBP and GSOO forecasts would show similar trends. Jacobs considers the following two sets of forecasts should be comparable:

- GSOO SWIS area, less: estimated Parmelia Pipeline load; Parkeston power station load and Southern System power station load, both understood to be included in GSOO SWIS definition; and less adjustment for SWC

with

- DBP Full Haul including SPAC plus: CS7

<sup>4</sup> Gas Statement of Opportunities, issued by Independent Market Operator, January 2014.

<sup>5</sup> Quoted on page 50

<sup>6</sup> Table 9, page 51

<sup>7</sup> Page 73

and

- GSOO Non-SWIS area plus: Parkeston PS and Southern System PS

with

- DBP North

For the first comparison Parmelia Pipeline, Parkeston and Southern System loads are estimated at 20 TJ/d, 7.5 TJ/d and 13.7 TJ/d, respectively, from the Bulletin Board and the [REDACTED] [REDACTED] also based on Bulletin Board data.

The comparisons are presented in Figure 2-3 and Figure 2-4 and show that the forecasts compared have very consistent trends. The GSOO SWIS and DBP Full Haul values differ by an almost fixed quantity of 4 TJ/d, which is a difference of less than 1%. The GSOO Non-SWIS and DBP North full haul values differ by more variable but similar amounts of 4 TJ/d. On the basis of these comparisons Jacobs considers that the DBP throughput forecasts resulting from the methodology plus assumptions have been arrived at on a reasonable basis and represent the best forecast or estimate possible in the circumstances.

Figure 2-3 Comparison of DBP FH and GSOO SWIS throughput projections

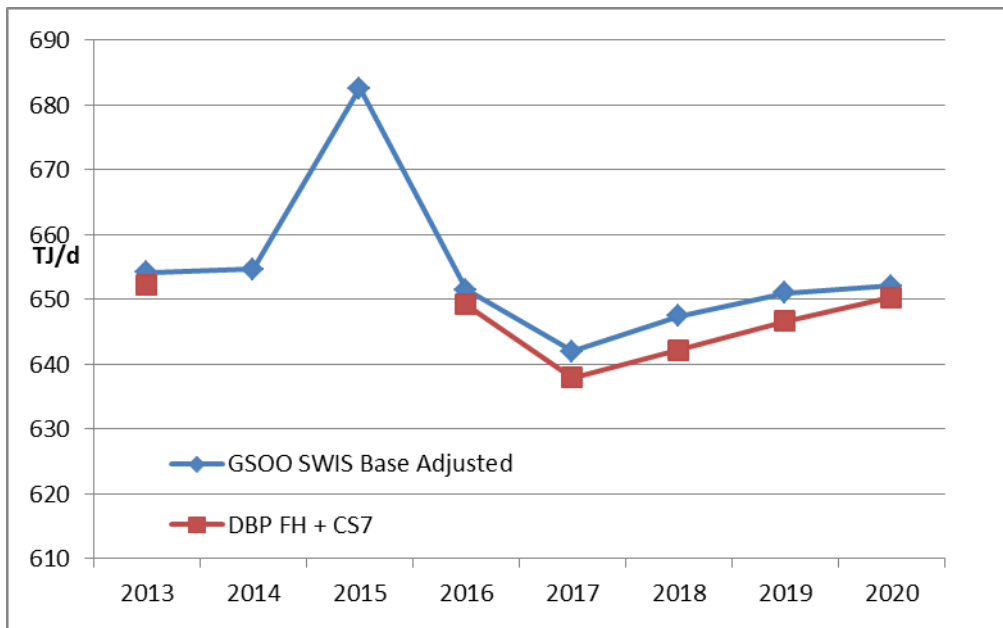
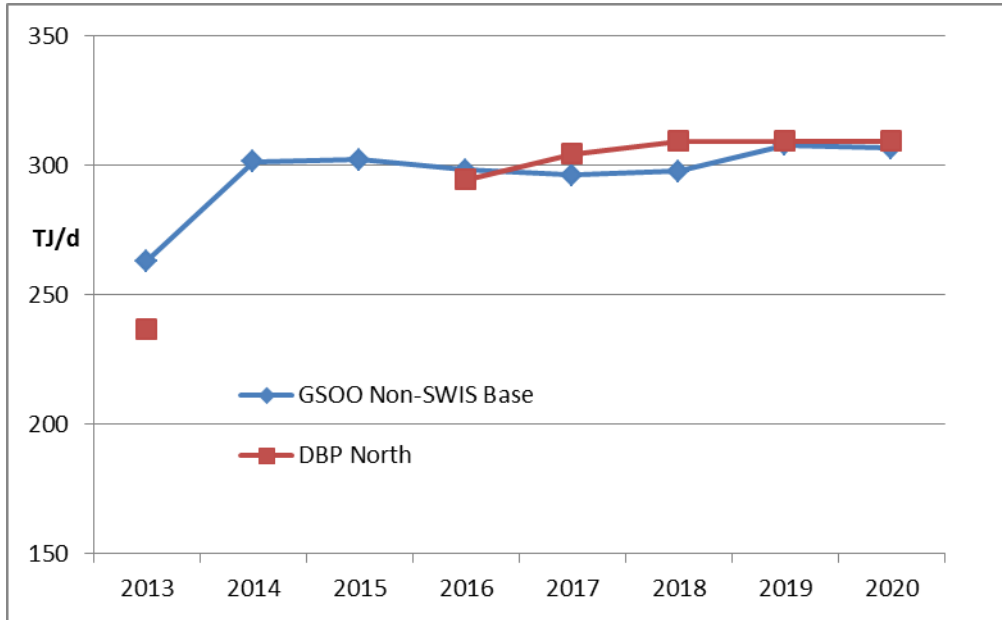


Figure 2-4 Comparison of DBP North and GSOO Non-SWIS throughput projections



## 2.4 Summary

Jacobs' independent review of DBP's forecast has established that DBP's approach in arriving at the forecasts has been the best that could be reasonably expected. For contracted capacity DBP has utilised the newly renegotiated shipper requirements that represent more than 85% of DBP's contracted capacity. This significantly reduces the uncertainty in the projection.

Similarly, for its throughput projections DBP's methodology combines historical trends in individual shipper throughput with economic drivers, thus accounting for both micro and macro drivers. Jacobs' assessment of DBP's assumptions and information used is based on comparisons with two other independent forecasts, namely, the SEI and the GSOO. Jacobs' comparisons demonstrate that, within the level of uncertainty normally associated with forecasts, DBP's projections are consistent with the GSOO. On this basis Jacobs considers that the DBP throughput forecasts resulting from the methodology plus assumptions have been arrived at on a reasonable basis and represent the best forecast or estimate possible in the circumstances.

As a result, Jacobs considers that DBP's forecasts meet the NGR criteria.

## Appendix A. Abbreviations

ABS	Australian Bureau of Statistics
APA	Australian Pipeline Trust
BREE	Bureau of Resources and Energy Economics
CSx	Compressor station x
DBNGP	Dampier Bunbury Natural Gas Pipeline
DBP	DBNGP (WA) Transmission Pty Ltd
DSD	Department of State Development
ESOO or SOO	Electricity Statement of Opportunities
GSOO	Gas Statement of Opportunities
IMO	Independent Market Operator
NGL	National Gas Law
NGR	National Gas Regulations
SPAC	Special Purpose Access Contract
SWC	South West Cogeneration
SWIS	South West Interconnected System (electricity network)