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DBP Transmission: Dampier Bunbury Natural Gas Pipeline (DBNGP)

REVIEW OF TECHNICAL ASPECTS OF PROPOSED ACCESS ARRANGEMENT FOR 2021 TO 2025 (AA5)

Report prepared for:

ECONOMIC REGULATION AUTHORITY OF WESTERN AUSTRALIA (ERA)

May 2020

Preface

This report has been prepared to assist the Economic Regulation Authority (ERA) with its assessment of DBNGP Transmission Pty Ltd's (DBP) Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline (DBNGP), for the period from 1st January 2021 to 31st December 2025 (AA5), which it is required to conduct in accordance with the National Gas Law and the National Gas Rules (NGR). This report covers a particular and limited scope as defined by the ERA and should not be read as a comprehensive assessment of proposed expenditure that has been conducted making use of all available assessment methods.

This report relies on information provided to EMCa by the ERA and by DBP up until 27th April 2020. EMCa disclaims liability for any errors or omissions, for the validity of information provided to EMCa by other parties, for the use of any information in this report by any party other than the ERA and for the use of this report for any purpose other than the intended purpose.

In particular, this report is not intended to be used to support business cases or business investment decisions nor is this report intended to be read as an interpretation of the application of the NGR or other legal instruments. EMCa's opinions in this report include considerations of materiality to the requirements of the ERA and opinions stated or inferred in this report should be read in relation to this over-arching purpose.

Some numbers in this report may differ from those shown in DBP's Access Arrangement Information (AAI) or other documents due to rounding.

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ABBREVIATIONS

Term	Definition
AAI	Access Arrangement Information
ABS	Australian Bureau of Statistics
ACMA	Australian Communications and Media Authority
AESCSF	Australian Energy Sector Cyber Security Framework
AGIG	Australian Gas Infrastructure Group
AMP	Asset Management Plan
BCO	Business Case Optimisation
BST	Base Step Trend
DBP	Dampier Bunbury Pipeline
DMIRS	Department of Mines, Industry Regulation and Safety
DMZ	Demilitarised Zone (refers to Maximo software)
ECI	Electrical Control and Instrumentation
ERA	Economic Regulation Authority
EV	Electric Vehicles
F&G	Fire and Gas
FEED	Front End Engineering Design
FHE	Full Haul Equivalent
GEA	Gas Engine Alternator
GIP	Good Industry Practice
ICT	Information and Communications Technology
ILI	In Line Inspections
IR	Information Request
IT	Information Technology
JGN	Jemena Gas Network
KPI	Key Performance Indicators
MDQ	Maximum Daily Quantity
MIL3	Maturity Indicator Level 3
MLV	Main Line Valves
OEM	Original Equipment Manufacturers
PMM	Project Management Methodology
PMO	Project Management Office
PPRC	Project Performance Review Committee

RTU	Remote Terminal Units
SIB	Stay in Business
SUG	System Use Gas

EXECUTIVE SUMMARY

Scope

1. This report describes our assessment of the technical aspects of DBP's regulatory submission for its AA5 Access Arrangement tariffs for reference services. In accordance with our scope, we have reviewed:
   - The governance, management and forecasting methodologies that DBP applies in the management of its business and in preparing the expenditure forecasts that it has proposed to ERA;
   - DBP's forecast throughput and its forecast System Use Gas (SUG) quantities;
   - The conformance of DBP's AA4 capex;
   - The reasonableness of DBP's proposed AA5 capex and opex allowances; and
   - DBP's proposals regarding categorisation and economic lives applied for regulatory depreciation purposes.

Our findings

DBP's expenditure governance and management processes show evidence of a bias towards over-forecasting

2. The application of DBP's governance, management and forecasting methodologies during the AA4 period resulted in:
   - significant cost variance at the business case level;
   - significant underspend in planned pipeline-related work;
   - a modest overspend at the portfolio level; and
   - achievement of its KPIs.

3. Except for Information and Communications technology (ICT), DBP has largely applied the same approach as it used in AA4, in developing the forecasts that it has proposed for AA5. There is evidence that DBP included in its AA4 forecast a significant number of projects to address untreated risks classified as 'Low', and it was consequently able to prudently defer a significant portion of planned work. It incurred unexpected expenditure on metering assets but was able to accommodate this by spending considerably less on works that it had planned and proposed as required, for its AA4 allowance.

4. The application of DBP's 'top-down challenge' process has led to retention of a significant number of AA5 projects designed to address Low and Intermediate risks and we consider that there are strong indications that the work program is biased towards an over-estimate of the planned work required in the AA5 period.

5. In our review of the proposed AA5 capex and for its opex 'projects', we look for areas in which we consider that DBP is again likely to be able to spend less than the expenditure that it has proposed for regulatory purposes, particularly in respect of lower-risk-ranked projects.

DBP's forecasting methodologies are reasonable, except for its labour cost escalation assumption and some weaknesses with its application of these methodologies

6. DBP's capex forecasts are derived primarily from a risk-ranked set of projects. The business cases for these projects include an adequate needs analysis, though options analysis is

relatively simplistic. We consider that DBP's cost estimation is adequate, noting that most of its projects are periodic or ongoing work, and we consider that DBP will not have issues with delivering its proposed plan.

7. DBP's has forecast its opex requirements using a combination of Base Step Trend (BST) for recurrent expenditure and a bottom-up forecast for SUG, GEA and turbine overhauls, and for a series of relatively small projects that it has proposed as recategorized from capex to opex. We consider that this combination of methods represents a reasonable approach to forecasting opex.

8. DBP has applied real cost escalation of 0.69% per year, both to its opex and to its capex forecasts. We consider that this is not a reasonable assumption.

DBP has forecast an excessive decline in throughput

9. DBP has forecast a significant step decrease in throughput, to occur starting from 2021. DBP claims that its forecast is in line with past actual throughput and aligns with AEMO's forecast. We consider that neither of these claims is supportable and we take note of stakeholder submissions that provide a contrary view, with evidence including information regarding low gas prices and other factors. We consider that a reasonable forecast is unlikely to show a decline in throughput, or at least not to the extent that DBP has forecast.

DBP's SUG quantity ratios to throughput are reasonable

10. DBP has forecast a considerable decrease in SUG costs over AA5, in part due to assumed lower gas prices and in part due to assumed lower throughput, as above. DBP has forecast SUG quantities using hydraulic modelling and, while noting that these quantities will depend heavily on throughput as above (particularly full-haul throughput), we nevertheless consider that its modelling of SUG ratios to throughput has a reasonable basis.

DBP's AA4 capex conforms to the NGR criteria, except for a component of its ICT capex

11. While there are material variances in the composition of DBP's AA4 projects relative to its AA4 forecast, we consider that these variances reflect reasonable reactions to changing information and circumstances. We consider that the extent to which DBP spent more for ICT than the allowance, in part reflects poor IT asset management and in part reflects a system decision for which DBP has not provided sufficiently compelling information. We propose an adjustment to DBP's proposed conforming capex, to reflect these additional ICT expenditures.

DBP's AA5 capex forecast includes some proposed expenditure that we consider is not prudent, or for which we consider the proposed timing or options are not adequately justified

12. We consider that at the business case level, DBP has in all but one case provided a compelling case to take some form of action in the AA5 period. However, this does not mean that we consider the timing, scope, or cost of the work is prudent. Our adjustments are, in the main, derived from our views on the following factors:

- DBP's track record of overstating the timing of work and consequently the likelihood of being able to prudently defer a portion of the work into AA6;
- our assessment that one of DBP's non-selected options is more prudent and/or cost effective than DBP's selection; and
- our assessment in some cases that DBP has over-estimated the cost of the proposed scope of work within the AA5 period.

13. For one 'benefits-driven' business case (BC22 IT Enabling), we are not convinced that the estimated benefits are sufficiently robust to justify the proposed capex.

14. As described earlier, we do not consider it reasonable to allow for a real labour cost escalation in DBP's capex forecast.

Some aspects of DBP's proposed AA5 opex are not adequately justified

15. For those components of its opex that DBP has forecast using the Base Step Trend methodology, we consider that it is not reasonable to assume DBP's proposed real labour cost escalation factor. We also consider that it is not reasonable to assume no allowance for continued productivity improvement over AA5. In other respects, we consider that DBP's BST opex forecast is reasonable.

16. We consider that there are some aspects of DBP's proposed bottom-up opex forecast that are biased towards over-estimation. This includes an element of DBP's forecast for GEA and turbine overhauls and increases that DBP has proposed for some minor capex to opex projects.

Elements of DBP's proposed changes to asset lives and a cap on economic lives, are not reasonable

17. We consider that it is not reasonable for DBP to reduce the economic lives of its large generators, inlet scrubbers and administrative buildings, through their inclusion in DBP's category of 'other' assets and DBP's proposed reduction in the economic life for these assets from 30 years to 10 years. Except for those assets, we consider it is reasonable for DBP to reduce the economic life for 'other' assets to 10 years.

18. We consider that it is reasonable to add the three proposed new asset categories for Cathodic Protection; SCADA ECI[1] and Communications and for Computers and Motor Vehicles, and the economic lives DBP proposes for these new categories are reasonable.

19. DBP has not made a sufficiently compelling case to adopt a cap on the economic life of individual assets, based on an assumed limited future value of the pipeline, starting from AA5. Therefore, based on the information and assessments that DBP has provided, we consider that it is not reasonable to increase regulatory depreciation for such purpose, in AA5.

Implications

20. We estimate that the impact of our findings will result in the following adjustments to DBP's proposed expenditure:

- A reduction of $3.7m (3%) to DBP's proposed AA4 conforming capex;
- A reduction of $30.2m (19%) to DBP's proposed AA5 capex allowance; and
- A reduction of $12.9m to DBP's proposed opex allowance, and which represents a 3.7% reduction in the components of opex that we reviewed.[2]

1 Electrical Control and Instrumentation

2 This adjustment applies to opex components other than SUG, for which we do not provide an alternative expenditure forecast.

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1 INTRODUCTION

1.1 Purpose and scope of requested work

1.1.1 Purpose

21. The Economic Regulation Authority (ERA), in accordance with its responsibilities under the National Gas Law (NGL) and the National Gas Rules (NGR), is currently reviewing DBNGP Transmission's (DBP) revised access arrangement (AA) proposal for the Dampier to Bunbury Natural gas Pipeline (DBNGP) for the 5-year period from 1 January 2021 to 31 December 2025 (AA5).

22. To assist with its assessment of DBP's AA5 Proposal, the ERA has engaged Energy Market Consulting associates (EMCa) to review and provide technical advice on:

- the capital expenditure (capex) incurred (or to be incurred) by DBP in the current 5-year period from 1 January 2016 to 31 December 2020 (AA4);
- DBP's proposed capex for the AA5 period;
- DBP's proposed operating expenditure (opex) for the AA5 period;
- the governance arrangements, forecast methodology and cost estimation processes employed by DBP when developing its expenditure proposals; and
- other specific matters, including DBP's KPIs and asset lives assumed for depreciation purposes.

23. The results of our technical assessment are set out in this report.

1.1.2 Scope of the review

24. In regard to DBP's expenditure, the overarching objective of this review is to assist the ERA to determine whether the actual capex incurred, or to be incurred, by DBP in AA4 and its proposed capex for AA5 complies with the criteria set out in rule 79 of the NGR and whether its proposed opex for AA5 complies with rule 91(1). Whilst we have not been requested by the ERA to document compliance of the capex and opex proposals with the individual rules and tests included in the NGR as a part of our assessment, to the extent that we consider that such expenditure does not comply, the ERA has sought our technical advice on adjusted expenditures that could be considered to comply.

25. In carrying out this review, the ERA has asked us to evaluate a range of matters that can affect capex and opex including, amongst others:

- DBP's substantiation and justification for forecast increases in opex and capex;
- DBP's project governance arrangements (e.g. procurement practices and delivery models), and the methods or models used by DBP to estimate its expenditure requirements and to prioritise areas of expenditure;
- the methodology DBP has used to develop capacity and utilisation forecasts as part of developing its capex and opex forecasts;
- the extent to which DBP has factored efficiencies into the opex and capex forecasts;
- DBP's ability to deliver its proposed capex program;
- the asset lives assumed by DBP when calculating depreciation; and
- the Key Performance Indicators (KPIs) used by DBP to support its capex and opex forecasts including comparison with industry standards and any proposed changes to DBP's operational and service level performance.

1.2 Regulatory framework

26. The provisions the ERA is required to have regard to when assessing DBP's capex and opex proposals are set out in Part 9 of the NGR. In short, these rules require the ERA to accept DBP's proposal if:

- the capex complies with the conforming capex criteria in rule 79 of the NGR and any forecasts or estimates underpinning the capex proposal are arrived at on a reasonable basis and represent the best forecast or estimate possible in the circumstances (rule 74(2)); and
- the opex complies with the criteria set out in rule 91(1) of the NGR and any forecasts or estimates underpinning the opex proposal satisfy rule 74(2).

1.3 Structure of this report

27. Our main findings are summarised in the Executive Summary at the beginning of this report.

28. In Section 2, we present a context overview of the capex and opex elements relevant to our review. This overview includes consideration of the expenditure trends and DBP's forecasting performance of AA4 capex, by way of contextualising its forecast regulatory allowances for AA5 capex and AA5 opex.

29. In the subsequent seven sections, we present the assessment that supports our findings as follows:

- in Section 3, we describe our assessment of the governance and management framework that DBP uses to plan and approve its expenditure, its business planning process, asset lives that have been assumed in DBP's depreciation calculations, and management of KPIs, together with the implications for its forecast expenditure of any identified issues;
- in Section 4, we describe our assessment of DBP's capex and opex forecasting methods;
- In Section 5, we describe our assessment of DBP's Demand Forecast of throughput, and its related forecast of System Use Gas quantities;
- in Section 6, we set out the results of our assessment of DBP's AA4 capex incurred, or to be incurred, against the capex criteria and describe any issues we have identified with the expenditure;
- in Section 7 we set out our assessment of DBP's proposed capex for the AA5 period; and
- in Section 8 we set out our assessment of DBP's proposed opex for the AA5 period.
- Finally, in section 9 we assess changes that DBP has proposed to its regulatory depreciation, through changes to asset classification, changes to assumed asset lives and DBP's assessment of a capped overall economic life expectation for the entire pipeline.

30. Further supporting information is provided in appendices. In particular Appendices B and C set out our assessment of a sample of projects from AA4 and as proposed for AA5.

1.4 Other matters

1.4.1 Information sources

31. In the course of carrying out this review, we have examined a large number of documents. This includes the AA Information (AAI) and other documents that DBP provided to the ERA in support of its proposed AA, and a number of other significant documents that were

provided by DBP during an on-site meeting (held on 6 March 2020), or in response to our information requests.

32. Our assessment is based on our observations from the onsite meetings, together with information supplied prior to, at, and following the onsite meeting pursuant to EMCa information requests. The last information provided to us and which we have incorporated into our assessment, was on 27th April 2020.

1.4.2 Public submissions

33. ERA received seven public submissions in response to its Issues Paper, and which were uploaded to ERA's website. We have reviewed these submissions and we refer to information from those submissions, where it is relevant to our assessment.

34. Some submissions significantly addressed matters relating to DBP's demand forecasts, its forecast SUG expenditure and its proposals regarding changes to regulatory depreciation of its assets. For these matters, we have provided a brief summary of what we consider to be some key points of significance to our assessment, in sections 5.2.2, 5.3.3 and 9.2. For other topics, we introduce and reference any relevant information from submissions directly in the sections where we present our assessment.

1.4.3 Rounding of numbers and real conversion

35. Numerical totals in tables may not present as being equivalent to the sum of the individual numbers due to the effects of rounding. Also, some numbers in this report may differ from those shown in DBP's AA submission or other documents due to rounding.

36. DBP presents its forecasts in real December $2020, which it determined based on its own forecast of inflation from the most recent actual ABS inflation index that it had at that time, which was for December $2018. Some information provided by DBP, such as Opex for the 2019 base year, is in nominal $2019 (i.e. for the calendar year 2019), and some of its expenditure forecasts (including business case information) are provided in terms that DBP specified as June $2019.

37. ERA has asked us to standardise cost information in this report in real December $2019. We have accordingly converted DBP's forecasts and references to costs through a two-step process of:

- Deflating by DBP's forecast inflation series back to a common base (depending how DBP had inflated it in the first place), and
- Adjusting it as necessary to December $2019 terms, using ABS indices of actual inflation.

38. For this reason, there are some differences between expenditure information in DBP's documents and expenditure information and forecasts attributed to DBP in this report. Such differences should be solely attributable to this information being expressed here in real terms as at December 2019.

2 BACKGROUND

2.1 Introduction

39. In this section, we provide background context to the assessments which follow. We first provide an overview of the total capex for the AA4 and AA5 periods, and we include observations of DBP's actual capex in AA4 against the ERA's AA4 capex allowance. We provide an overview of the total opex for the AA4 and AA5 periods, and we include observations of the actual opex in AA4 against the ERA's AA5 opex allowance.

40. We then outline our review approach for the assessment we have undertaken, and which is described in the remainder of this report.

2.2 DBP's proposed AA5 capex

2.2.1 DBP's proposed and historical capex

41. DBP has forecast total capex of $158.6m for the AA5 period. In the table below, we show the breakdown of capex in AA5 by asset class.

Table 2.1: Proposed AA5 capex by asset class- $m, real Dec 2019

Category	Forecast					Total AA5 capex
	2021	2022	2023	2024	2025	
Pipeline	0.0	0.0	0.0	0.0	0.0	0.0
Compression	6.1	3.4	4.0	3.8	4.5	21.9
Metering	1.8	1.2	1.4	1.2	1.4	7.0
Other	2.7	1.3	1.1	5.0	4.8	14.9
Computers & motor vehicles	7.4	5.2	3.9	5.7	3.7	25.9
Corrosion protection	3.4	2.9	3.1	2.9	2.4	14.7
SCADA, ECI & Comms	19.5	21.7	8.6	12.2	12.1	74.1
Total	40.9	35.8	22.2	30.7	28.9	158.6

Source: DBNGP FP 8.6 Capex Forecast Model Public – converted to real December 2019

42. DBP reports that it has incurred, or will incur, a total of $122.3m capex in the AA4 period which includes $65.2m as actual and $57.1m as an estimate for years 2019 and 2020. In the table below, we show the breakdown of capex in AA4 by asset class.

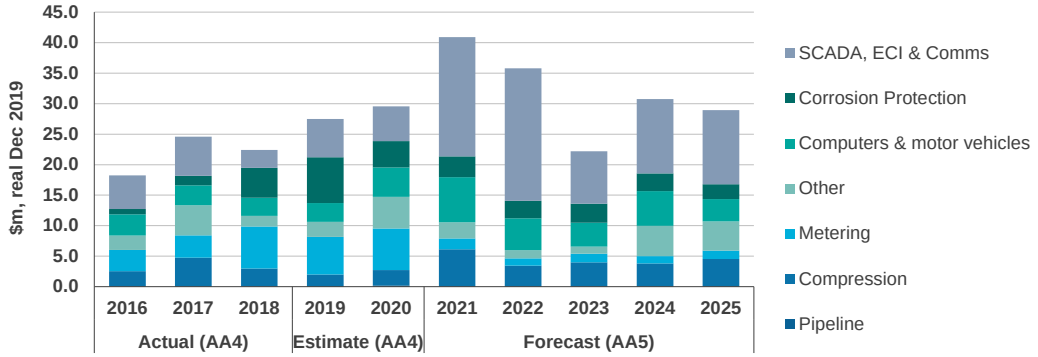
Table 2.2: Actual/estimate AA4 capex by asset class - $m, real Dec 2019

Category	Actual (AA4)			Estimate (AA4)		Total AA4 capex
	2016	2017	2018	2019	2020	
Pipeline	0.0	0.0	0.1	0.0	0.2	0.3
Compression	2.5	4.8	2.9	2.0	2.5	14.7
Metering	3.5	3.6	6.9	6.2	6.8	27.0
Other	2.4	5.0	1.8	2.5	5.2	16.8
Computers & motor vehicles	3.5	3.2	3.0	3.1	4.8	17.6
Corrosion protection	0.9	1.6	4.9	7.5	4.3	19.2
SCADA, ECI & Comms	5.5	6.4	2.9	6.3	5.7	26.8
Total	18.2	24.6	22.4	27.5	29.6	122.3

Source: EMCa analysis referring to DBP's response to Information Request EMCa01

43. In the figure below, we show capex for the AA4 and AA5 periods.

Figure 2.1: Capex trend for the AA4 and AA5 periods



Source: EMCa analysis referring to DBP's response to Information Requests EMCa01 and EMCa25

44. DBP's total proposed capex in AA5 is 30% ($36.3m) higher than the actual/estimated AA4 capex, driven primarily by increases in forecast expenditure in the SCADA, ECI and Comms asset category (+$47.3m), but partially offset by a $20m reduction in the Metering asset class.[3]

2.2.2 EMCa observations on capex trends and performance

45. DBP expects to spend $8.9m or 7.9% more than the ERA's regulatory capex allowance in the AA4 period, as shown in the table below.

Table 2.3: Actual/estimated capex versus ERA allowance in the AA4 period - $m, real Dec 2019

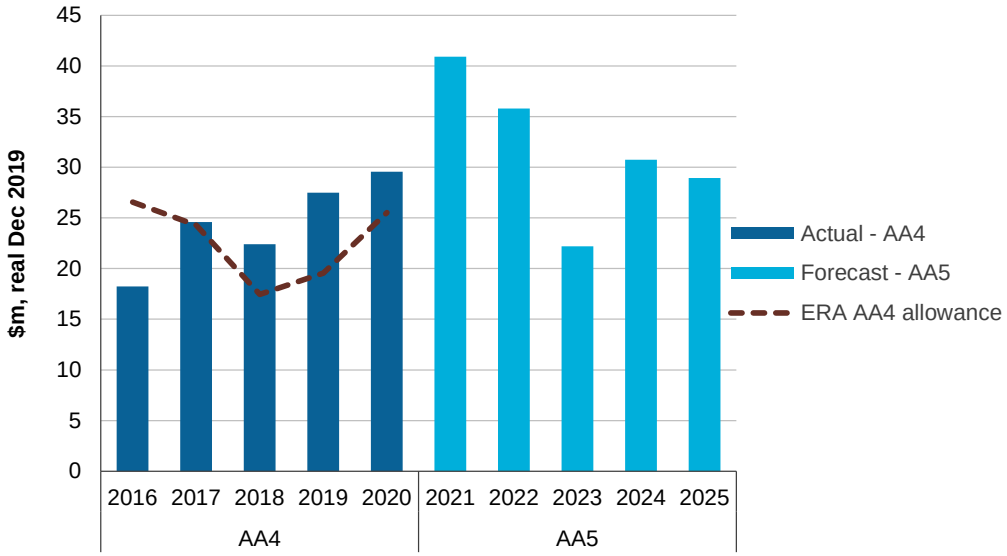
Category	Actual (AA4)			Estimate (AA4)		Total AA4 capex
	2016	2017	2018	2019	2020	
Actual/estimate capex	18.2	24.6	22.4	27.5	29.6	122.3
ERA Allowance	26.6	24.3	17.4	19.6	25.5	113.4
Variance	***8.3***	***-0.3***	***-5.0***	***-7.9***	***-4.0***	***-8.9***

Source: EMCa analysis referring to DBP's response to Information Requests EMCa01 and EMCa25

[3] DBP reclassified $10.4m capex to opex in AA5, so on a like-for-like basis, the AA4 to AA5 increase would be even higher

46. In the figure below, we show the variation between the AA4 actual/estimated capex, the ERA allowance and DBP's forecast AA5 capex. DBP forecasts a significant increase in capex from the AA4 actual (or to be incurred) amount of $122.3m to $158.6m. The peak capex in 2021 and 2022 is driven by DBP's proposed $36.0m Northern Communications system replacement.

Figure 2.2: DBP capex versus ERA allowance for the AA4 period and the AA5 capex forecast



Source: DBP responses to Information Requests EMCa01 and EMCa25

2.3 DBP's proposed AA5 opex

2.3.1 DBP's historical and proposed opex

47. DBP has forecast total opex of $454.1m for the AA5 period. In the table below, we show the breakdown of proposed AA5 opex in each category.[4]

Table 2.4: Proposed AA5 opex by opex category - $m, real Dec 2019

Category	2019	2021	2022	2023	2024	2025	Total AA5
Efficient Base Year	60.5	60.5	60.5	60.5	60.5	60.5	302.5
Step changes		0.0	0.0	0.0	0.0	0.0	0.0
Fuel Gas (SUG)		20.4	20.8	21.0	22.0	22.3	106.5
GEA & Turbine overhauls		8.8	7.6	7.6	4.3	2.1	30.4
Capex to Opex		2.3	1.9	2.2	2.2	1.9	10.4
Labour cost escalation		0.4	0.6	0.9	1.1	1.3	4.3
Total forecast opex		**92.5**	**91.4**	**92.1**	**90.0**	**88.1**	**454.1**

Source: DBP Opex model – converted to real Dec 2019

48. DBP reports that it has incurred $386.5m of actual opex from 2016-2019 compared to the ERA allowance of $440.7m for the same period (2016-2019). For completeness, we show

[4] As stated in section 1, we have converted DBP's figures, which are proposed in December $2020, into equivalents in December $2019. This applies to data throughout this report.

in the table below the amount of $111.05m (real Dec 2019) in 2020 which is as per ERA allowances.

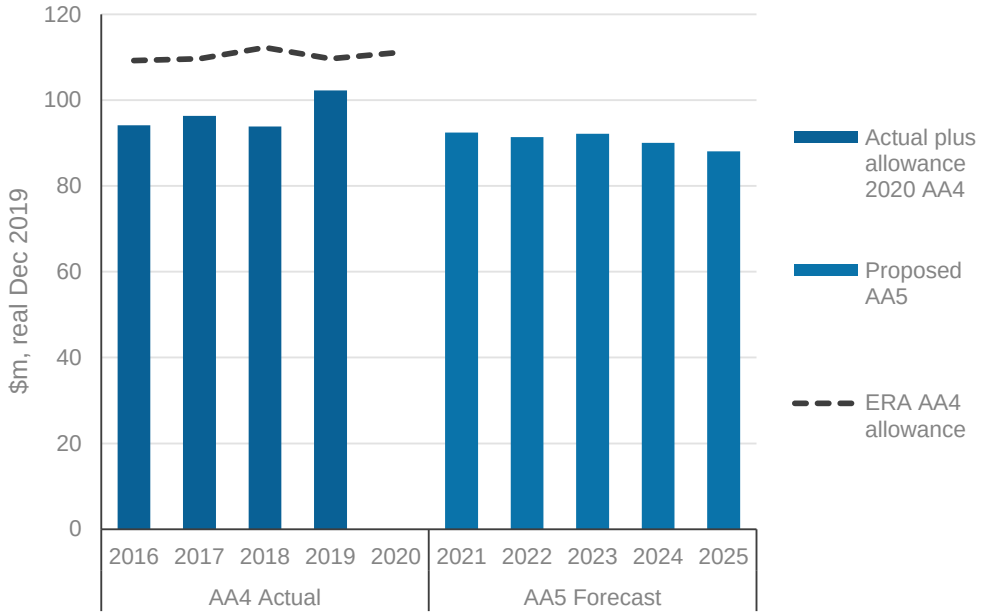
Table 2.5: AA4 opex by category - $m, real Dec 2019

Category	2016	2017	2018	2019	2020	Total AA4
Salaries	30.60	31.71	27.03	25.74	32.17	147.25
Salaries - Contractors	0.61	0.55	0.99	2.10	0.87	5.12
Employee Expenses	0.19	0.15	0.22	0.18	0.26	1.00
Advertising	0.03	0.11	0.03	0.00	0.05	0.23
Consulting	3.19	3.51	3.09	4.34	4.86	18.99
Entertainment	0.57	0.50	0.50	0.51	0.49	2.57
IT	3.83	4.54	4.75	4.39	4.41	21.93
Insurance	2.83	3.19	2.84	2.89	4.02	15.77
Motor Vehicle	1.14	1.06	1.15	1.09	1.14	5.58
Office & Admin	0.90	0.98	1.04	1.29	0.85	5.06
OHS	0.18	0.26	0.20	0.20	0.23	1.07
Repairs & Maintenance	4.61	5.26	7.34	7.49	4.35	29.04
Training & Development	1.01	1.32	1.19	1.33	1.00	5.85
Travel & Accommodation	1.96	2.40	2.15	2.19	2.11	10.81
Utilities Rates & Taxes	8.77	6.79	8.46	9.65	9.32	43.00
Reactive Opex	1.97	1.28	1.55	2.77	1.37	8.95
Fuel Gas	24.50	27.76	28.11	31.96	38.37	150.71
GEA/Turbines	7.21	4.93	3.21	4.10	5.17	24.62
Total	**94.12**	**96.30**	**93.86**	**102.24**	**111.05**	**497.56**
ERA allowance	109.21	109.62	112.24	109.60	111.05	551.71
Variance	***-15.09***	***-13.32***	***-18.38***	***-7.36***	***0.00***	***-54.15***

Source: DBP response to EMCa02 converted to real Dec 2019. Note – the 2020 figures are based on ERA allowance

49. In the figure below, we show the long-term opex trend for the AA4 and AA5 periods against the ERA allowance.

Figure 2.3: DBP Opex trend 2016 – 2025 - $m, real Dec 2019[5]



Source: DBP response to EMCa02 and converted to Dec 2019

2.3.2 EMCa observations on opex trends and performance

50. DBP, on average, has spent significantly less than ERA allowances in AA4 (2016 – 2019) with total variance of $54.2m, mainly contributed by fuel gas (SUG), salaries and GEA/turbines overhaul. For the AA5 period (2021 – 2025), DBP's forecasts, on average, will be lower than its 2019 actual opex as shown in the Figure 2.3 above.[6]

51. Further assessment of opex, including assessment of variances for the components other than SUG, is discussed in the Opex section – Section 8.

2.4 Approach for our review

52. Our review has entailed:

- carrying out a first pass review of DBP's capex and opex proposals to identify any areas where there has been a material change in either:
  - the capex incurred (or to be incurred) by DBP in AA4 relative to what was approved by the ERA in its 2016 Final Decision, with a focus on the material variances against the ERA allowance; or
  - the expenditure DBP has proposed for AA5 relative to what it spent in AA4;
- conducting a more detailed assessment of the capex and opex proposals using the review framework outlined in Appendix A and having regard to information provided by DBP in its initial submission to the ERA, at the on-site meeting, and in response to our information requests. For:
  - capex, this typically involved review of various DBP planning documents and 'business case' documents for its proposed projects; and
  - opex, we reviewed DBP's forecasting methodology and relevant input assumptions; and

5 In Response to Information Request (IR) EMCa02, DBP did not provide 2020 estimated budget.

6 DBP has reported its actual opex for 2019 in response to IR EMCa002. This amount is greater than the amount that DBP has used as its Base Year amount (as is described in section 8.3)

- carrying out a high-level review of the remainder of DBP's capex and opex proposals.

53. Our review has placed emphasis on those matters that are of greatest significance in driving the level of the reference tariffs that the ERA has been asked to approve. Accordingly, we have deepened our assessment process on such components of proposed expenditure to provide the ERA with the necessary supporting evidence and supporting logic on matters of most significance. Our review does not, nor is it intended to, represent an expenditure approval process and the specific projects, programs, and activities that DBP chooses to undertake are matters for DBP's management judgment.

3 GOVERNANCE AND MANAGEMENT

3.1 Introduction

55. To inform our assessment of the capex incurred (or to be incurred) by DBP in the AA4 period and its proposed expenditure for the AA5 period, we have reviewed DBP's investment governance and management systems, procedures, and practices and compared them to good industry practice (GIP). We have also compared what DBP's governance framework requires and the evidence we have seen, or otherwise, of consistent application of those requirements.

56. The focus in this section is the business-as-usual investment governance policies, frameworks, and processes. The extra steps taken to develop the regulatory forecast (i.e. for the AA5 period) are discussed in section 7 for capex and section 8 for opex.

3.2 Elements of DBP's investment governance and management framework

3.2.1 Investment governance framework

Introduction

57. We have reviewed DBP's governance framework with the emphasis on the policies, procedures, and key documents that it has in place to:

- develop its 'portfolio' of work;
- approve individual projects of work in the context of the portfolio of work; and
- manage the delivery of approved work to achieve efficient costs.

58. Our review has focused on:

- the alignment of the governance framework with DBP's corporate objectives, including its regulatory and statutory obligations;
- the alignment with GIP, cognisant of the scale and scope of DBP's operations;
- evidence that the processes and procedures are used in practice; and
- the effectiveness of the governance process.

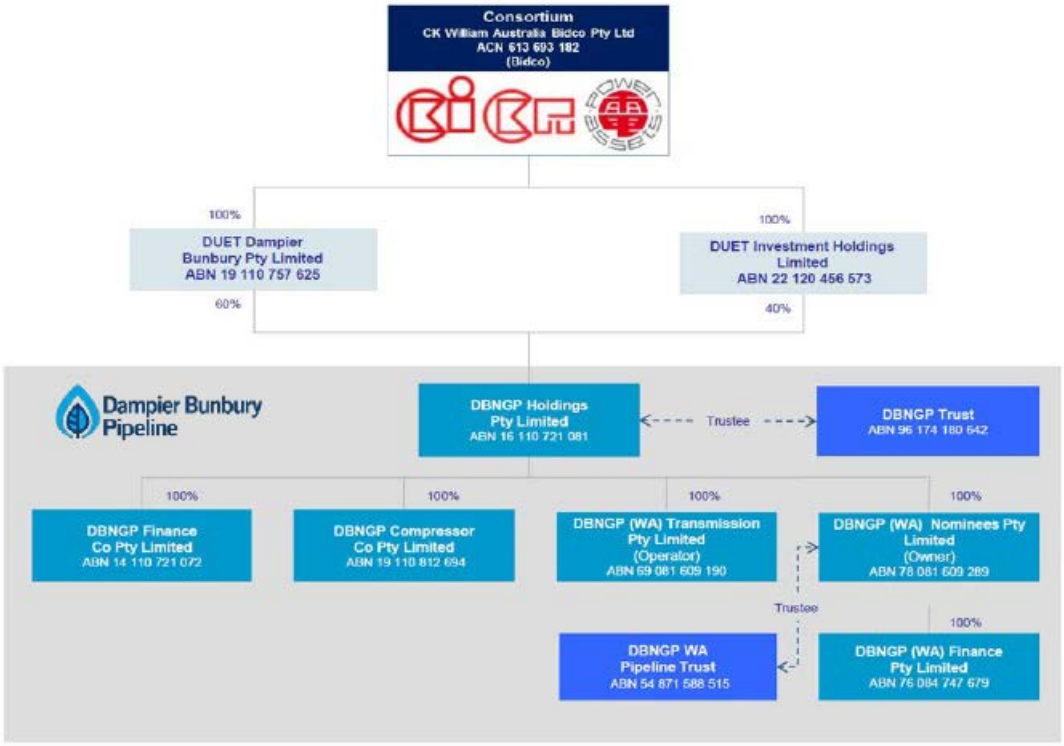
DBP's approach

Management and operation of the DBNGP

59. The current ownership and management structure of the DBNGP is shown in the figure below. DBNGP (WA) Nominees Pty Ltd is owner of and holder of the Pipeline Licences for the DBNGP. DBNGP (WA) Transmission Pty Ltd is the Operator of the DBNGP. DBP Transmission (DBP) is the trading name of the DBNGP group of companies, a part of the Australian Gas Infrastructure Group (AGIG), which in turn is owned by Cheung Kong Group (CK Group). [7]

[7] '*AGIG combines the operations of Australian Gas Networks (AGN), DBP and Multinet Gas, serving approximately 1.9 million customers through its assets in Victoria, New South Wales, South Australia, Queensland, Western Australia and the Northern Territory.*' DBNGP FP_8.2_Asset Management Plan General CONFIDENTIAL, p10

Figure 3.1: Ownership and management of the DBNGP



Source: DBNGP FP_8.1_Asset management System Framework CONFIDENTIAL

Safety Case and Formal Safety Assessments

60. DBP's DBNGP Safety Case was prepared by DBP and describes the minimum standards and requirements that it considers to be necessary for operation and maintenance of the DBNGP. The current DBNGP Safety Case, meeting the requirements of the PPA and MoSoPO Regulations[8], was accepted by the DMIRS[9] on 2nd August 2018. It has been updated since then to incorporate DMIRS's Safety Case Response Notes.

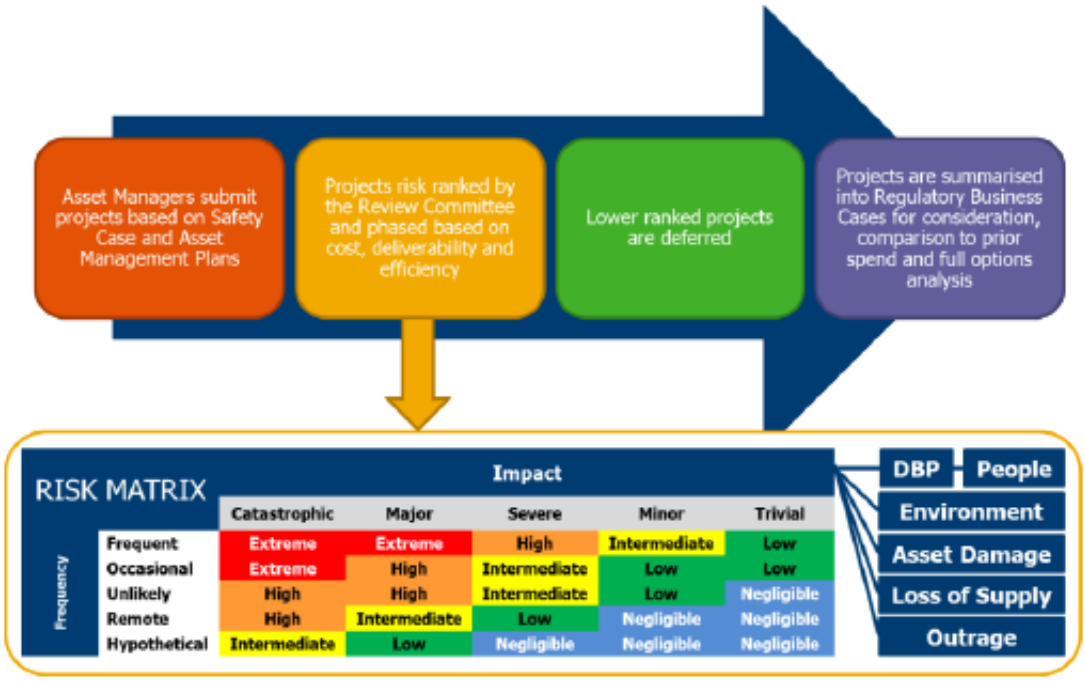
Capex governance

61. DBP summarises its project governance structure in Figure 3.2.

8 Petroleum Pipelines (Management of Safety of Pipeline Operations) Regulations 2010

9 Department of Mines, Industry Regulation and Safety

Figure 3.2: DBP's summary of its capex planning process and operational risk matrix



Source: AGIG DBNGP Final Plan 2021-2025 (amended 15 January 2020), p74

62. Stay In Business ('SIB') projects, which exclusively comprise the AA4 and AA5 capex programs, are generated by one or more of six drivers via the Safety Case and its AMPs:

- Carry-over and/or continuing projects;
- pipeline integrity and safety;
- equipment obsolescence;
- policy change (e.g. to incorporate new industry standards);
- network security; and
- discretionary (improvement) projects

63. A five-year capex plan is developed, prioritised, and updated annually by evaluating the SIB proposals (also referred to as business cases) using the DBP Risk Model. This process is illustrated in the figure below. DBP states that: '*The* PPRC *review risk ranking, consider options analysis and optimal phasing based on risk (to the business, people, environment, asset damage, loss of supply and reputation), cost, deliverability and efficiency. Highly ranked projects and programs are summarised into Business Case categories for consideration and comparison to prior spend. Lower ranked projects are deferred.'*[10]

64. The approved SIB projects are authorised for execution and then follow the project lifecycle steps of plan, deliver, and finalise in accordance with DBP's Project Management Methodology (PMM). The project lifecycle is illustrated in the figure below. The PMM outlines the approval process and major project milestones at each stage of the project lifecycle. DBP's Project Management Office (PMO) is a part of AGIG's Transmission Asset Management Division ('TAM') and is responsible for the PMM. The PMM includes a change control process which '*…ensures there is governance around changes in scope and cost at all stages of the project lifecycle*.' [11]

[10] AGIG DBNGP Final Plan 2021-2025 (amended 15 January 2020), p74

[11] AGIG DBNGP Final Plan 2021-2025 (amended 15 January 2020), p83

Figure 3.3: DBP project lifecycle

Source: AGIG DBNGP Final Plan 2021-2025 (amended 15 January 2020), p83

Opex governance

65. DBP did not explicitly explain its opex governance process in its submission. However, from our discussion at the on-site meeting on 6th March 2020 with DBP representatives, we understand that at the start of each calendar year DBP prepares draft budgets of the operating activity for the following five years. The budget is subject to a similar review and monitoring process as described above for the capex process.

Internal Audit

66. DBP advises that over the period 2016-19, it reviewed procurement for opex and payment processes. Subsequent actions led to improvements in the following areas:

- vendor evaluations and approval of preferred vendors;
- management of its contracts database;
- competitive tendering processes;
- controls within the Maximo procurement management system; and
- measures to enhance payment controls.

EMCa assessment

67. Confidence in forecasts that may be derived from an effective governance process can be provided to the extent that DBP delivered evidence from DBP that:

- the portfolio of work is refined through a 'top-down' or Board-level challenge process that results in a lower portfolio of work and/or expenditure;
- at the portfolio level there is consistency between forecast and actual expenditure;
- at the project level, there are compelling explanations of any variance between actual and estimated expenditure;
- forecasting issues have been identified, the processes improved, and the outcomes are progressively improving, and
- expected benefits from the expenditure have been realised.

68. We provide below our observations on each of these factors.

DBP's top-down challenge process resulted in an increase from the preliminary AA5 capex project list

69. We note the following points from DBP's response to Information Request (IR) EMCa30 in which we asked for evidence regarding the 'top-down' challenge process:

- reviews of proposed capex were undertaken by the 'WA AA Review Steering Committee' which comprised the AGIG executive management team;
- DBP's June 2018 preliminary capex list was $148m (real June 2018);
- DBP's total capex forecast was increased to $159m (real Dec 2020) in January 2019 and essentially remained at that level for the next 12 months, which included three further reviews;

- the increase in the total from c$150m to c$160m by January 2020 was despite DBP reducing the scope for compressor station accommodation work by $11m and reclassifying $11m capex to opex, so the net increase for the remainder was c$32m over that time;
- the only explicitly identified reasons for the increase over the 18 month review period are the advancement of replacement of [redacted] compressor package control systems from the AA6 period (cost unspecified), the Northern Communications System replacement project, and updated unit and other cost information;
- DBP's project list in January 2019 included 14 projects addressing Low risks at an aggregate cost of approximately $12m, all of which appear to have been retained in the final project list; and
- DBP illustrates a 'Business Case Optimisation (BCO) assessment matrix' which is essentially a 2 x 2 matrix (urgency vs Importance), but it is not clear what role it played in 'optimising' the portfolio of work.

70. DBP followed an internal challenge process, but whilst DBP states that the program of work was optimised by '…*staging works over time to 'ensure: costs and resources are optimised and interdependencies are identified',*[12] it is not apparent how DBP took into account the risk ranking of projects in landing on the Final Plan composition. DBP does state that '*~$43m is currently considered as low Importance/Urgency for AA5'*[13]. Whilst this quote is from a December 2018 review, given that the AA5 capex plan was at $160m at this time and did not reduce, it is reasonable to assume that the bulk of the $43m capex referred to was retained in the Final Plan.

71. In our experience, effective, risk-based top-down challenges of initial bottom-up capex lists results in less projects and lower expenditure in the equivalent of the 'final plan', not more as with DBP's process.

72. We do not see sufficiently compelling information to demonstrate that the resultant portfolio is reasonably likely to be set at a prudent level. Furthermore, it appears DBP has retained sufficient projects, albeit staged or phased over time, to spend what it considers to be an 'affordable' amount rather than a risk- and cost-optimised amount.

There is a small variance in AA4 capex (actual vs ERA allowance) at the portfolio level

73. The table and figure below compare DBP's initial, revised and actual/estimate[14] AA4 capex with the ERA's Final Decision. They show that DBP expects to deliver $121.9m which is $8.6 (7.6%) higher than the ERA AA4 allowance of $113.4m. This is despite an unexpected $17m impact of Meter station-related incidents. This demonstrates an ability to manage expenditure at the portfolio level.

74. In regard to the five-year program-level expenditure governance, the largest variances in percentage terms were derived from the ICT capex program. DBP advises that the variances were '…*caused due to the ad-hoc approach towards application lifecycle management which will be corrected for under the proactive approach recommended in AA5.'*[15] DBP has changed to a more 'proactive' approach which it believes will lead to lower long term costs and better planning - we consider this further in our assessment of AA4 and AA5 capex.

12 IR EMCa30-3_18.12.18_WA AA RSC Dec_review of BCOs, slide 17

13 *Ibid,* slide 5

14 The values for 2018 and 2019 were estimates in the information provided by DBP

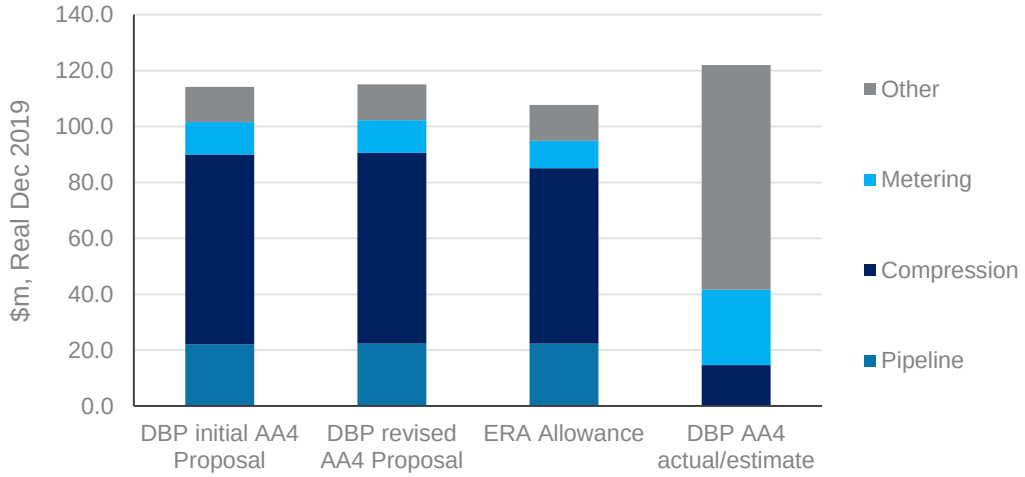
15 Business Case 21 (Attachment 8.5, p328)

Table 3.1: Comparison of actual AA4 capex with DBP forecasts and ERA allowance - $m, real Dec 2019

Category	DBP initial AA4 Proposal	DBP revised AA4 Proposal	ERA Allowance	DBP AA4 actual/estimate	Difference AA4 Initial & actual
Pipeline	22.1	22.3	22.3	0.3	-21.8
Compression	67.8	68.2	62.8	14.7	-53.1
Metering	11.7	11.7	9.8	27.0	15.3
Other	12.7	12.8	12.8	80.3	67.6
Total	114.3	115.1	107.7	122.3	7.9

Source: EMCa analysis derived from DBP's response to Information Request EMCa01 and EMCa25

Figure 3.4: Comparison of actual AA4 capex with DBP forecasts and ERA Final decision - $m, real Dec 2019



Source: EMCa analysis referring to DBP's response to Information Request EMCa01 and EMCa25

AA4 business case-level variances undermine confidence in DBP's capex forecasting ability

75. AA4 approved capex versus actual capex volatility is pronounced at the business case level. Of the 27[16] AA4 capex business cases, only four[17] were delivered within ±10% of their respective ERA allowance. In the figure below we show the percentage variances for many of the AA4 capex business cases.[18] Eight programs delivered in AA4 had zero or negligible ERA allowance and are not shown in the figure because the variances in percentage terms are extremely high or infinity.[19]

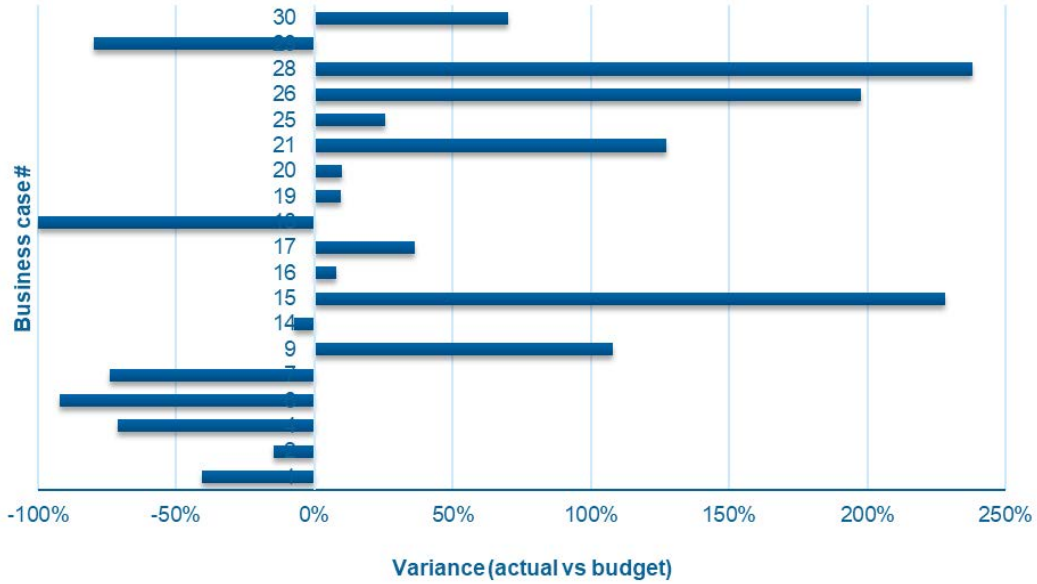
16 Not including BC05 Turbine GEA replacement, as this has been classified by DBP as an opex program and there was no BC08 or BC22 in AA4; BC 27, 28, and 29 were AA4-only BCs

17 As defined by Business Cases 14, 16, 19, 20

18 We have excluded business cases for which the variance is thousands of percent or infinity due to very small AA4 planned expenditure or no expenditure, respectively

19 As defined by Business Cases 03, 10, 13, 11, 12, 23, 24, 27

Figure 3.5: AA4 variance (Actual capex vs ERA Allowance) for business cases with ERA allowance >$40k [20]



Source: EMCa analysis of DBP's response to IR EMCa01

76. Whilst some of the volatility may have arisen because of DBP's recategorisation of expenditure between business cases, the reasons given for the variances are overwhelmingly due to scope changes.

77. DBP has provided descriptions of the variances between ERA allowances and actual AA4 expenditure in its capex and opex business cases provided with its AA5 submission, however in most cases we needed supplementary information from DBP to enable us to understand the variances.

78. DBP's responses to our requests for further information provided sufficient information for us to conclude that:

- DBP could convey satisfactory explanations of the bases for the variations;
- however, DBP's explanations did not all appear to align with the information in the historical documents provided.

79. The 'annual' AA4 business cases provided to us by DBP in response to our request for information[21] do not include any options analysis or many of the other features of a robust business case:

- whilst we consider these documents to be adequate for reporting and monitoring relatively small expenditure items or somewhat larger recurrent capex, in our view they are not sufficient to support expenditures on projects of over a million dollars; and
- it is not clear to us how DBP's Project Review Committee can assess that the capex is likely to be prudent from a bottom-up perspective when the proposal documents typically do not contain options analyses.

[20] This graph does not show the variance for (i) business cases BC03, 10, 13 that each had less than $40k ERA allowance but for which DBP spent significantly more, and (ii) business cases BC11, 12, 23, 24, 27 for which there was no ERA allowance

[21] IR EMCa03

Pipeline-related risks appear to be overstated

80. It is not unusual over the course of a five-year period (with forecasts developed up to seven years in advance of the final year) for there to project 'roll-ins'[22] and 'roll-outs'.[23] The table below shows that in comparing the ERA allowance and the actual AA4 capex:

- DBP underspent projects that were planned at the start of the AA4 period by $14.8m (-13%); and
- DBP spent $23.6m on projects that were not planned at the start of the year with approx. $16m of this on responding to incidents at metering stations.[24]

Table 3.2: AA4 actual and estimated project expenditure compared to ERA allowance' - $m, real Dec 2019

Category	ERA allowance	Actual
Planned and capex incurred	99.4	98.6
Planned but no capex incurred	14.0	0.0
Not planned but capex incurred	0.0	23.6
Total	113.4	122.3

Source: DBP response to EMCa25

81. The table below shows that DBP's expenditure on its planned pipeline-related works was $28.3m less than the ERA allowance. The bulk of the variance was from a deliberate reduction in the expenditure on projects within Business Case 01 (Compressor Stations),[25] offset somewhat by $6.8m spent above the ERA allowance on other planned pipeline-related work. The resultant underspend against the ERA allowance is $21.4m (-19%) for the nine business cases included in our analysis. In the balance of the AA4 capex portfolio, DBP spent more than the ERA allowance primarily in Information technology (IT) and Operational Technology (OT) assets.

Table 3.3: AA4 capex variance for pipeline assets-related work - actual vs ERA allowance ($m, real Dec 19)

Category	Variance	
Underspend on planned pipeline-related work[26]	-$28.3	-25%
Overspend on planned pipeline-related work[27]	$6.8	6%
Variance on pipeline related AA4 capex	-$21.4	-19%

Source: EMCa analysis of DBP response to IR01

82. DBP's ability to absorb the majority of an unexpected variance to its Metering asset category and to introduce numerous other unforeseen capex projects in the AA4 period indicates that the extent of risks were over-stated and/or it found cheaper ways of delivering some projects.

83. These considerations undermine confidence in the AA5 forecast.

Benefits appear to have been realised to date

84. DBP's AA4 Stay-In-Business (SIB) program of work is directed towards maintaining reliability of the pipeline and delivering the requisite gas quantity and quality to its customers. DBP's system reliability has averaged very close to 100% so far in the AA4

22 Projects bought forward from future periods of unforeseen work being prioritised

23 Projects deferred to beyond the current period (in this case, to 2020 or beyond) or cancelled

24 Refer to section 5 and appendix B (per BC 15 Metering stations) for more information

25 To compensate for the expenditure required to respond to three incidents at metering stations

26 Variance from Business Cases 01, 02, 06, 13, 18, and 29

27 Variances from Business Cases 09, 15 (less $15.9m repairs/modifications), and 19

period, with no curtailments, and with totex expected to be $73m below the AA4 expenditure allowance.[28]

3.2.2 Risk management framework

DBP's approach

85. DBP's risk management framework is part of its Corporate Governance program. The risk management framework includes reporting lines through the Audit & Risk Management Committee to the DBP Board.[29]

86. The Board Risk & Compliance Committee requires management to provide reports on performance in relation to the identification, assessment, and management of risks.[30]

87. DBP's internal audit plan is approved by the Board each year. External firms are typically used to undertake the audits. Outcomes and recommended actions are presented to, deliberated, and agreed to by the Audit Committee.[31]

88. DBP uses a project priority scoring process for its SIB capital projects. DBP states that it incorporates the Corporate Risk Analysis Matrix for the risk assessment and ranking[32] as shown in the figure below.

Figure 3.6: DBP's Risk Analysis Matrix

Qualitative Risk Analysis Matrix – Level of Risk						
		Consequence				
Frequency		1 Trivial	2 Minor	3 Severe	4 Major	5 Catastrophic
E	Frequent	LOW	INTERMEDIATE	HIGH	EXTREME	EXTREME
D	Occasional	LOW	LOW	INTERMEDIATE	HIGH	EXTREME
C	Unlikely	NEGLIGIBLE	LOW	INTERMEDIATE	HIGH	HIGH
B	Remote	NEGLIGIBLE	NEGLIGIBLE	LOW	INTERMEDIATE	HIGH
A	Hypothetical	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	LOW	INTERMEDIATE

Source: DBNGP FP_8.8_Operatonal_Risk_Management_Framework_CONFIDENTIAL, p2

89. DBP's risk analysis matrix is based on *AS2885.1: Pipelines- Gas and Liquid Petroleum Design and Construction*[33] with risk consequence definitions of:

- impact on DBP – operational risk;
- people – safety risk;
- environmental impact;
- [loss of] supply / [community] outrage; and
- Asset damage.

28 Although reliability is a lagging indicator

29 DBNGP FP_8.8_Operational Risk_Management_Framework_CONFIDENTIAL, p1

30 DBNGP FP_8.8_Operational Risk_Management_Framework_CONFIDENTIAL, p1

31 AGIG DBNGP Final Plan 2021-2025 (amended 15 January 2020), p65

32 Sub 2 App B SIB Risk Ranking Process

33 With the exception of the frequency and severity classes included in AS2885.1. DBP state that its risk model captures the DBNGP operating environment whilst maintaining consistency with AS2885.1 and AS/NZS ISO 31000 (Risk Management- Principles and Guidelines)

90. DBP has nominated indicative frequency scales that increase from a hypothetical value of 1 in 10,000 years by a factor of 10 to a frequency value of 1 or more per year.

91. The process includes provision for calculation of a risk score and an implementation score to assist the prioritisation of projects. The risk score is a product of the risk factors shown in the figure below. DBP states that the risk scores have been designed to enable distinct separation between each of the risk levels.

Figure 3.7: Risk ranking factors

Frequency		Consequence				
		1	2	3	4	5
		Trivial	Minor	Severe	Major	Catastrophic
E	Frequent	5	25	125	625	625
D	Occasional	5	5	25	125	625
C	Unlikely	1	5	25	125	125
B	Remote	1	1	5	25	125
A	Hypothetical	1	1	1	5	25

Source: EMCa09_AA4 SIB Risk Ranking Confidential

EMCa assessment

The majority of projects in the early years of the AA4 period addressed Intermediate risks

92. We sought to understand how DBP applied its risk ranking model. As shown in the figure below, we observed that:

- only 20 out of 74 projects (27%) commenced in the 2015/16[34] financial year were designed to address Extreme (3) or High risks (17);
- 38 projects (51%) of the capex projects were designed to treat Intermediate risks – these risks are tolerable to DBP if they are demonstrated to be ALARP;
- the balance of 16 projects (22%) of the capex projects were addressing Low risks – the untreated risks were typically posing a low impact on DBP's operations,[35] which nonetheless DBP considered prudent to address.

93. In 2016 and 2017 it appears that the majority of the capex was allocated to rectifying Intermediate risks. However, from 2018 onwards, projects designed to address High risks dominate the annual work programs numerically and in terms of the allocated capex. By 2020 all projects are addressing High risks, with only one project addressing Intermediate risks. This indicates a shift in risk tolerance from DBP in 2020, however the information provided in response to one of our information requests shows a similar count (14) of projects to treat low risks in the development of the AA5 program.[36]

94. Whilst when measured by volume the Low-ranked projects comprised a significant proportion of the number of projects, they collectively represented only about 5% of annual expenditure.

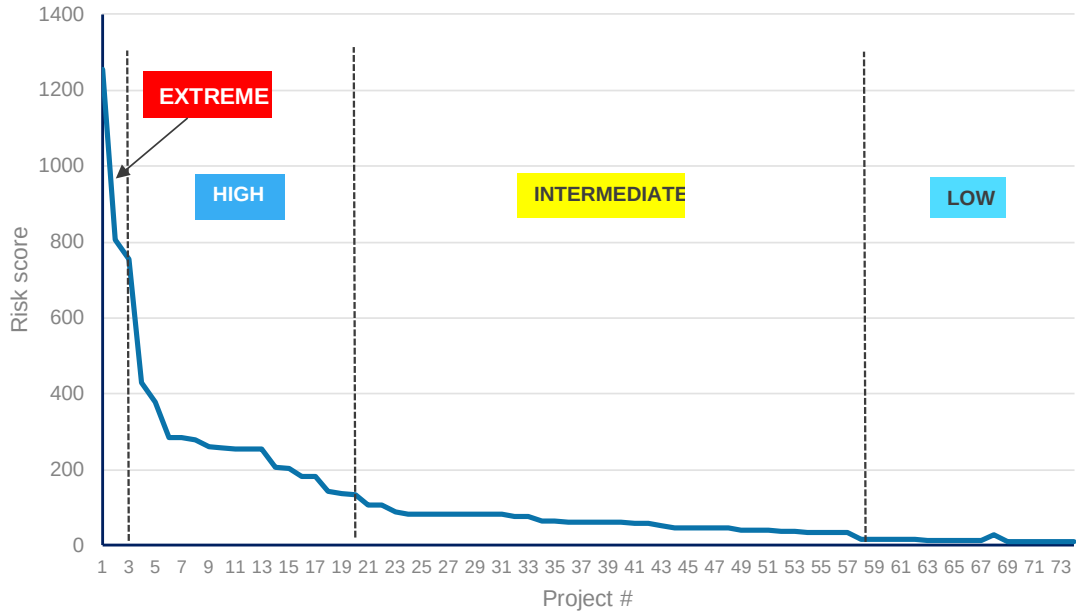
95. In our assessment of the prudency of DBP's AA4 and AA5 capex, we considered the risks being treated by DBP at the business case level.

[34] The scores for CY16 were not explicitly available; the proportions of High/Intermediate/Low for 2016/17 projects was similar to 2015/16

[35] Examples include tools, test equipment, and crew accommodation approaching end-of-life

[36] DBP response to Information Request EMCa30 (per DBNGP AA5 Capex Plan 14 January 2019)

Figure 3.8: DBP's project untreated risk profile in FY2015/16[37]



Source: EMCa analysis of DBP response to Information Request EMCa 09_AA4 SIB Risk Ranking Confidential

96. DBP's business process allows for grouping of projects into the categories of: (i) carryover; (ii) mandatory; (iii) Front End Engineering Design (FEED); (iv) ranked, and (v) discretionary.[38] Ranked projects are risk-ranked to determine their respective priority within a funding limit. Mandatory projects include:

- integrity/safety – required to improve or maintain pipeline integrity;
- equipment obsolescence – replacement and/or upgrade for operability and maintainability; and
- policy – to incorporate new industry standards, operational, health and safety policy or licensing and regulatory requirement.

97. Based on our knowledge of industry practice, we consider that equipment obsolescence and some elements listed under 'policy' should not automatically be regarded as mandatory.[39]

98. Where DBP is treating an Intermediate risk, it typically seeks to qualitatively justify the rationale for doing so either in terms of reference to the ALARP test or, less often, claiming that the work is mandatory. We have not assessed the prudency of all 104 of the AA4 capex projects but we do discuss our assessment of selected business cases in Appendix B and section 6.

48 of DBP's approved AA4 projects addressed low risks

99. The figure below shows that DBP included 48 AA4 projects in four of the five annual project lists to address a highest untreated risk ranking of 'Low'.[40] DBPs Risk Management Framework states that *Low* and *Negligible* risks are tolerable.[41] Inclusion of these projects appears to contradict the process for optimising the list of programs derived from the 'bottom up' process illustrated in step 3 of Figure 3.2.

100. We have not been able to discern from the information provided what the expenditure on these projects was in 2016, however the total expenditure on addressing Low risks in the other three periods is $4.9m, or an average of $1.6m p.a. On this basis we estimate that

37 Established by the highest of the risk ratings across the six risk dimensions in DBP's risk profile

38 DBNGP FP_8.2_Asset Management Plan General CONFIDENTIAL, Figure 10, p55

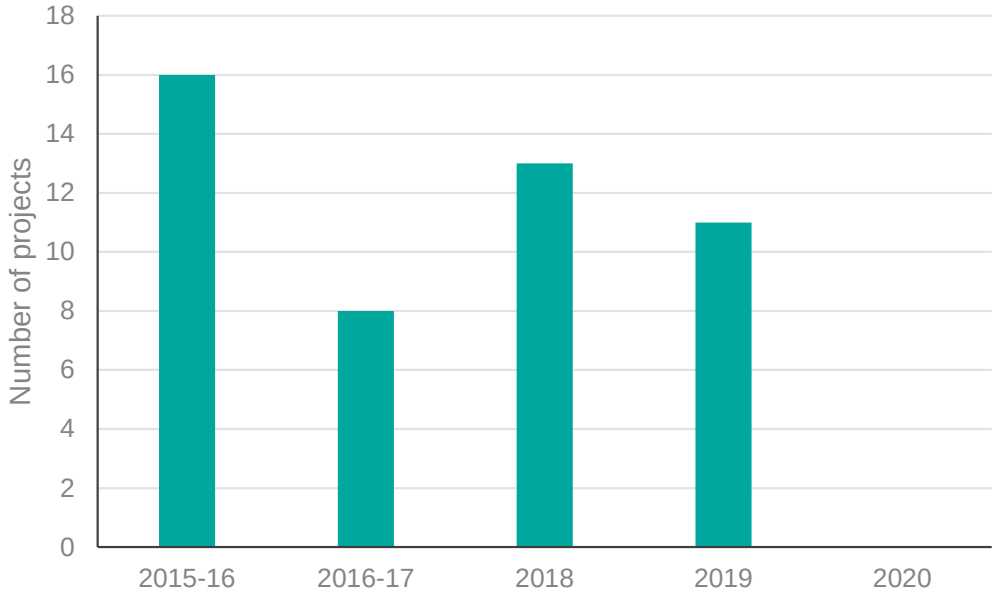
39 This is not to say that expenditure driven by these factors is not justified

40 That is, the other five risk dimensions considered by DBP are ranked either Low or negligible

41 DBNGP FP_8.8_Operatonal_Risk_Management_Framework_CONFIDENTIAL, p2

DBP has spent approximately $6.5m out of the $121.9m (5%) on projects to address low-rated risks. The average amount per project is estimated to be $135k.

Figure 3.9: Number of projects in DBP's work program with 'LOW' untreated risk rating



Source: EMCa 09_AA4 SIB Risk Ranking Confidential (note that from DBP's information, it will not undertake any low risk rated projects in 2020)

101. We have not assessed the prudency of all 104 of the AA4 capex projects but we do discuss our assessment of selected business cases in Appendix B and section 6.

14 of DBP's AA5 projects address low risks with the majority of projects addressing High risks

102. Based on the December 2018 iteration of its risk-ranked project list provided in response to IR EMCa30:

- 14 of the 88 AA5 projects (i.e. 16%) shown in the list provided are to address Low untreated risks at a total cost of approximately $12m or an average of $2.4m p.a., which is higher than the average across the AA4 period; and
- Approximately 50% of the proposed projects are designed to address High or extreme untreated risks.

Summary

103. DBP's AA4 and AA5 'top-down' challenges to its 'bottom-up' project lists have led to retention of a significant number of projects designed to address Low ranked risks with a significant portion of total capex for each AA period. When combined with the considerable number of projects designed to address Intermediate risks, a significant portion of the AA4 and AA5 capex programs, at least at their inception, is designated to address Low-Intermediate risks. This is consistent with DBP's own assessment that approximately 25% ($40m) of the AA5 planned capex portfolio is for low importance/low urgency work.

104. In our view, this is strong indication that the work program is biased towards an over-estimate of the planned work required in the AA5 period.

3.2.3 Asset management

DBP's approach

105. DBP provided copies of its 'Asset Management Plan General' which was last updated in December 2019. In response to our request, DBP also provided the asset management plans for nine 'disciplines'.[42]

106. The AMP General states that its purpose is '…*to enable effective management of asset related risks'*:[43]

- *To ensure that key asset risks, and their controls, are factored into the management of assets*
- *Demonstrate the logical development of asset improvement and/or replacement plans*
- *To complete the feedback loop by providing a framework for monitoring the effectiveness of controls.'*

EMCa Assessment

DBP's asset management plan is detailed

107. DBP's Asset Management Plan General describes the facilities in detail, providing the history of the development of the facilities including recent work completed. Among other things, the AMP provides insight into the risk-related issues with the facilities (i.e. at a high level, primarily in qualitative terms but with some quantitative data). It describes the asset management strategies and plans to address the issues in each of the nine asset management disciplines.

108. The nine discipline AMPs provide more detail on the management of the respective facilities and systems. In most cases operational KPIs to monitor critical aspects of plant and maintenance performance are explicit and consistent with good industry practice.[44]

109. We also note that a continuous improvement process is described in the AMP General, which includes (i) monthly reporting of asset performance and process safety KPIs, and (ii) annual technical audits. DBP provided us with copies of its Transmission Dashboard which is commensurate with good industry practice. We saw some evidence of incorporation of audit actions in discipline AMPs.

3.2.4 Procurement and contract management

DBP's approach

110. All purchasing decisions for goods and services are made in accordance with AGIG's 2020 Procurement Policy and 2020 Purchasing Procedure.

EMCa Assessment

111. The principles, processes, scope and required actions are consistent with good industry practice for expenditure of the scope and scale associated with the DBNGP.

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42 Pipeline Mechanical, Rotating Equipment, Corrosion Protection, EC&I, Metering facilities, Telecommunications, SCADA, Land Management, and Efficiency and Reliability.

43 DBNGP FP_8.2_Asset Management Plan General CONFIDENTIAL, p13

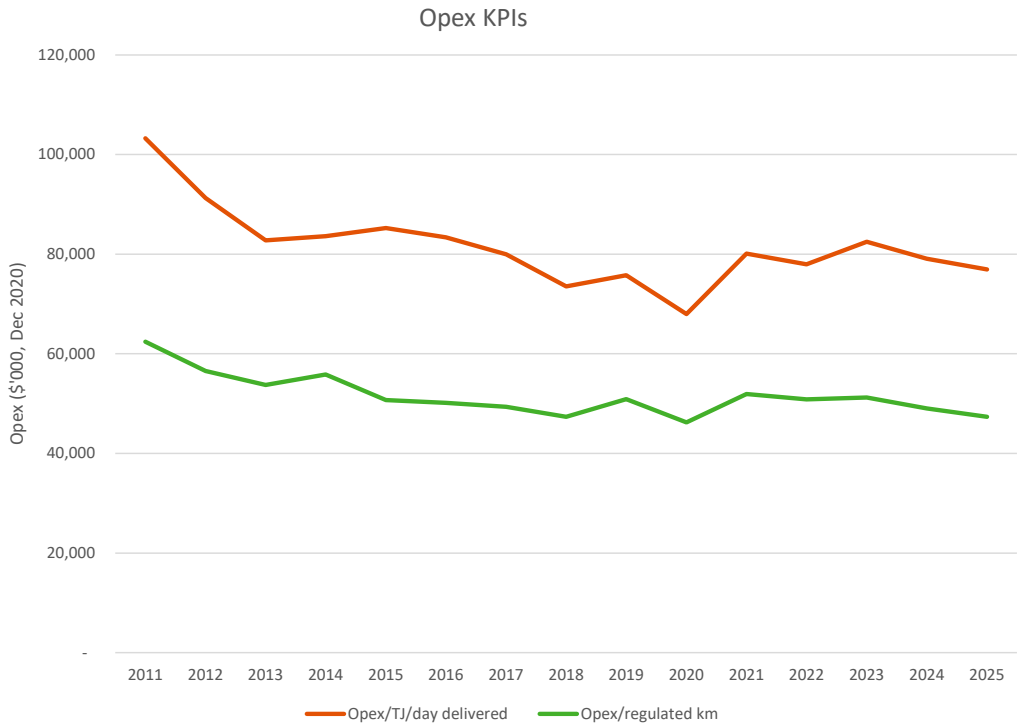
44 For some asset categories, the KPIs are not shown, with reference instead to the 'Process Safety dashboard on the DBP Intranet.

3.2.5 Key Performance Indicators

DBP's KPIs

112. The figure below shows two of DBP's KPIs: $/TJ MDQ km (i.e. normalised against capacity reservation) and $/TJ km (i.e. normalised against throughput). In its AAI document, it also presents $/GJ MDQ and $/GJ KPIs, though this did not show the forecast. DBP subsequently provided an updated graph, which is shown below.[45]

Figure 3.10: DBP unit operating expenditure KPI ($Dec2020)



Source: DBP response to IT EMCa038

EMCa Assessment

Benchmarking with other gas transmission pipelines

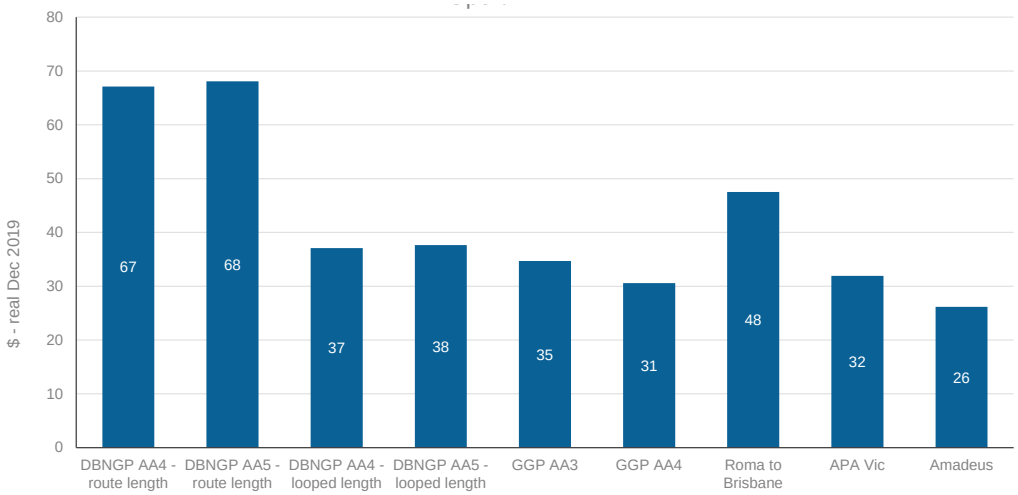
113. In figure 3.11, we show our estimate of a DBP benchmark comparison against four other gas transmission pipelines. Three of these are regulated by the AER;[46] the other is the Goldfields Gas Transmission pipeline which is regulated by the ERA. We have compared these based on opex per mm-km, where mm represents the pipeline diameter, noting that some of the comparators have published benchmarks also expressed in these terms.

114. Based on route length, the DBP opex is considerably greater than the comparators. However, we have also taken into account that a considerable proportion of the DBP is looped. When we compare its opex on the basis of total pipeline length including looping, the cost falls into the range of other pipelines, though it is higher than the equivalent benchmark for GGP AA3 and AA4.

45 DBP response to IR EMCa38

46 APA Victoria, Roma to Brisbane and Amadeus

Figure 3.11: benchmark comparison of DBP opex against other regulated gas transmission pipelines (Opex / mmkm – real Dec 2019) [47]



Sources: EMCa analysis derived from DBGP Opex model, RBP AAI 2017-22 p.22, APA Vic AAI 2018-2022 p.19, Amadeus AAI and ERA Final Decision on GGP Revised AA 2020-2024 p.38

3.3 Conclusions and Implications for DBP's AA5 Proposal

115. DBP's governance and management system does not appear to have been changed significantly from its approach at the beginning of the AA4 period, with the exception of IT management. The application of these practices during the AA4 period resulted in:

- significant cost variance at the business case level;
- significant underspend in planned pipeline-related work;
- a modest overspend at the portfolio level; and
- achievement of its KPIs.

116. Whilst DBP has been able to provide reasons for most of the variance between planned and actual costs for its AA4 program, there is limited evidence that it has modified its governance and management system to account for lessons learned throughout the AA4 period. The exception is with its ICT portfolio for which, as discussed in section 7, DBP claims to have moved from an 'ad hoc' planning approach to a more proactive approach.

117. There is evidence that DBP included in its AA4 forecast a significant number of projects to address untreated risks classified as 'Low' and that the majority of the untreated risks addressed in the AA4 period were classified by DBP as 'Intermediate'. Consequently, DBP was able to prudently defer a significant portion of planned work

118. DBP has also demonstrated that it can find ways to underspend the ERA's AA4 capex allowance on planned work without affecting pipeline performance. It spent $23.9m (21%) less than allowance on planned projects and an extra $9.5m on new projects (not including the work to address the incidents in the Metering asset class). Overall DBP's net result was a $14.4m (-13%) underspend of planned work.

119. The application of DBP's 'top-down challenge' process has led to retention of a significant number of AA5 projects designed to address Low and Intermediate risks. This is consistent with DBP's own assessment that approximately 25% of the AA5 planned capex portfolio is for low importance/low urgency work. Whilst we note that DBP is likely to consider some of these programs as 'mandatory', we consider that there are strong indications that the work program is biased towards an over-estimate of the planned work required in the AA5 period.

[47] DBNGP pipeline data is based on the data from AEMC website https://www.aemc.gov.au/energy-rules/national-gas-rules/gas-scheme-register/wa-dampier-bunbury-natural-gas-pipeline

120. In our review of the proposed AA5 capex, we look for areas in which we consider that DBP is again likely to be able to spend less than the expenditure that it has proposed for regulatory purposes, particularly in respect of lower-risk-ranked projects.

4 EXPENDITURE FORECASTING METHODS AND ASSUMPTIONS

4.1 Introduction

122. In this section, we describe and assess the forecasting methods and assumptions that DBP has applied in developing its AA5 capex and opex forecasts. This includes our assessment of DBP's inclusion of an assumed real labour cost escalator in its capex and opex forecasts.

4.2 Capex forecasting

4.2.1 DBP's approach

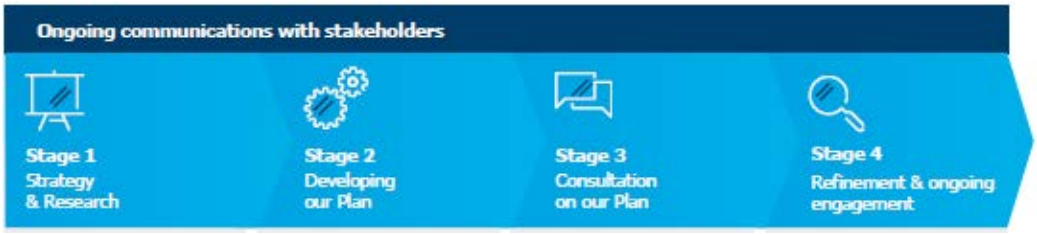
Regulatory Business Cases

123. We outlined DBP's business-as-usual capital project development process in section 3. Forecasting for regulatory purposes includes the development of 'regulatory business cases' for capital expenditure of at least $1m, with DBP including smaller projects within one of the AA5 business cases.

Stakeholder engagement

124. As part of its regulatory submission preparation, DBP advises that it incorporated feedback from shippers and other stakeholders throughout the process of developing and refining its AA5 Proposal, as illustrated in the figure below.

Figure 4.1: DBP's stakeholder engagement process - overview



Source: DBNGP FP_5.1_Engaging Stakeholders_Future_Plans_PUBLIC, p18

125. DBP's AA5 regulatory business cases include a statement about the relevant stakeholder feedback and the alignment of the proposed expenditure with the feedback. The key themes from stakeholders are:[48]

- current levels of reliability and safety are highly valued;
- stakeholders are keen to ensure DBP's costs are efficient;
- stakeholders supported improved customer experience via IT investment where the business case supports it.[49]

[48] DBP slides from on-site meeting: 5-03.06_ERA EMCa session capex

[49] From our understanding of the feedback this means where the net benefit is (strongly) positive

Cost estimation

126. DBP advises that it uses three methods for determining efficient project costs: actual historic costs, specialised engineering advice, and market testing through vendor quotes or expressions of interest.[50]

127. DBP has derived its AA5 forecast capex by applying a combination of the following expenditure techniques which collectively are similar to its AA3 cost estimation process:[51]

- **Continuation projects/programs** – where expenditure is incurred from works commenced in AA4, but to be completed in AA5, the cost estimate is determined by '*…identifying the volume of work to be undertaken and applying a historical average unit rate…consideration is also given to the specific projects and locations where historical work has been delivered.'*
- **Periodic programs** – '*cost estimates have been developed with regard to historical costs …for the same, or similar programs of work. Where the program of work has not been delivered for some time …we may also have regard to updated vendor and contractor quotes.'*
- **One-off, new, or discrete projects** – *'efficient costs are determined through a competitive tender process. Where a competitive tender process has not yet been undertaken, an expression of interest is undertaken or a bottom up cost estimate is produced.'*

4.2.2 EMCa assessment

Business Cases

128. DBP has provided nineteen AA5 'regulatory' business cases which collectively cover 109 projects. There are also 'initiatives' within some projects. The business cases include contents that are largely consistent with what we would expect to see in business cases that are progressing towards full options analyses, scoping, and cost estimation suitable for CEO or Board approval.

Needs analysis

129. We assessed the information in the 19 AA5 business cases, and which encapsulate 109 AA5 projects. All AA5 business cases are addressing what DBP assess to be High-rated risks (i.e. at the business case level – some projects within the business case may not be addressing high untreated risks).[52]

130. The combination of the need and risk analysis in the business cases is sufficient to support the need for some form of action within the AA5 period. However, as discussed below, this does not mean that we consider that the scope or timing of the proposed solution are necessarily prudent.

Options analyses

131. The options analysis in most business cases is relatively simplistic – typically three options are considered with one being to 'do nothing', another being a very expensive option and the third the recommended option, and which falls somewhere in between the other two options in terms of scope and cost. In our view the recommended option is biased towards being conservative in terms of timing. From our experience, there is often a viable variation to the recommended option or to the expensive option that results in reduced activity in the relevant regulatory period and reduced cost for a minimal increase in risk. Our findings of DBP's proposed AA5 capex at the business case level are discussed further in Section 7 and Appendix C.

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50 DBNGP FP_8.7_Cost Estimation Methodology 2021-25-PUBLIC, p1

51 AGIG DBNGP Final Plan 2021-2025 (amended 15 January 2020), p74

52 DBP assigns the overall untreated risk equal to the highest-rated risk

Capex cost estimation methodology

132. DBP's methodology for deriving total cost estimates for capex projects is consistent with common industry practice for businesses with similar levels of repeat (or periodic) work and capex program value.

133. In response to our request for information, DBP provided its self-assessment of the accuracy of the projects in its proposed AA5 capex portfolio. Our summary of the results is in the table below, which shows that DBP considers that 90% of its cost estimates through to 2025 are accurate to within ±15%, with almost half of the total expenditure based on estimates of 5-10% accuracy.[53]

Table x: DBP's self-assessment of cost estimate accuracy for AA5 projects by value - $m, real Dec 2019

Estimate accuracy	Amount $	% of Total capex
Class 1 (+/- 30-50%)	0.0	0%
Class 2 - (+/- 15-30%)	14.7	9%
Class 3 - (+/- 10-15%)	65.6	41%
Class 4 - (+/- 5-10%)	78.3	49%
Total	158.6	100%

Source: EMCa analysis of DBP's response to IR EMCa29

134. DBP's claimed cost estimate accuracy is supported by linking the cost estimation methodology to the project lifecycle phase[54] that each project is in and describing the level of approval for each project.

135. Given that DBP's proposed portfolio of work for the AA5 period is largely 'periodic' or 'ongoing' work, we accept that the majority of cost estimates are likely to be more accurate than for 'one-off/new' projects.

136. DBP's capex cost estimation methodology is similar to its approach for its AA4 period forecast and as discussed in section 3 of this report, its actual delivered program of work exhibited enormous cost variation (ERA allowance vs actual) at the project/program level. We consider that this degree of cost variance and its capacity to underspend planned work has less to do with its cost estimation methodology and more to do with DBP's asset management approach, which builds in an inherent capacity to defer work prudently.

Deliverability of the work program and projects

137. We noted in section 3 that DBP had described a 'top-down' challenge process which included staging (or phasing) work to take into account project interdependencies and resource capabilities.

138. We are satisfied that there is not a systemic issue with the deliverability of DBP's portfolio of work. However, as part of our AA5 capex assessment we have also examined the deliverability of the designated work under the respective AA5 business cases.

4.3 Opex forecasting

4.3.1 DBP's approach

139. DBP has forecast opex using a combination of a 'base-step-trend' (BST) and 'bottom-up' approaches.

53 DBP response to IR EMCa29

54 Initiate, plan, and deliver

140. For the components included in DBP's BST forecast, DBP has used a combination of January 2019 to September 2019 actual expenditures plus October 2019 to December 2019 forecast expenditure and made adjustments on irregular expenditures, as the 'efficient base year' expenditure value. DBP then escalated some component of the base year with real labour cost. It has not applied any other escalation factors. DBP has also not applied any 'step' changes in its BST forecast.

141. For the components that DBP has forecast separately in its bottom-up approach, DBP has provided the business case justifications for those forecasts. The bottom up components consist of System Use Gas (SUG), GEA & Turbine overhauls and capex projects which DBP re-categorised as opex projects.

4.3.2 EMCa assessment

142. EMCa considers that DBP's forecasting method, comprising a combination of separate forecasts for irregular and cyclical costs, and a BST forecast, is reasonable. From a methodology perspective, EMCa further considers that it is reasonable that DBP has not escalated for factors other than real labour costs, noting that it has not forecast any factors that may be considered growth drivers, and that it has not applied any step increases.

143. We assess DBP's opex forecast in Section 8.

4.4 Labour cost escalation assumption

4.4.1 What DBP has proposed

144. DBP has applied a real labour cost escalator to its proposed opex and capex. For opex components that DBP has forecast using a BST method, DBP has applied its proposed real labour cost escalation rate to the labour-related components of its forecast. For those components of its opex forecast that DBP has forecast on a bottom-up project basis, and for all of its capex forecast, DBP states that it has included real labour cost escalation to labour-related components, in forecasting the cost of these projects.

145. DBP claims to have used a method that is consistent with the ERA's Final Decision on ATCO and GGP[55] by adopting WA Treasury forecasts for general Wages Price Index (WPI) growth and CPI and without adding a premium for wages growth in the Electricity, Gas, Water and Wastewater Services (EGWWS) sector. From this it has derived its proposed real wage growth annual escalation rate of 0.69% as shown in the table below.

Table 4.1: DBP calculation for its real wages' growth escalation factors

Measure	Value
WA Treasury WPI forecast	3.15%
less WA Treasury CPI	2.46%
Annual labour cost escalation	**0.69%**

Source: AGIG DBNGP Final Plan 2021-2025, Table 7.2, page 61

146. DBP has applied the labour cost escalation of 0.69% to three categories (Salaries, Salaries – Contractors and Consulting) of its opex Base Year and which account for 34% of DBP AA5 proposed opex. DBP has also escalated 38% of AA5 proposed capex at this rate, based on its assessed labour content of capex projects.[56]

55 AGIG DBNGP Final Plan 2021-2025 page 61.

56 We observe that DBP has built up its capex project costings from specific labour and materials components in its business cases.

4.4.2 EMCa assessment

While differing slightly in its extrapolation approach from that used by ERA in prior decisions, DBP's use of source data and its calculation method are reasonable

147. We have based our assessment on the real cost escalation factors and their derivation shown in DBP's opex model, which tallies with the overall opex amounts shown in its regulatory submission.

148. DBP's proposed real cost escalation rate is higher than the ERA final decision on GGP and ATCO Gas even though DBP claims it uses the same method as the ERA decisions and noting that at the time of its submission, the WA Treasury WPI and CPI indices had not changed since those decisions. [57]

149. DBP has also used slightly different methods to determine its averages for WPI and CPI. DBP's response to ERA's information request (ERA08) shows how DBP calculated its labour cost escalation as follows:

- the three years of WA Treasury Wage Price Index (WPI) are forecast from Financial Year 2020/21 to 2022/23 and extrapolated to an extra two financial years to 2025/26. DBP then converted them into calendar years by averaging between successive financial years, resulting in an arithmetic average 3.15% per year for WPI;
- in calculating the average CPI of 2.46%, DBP used three years of WA Treasury Consumer Price Index (CPI) forecast from Financial Year 2020/21 to 2022/23 and extrapolated to an extra two financial years to 2025/26. DBP then used a geometric mean to derive the average CPI and has not sought to convert these financial year indices into calendar year indices; and
- DBP has not added an EGWWS sector premium.

150. Details of DBP calculations are in the table below.

Table 4.2: DBP calculation to derive real labour cost escalation

Financial Year	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	Average
WPI (FY - WA Treasury)	2.75%	3%	3.25%	3.25%	3.25%	3.25%	
Calendar year	**2021**	**2022**	**2023**	**2024**	**2025**		
DBP converted to Calendar Year	2.88%	3.13%	3.25%	3.25%	3.25%		3.15%
Financial Year	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25**	**2025-26**	
CPI (FY - WA Treasury)	2.25%	2.50%	2.50%	2.50%	2.50%	2.50%	2.46%
DBP real labour cost escalation							**0.69%**

Source: DBP response to ERA08

151. Because the regulatory calculation involves a forecast that extends beyond the WA Treasury forecasts and is in calendar years, there is a need to consider how to extrapolate and adjust those. This is necessarily a matter of forecasting judgment and, while arguments could be made for a range of alternatives, we consider that if the WA Treasury forecasts are to be the basis, then it is reasonable to simply extrapolate them using the final year forecasts.

152. It would also be preferable to apply the same calculation methods to WPI and CPI and we consider that DBP should have done so. We consider that differences in converting from

[57] WA Treasury updated its forecasts in its 2019/20 Mid-year Financial Projections Statement. If these later projections are applied using DBP's method, then the real labour cost escalation derived from this would average 0.44%. https://www.wa.gov.au/government/document-collections/government-mid-year-financial-projections-statement-mid-year-review

financial years to calendar years and differences in the use of geometric and arithmetic means result in a forecast that nevertheless lies within a reasonable forecasting range, given inevitable forecasting uncertainty. However, we consider that DBP's forecast is not reasonable in any case, as we describe below.

Current considerations in forecasting real cost increases

153. Since DBP submitted its Final Plan, the coronavirus pandemic has very significantly reduced world economic activity. While updates to the government-sourced forecasts that DBP utilised are not yet available, economic commentators are forecasting a likely recession that could take five to 10 years to fully recover from, and unemployed and government-subsidised employment together in excess of 10%[58], and representing a doubling of recent rates.

154. As an example, CITIC refers in its public submission to the '*…fundamental downturn (that) is currently in progress…'* and contends that *'….the costs of labour, parts, steel and pipe are expected to fall and are likely to continue falling over the coming years.*'[59]

Our conclusions

155. We consider that it is no longer reasonable to forecast increases in the real cost of labour. The effect on labour and materials costs of a significant and sustained global downturn will depress prices for both and, we consider it likely that this will offset the drivers that led DBP to propose such an increase.

4.5 Conclusions and implications for DBP's AA5 proposal

4.5.1 Our findings

Capex forecasting

156. As described in section 3, DBP's approach to SIB capex forecasts is derived primarily from bottom-up aggregation of projects generated from its 'Asset Management Plan General' and its nine subordinate asset management Plans. DBP has then developed a risk-ranked set of projects from which it has selected projects for the AA5 period and has allocated them to 19 business cases.

157. In this section we focussed on the key aspects of the business cases. Our findings are that:

- the business cases cover the topics that we would expect to see;
- DBP's needs analysis, including its risk analysis, is adequate at a business case level (not necessarily at a project level as this is typically opaque to us) and is sufficient to support the need for some form of action within the AA5 period;
- the options analysis in most business cases is relatively simplistic – from our experience, there is often a viable variation to the recommended option that results in reduced activity in the relevant regulatory period and reduced cost for a minimal increase in risk by deferring the work or otherwise modifying the approach and/or scope;
- DBP's proposed portfolio of work for the AA5 period is largely 'periodic' or 'ongoing' work, so the majority of cost estimates are likely to be more accurate than for 'one-off/new' projects; and
- There are no systemic deliverability issues.

[58] For example: https://www.bloomberg.com/news/articles/2020-05-01/australian-unemployment-soared-to-10-8-jobless-claims-signal

[59] CITIC submission, pages 4 and 5

Opex forecasting

158. We consider that DBP's forecasting methodology for opex is reasonable. In section 8 we assess DBP's application of this methodology.

4.5.2 Real labour cost escalation

159. We consider that it is not reasonable to assume real labour cost escalation such as DBP has proposed.

4.5.3 Implications

AA5 Capex

160. The implications for our assessment of DBP's AA5 capex proposal are to focus on:

- the prudency of the option selected, and the timing of the work are likely to be the areas of most concern; and
- the main areas of the business cases and, where practicable, the projects within the business cases, need to be reviewed given the propensity for DBP to underspend its proposed work with variances deriving from multiple sources.

AA5 Opex

161. The implication for our assessment of DBP's AA5 opex proposal is a need to assess the reasonableness of:

- the assumptions used in the BST component of the opex forecast, and
- those components that are forecast on a bottom-up basis, being GEA/Turbine overhauls and the capex to opex projects and
- the SUG quantity forecast that DBP has used as the basis for its proposed SUG opex.

Real labour cost escalation

162. Consistent with our finding, we recommend adjusting DBP's proposed capex and opex to remove real labour cost escalation.

5 FORECAST DEMAND AND SYSTEM USE GAS

5.1 Introduction

163. In this section we present our review of DBP's demand forecast and its forecast System Use Gas (SUG) quantities. We consider the demand forecast to the extent that it can (potentially) affect proposed capex and also because the forecast throughput is a key determinant of the SUG requirement, which in turn is a significant component of opex.

5.2 Forecast demand

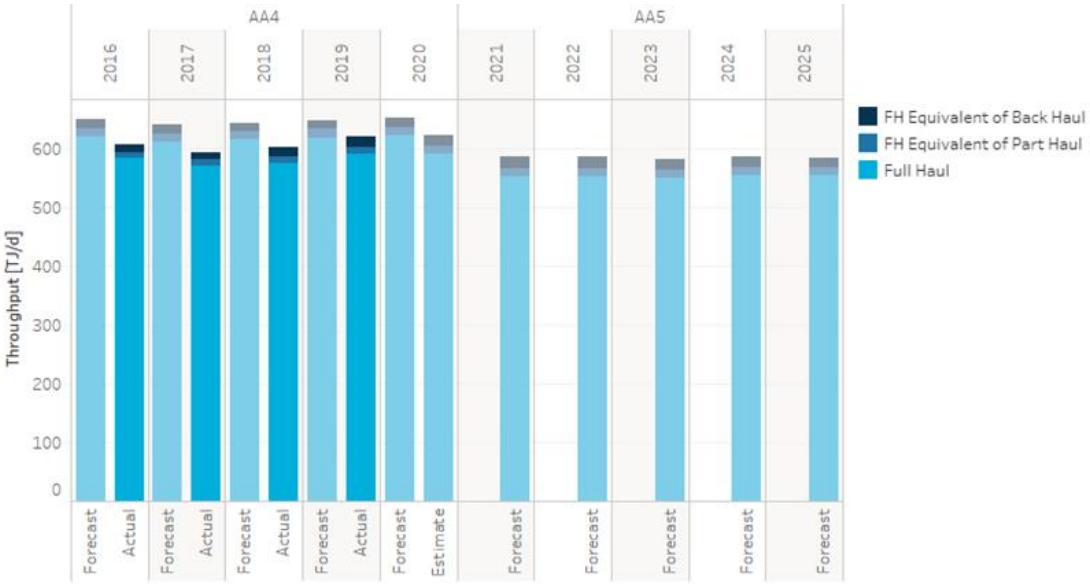
5.2.1 What DBP has proposed

DBP's AA5 forecast and AA4 outturn

164. DBP has forecast both contracted capacity (MDQ) and throughput for each of the three reference services: Full Haul, Part Haul and Back Haul. For AA5, it has forecast a 16% decrease in contracted capacity and a 9% decrease in Full Haul Equivalent throughput[60] compared with AA4.[61]

165. The following figure shows DBP's AA4 actual throughput together with its forecasts for that period, and its current forecasts for AA5. The graph shows that over every year DBP's actual AA4 throughput (on an FHE basis) has been lower than its forecast. DBP's AA5 forecast shows a step decrease from 2020 to 2021, and then an essentially flat forecast year-on-year thereafter.

Figure 5.1: DBP's actual and forecast throughput (Full Haul Equivalent basis))



Source: EMCa analysis, from information provided in DBP response to IR EMCa048

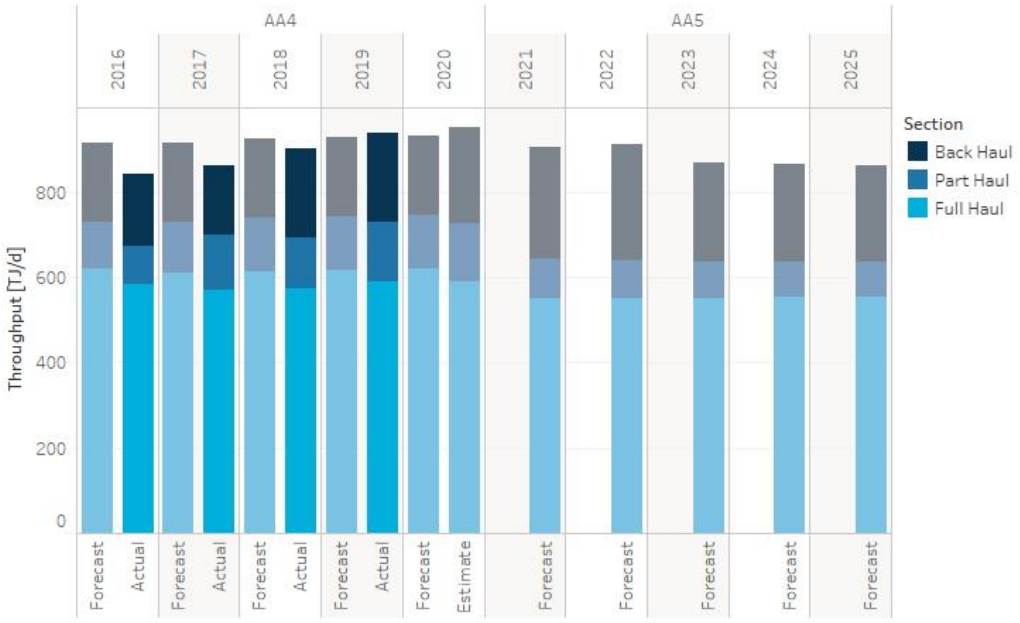
60 Whereas the Full Haul service transports over the full length of the pipeline (1,399 km), Full Haul Equivalent throughput weights Part Haul and Back Haul according to the distances transported for each customer.

61 DBP Final Plan, page 108

166. The graph below shows total throughput, disaggregated into the three Reference Services.[62] While Full Haul throughput was relatively flat during AA4, Part Haul and Back Haul throughput increased such that by 2019, total throughput was slightly above forecast. DBP estimates that 2020 total throughput will also be above its forecast for the same reasons.

167. For AA5, DBP forecasts still larger increases in Back Haul, but with a step decrease in both Full and Part Haul from 2020 to 2021, with these two components remaining essentially constant thereafter.

Figure 5.2: DBP's actual and forecast throughput (by reference service)



Source: EMCa analysis, from information provided in DBP response to IR EMCa048

DBP's forecasting and verification approach

168. DBP states that its demand forecasts are built up from confidential information provided to it by each of its customers. In its Final Plan[63] and in its Forecast Contracted Capacity and Throughput document[64] DBP describes how it has prepared its forecasts, including from assessment of its current contracts and throughput volumes, from current contract negotiations and other confidential information from its customers and from external source information including AEMO's GSOO and from review of trends. At our onsite meeting, DBP informed us that its customers are increasingly using the option of shipping throughput in excess of their contracted capacity, and which accords with its forecast of a smaller decrease in throughput than contracted quantities.

Supporting assessment that DBP has provided

169. DBP has provided two documents to support its demand forecast:

- an Independent Reasonable Assurance Report from KPMG[65], and
- a *Gas Forecast Review* conducted by ACIL Allen[66].

62 Note that this shows throughput 'as metered', without adjusting part haul and back haul to Full Haul Equivalence, using distance factors.

63 DBP Final Plan, section 11.6

64 DBP Attachment 11.1 is titled '*Reasonable Assurance Review Demand Forecast*.' This contains the '*Forecast Contracted Capacity and Throughput'* document, which is authored by DBP, and the '*Independent Reasonable Assurance Report*' which is a two-page letter, authored by KPMG.

65 Included in Attachment 11.1

66 DBP Attachment 11.2

170. KPMG's Report is provided as a two-page signed document (dated 18th September 2019) which provides a conclusion that DBP's forecasts have been prepared '*in accordance with the Basis of Preparation as describe on pages 7 and 8' of the AA5 Forecast Contracted Capacity and Throughput document'.*

171. For its assessment of forecast throughput, ACIL Allen describes its approach as follows: *'The approach adopted involves comparing the throughput forecasts for consistency and reasonableness against the most recent demand projections published in AEMO's GSOO for Western Australia. AGIG's throughput forecasts are also assessed against their own historical behaviour with any changes in trajectory between the historical and forecast values being analysed*.' [67]

172. The ACIL report provides illustrative analysis and descriptions of the patterns of change inherent in the DBP forecasts, and compares them with AEMO's forecast in its Gas Statement of Opportunities (GSOO) as at December 2019. ACIL endorses DBP's bottom-up approach as a '*valid way of determining likely levels of throughput demand over the next regulatory period*' and that '*It is our view that after accounting for AGIGs detailed knowledge of its customers' intentions, that their throughput demand forecasts are reasonable when compared against the independent domestic gas forecasts published by AEMO.*[68] '

5.2.2 Public submissions

Stakeholders are frustrated by the lack of usable information on the demand forecasts

173. Public submissions that address DBP's demand forecasts, express concern with the lack of transparency of the information provided. For example, Wesfarmers states that *'(r)egretfully, WesCEF believes it has received far too little information to form an opinion on this estimate.'*[69]

174. In a similar vein, gasTrading states that it '*….is of the view that getting transparency on the forecast is very difficult given the confidential nature of information received by DBP. However, gasTrading would like to see more clear comparisons to rolled up data, for example comparing AEMO's GSOO and ESOO with DBP's forecasts*.'[70] gasTrading further suggests that historical data and forecasts could be aggregated in categories, in order to demonstrate trends. We obtained such data through an information request, and we use this as part of our assessment in section 5.2.3 below.

Stakeholders consider that there are significant positive demand factors for gas transportation in WA

175. Submissions expressed the view that a combination of low WA gas prices, the role of gas as a transition fuel towards lower carbon, and the closure of Muja C coal-fired power station in 2022 are all positive factors for gas demand in WA. For example, Wesfarmers states that it '*believes that natural gas, and therefore natural gas transmission and storage will have a growing* role *to play in the long term strategic orientation of the State's energy needs and decarbonisation targets.'* Wesfarmers also refers to '*…the ongoing development of additional gas fields whose gas is to be processed using infrastructure that is already connected to the DBNGP.*'

176. CITIC Pacific[71] questions the '*…un-realistic step change [reduction] from 2020 to 2021 which continues throughout AA5.'* CITIC proposes that the excess in WA of production over consumption, low gas prices compared with the eastern states, new gas fields being developed, new mining projects constructing new gas fired power stations and replacing existing diesel power stations, are more likely to lead to an increase in throughput in AA5.

67 Attachment FP11.2 ACIL Allen Gas Forecast Review (p13)

68 Ibid (p20)

69 Submission from Wesfarmers Chemicals Energy & Fertilisers, 30 March 2020

70 Submission from gasTrading, 30 March 2020

71 Submission by CITIC Pacific Mining Management Ltd

5.2.3 Our assessment

DBP's regulatory submission information was inadequate for assessment

177. DBP's Forecast Contracted Capacity and Throughput document[72] provides only relatively sparse quantitative information – comprising its forecast contracted quantities and its forecast of throughput (which it provides on a Full Haul Equivalent basis). The document does not include any annual historical data to assist in identifying trends, and its AA4 to AA5 comparison is provided only in the form of a 'waterfall' chart that compares throughput in aggregate between the periods, on a FHE basis. It does not provide any meaningful breakdown of its throughput forecasts and which would assist in assessing their validity.

178. Some information is also provided in chapter 11 of DBP's Final Plan. We sought to review DBP's demand forecast from the combination of information in its Final Plan chapter 11 and its Attachment 11.1 but concluded that they are not sufficient to support a meaningful quantitative review. Limitations include historical and forecast data not always presented on the same basis: for example, with some throughput data presented in terms of distance-adjusted Full Haul Equivalent, and in other places provided as total throughput (not distance-adjusted), but disaggregated for each of the services (Full Haul, Part Haul and Back Haul). Some historical data is also presented only as an 'AA4' aggregate data.

179. We therefore sought further information, including historical and forecast throughput on a 'like for like' basis, and which DBP provided in spreadsheet form.[73] We have used this information to assist with our review, and which we describe below.

[redacted]

180. [redacted]

181. [redacted]

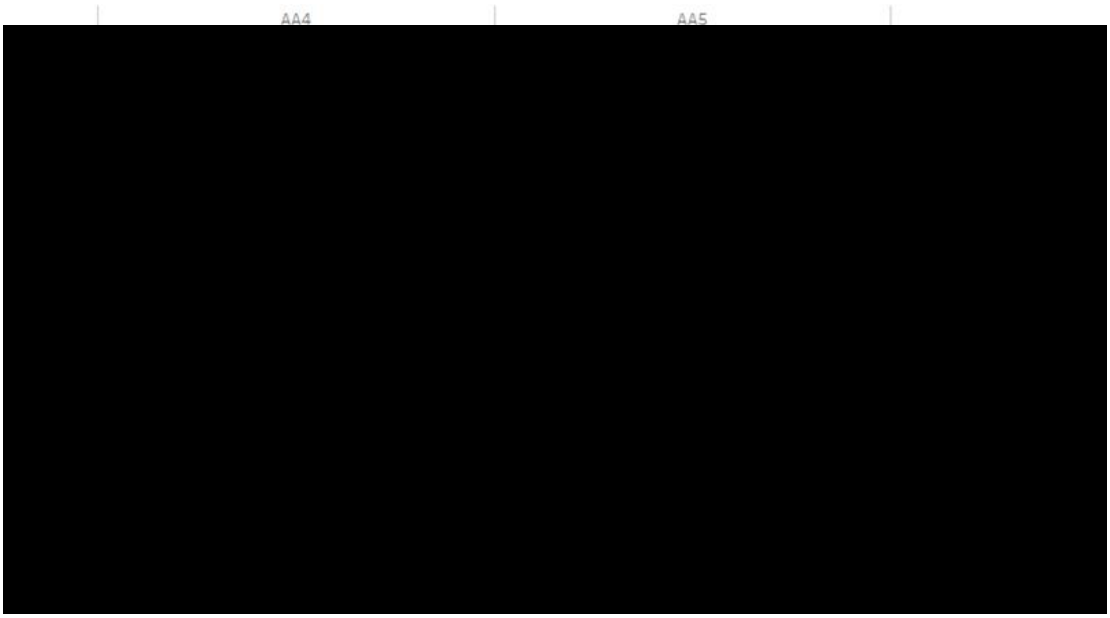
182. [redacted]

72 DBP Attachment 11.1

73 DBP response to IR EMCa048

74 Material in this subsection shows DBP's individual customer data and forecasts, which are confidential to those customers and to DBP.

[redacted]



DBP's Forecast Report and the KPMG Assurance Report[75] provide insufficient insight to be able to assess DBP's throughput forecast

183. A significant limitation of the KPMG report is that (as per its scope) it provides assurance only on the basis for DBP's forecasts that DBP has described. However the basis that DBP has described is essentially only a description of a range of factors that DBP states it has taken into account, specifically those on pages 7 and 8 of DBP's Forecast Demand document, and which is in essence a summary PowerPoint deck.

184. The combination of DBP's high level description of its method and the KPMG assurance only that DBP's forecast has been prepared in accordance with that high-level method, therefore provides little insight into what DBP has actually done to produce its forecast. It gives no understanding of the range of forecast information that DBP may have had from its customers, the levels of commitment or assurance that those customers may have given on that forecast information, the possible alternative scenarios that it may have considered or the judgments that it made in regard to that information.

The ACIL Allen report does not support DBP's claimed top-down alignment with AEMO's forecasts

185. DBP has also relied for support on ACIL Allen's findings, which DBP summarises as testifying *'that our throughput forecasts are in line with past actual throughput and independent forecasts from AEMO, once changing market conditions are taken into account.'*[76]

186. We do not accept either aspect of these claims. Analysis and evidence of '*changing market conditions*' fundamentally underpins any forecast; taking account of market conditions cannot be presented as a generalised rationalisation to explain differences between forecasts. An assessment requires consideration of specific and quantified factors that might explain those differences and which, if accepted, would reasonably reconcile between those forecasts. Neither DBP nor ACIL Allen's report does this, as we show in the following subsections.

75 Both in Attachment 11.1

76 DBP Final Plan, page 113

DBP's demand forecast is considerably below AEMO's and moves in the opposite direction

187. The following graph and table show DBP's historical and forecast throughput, with the DBP forecast compared with AEMO's forecast. It is immediately obvious that DBP's forecast is neither '*in line with past actual throughput',* nor does it '*compare with AEMO's forecast'*. In both respects, DBP's forecast moves in the opposite direction.

188. In Table 5.1, we sought to compare DBP's forecast with AEMO's forecast at an industry level, based on information that DBP provided in response to an information request.[77] In DBP's workbook, it had applied a mapping of individual customer throughput information to 'AGIG categories'[78] and from those categories, it had then further mapped the data to the industry segments used by AEMO for its forecast.[79]

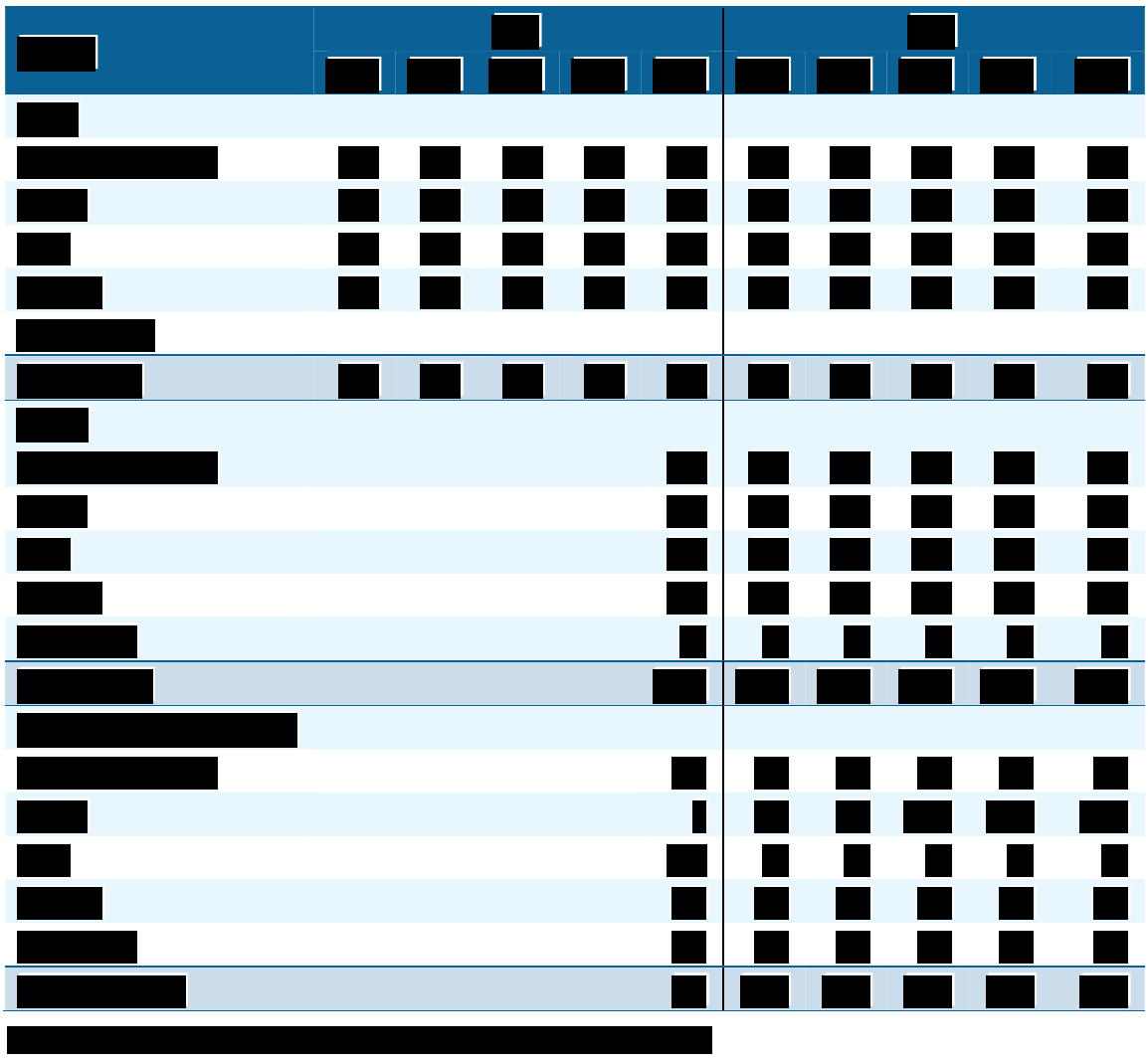
189. We applied the same mapping, in producing the comparisons shown in Table 5.1. However, the throughput amounts are significantly different for every category, and the AGIG information does not map to a 'distribution' customer segment although this is supplied.

77 Attachment 11.2 ACIL Report Throughput analysis EMCa48 Response (excel workbook) and explanation provided in EMCa48 response_CONFIDENTIAL (word document)

78 Attachment 11.2 workbook, tab 'AGIG by sector'

79 Ibid, tab 'Comparisons'.

[redacted]



190. In its review, ACIL Allen seeks to compare the DBP and AEMO forecasts and suggests reasons for the differences. One of these is that some of the gas demand that the AEMO report forecasts is delivered to the Perth region through the Parmelia pipeline from sources not supplied through the DBP. [redacted]

191. [redacted] it neither explains the difference in the 2020 estimate nor

80 The ACIL report refers to the 'DBP' forecast as the 'AGIG' forecast, based on the parent company name. We use DBP and AGIG interchangeably. As described in the paragraph which follows this table, we are aware that the AEMO data is for the whole of WA while the DBP data is for DBNGP throughput only. In the paragraph which follows we describe our attempts to reconcile these differences.

81 DBP's source information does not attribute a component of its forecast to this segment, though its segment breakdown does add to its total throughput forecast. It appears therefore that its forecast of gas for distribution is included in other segments.

82 ACIL Allen Gas Forecast Review, page 19.

83 DBP response to IR EMCa050

the significantly increasing difference in the forecasts over AA5 (i.e. rising to 278 TJ/day, as shown above).

[redacted]

The ACIL Allen report purports to show similar sectoral trends to the AEMO forecasts, but we observe little correlation

193. [redacted]

194. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

84 ACIL Allen Gas Forecast Review, page 18 (footnote 4)

85 DBP response to IR EMCa048. DBP had apparently recognised this error and advised ERA, however to our knowledge, the ACIL report has not been corrected for it

198. Given the considerable and largely unexplained differences between the AEMO forecasts and the DBP forecasts, we cannot accept that the AEMO forecasts support the DBP forecasts. This should not be taken to imply that the AEMO forecasts carry any greater weight than the DBP forecasts, and we have not reviewed the AEMO forecasts except as presented as purported support by DBP and its consultants. However, there are fundamental differences between DBP's forecast and the AEMO forecast. At a qualitative level we can accept suggested reasons that might go some way towards explaining these differences, however the information and analysis that DBP has provided do not do so sufficiently for us to be able to accept the proposition that DBP's forecasts are '*in line with*' the AEMO forecasts.

5.2.4 Conclusions and implications

Our findings

199. We consider that the information that DBP has provided is not sufficient to justify its throughput forecast. We consider that the KPMG assurance report on DBP's bottom-up forecasting process, is of limited value, largely because the methodology that it provides assurance on is insufficiently prescribed.

200. We do not accept DBP's claimed support for its throughput forecasts from the report it commissioned from ACIL Allen. Contrary to AGIG's claims, the ACIL Allen report does not show alignment with AEMO's forecasts, but rather, it shows considerable differences and does not reconcile. A compelling forecast that refers to the AEMO GSOO forecast for support, would need to articulate whether it accepts or refutes that forecast and, to the extent that DBP proposes a different forecast, would need to provide evidence that explains and reconciles those points of difference.

[86] Refer to graphs in DBP Attachment 11.2: ACIL Allen Gas Forecast Review pages 21 and 22 and associated explanation

201. Our findings above essentially align with issues raised in stakeholder submissions. DBP and its consultants' supporting information does not acknowledge having considered the low price of gas and the positive opportunities this might create for higher gas use. DBP has not provided evidence of having considered new customer projects or the possibility that they may involve new gas-fired power stations, or opportunities such as conversion of existing diesel units to gas. A compelling forecast would need to show evidence of having considered such factors, regardless of the position arrived at.

Implications of our findings for the capex forecast and for the SUG opex cost forecast

202. Stakeholder submissions suggest a range of positive factors for gas demand in WA generally and for the demand for gas transportation through the DBNGP. The relevant stakeholders are well-informed participants in the WA gas sector and we consider that at least some of the factors are likely to lead to higher gas demand than DBP has forecast. DBP's information does not address these factors, or at least does not do so sufficiently that they can be countered or disregarded.

203. Absent further information, we consider that a reasonable default position would be to assume a continuation through AA5, of DBP's estimated 2020 throughput. Our expectation is that continuing throughput at the current level would not affect DBP's capex forecast, which does not forecast any need for expansion capex, and we have seen no indication that its proposed capex relies on a reduced throughput forecast.

5.3 System Use Gas

5.3.1 What DBP has proposed

204. In AA5, DBP is forecasting to spend $106.5m[87] on System Use Gas (SUG), or an average of $21.3m per year. This compares with an actual cost of $112.3m for the four years of AA4 to date, or an average of $28.1m per year. The primary driver of SUG expenditure is its use in compressors to achieve the pressure required to deliver contracted gas volume to outlet points. Other SUG is required for operational purposes.[88]

205. [redacted]

206. DBP's SUG quantity forecast reflects both its forecast decrease in throughput, and its modelled decrease in the ratio of SUG to throughput. The figure below shows DBP's historical and forecast SUG.

87 DBP proposes $107.4m in December $2020 terms (see figure 7.1 of DBP Final Plan). We have converted this to $106.5m in December $2019 terms.

88 See DBP Final Plan, page 62

89 DBP response to IR EMCa37. (EMCa calculation from DBP spreadsheet)

[redacted]

[redacted]

5.3.2 The basis for DBP's forecast

207. In its Final Plan, DBP states that it has '…*adopted the same quantity calculation that was approved in AA4*.' We sought further information on this. In its response,[90] DBP states that it uses hydraulic modelling software both for longer term planning and for operational planning. DBP describes how this software incorporates fuel efficiency parameters specific to each compressor and a range of other factors including gas heating value, to produce fuel curves as a ratio of throughput. The dynamics of different operating conditions and compressor configurations result in multiple fuel curves, which are then weighted together and applied to DBP's forecast throughput, to produce a forecast of compressor gas use as well as operational gas use.

208. [redacted]

209. DBP describes how it correlates both its short term and its long term SUG forecasts, against actual gas use, and monitors this. DBP provides the following diagram as evidence of the correlation between the SUG modelling underpinning its AA4 gas forecasts, and actual SUG daily quantities. A broad correlation is evident, however visually it would appear that its model may be biased towards over-forecasting. DBP has not provided information on the extent of such bias.

90 DBP response IR EMCa49

91 [redacted]

5.3.3 Public submissions

210. The submissions tend to focus on the implied gas price element of DBP's forecast, rather than its SUG quantity forecast. For example, Wesfarmers infers that DBP's forecast gas price is $7.20/GJ in AA5, and which it states is '*far in excess of current gas prices and expected gas prices in AA5.'*[92] CITIC Pacific '…*submits the average price allowed for SUG should be between $3.50 and $4.50/GJ*.'

211. While noting it is unable to see the data behind the calculation, gasTrading states that '*…the SUG annual spend does not seem consistent with contract gas prices or the volumes claims made by DBNGP.'*[93]

5.3.4 Our assessment

System Use of Gas forecasting methodology

212. We have assessed DBP's SUG quantity forecast. DBP's explanations of its fuel gas use model and its application are in accordance with common industry practice and appear to be reasonable.

Our cross check of DBP's SUG forecast

213. Following review of DBP's methodology, we tested the relationship between DBP's SUG forecast and its throughput forecast.

214. In its response to IR EMCa39, DBP provided historical information on compressor SUG and total SUG; however, it provided forecast information only for total SUG.

215.

92 Wesfarmers submission, page 11

93 Submission from gasTrading, 30 March 2020

[redacted]

216. Either assumption for operational SUG implies a decrease in the ratio of SUG to throughput, which would be consistent with the non-linear relationship between throughput and SUG.

217. Detailed modelling such as DBP describes is required to allow for variable daily gas throughput, dynamic effects and varying conditions and compressor configurations. This cannot be directly simulated by assuming a direct relationship between SUG and daily throughput averaged over a year, however our indicative cross check suggests that DBP's forecast SUG quantities are reasonable, based on its throughput forecast.

[redacted]

5.3.5 Conclusions and implications

Our findings

218. While it is not feasible to duplicate the hydraulic modelling by which DBP has forecast its SUG quantities, DBP has provided us with further information than it provided originally in its submission and, from this information, we consider that its forecast SUG quantities constitute a reasonable forecast, when considered against DBP's throughput forecast. However, if a higher throughput forecast was to be adopted, then (absent other factors) this would imply a higher SUG quantity requirement.

Implications for opex forecast

219. The SUG cost element in DBP's opex forecast is dependent on its throughput forecast, the relationship between that throughput forecast and SUG quantities and its forecast gas price. Our findings above relate to the relationship between DBP's SUG forecast and its throughput forecast.

5.4 Conclusions and implications for DBP's AA5 proposal

220. We conclude that DBP's forecast throughput is likely to be higher than DBP has forecast. We consider that DBP has neither adequately explained nor provided adequate evidence to support the significant step decrease in throughput that it has forecast from 2020 to 2021 and has not adequately considered or reconciled its forecast with the AEMO GSOO forecast.

221. We consider that DBP's forecast SUG quantity would be a reasonable forecast if its throughput forecast were accepted. We form this view based both on DBP's extensive

documentation of the basis on which it has developed that forecast, its own reported validation of its modelling, and because the information it provided to us demonstrates that its forecast SUG ratio broadly aligns with, and is lower than, its historical ratio.

6 AA4 CAPEX

6.1 Introduction

222. This section contains our assessment of the capex incurred (or to be incurred) by DBP in AA4. We have undertaken this review using the assessment framework set out in Appendix A and having regard to our findings in Sections 3 and 4.

223. The results of our review and our overall assessment of whether this capex satisfies the capex criteria for the purposes of determining the level of conforming capex under the NGR are set out below.

6.2 Our assessment

6.2.1 Compliance with capex criteria

224. Our assessment of the capex incurred and to be incurred in the AA4 period has been based on DBP's AAI ('Final Plan 2021-2025') and supporting information, our observations from the onsite meeting that we held with DBP, and information supplied pursuant to EMCa information requests.

225. We requested DBP to provide spreadsheet model(s) to show the breakdown of AA4 (2016-2020) capex by project and by asset category. DBP subsequently provided:

- spreadsheet *EMCa 01_AA4 Capex_Confidential*; and
- spreadsheet *EMCa25_AA4 Capex_Confidential_Updated model for Asset Class.*

226. The capex models listed above provide AA4 capex information in several configurations:

- project level – 104 projects with expenditure varying between $7k and $11.7m;
- business case level – 28 'regulatory business cases, each of which typically encompass multiple projects; and
- asset level – 8 classes which typically comprise projects from more than one business cases.[94]

227. The Asset level categories differ from DBP's asset management plan (AMP) structure (discussed in Section 3) for reasons that are not obvious. This makes our assessment more difficult because there is not a direct link between the projects in each business case to the respective AMP.

228. Therefore, we have based our review of the compliance or otherwise of DBP's actual/estimated remaining AA4 capex on assessment of information at the business class level. Using DBP's allocation of the business case expenditure to one or more Asset classes, we have then determined annual adjustments at the asset class level. As part of our assessment we have referred to the relevant asset-level AMP for supplementary information such as asset class maintenance intervals and equipment replacement strategies.

229. In our assessment, we have treated business cases with a negative variance (i.e. underspend) compared to the 'ERA Approved' capex differently from business cases with a positive variance:

- negative variance: we have considered the reasons for the underspend, links to other business cases, and whether or not the actual expenditure is reasonably considered to be at an efficient level;

[94] It is typically the case that expenditure in a particular business case is allocated across more than one asset class based on the nature of the projects.

- positive variance but less than +10%: as for negative variance; and
- positive variance greater than 10%: we have summarised our assessments for each business case in Appendix B – this includes the projects for which there was no ERA allowance forecast (i.e. BC 11, 23, and 27).In the following sections we consider the business cases in each asset class.

6.2.2 Compression asset class

230. DBP expects to spend $14.1m in the AA4 period on Compression, an $18.9m reduction from its ERA Approved forecast of $33m. As shown in the table below, the various projects that DBP has classified as related to 'Compression' have been aggregated into six Business cases.

Table 6.1: Summary of AA4 Compression asset class - $m, real December 2019

Business case	ERA Allowance	AA4 Actual	Variance Actual vs Allowance
01 Compressor station	15.4	9.4	-6.0
07 Compressor station accommodation	9.6	2.5	-7.1
13 Compressor station inspection	0.0	1.5	1.5
16 Tools	0.0	0.2	0.2
18. Turbine exhaust	1.8	0.2	-1.6
29. CS1 re-wheel	6.2	0.4	-5.8
Total	**33.0**	**14.1**	**-18.9**

Source: EMCa analysis referring to DBP's response to Information Request EMCa25

Compressor Stations BC01

231. DBP has linked 36 projects to the Compressor Stations business case, with a collective underspend of $6.0m compared to the ERA allowance. Seventeen of the projects are allocated to the Compression asset class. Our review of the reasons for the business case-level underspend is summarised in Appendix B. In summary, there were reductions in each of the three capex sub-categories of replacement, preventative and upgrade. The underspends were largely deliberate, with DBP (i) reallocating a portion of the ERA allowance from Compressor stations to offset increases in the Metering asset class, and (ii) deferring refurbishment/replacement work at CS2 due to a cyclone. We are satisfied that the responses (described in more detail in our BC15 assessment in Appendix B) were appropriate given the nature of the issues and the magnitude of the unexpected costs.

232. In summary, we consider that DBP's actions were consistent with the approach of a prudent operator and that the residual cost incurred is reasonable. We therefore propose no adjustment.

Compressor station accommodation BC07

233. Only two projects are denoted under this business case and both are allocated to the Compression asset class. The projects' initial scope and cost estimate of $9.5m was based on establishing new accommodation outside of the Compressor station facilities to provide a modern, quieter alternative to on-site accommodation. This approach turned out to be '*…far more costly and difficult than initially envisaged…'* DBP therefore directed the expenditure to refurbishing existing accommodation facilities. Given the age and condition of the existing facilities, we consider (i) it was reasonable to take some action in the AA4 period, and (ii) that DBP acted as a prudent operator in refurbishing rather than relocating given the updated commercial circumstances. We therefore propose zero adjustment.

Compressor station inspection BC13

234. Three of the five projects under this business case have been allocated to the Compression asset class at a cost of $1.5m. DBP advises that compressor station inspections were a component of Compressor Station subsequent cost and the costs are actually captured within BC01 Compressor stations (i.e. it was not separately reported in AA4). Undertaking compressor station inspections is consistent with good industry practice and were undertaken by DBP despite the pressure on it to defer or cancel expenditure to cater for the increased costs in the Metering asset class. We consider that the work would be undertaken by a prudent operator and that the cost incurred is reasonable. We therefore propose no adjustment.

Tools replacement BC16

235. Only one Tools project is allocated to the Compression asset class. Most of the capex on tools is recurrent replacement at the end of their useful life, with varying asset lives depending on the specific tool. Actual expenditure is expected to be 8% higher than the ERA approved amount. Given (i) the recurrent nature of the expenditure which is based upon DBP's assessment of the economic life of its tools,[95] (ii) the relative consistency of the expenditure with historical expenditure, and (iii) the alignment of actual expenditure to forecast expenditure, we consider that:

- replacement of the tools is consistent with good industry practice, and
- the incurred cost is reasonable.

Turbine Exhaust Replacement BC18

236. In response to our request for an explanation of the apparent inconsistency in information regarding the capex spent on the single AA4 Turbine exhaust replacement project, DBP advised that:[96] *'…these activities were undertaken under the Compressor Stations subsequent costs project in AA4 and therefore actual costs are captured under DBP01 Compressor Stations (as opposed to DBP18 Turbine Exhaust Replacements) in "EMCa01_AA4 Capex".* Therefore, the apparent underspend in the table above is actually the result of a change in reporting structure, not an underspend. We have concluded that the incurred cost under BC01 Compressor stations requires no adjustment (refer to our assessment above and in Appendix B). We therefore we propose no adjustment to the cost incurred for Turbine exhaust Replacement BC18.

Compressor Station 1 Re-wheel BC29

237. The ERA allowance included provision for re-wheeling two compressor units at CS1. DBP advises that: '*In 2016, we undertook a front-end engineering design (FEED) study with the compressor manufacturer* [redacted] *Through this process, we identified that only one of the two compressors needed re-wheeling due to the low utilisation of CS1 at that time.'* The underspend against the ERA allowance was -80%. We consider that DBP's explanation is adequate to confirm that it has acted in accordance with good industry practice by reviewing its initial position with more up-to-date information, including by applying the FEED methodology the explanation to be reasonable. We also consider the cost incurred to be reasonable. On this basis, we propose no adjustment.

6.2.3 Computers & Motor Vehicles asset class

238. DBP expects to spend $17.6m in the AA4 period on Computers & Motor Vehicles, a $7.7m increase from its ERA Approved forecast of $9.8m. As shown in the table below, the various projects that DBP has classified as related to 'Computers and Motor Vehicles' have been aggregated into one of eight Business cases.

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95 Which is based on the manufacturer recommendations but modified according to DBP's operating experience

96 DBP response to IR EMCa14; this response also corrected an error in BC18 (p284) which ascribed the replacement cost to CS4/2 and the repair cost to CS&/2 rather than the other way around.

Table 6.2: Summary of AA4 capex for the Computers & Motor Vehicles asset class - $m. real December 2019

Business case	ERA Allowance	AA4 Actual	Variance Actual vs Allowance
01 Compressor station	1.3	0.5	-0.7
11 Maximo DMZ	0.0	1.4	1.4
14 Asset management[97]	0.0	0.0	0.0
17 Fleet and Civil	3.8	5.2	1.4
20 CRS	0.8	0.8	0.1
21 IT Sustaining Applications	2.9	6.6	3.7
23 IT Security	0.0	1.4	1.4
30 IT Sustaining Infrastructure	1.1	1.6	0.5
Total	**9.8**	**17.6**	**7.7**

Source: EMCa table derived from DBP's response to Information Request EMCa25

Compressor stations BC01

239. There was only one project relating to compressor stations under this asset class: *Upgrade of* [redacted] *HMI software to the latest Windows version.* The reason for the underspend is not explicit in BC01. From the expenditure profile (forecast versus incurred) DBP allowed for three upgrades of HMI software in the AA4 period, however only CS6 and CS9 software was upgraded (per a seven-year cycle). We therefore assume that DBP deemed that the third upgrade was not prudent. On this basis, we assume that DBP acted in accordance with good industry practice and that the reduced cost is reasonable. We therefore propose no adjustment.

Maximo DMZ BC11

240. We provide our assessment of BC11 in Appendix B. In summary, the bulk of the expenditure in AA4 was on (i) Maximo business process redesign and (ii) life-cycle driven upgrades.

241. We are satisfied that DBP took a prudent approach to confirming the net benefits from its process redesign project (via trails at a limited number of sites). It is not clear to us why DBNP did not budget for the life-cycle upgrade activities, given that such refreshes are foreseeable and consistent with good industry practice. We assume that this is an example of DBP's 'ad-hoc' approach to ICT planning (and budgeting) referred to in section 3.2. However, on balance we consider that DBP's expenditure on Maximo and the Demilitarised Zone (DMZ) software is consistent with good industry practice and that reasonable expenditure was incurred. We therefore propose no adjustment.

Asset Management BC14

242. The ERA allowance for this project was $0.0m. DBP's actual expenditure was $12,000 in relation to the Computers and Motor Vehicles asset class. We do not propose any adjustment to this expenditure.

Fleet and Civil BC17

243. We provide our assessment of BC17 in Appendix B. In summary, we consider that DBP's management of its vehicle fleet is consistent with good industry practice. Nonetheless, it overspent the ERA allowance by 37%. We asked for an explanation and we were satisfied that it incurred expenditure in year one of the AA4 period on replacement of double the annual average due to delivery delays in 2015 and that after accounting for this, the actual

[97] The amount incurred was of the order of $12,000, and is therefore below the level of significance shown here

incurred costs were 6% higher per unit than expected. Based on this explanation, we are satisfied that the costs incurred are reasonable and propose no adjustment.

Customer Reporting System (CRS) BC20

244. DBP expects to deliver the CRS business case scope for 10% ($78k) more than the ERA's allowance of $0.8m. The project involves annual CRS enhancements and upgrades to ensure the system continues to meet business and customer requirements. We consider the variance to be within reasonable limits given the nature of the project and the forecast horizon. We do not propose any adjustment to the $0.8m expenditure.

IT Sustaining Applications BC21

245. We provide our assessment of BC21 in Appendix B. In summary, DBP proposes commencing replacement of Microsoft Dynamics AX financial software system in 2020 at a cost of $3.0m ($2019) in 2020 because it 'comes out of support' at the end of 2021 and because it is a 'sub-optimal system'. This is part of an 'Interim DBP finance solution' that according to BC21 is forecast to cost a further $2.0m ($2019) capex in AA5 (plus change management charges plus opex). AGIG's IT initiative roadmap notes that *'[t]he interim DBP finance solution is still subject to further investigation…'*. The roadmap shows work across Q3 and Q4 of 2020 and Q1 of 2021.

246. BC21 discusses, but dismisses, the option of delaying the replacement of Dynamics until the planned AGIG-wide 'One ERP' solution is adopted in 2023. The identified advantages of the option are: (i) move $3m ($2019) from 2020 to 2023, (ii) reduce DBP-only costs by sharing system design and integration across the group, and (iii) reduce the likelihood of having to do two finance system migrations in the space of five years. The identified disadvantage is that it: *'…exposes [DBP] to significant risk associated with no system or security updates over a further three year period…'* We consider that a further option should be considered by DBP, which is to defer replacement of Dynamics until the AA5 period and, if necessary, advance the One ERP project, sharing the cost across all AGIG businesses. We therefore propose an adjustment of -$2.0m

247. DBP's ERA approved capex for other IT sustaining applications in the AA4 period was $2.0m. It now forecasts spending $3.1m. Seven of the ten IT initiatives had zero ERA allowance. This is indicative of poor IT asset management, which DBP appears to acknowledge in its comments regarding its 'ad hoc approach'. On this basis, we do not consider DBP's overspend is consistent with good industry practice.

248. We consider that $2.9m (i.e. the ERA allowance) represents what a prudent operator would incur for IT Sustaining Applications.

IT Security BC23

249. We provide our assessment of BC23 in Appendix B. In summary, DBP initiated an assessment of its cybersecurity maturity against the Australian Energy Sector Cyber Security Framework (AESCSF) in CY2017. DBP had significant gaps compared to the target Maturity Indicator Level 3 (MIL3, the highest level). Given the global and Australian energy sector emphasis on cybersecurity that has emerged in the last five years, we consider it reasonable to assume that, guided by its assessment, DBP appropriately prioritised and undertook prudent initiatives. Benchmarking itself against the AESCSF is consistent with good industry practice and, based on our experience, the cost incurred is reasonable. We therefore propose no adjustment

IT Sustaining Infrastructure BC30

250. We provide our assessment of BC30 in Appendix B. In summary, DBP proposes spending $0.5m more than the ERA allowance on a combination of office refit & AV upgrade, Citrix upgrade (moving off-premises via a cloud solution), and hardware renewal (end-user equipment at end-of-life). The majority of the additional expenditure is on end-of-life assets. As we consider that DBP's ICT asset renewal criteria are consistent with good industry practice, we consider that the expenditure is likely to have been prudent and, based on our

experience, we consider the cost incurred is reasonable. We therefore propose no adjustment.

6.2.4 Corrosion protection asset class

251. DBP's actual/estimated capex in the AA4 period in the Corrosion protection category is $19.2m across four business cases. This is $1.3m or 7% higher than the $17.8m ERA Allowance, as shown in the following table.

Table 6.3: Summary of AA4 capex for the Corrosion Protection asset class - $m, real December 2019

Business case	ERA Allowance	AA4 Actual	Variance Actual vs Allowance
01 Compressor station	4.5	3.7	-0.8
02 Pipeline and MLV	0.8	2.4	1.7
15 Meter stations	0.7	0.4	-0.3
19 Pipeline MLV Inspection	11.8	12.6	0.8
Total	**17.8**	**19.2**	**1.3**

Source: EMCa table derived from DBP's response to Information Request EMCa25

Compressor stations BC01

252. Four projects under this business case have been allocated to the Corrosion protection asset class. Refer to our comments on BC01 in Appendix B and in section 6.2.2. The business case refers to undertaking activities to protect compressor stations from corrosion and to upgrade corrosion protection equipment. The largest proactive program is refurbishment of below-ground pipework. We were advised at the on-site that the work was deferred as a result of reprioritisation of capital works due to the meter station incidents. Provided the work is undertaken as soon as practicable in the AA5 period, we consider the minor delay to be acceptable and the incurred cost to be reasonable. We propose no adjustment.

Pipeline and Main Line Valves (MLV) BC02

253. While the overall AA4 capex under BC02 is expected to be $1.1m less (-15%) than the $7.3m approved by the ERA. DBP explains the net variance arose from a combination of arising from (i) finding less costly means of deferring planned work and deferrals which were possible once updated condition assessments had been performed, and (ii) undertaking unplanned work. The additional $1.7m work was undertaken on seven projects, six of which incurred capex of $100k or less. The largest project for which there was no ERA allowance was *Piping interface wrap removal* at $0.7m which is now an ongoing project to rectify pipeline interface corrosion. Based on information in the business case, the Corrosion Protection AMP, and DBP's response to Information Request EMCa31, we consider that DBP's actions in this asset class are commensurate with good industry practice and that the incurred cost is reasonable. We propose no adjustment to the Pipeline and MLV capex.

Meter stations BC15

254. Refer to our assessment in Appendix B and in section 6.2.5. Three meter stations projects were classified under the Corrosion protection asset class, with the actual capex 50% of the ERA allowance. The reduction in expenditure was the net result of DBP not undertaking the planned *Earthing replacement and AC mitigation of facilities' project* and undertaking two new projects at a lower net cost. The drivers for the change in this asset class at meter stations is not explicit. Regardless, actual capex was less than the allowance. Based on our assessment of the Corrosion protection asset management plan, we are satisfied that the underspend was likely to be the result of prudent deferral following closer asset inspection prior to undertaking the work. We propose no adjustment.

Pipeline Main Line Valve inspection BC19

255. Two projects were included under BC19 for corrosion protection: *Inspection of piping above/below ground interface* and *Intelligent pigging of the DBP.* Both of these are common in the industry - the work has been delivered within ±10% of the ERA allowance, which indicates reasonable management of a recurrent activity. We propose no adjustment.

6.2.5 Metering asset class

256. DBP's actual/estimated capex in the AA4 period in the Metering asset class is $27m, as shown in the table below. This is $19.7m more than the $7.3m ERA allowance.

Table 6.4: Summary of AA4 capex for the Metering asset class - $m, real December 2019

Business case	ERA Allowance	AA4 Actual	Variance Actual vs Allowance
13 Compressor station inspection	0.0	1.1	1.1
15 Meter stations	7.3	25.9	18.6
Total	**7.3**	**27.0**	**19.7**

Source: EMCa table derived from DBP's response to Information Request EMCa25

Compressor station inspection BC13

257. Two projects (pressure relief valve and pressure vessel inspections at meter stations) were included in this business case and allocated to the Metering asset class. However, DBP also advises that the capex was '*[n]ot separately reported in AA4 – therefore approved spend (inspections was a component of Compressor station subsequent cost) is captured in 01. Compr. Stn…'* We have proposed no adjustment to the capex incurred under BC01 Compressor stations (refer to the description in Appendix B and section 6.2.2) and therefore we propose no adjustment to the two projects under this asset class.

Meter stations BC15

258. Refer to Appendix B for a description of our assessment of the Meter stations business case. Twelve of the 15 Meter stations projects are allocated to the Metering asset class. The over expenditure was due primarily to three unforeseen events/projects that required redirection of resources and expenditure from other asset classes (primarily Compressors) to address the risks:

- Overpressure incident at Kwinana power station – DBP reports working with the DMIRS[98] to endorse a new meter set design, which has or will cost c$11m incremental capex to install at relevant meter stations to reduce the risk of downstream pressurisation to an acceptable level. DBP's response to this incident is commensurate with good industry practice.
- Valve failure due to corrosion - an incremental cost of $5m was required to repair and reconfigure the pipework to allow maintenance in the future. DBP advise that preventative maintenance was not undertaken because of the existing configuration / disruption to Alcoa production. The configuration issue was addressed as part of the repair which we consider to be a prudent undertaking.
- Odorant system – the incremental cost to fix what DBP advise was an unreliable odorant system and to upgrade measurement equipment at the same time was $1m. This is a prudent undertaking.

259. We consider that DBP has acted in accordance with good industry practice and the costs incurred are reasonable.

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6.2.6 'Other' asset class

260. DBP's actual/estimated capex in the AA4 period in the Other category is $16.8m, $6.0m (+56%) more than the ERA allowance of $10.7m, as shown in the table below.

Table 6.5: Summary of actual/estimate AA4 capex for the 'Other' asset class

Business case	ERA Allowance	AA4 Actual	Variance Actual vs Allowance
01 Compressor station	4.6	5.3	0.7
02 Pipeline and MLV	1.4	1.8	0.4
03 SCADA	0.0	0.1	0.1
04 HSE	0.6	0.2	-0.4
10 Jandakot	0.0	0.5	0.5
12 Safety Case	0.0	0.4	0.4
14 Asset management	2.9	2.7	-0.2
16 Tools	1.1	1.2	0.1
24 Process safety	0.0	0.0	0.0
25 Decommission	0.1	0.2	0.0
27 Office relocation	0.0	4.2	4.2
30 Level 6 Office Re-fit and AV Upgrade	0.0	0.2	0.2
Total	**10.7**	**16.8**	**6.0**

Source: EMCa table derived from DBP's response to Information Request EMCa25

261. DBP has assigned 39 projects under the 12 business cases in this asset class, half of which have actual expenditure of $100k or less.

Compressor Stations BC01

262. The major expenditure above the ERA allowance was end-of-life replacement of air conditioning which at $1.9m was 85% ($0.9m) more than the allowance and is in addition to replacements under the compressor station accommodation project (BC07). Refer also to our assessment summary of this business cases in Appendix B. From the annual forecast capex for the same work proposed in the AA5 period it appears that the overspend was due to poor initial cost estimation. We consider that DBP has acted as a prudent operator and the cost incurred was reasonable. We therefore propose no adjustment.

Pipeline and MLV BC02

263. The major driver of the net increase of $0.4m was the *Permanent Work Platforms at CCVT Sites* project which cost an extra $0.7m to comply with Working at Height legislation. We are satisfied that DBP has an obligation to comply with the Working At Heights legislation and that the cost incurred was reasonable. We therefore propose no adjustment.

Office relocation BC27

264. Refer to our assessment in Appendix B. The major driver of the cost increase from zero ERA allowance to AA4 expenditure of $4.2m was a shift from DBP's strategy of remaining at its current address and incurring opex for the lease and maintenance to a move to new premises. Faced with a decision about whether to renew its lease which is due to expire in the near future, DBP investigated options which included staying in the current premises or moving to alternative locations.

265. The business case provides details regarding the estimated opex and capex. The costs are based on a combination of commercially negotiated outcomes and supplier quotes. DBP's

preferred option of relocating to another CBD premise is the cheapest overall. We consider that DBP's decision is commensurate with the actions of a prudent operator and that the cost incurred and to be incurred is reasonable. We therefore propose no adjustment.

Business Cases 03, 04, 10, 12, 14, 16, 24, 25, 30

266. The variances between actual capex and the ERA Allowance are either minor or negative for the projects under these business cases. We consider that it is likely that DBP has acted as a prudent operator and the costs incurred are likely to be reasonable. We therefore propose no adjustments.

6.2.7 Pipeline asset class

267. DBP's actual/estimated capex in the AA4 period in the Pipeline asset class is only $0.3m, spread across two new projects, related to inspection of pressure relief valves and pressure vessels. Both of these are recurrent activities and we consider that the expenditure is likely to have been incurred in accordance with good industry practice and that the costs incurred are reasonable. We therefore propose no adjustment.

Table 6.6: Summary of AA4 capex for the Pipeline asset class - $m, real December 2019

Business case	ERA Allowance	AA4 Actual	Variance Actual vs Allowance
19 Pipeline MLV Inspection	0.0	0.3	0.3
Total	**0.0**	**0.3**	**0.3**

Source: EMCa table derived from DBP's response to Information Request EMCa25

6.2.8 SCADA, ECI & Comms asset class

268. DBP's actual/estimated capex in the AA4 period in the SCADA, ECI, and Comms category is $26.8m. It is $7.9m or 23% less than the $34.7m ERA allowance, as shown in the table below.

Table 6.7: Summary of AA4 capex for the SCADA, ECI, & Comms asset class - $m, real December 2019

Business case	ERA Allowance	AA4 Actual	Variance Actual vs Allowance
01 Compressor station	17.7	6.8	-10.9
02 Pipeline and MLV	5.1	2.0	-3.1
03 SCADA	0.0	1.8	1.7
06 GEA Control System	5.8	0.5	-5.4
09 Compressor package control system	3.1	6.5	3.4
26 Comms	0.8	2.3	1.6
28 Southern comms	2.0	6.9	4.9
Total	**34.7**	**26.8**	**-7.9**

Source: EMCa table derived from DBP's response to Information Request EMCa01 (Capex by project)

Compressor station BC01

269. DBP planned 17 projects to be undertaken in AA4 at the total cost of $17.7m. Most of the project capex was either reduced significantly or incurred at a level commensurate with the ERA allowance. As discussed in Appendix B and in section 6.2.2, the lower level of spend was driven primarily by reprioritisation of work from the Compressor stations category to Metering. We propose no adjustment for the projects under these business cases.

Pipeline and MLV BC02

270. DBP has allocated eight pipeline MLV projects to the SCADA, ECI, and Comms asset class. DBP overspent the approved capex on two planned projects by 51% but this was a relatively small amount at $0.3m. Three unplanned projects have a combined capex of $0.4m. On the remaining three projects, DBP incurred capex below the forecast amount by a combined $3.9m:

- solar panel replacement - this was expected to require $0.4m (i.e. the ERA allowance) but was deferred to AA5;
- relocate northern communications hut batteries – reduced by $1.8m by applying '*…a technical solution that was originally not thought possible';* and
- upgrade fire and gas (F&G) control systems at main line valves - the ERA allowance was $2.1m but only $0.4m will be incurred in the AA4 period. We infer from information in the business case that this is because remote terminal units (RTU) which, among other things, respond to fire and gas systems were not required to be replaced as planned in AA4 – instead replacement will commence in 2023.

271. We consider that DBP has acted as a prudent operator in this case and that the costs incurred are reasonable. We propose no adjustment.

SCADA BC03

272. DBP's approved capex for work on its SCADA systems was $39k (for alarm management). It estimates it will spend $1.9m in the AA4 period related to the following investments:[99]

- Hardware: $1.0m (servers, firewall, switches) driven by Microsoft upgrading its operating system from 32-bit to 64-bit - we consider that good operating practice is to upgrade to 64bit hardware to maintain ongoing operational integrity. Furthermore, we are satisfied that DBP's incurred cost was reasonable;
- master station security and resilience: $0.5m driven by audit findings – as discussed in section 6.2.3 and in Appendix B (refer to IT Security, BC23) we consider that DBP's responses to its relative immaturity when measured against the AESCSF are prudent given the criticality of master stations to operational integrity; based on our experience, we consider the incurred costs to be reasonable;
- simulation hardware: $0.2m to help improve operational responses (including alarm management)- based on the information provided it appears to be a reasonable initiative to undertake to help maintain operational integrity.

273. We consider that DBP has undertaken this work as a prudent operator and that the incurred costs are reasonable.

GEA Control System BC06

274. For AA4, DBP proposed a capital program of around $5.8 million on a range of gas engine alternator (GEA) and energy management systems. Due to priorities that arose in other parts of its operations '*…and further assessment of short-term asset performance'*, DBP advises that it was able to defer most of the GEA program and reallocate resources to other programs. This resulted in an underspend of 92%. This is a further example of where initial replacement plans based on age can be deferred closer to the scheduled time based on reassessment of the need. This is consistent with the actions of a prudent operator. We consider the costs incurred to be reasonable and we propose no adjustment.

Compressor Unit Control BC09

275. Refer to our assessment in Appendix B. In summary, the cost increase of $3.4m is to bring forward replacement of the control system at CS4/2. DBP provided supporting information to explain the reason for the cost increase. We asked DBP for further information to justify the advancement of the CS4/2 – it cited the following: (i) the obsolete operating system of

[99] Response to IR EMCa22

HMI was identified as posing a serious cybersecurity risk, (ii) components of the control system were no longer supported by the OEM and the obsolete software could not support recommended software changes, and (iii) the unit was '*nearing the end of its technical design life'.*[100]

276. On the basis of the information provided we consider that the work would be undertaken by a prudent operator and the cost incurred is reasonable. We therefore propose no adjustment.

Communications BC26

277. Refer to our assessment in Appendix B. In summary, DBP undertook unplanned activities which led to the $1.6m overspend:

- Replacement of UHF radios ($1.1m) due to an Australian Communications and Media Authority (ACMA) requirement for a change to the 800MHz band – we consider DBP's response to be prudent in response to the regulator's requirements;
- Upgrading network cabling and ethernet extenders at compressor stations ($0.4m) because the old cabling could no longer handle data transfer requirements – we consider this to be a prudent response; and
- Telecommunications resilience ($0.4k) in response to communications system outages experienced in 2017 -

278. DBP advises that it did not spend $0.4m on repeater huts in the AA4 period, because it could integrate the work with the proposed AA5 Northern Communications project. We consider this to be a prudent approach.

279. Overall, we consider that the actual AA4 expenditure was prudent and the cost incurred was reasonable.

Southern Communications BC28

280. Refer to our assessment in Appendix B. In summary, the $4.9m capex variance was due to removing reliance on [redacted] shared assets. The increased spend involves installing new equipment and redesigning the system configuration so that the DBP southern communications network is no longer connected to [redacted] assets. DBP advises that the decision to remove reliance on [redacted] shared assets was appropriate because [redacted] advised that it would no longer permit DBP to use the shared assets unless DBP upgraded the infrastructure, and it planned to sell its communications assets at the East Perth Control Centre (which DBP relies on).

281. We asked DBP five questions to test the need for the increased capex and the reasonableness of the cost incurred. Based on the responses, we are satisfied that (i) separation of DBP assets from [redacted] is a prudent response given the operational criticality of the southern communications network, and (ii) the cost incurred was reasonable.

6.3 Conclusions

6.3.1 Our findings

282. DBP's AA4 capex was characterised by a high degree of volatility, with the majority of business cases either significantly underspent or overspent when measured against the ERA allowance. Our assessment of DBP's AA4 capex has focussed on its expenditure on projects within the 13 business cases for which DBP incurred capex significantly above the ERA allowance. In each case we sought to determine whether the capex incurred was prudent and efficient by examining the reasons for the variation, cognisant of our concerns with DBP's governance and management approach expressed in section 3. Of particular

100 Response to IR EMCa32

concern was the propensity of DBP to include a large number of projects designed to address what it rated as presenting Low or Intermediate untreated risks.

283. We also reviewed the capex incurred on the other 14 projects to determine if there was any reason why even the reduced amount could reasonably be considered as not prudent nor efficient.

284. Our findings are that:

- DBP was able to prudently defer expenditure as a result of one or more of the following:
  - finding cheaper ways of undertaking the work
  - finding that the condition of the asset(s) was sufficient to allow deferral
  - integrating proposed projects with other, related projects at a lower combine cost
  - de-prioritising lower priority work in favour of higher priority work;
- the majority of the activities to address low untreated risks were either deprioritised or were undertaken on assets that reached their economic end-of-life;
- for the 14 projects that were either underspent or within $40k or +10% of the ERA allowance we did not find any areas where we consider that the capex incurred was not prudent or the costs reasonable – we therefore propose no adjustment;
- three unexpected incidents at meter stations caused approximately $16m overspend of the Metering stations business case ERA allowance and led to deferment or cancellation of planned work elsewhere, particularly in BC01 Compressor stations. We consider that this was a prudent response to the incidents and the costs incurred were reasonable – we therefore propose no adjustment;[101]
- for the 13 business cases with large positive variances, DBP's explanation of the variance in the information initially provided typically did not provide compelling information for us to conclude that the capex was prudent and efficient. We explored these matters further at our on-site meeting with DBP and in follow-up Information Requests. In all but one case, the details then provided regarding the drivers of the overspend compared to the ERA allowance were sufficient for us to be satisfied that the capex incurred could reasonably be considered to be efficient and consistent with a prudent operator. We therefore propose no adjustments to 12 of the 13 business case amounts; and
- in the case of the capex incurred under BC 21 IT Sustaining Applications – we propose an adjustment to two aspects of the work:
  - replacement of the MS Dynamics AX system: on the basis that, in our view, DBP has not provided sufficiently compelling information to justify its proposed timing and approach and so we propose no capex in 2020 should be allowed; and
  - the remaining capex: on the basis that, in our view, DBP's overspend of the aggregate AA4 allowance was the result of poor IT asset management, we propose a negative adjustment equivalent to the overspend.

6.3.2 Implied adjustment assessment

285. Our assessed adjustment to DBP's AA4 capex has been applied to each asset class. We have made an adjustment for all or part of specific project or program expenditures, where we consider that the information DBP has provided for our assessment does not demonstrate that the expenditure can reasonably be considered to be consistent with the actions of a prudent operator.

286. In the absence of better information, we defaulted to the ERA's allowance where the project or program was previously considered by the ERA as part of its AA4 decision process. Where a relevant project or program was not proposed or considered by the ERA in its AA4

[101] However, the underspend of the ERA allowance for BC01 was approximately $26m, so DBP reprioritised/cancelled a further $10m worth of activity

Decision, we have proposed an adjustment based on information provided in DBP's business case documentation.

287. As discussed above and in appendix B, we have only proposed an adjustment to the AA4 expenditure in one business case: BC21 IT sustaining applications.

288. We have produced our adjustments based on the timing of the projects and programs where possible and have sought to reflect any delays to the project against the capex allowance.

289. The aggregate impact of our assessed adjustments would imply a reduction to DBP's AA4 capex of $3.7m, which represents 3% of DBP's actual/estimated capex of $122.3m.

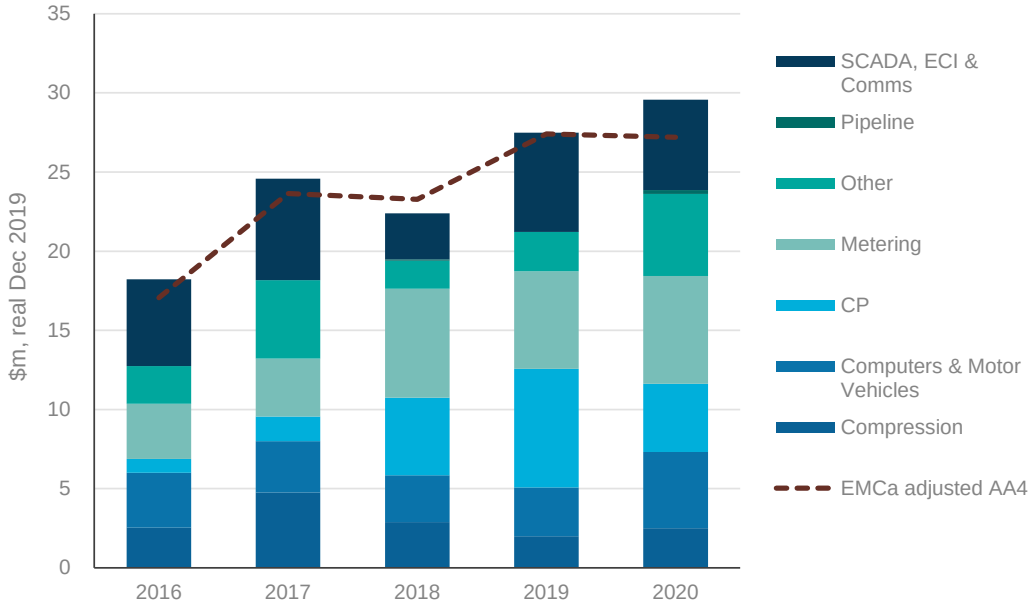
Table 6.8: Adjustments in AA4 period by asset class - $m, real Dec 2019

Asset class	2016	2017	2018	2019	2020	Total AA4
Compression	2.5	4.8	2.9	2.0	2.5	14.7
Computers & Motor Vehicles	3.5	3.2	3.0	3.1	4.8	17.6
CP	0.9	1.6	4.9	7.5	4.3	19.2
Metering	3.5	3.6	6.9	6.2	6.8	27.0
Other	2.4	5.0	1.8	2.5	5.2	16.8
Pipeline	0.0	0.0	0.1	0.0	0.2	0.3
SCADA, ECI & Comms	5.5	6.4	2.9	6.3	5.7	26.8
Total	**18.2**	**24.6**	**22.4**	**27.5**	**29.6**	**122.3**
EMCa adjustment on asset class Computer (Business cases BC21)	*-1.2*	*-0.9*	*0.9*	*-0.1*	*-2.4*	*-3.7*
EMCa adjusted AA4	17.1	23.6	23.3	27.4	27.2	118.6

Source: EMCa analysis derived from DBP responses to Information Request EMCa01

290. The following graph illustrates the effect of the assessed adjustments against DBP's proposed conforming AA4 capex.

Figure 6.1: DBP AA4 capex and EMCa adjusted - $m, real Dec 2019



Sources: EMCa analysis and DBP's response to Information Request EMCa01

7 PROPOSED AA5 CAPEX

7.1 Introduction

291. This section contains our assessment of DBP's AA5 capex forecast. We have undertaken the review using the assessment framework set out in Appendix A based on DBP's AAI (Final Plan 2021-2025) and supporting information (such as AMPs), our observations from the onsite meeting that we held with DBP, together with information supplied pursuant to EMCa information requests and with regard to our observations and findings in Sections 2, 3, 4 and 4.4 of this report.

292. DBP's capex model, DBNGP FP_8.6_Capex Forecast Model 2021-25_CONFIDENTIAL, provides AA5 capex information in several configurations:

- Project level – 109 projects with capex ranging from $51k to over $30m;
- Business case level – 19 business cases, which comprise multiple projects; and
- Asset level – 7 classes which comprise expenditures allocated from the business cases.

293. The results of our review and our overall assessment of whether the proposed capex is likely to satisfy the capex criteria for the purposes of determining the level of conforming capex under the NGR are set out below. We provide summaries of our business case assessments in Appendix C. Refer to the adjustment table in section 7.4.2 for the total adjustments.

294. As we described in section 4.4, DBP has included an assumed rate of real labour cost escalation in its forecast capex requirements. In our assessment of adjustments at the asset class level in this section, we have not included the overarching adjustment that results from our finding that such escalation is not a reasonable assumption. Our adjustment to remove proposed labour escalation is made in our final adjustment tables (Table 7.8 and Table 7.9).

295. The asset class categories differ from DBP's asset management plan (AMP) structure (discussed in Section 3.2.3) for reasons that are not obvious. This makes our assessment more difficult because there is not a direct link between the projects allocated to each asset class and the respective AMP. Therefore, we have based our review of the justification or otherwise of DBP's forecast AA5 capex at the business class-level. The adjustments are then applied at the asset class level by pro-rating the adjustment according to the proportion of capex DBP has ascribed from business cases to asset classes.[102]

7.2 DBP's proposed AA5 capex allowance

296. DBP's proposed AA5 capex by asset class is shown in the table and figure below. Its AA5 forecast capex is 30% higher than its actual AA4 capex.

297. The table does not include the project expenditure for Turbine and GEA Overhauls (Business Case 05) which DBP classifies as opex. For AA4, it does however include capex of $10.4m under four business cases (BC14, 19, 24, and 25) that DBP treated as capex in AA4 but is treating as opex in the AA5 period. The increase from AA4 to AA5 would be 39% on a 'like for like' basis; that is, if the capex under these four business cases was not included in the AA4 total.

[102] For example, the capex under the 34 projects in the Compressor stations business case is allocated to five asset classes: Compression (11 projects); SCADA, ECI, and Comms (15 projects), Corrosion Protection (5), Other (2 projects), and Computers and Motor vehicles (1)

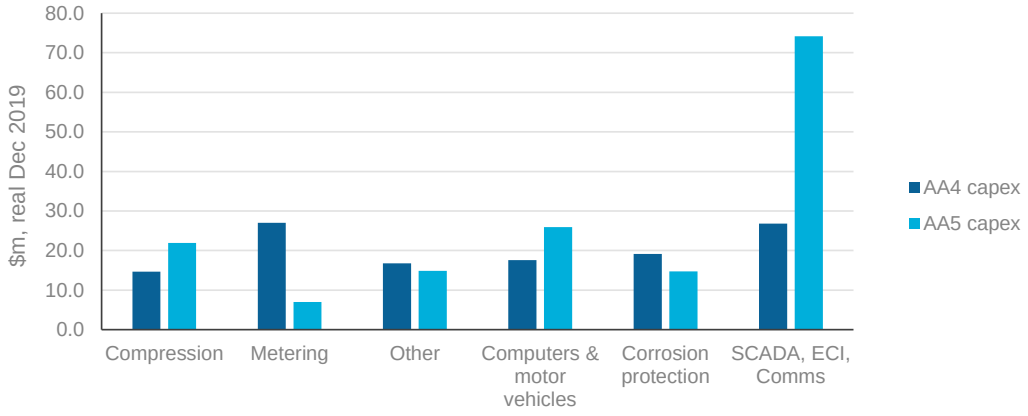
Table 7.1: AA5 forecast capex versus AA4 capex by asset class - $m, real December 2019

Asset Class	Total AA4 capex	Forecast AA5 capex					Total AA5 capex
		2021	2022	2023	2024	2025	
Pipeline	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Compression	14.7	6.1	3.4	4.0	3.8	4.5	21.9
Metering	27.0	1.8	1.2	1.4	1.2	1.4	7.0
Other	16.8	2.7	1.3	1.1	5.0	4.8	14.9
Computers & motor vehicles	17.6	7.4	5.2	3.9	5.7	3.7	25.9
Corrosion protection	19.2	3.4	2.9	3.1	2.9	2.4	14.7
SCADA, ECI, Comms	26.8	19.5	21.7	8.6	12.2	12.1	74.1
Total	122.3	40.9	35.8	22.2	30.7	28.9	158.6

Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025 PUBLIC

298. The figure below illustrates clearly that the main source of capex increase from the AA4 total is the proposed $74.1m in the SCADA, ECI and Communications asset class, a rise of $47.3m (177%). This is partially offset by the $20.0m reduction in Metering capex which was much higher than forecast in AA4 because of three unexpected incidents (as discussed under BC15 Metering in Appendix B).

Figure 7.1: Comparison of AA4 and AA5 capex by asset class - $m, real December 2019



Source: EMCa derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025PUBLIC

7.3 Our assessment of proposed AA5 capex

7.3.1 Compression asset class

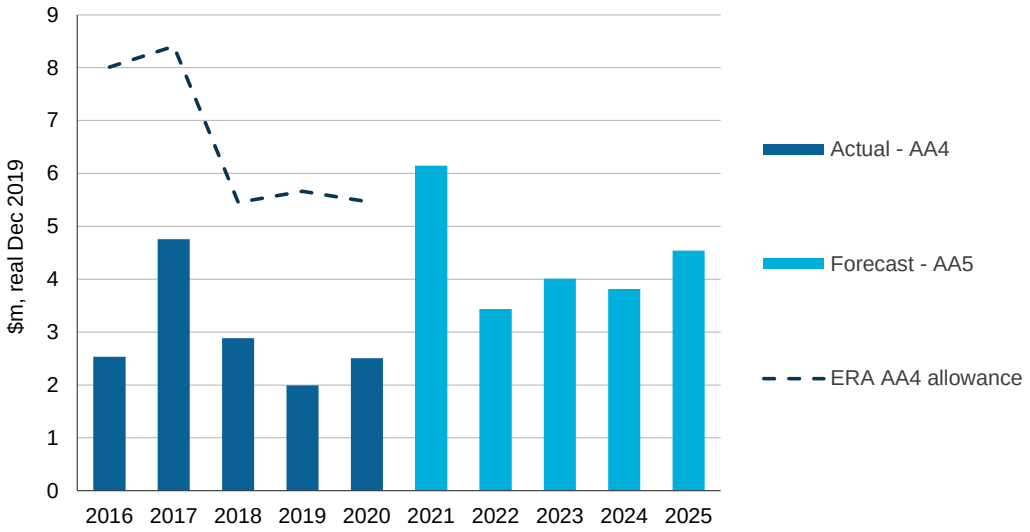
299. As shown in the table below, DBP's AA5 Compression asset class capex forecast of $21.9m is $7.2m (49%) more than DBP's actual AA4 capex of $14.7m. The figure below shows that DBP spent significantly less than the ERA allowance in this asset class during AA4 for reasons discussed in Section 6.

Table 7.2: DBP's forecast AA5 capex in the Compression asset class - $m, real Dec 2019

Relevant Projects by Business Case	AA4 Total	2021	2022	2023	2024	2025	AA5 Total
01 Compressor stations		3.9	1.3	1.8	1.4	2.0	**10.3**
02 Pipeline and MLV		0.0	0.0	0.3	0.6	0.6	**1.5**
07 Compressor station accommodation		1.0	1.0	1.0	1.0	1.0	**5.1**
18 Turbine exhaust replacement		1.2	1.1	0.9	0.9	0.9	**4.9**
Total	**14.7**	**6.1**	**3.4**	**4.0**	**3.9**	**4.5**	**21.9**

Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025PUBLIC

Figure 7.2: AA4 actual/estimate and AA5 forecast capex in the Compression asset class - $m, real December 2019



Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_PUBLIC

300. As shown in the table above, projects from four business cases are allocated to the Compression asset class. We discuss these business cases in the following sub-sections.

Compressor stations BC01

301. DBP's 11 compressor stations projects related to 'compression' are predominantly associated with replacement of plant and equipment at end-of-life or refurbishment.

302. As discussed in section 6, the AA4 compressor stations capex was lower than forecast due to DBP's decision to prioritise spending about $20m capex on the Metering asset class to respond to three unexpected incidents. Some of the increase seen in the expenditure profile for AA5 is due to the need to undertake the replacement and refurbishment work deferred from the AA4 period. DBP also states in BC01 that *'there is a greater volume of assets reaching end of life in the next five years than in the AA4 period….'* The timing and volume of work in AA5 is based on DBP's end-of-life replacement (or, in some cases, overhaul) cycles – that is the timing is predominantly age-based.

303. In Appendix C we assess the proposed expenditure for the entire AA5 compressor stations business case capex of $36.3m (a bundle of 34 individual projects). We conclude that a level of capex 20% less than DBP's forecast (i.e. $29.1m) is likely to satisfy the capex criteria. This is primarily because DBP has demonstrated that:

- it updates its age-based or condition-based assessment of the asset health – this can lead to prudent deferral of work, noting that its scheduled replacement and/or major

refurbishment work is based predominantly on age in the early stages of asset planning; and

- it has demonstrated during the AA4 period that it can sometimes deliver replacement and refurbishment work at a lower cost than allowed for in the preliminary cost estimate (e.g. through competitive procurement, or a cheaper technical approach).

304. This adjustment of -20% (-$2.1m) is applied to the annual expenditure for the eleven Compressor stations projects in the Compression asset class.

Pipeline and MLV BC02

305. As discussed in Appendix C, DBP's Pipeline and MLV business case covers 14 projects of which only one is allocated to the Compression asset class - *Pig barrel isolation valve replacement* ($1.5m). As discussed in Appendix C, our assessment is that the work is necessary, however we consider it reasonable to assume that the commencement of pig barrel isolation valve replacement could be prudently deferred by two years. This would roll out $1.2m capex into the AA6 period.

Compressor station accommodation BC07

306. As discussed in Appendix C, DBP's AA5 BC 07 involves only one project, which is continuation of work commenced in AA4 to refurbish compressor station accommodation and which is expected to be concluded in 2025. The AA5 capex forecast is 109% higher than the AA4 work. We consider that DBP's cost estimate for the remaining work is overestimated based on its historical costs and its explanation of what work remains. In our view a reduction of $0.5m to the proposed $5.1m AA5 capex will result in a more reasonable cost.

Turbine exhaust replacement BC18

307. DBP's AA5 business case 18 involves only one project to replace seven turbine exhaust systems which have reached end-of-life ($4.9m). As discussed in Appendix C, our assessment is that, with one exception, the work is necessary, but the timing of the work can be deferred. We consider that the capex forecast can be prudently reduced by $2.0m to achieve a more reasonable cost in the AA5 period.

7.3.2 Metering asset class

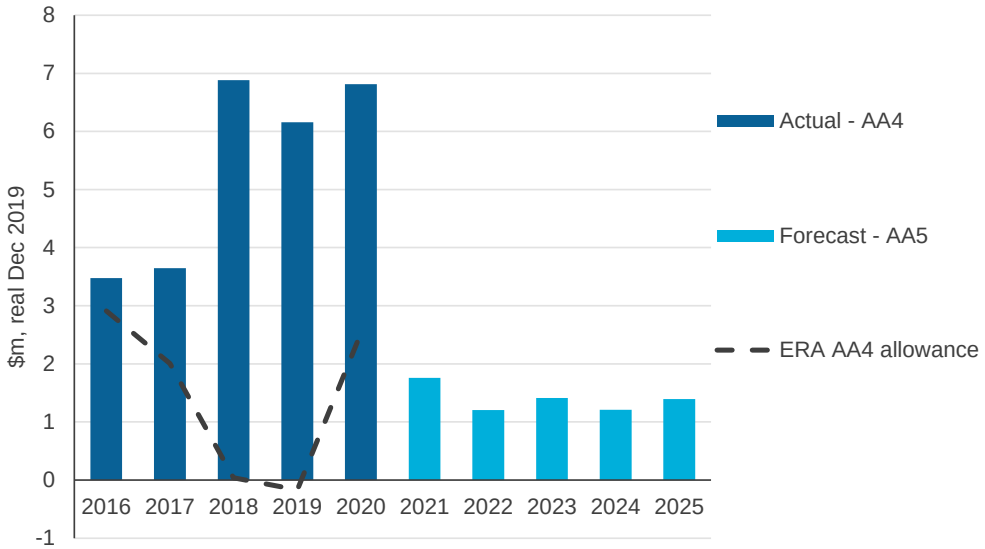
308. As shown in the table below, DBP has forecast $7.0m capex over the AA5 period in the Metering asset class, as shown in the table below.

Table 7.3: DBP's forecast AA5 capex in the Metering asset class - $m, real Dec 2019

Relevant Projects by Business Case	AA4 Total	2021	2022	2023	2024	2025	AA5 Total
15 Meter stations	27.0	1.8	1.2	1.4	1.2	1.4	7.0
Total	**27.0**	**1.8**	**1.2**	**1.4**	**1.2**	**1.4**	**7.0**

Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_CONFIDENTIAL

Figure 7.3: AA4 actual/estimate and forecast AA5 capex in the Metering asset class - $m, real Dec 2019



Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_PUBLIC

309. DBP proposes AA5 capex that is commensurate with historical levels and which is similar to the AA4 ERA allowance. Eight of the ten projects identified in the Meter stations business case are allocated to the Metering asset class – the other two are linked to Corrosion Protection. The proposed program of work includes asset replacement, upgrades, and preventative maintenance. The two largest projects account for the majority of the Metering capex forecast:

- Meter station valves and control valves overhaul ($4.0m); and
- Water bath heater replacement at Meter Stations ($1.2m).

310. In Appendix C we assess the entire AA5 Metering Stations capex. Based on our judgement, we conclude that a level of capex 10% less than DBP's forecast is likely be the efficient amount required to deliver the required work. This is primarily because DBP has demonstrated that as the date for the planned capex activity approaches:

- it updates its age-based or condition-based assessment of the asset health – this can lead to prudent deferral of work, noting that its scheduled replacement and/or major refurbishment work is based predominantly on age in the early stages of asset planning; and
- it can deliver replacement and refurbishment work at a lower cost than allowed for in the preliminary cost estimate (e.g. through competitive procurement, or a cheaper technical approach).

311. The -10% (-$1.4m) adjustment is applied to the annual expenditure for the eight projects in this asset class.

7.3.3 'Other' asset class

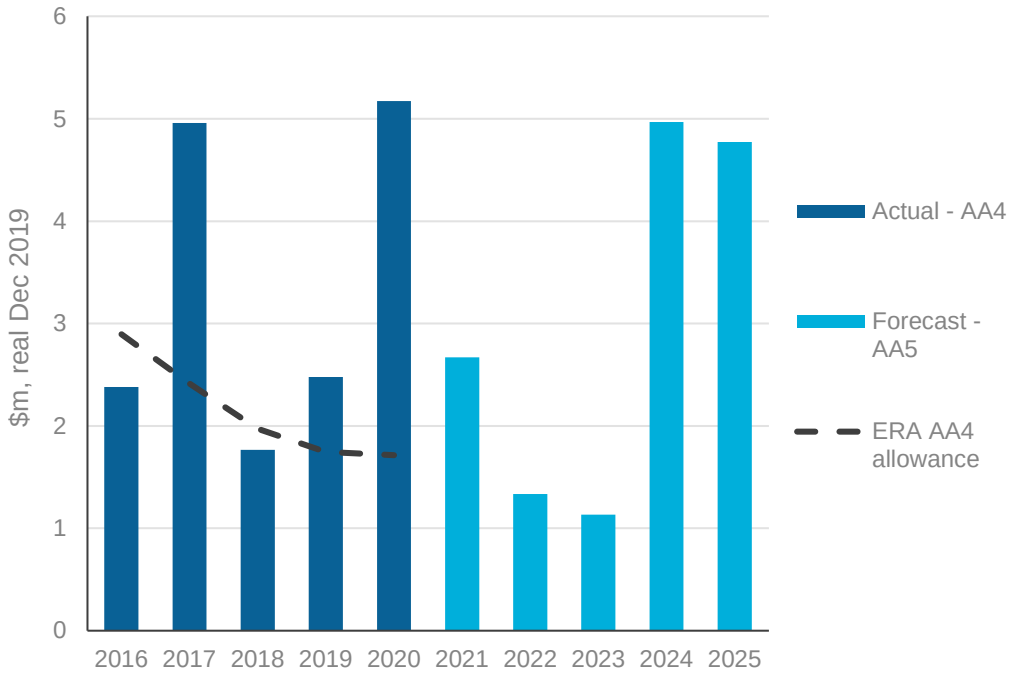
312. DBP has forecast $14.9m AA5 capex in the Other asset class, as shown in the table below. This is $1.9m less than the expected AA4 capex in this asset class.

Table 7.4: DBP's forecast AA5 capex in the 'Other' asset class - $m, real Dec 2019

Relevant Projects by Business Case	AA4 Total	2021	2022	2023	2024	2025	AA5 Total
01 Compressor stations		0.8	0.6	0.4	0.2	0.4	**2.4**
02 Pipeline and MLV		0.5	0.5	0.5	0.4	0.0	**1.8**
10 Jandakot site redevelopment		0.5	0.0	0.0	4.1	3.9	**8.5**
12 Safety Case		0.5	0.0	0.0	0.0	0.0	**0.5**
16 Tools		0.4	0.3	0.3	0.3	0.5	**1.7**
Total	**16.8**	**2.7**	**1.3**	**1.1**	**5.0**	**4.8**	**14.9**

Source: EMCa table derived from DBP's response to Information Request EMCa01

Figure 7.4: AA4 actual/estimate and forecast AA5 capex in the Other asset class - $m, real Dec 2019



Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_PUBLIC

313. As shown in the table above, projects from five business cases are allocated to the Other asset class. We discuss the business cases in the following sub-sections.

Compressor stations BCO1

314. Of the 34 projects under this business case, two are allocated to the 'Other' asset class:

- Hazardous area inspection and rectification ($1.2m); and
- Replacement of Air Conditioning at Compressor Stations ($1.2m).

315. In Appendix C we assess the entire AA5 Compressor Stations $36.3m capex rather than each project. Based on DBP's demonstrated capacity to prudently defer projects and to deliver some projects under target capex, our judgement is that a level of capex 20% less than DBP's forecast is likely to be a reasonable amount. We propose applying this adjustment to the annual expenditure for the two projects in this asset class (i.e. -$0.2m per project).

Pipeline and MLV BC02

316. Of the 14 projects under this business case, one is allocated to the 'Other' asset class: *Replacement of Original DBNGP signage* ($1.8m).

317. In Appendix C we assess the entire AA5 Pipeline and MLV BC02 capex rather than individual projects. We conclude that an overall level of capex 10% less than DBP's forecast is likely to be sufficient to prudently undertake the required work for all but the 'Pig barrel isolation valve replacement' project (which is discussed under the Compression asset class in section 7.3.1). The basis for the proposed 10% adjustment is a combination of DBP's demonstrated capacity to (i) prudently defer work, and/or (ii) deliver some work more cost effectively than originally budgeted. We propose applying a -10% (-$0.4m) adjustment to the annual expenditure for the single project in this asset class.

Jandakot site redevelopment BC10

318. There are two projects under this business case. Both are allocated to the 'Other' asset class:

- Jandakot Upgrade Completion ($8.3m); and
- IACS office/workshop/test lab ($0.2m).

319. As discussed in Appendix C, our assessment is that:

- the work is required, and the scope of work is reasonable; and
- the complexities associated with the approval of such a significant redevelopment on the Class A Jandakot Water Mound due to planning protections, are likely to lead to at least a 12-month deferral of the construction works scheduled to commence in 2024.

320. Accordingly, we consider that AA5 capex of $4.6m (i.e. a reduction of $3.9m from the $8.5m proposed by DBP) is likely to satisfy the capex criteria.

Safety Case BC12

321. There is only one project under this business case: *Safety case revision and remaining life review* ($0.5m).

322. As discussed in Appendix C, we consider that:

- the scope is reasonable; however, the work will be relatively straight forward and is an incremental update of the current version for the covered assets - therefore the cost estimate appears to be overstated; and
- any cost of reviews of non-covered assets should be allocated to those assets.

323. Accordingly, we consider that an adjustment to the proposed AA5 capex of -$0.2m is likely to result in a reasonable expenditure level.

Tools BC16

324. All four projects under this business case are allocated to the 'Other' asset class:

- Transmission Asset Management (TAM) tools ($0.4m);
- Transmission Operations Management (TOM) tools ($1.0m);
- Borescope replacement ($0.2m); and
- Emergency response equipment ($0.1m).

325. As discussed in Appendix C, we consider that:

- a portion of the proposed increase in TAM tools and TOM tools capex above the ERA allowance appears to be linked to new, uncovered assets; and
- the proposed unit cost increase for the borescopes is not adequately justified; and

326. Accordingly, we consider that AA5 capex of $1.3m (i.e. an adjustment of -$0.4m) which is equivalent to the AA4 capex in real terms is likely to represent a reasonable amount.

7.3.4 Computers and Motor Vehicles asset class

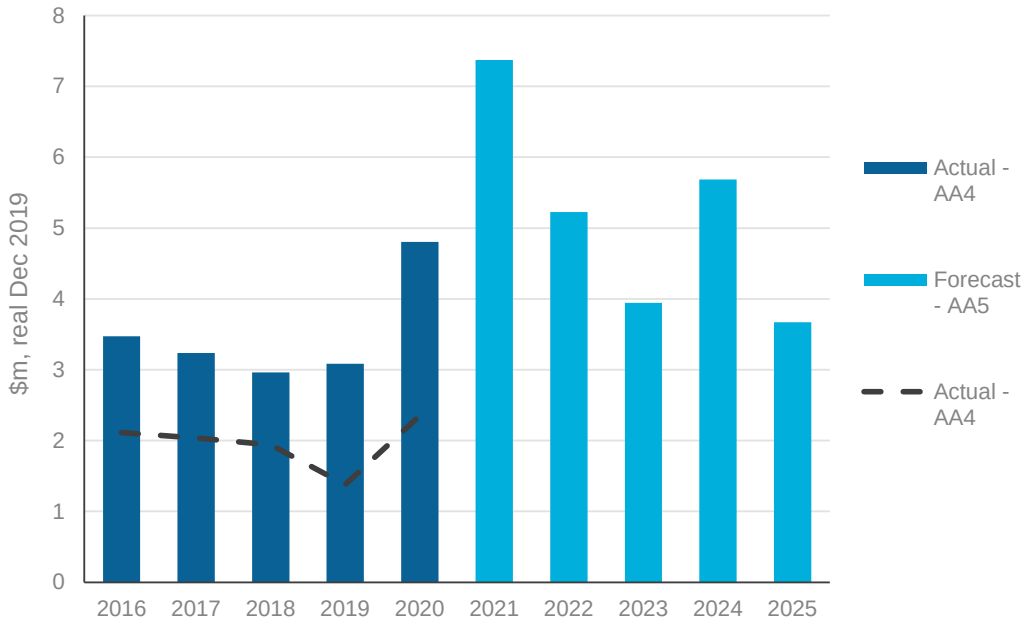
327. DBP has forecast $25.9m AA5 capex in the 'Computers and Motor Vehicles' asset class, as shown in the table below. The expected AA5 capex in this asset class is $25.9m, which is $8.3m higher than the expected AA4 capex of $17.6m.

Table 7.5: DBP's forecast AA5 capex in the Computers & Motor Vehicles asset class - $m, real Dec 2019

Relevant Projects by Business Case	AA4 Total	2021	2022	2023	2024	2025	AA5 Total
01 Compressor stations		0.0	0.3	0.0	0.0	0.3	**0.5**
03 SCADA		0.0	0.0	0.0	1.0	0.0	**1.0**
11 Maximo and DMZ		1.5	0.2	0.2	0.3	0.2	**2.3**
17 Fleet and civil equipment		1.0	0.8	1.0	0.8	1.0	**4.8**
20 CRS		0.6	0.3	0.2	1.7	0.2	**2.9**
21 IT sustaining applications		1.6	0.8	0.4	0.4	0.2	**3.4**
22 IT enabling		1.5	1.3	1.4	0.6	0.6	**5.2**
23 IT security		0.4	0.6	0.4	0.2	0.2	**1.8**
30 IT sustaining infrastructure		0.7	1.0	0.5	0.7	1.1	**4.0**
Total	**17.6**	**7.4**	**5.2**	**4.0**	**5.7**	**3.7**	**25.9**

Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_PUBLIC

Figure 7.5: AA4 actual/estimate and forecast AA5 capex in Computers & Motor Vehicles asset class - $m, real Dec 2019



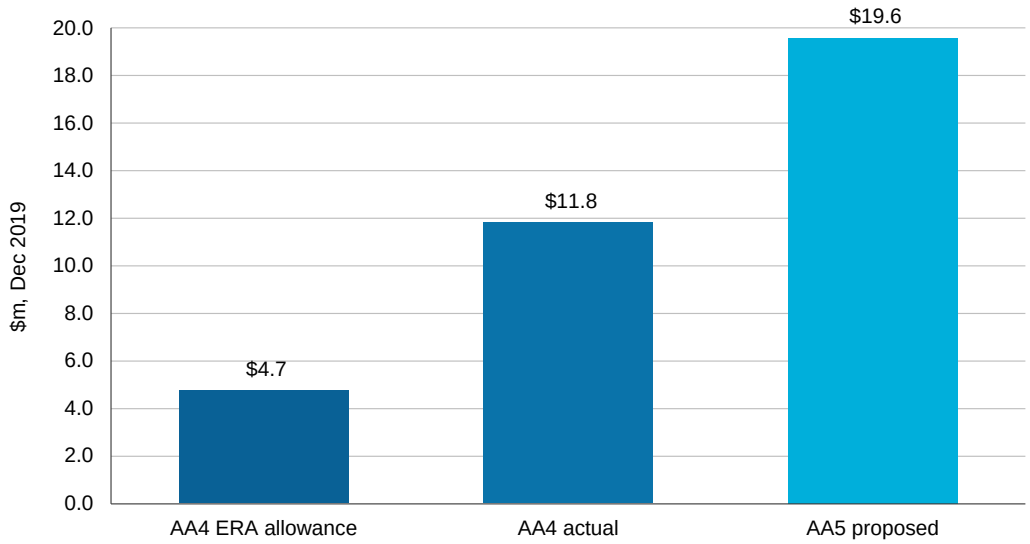
Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_ PUBLIC

328. As shown in the table above, projects from nine business cases are allocated to the Computers and Motor Vehicles asset class.

329. One of the key drivers of the proposed increased AA5 capex in this asset class is ICT capex – refer to the figure below. AA4 actual ICT capex exceeded the AA4 ERA allowance by $7.1m (173%) and the proposed AA5 ICT capex exceeds the AA4 actual ICT capex by $7.8m (66%). The increase is driven from four sources: applications software, enabling IT (including replacement of DBP's asset management and financial management systems),

enhanced focus on DBP's cybersecurity, and ICT hardware replacement and upgrades. Each of these sources is discussed under the relevant business cases below.

Figure 7.6: DBP's ICT capex trajectory - $m, real Dec 2019



Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_ PUBLIC, and responses to IR EMCa01 and EMCa25

330. Only one public submission referred to ICT-related expenditure. It is '*broadly in support of the IT Investment Plan provided DBNGP engages with its customers and stakeholders to efficiently manage the transition of systems and interface with other parties' systems'.* gasTrading's opinion is that '…*the costs to upgrade systems to enable AGIG to manage its portfolio of businesses should not be included in the Access Arrangement…unless there is a business case for the customer'.*[103]

Compressor stations BC01

331. Of the 34 projects under this business case, one is allocated to the Computers and Motor Vehicles asset class: *Upgrade of* [redacted] *HMI software to latest Windows version* ($0.5m).

332. In Appendix C we assess the compliance or otherwise of the entire AA5 Compressor Stations BC01 $36.3m capex comprising 34 projects. We conclude that an overall level of capex 20% less than DBP's forecast is likely to be the prudent level of expenditure required to address the identified risks. In summary, the basis for our proposed adjustment is DBP's demonstrated capacity to (i) prudently defer work, and/or (ii) deliver some work more cost effectively than originally budgeted. The adjustment of -$7.3m is applied to the annual expenditure for the compressor stations project, and a proportionate reduction of -$0.1m would therefore apply to the $0.5m component in this asset class.

SCADA BC03

333. Of the two projects under this business case, one is allocated to the Computers and Motor Vehicles asset class: *SCADA software upgrade* ($1.0m). In Appendix C we assess the compliance or otherwise of the entire AA5 SCADA capex of $1.9m. The cost estimate for the software refresh is based on upgrading the current version of Scada software [redacted] to [redacted] and is based on a recent quote from DBP's vendor, [redacted]. Based on our experience, a periodic upgrade within the AA5 period is a prudent initiative and that the cost has been reasonably derived. On this basis, we propose no adjustment.

103 gasTrading Australia Pty Ltd, submission, 30 March 2020, pp10-11

Maximo and DMZ BC11

334. Maximo is DBP's asset management software and DMZ is a network used to separate and provide cyber security for DBP's OT tools and system from the rest of its tools and systems. DBP's business case is based on upgrading DMZ; reconfiguring, upgrading and patching Maximo; and firewall and server replacement. DBP proposed capex of $2.2m, which is $0.9m more than in AA4. All four projects under this business case are allocated to the Computers and Motor Vehicles asset class:

- CSN Cisco Firewall and Server Replacement ($0.2m);
- Maximo annual patching ($0.4m);
- DMZ upgrade ($0.5m); and
- Maximo Business Process Redesign ($1.1m).

335. In Appendix C we assess the compliance or otherwise of the entire AA5 Maximo and DMZ capex. The Cisco firewall and server capex is driven by standard end-of-life replacement timing. The DMZ capex will provide ongoing patching (2022, 2023, 2025), and security-driven upgrades which we consider to be prudent. The Maximo-related work includes standard maintenance investment (updates and patches). The biggest investment is the continuation of the 'Maximo Business Process Redesign' project which was initiated in AA4 (refer to Appendix B, BC11).

336. We requested further information from DBP on its AA5 cost estimates (specifically the 'manufacturers guidance'). DBP's response has satisfied us that the cost estimate for the work is reasonable and the activities are consistent with what a prudent operator would undertake. On this basis we propose no adjustment.

Fleet and Civil Equipment BC17

337. Both projects under this business case are allocated to the Computers and Motor Vehicles asset class:

- Annual replacement of [redacted] fleet vehicles [redacted] ($4.1m); and
- Replacement of civil equipment ($0.6m).

338. In Appendix C we assess the compliance or otherwise of the two projects separately. Our conclusions are that:

- DBP does not explain satisfactorily why it expects the average AA4 replacement rate from 2017-2020[104] of [redacted] fleet vehicles to be exceeded over the AA5 period, given the relative homogeneity of the fleet – we propose that $3.6m [redacted] would represent an allowance sufficient to prudently manage DBP's fleet assets; and
- DBP's forecast of the capex required to manage its civil equipment fleet (trucks, graders, tractors, etc) is reasonable.

339. Accordingly, we consider that AA5 capex of $4.3m is likely to be sufficient to prudently manage the fleet and civil equipment during the AA5 period. This equates to an adjustment of -$0.5m.

Customer Reporting System BC20

340. There is only one project in the business case: *CRS Upgrade* ($2.9m). In Appendix C, we conclude that:

- DBP's preferred option ties it to a currently unresponsive vendor for the foreseeable future; and

104 The volume of replacements in 2016 was atypical because of deferrals from 2015

- DBP's option 3 is likely to achieve the same or better outcomes as option 2 at $0.5m lower cost (-17%), including capex for minimising transition risk from the incumbent vendor to a competitor.

341. Accordingly, we consider that AA5 capex of $2.4m (i.e. an adjustment of -$0.5m) is likely to be a reasonable amount to manage the CRS asset during the AA5 period.

IT Sustaining Applications BC21

342. There are six projects under this business case totalling $3.4m, all of which are allocated to the Computers and Motor Vehicles asset class.

343. In Appendix C we assess the compliance or otherwise of the proposed capex in two parts:

- MS Dynamics AX ('Dynamics') replacement; and
- five other projects associated with customer support, service desk, and smaller core systems.[105]

344. The assessment of the proposed AA5 capex of $2.0m for completing the Dynamics replacement project is closely linked to the planned $3.0m capex in 2020 when the project is scheduled to be initiated. We conclude that commencing the project in 2020 is unlikely to be prudent and that a more prudent approach overall is to defer the start of the project to the AA5 period. We further consider that based on the information provided and our experience, a reasonable approach would be for DBP to undertake the Dynamics replacement as part of the AGIG-wide 'One ERP' project to reduce overall disruption to DBP and to reduce the cost to DBP through cost sharing across AGIG's business. On this basis we conclude that AA5 capex of $2.0m is likely to satisfy the capex criteria for Dynamics replacement. Whilst this is the same amount as proposed for the AA5 period by DBP, it is in effect a 60% reduction on DBP's proposed amount when taking into account our recommended deferral of the $3m from the AA4 period into the AA5 period.

345. We conclude that the proposed $1.4m capex for the other five projects is likely to be a reasonable amount to undertake the proposed activities based on good industry practice of seeking to avoid unnecessarily building 'technology debt'.[106]

346. Collectively, this represents a zero adjustment to the $3.4m DBP proposes to spend in the AA5 period.

IT Enabling BC22

347. DBP refers to three capex initiatives (not projects) under this business case totalling $5.2m:

- Business intelligence ($1.8m);
- Data management and analytics ($1.7m); and
- Digital transformation ($1.7m).

348. We provide our assessment of the proposed capex in Appendix C. Our conclusions are:

- whilst there are likely to be benefits from the proposed initiatives, we do not consider that DBP has demonstrated that the benefits are likely to be sufficiently high and robust to justify proceeding on the basis proposed;
- by focussing on a reduced scope of work targeted at realising the highest tangible benefits, a viable project may emerge; and
- a pilot project may be an appropriate first step in proving the costs and benefits.

349. Accordingly, we consider that AA5 capex of $1.5m (an adjustment of -$3.7m) is likely to be a reasonable amount to invest in securing most of the forecast benefits.

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105 Enhancements, software version upgrades and patches, software license & support costs for the following: DBP Websites, GIS System / Tools, and Document Management Systems

106 Noting that in the case of Dynamics, we consider that the build up of technology debt would be minor and more than adequately offset by the cost and implementation advantages of aligning with the One ERP project

IT Security BC 23

350. DBP refer to three capex initiatives (not projects) under this business case totalling $1.8m:

- Cyber Resilience ($1.3m);
- Technology Governance and Automation ($0.1m); and
- Data Protection and Privacy ($0.4m).

351. We provide our assessment of the proposed capex in Appendix C. Our conclusions are:

- DBP should continue to invest in progressively achieving MIL3 under the AESCSF;[107] and
- DBP proposes investing heavily in software and hardware projects under multiple business cases, all of which will contribute to improving DBP's cybersecurity
- DBP's option 3 (spend the same amount as in AA4 in real terms) is likely to be the prudent approach.

352. Accordingly, we consider that AA5 capex of $1.5m (an adjustment of -$0.3m) is a reasonable amount to achieve the objectives.

IT Sustaining Infrastructure BC30

353. DBP includes two projects[108] under the business case totalling $4.0m to refresh key infrastructure in accordance with its lifecycle management plan and incorporating the office relocation:

- Annual IT Asset Renewal ($3.5m); and
- Citrix Virtual Servers Upgrade ($0.5m).

354. We provide our assessment of the proposed capex in Appendix C. Our conclusions are:

- DBP has not demonstrated that the proposed near four-fold increase in IT sustaining infrastructure expenditure from the AA4 ERA allowance level is warranted;
- similar to our assessments of aspects of DBP's pipeline asset renewal programs, we consider that DBP has demonstrated that replacement of assets in practice can prudently be deferred (i.e. allowing for longer replacement intervals) with minimal increased risk but significant cost deferral;
- in the absence of an NPV analysis (which we requested, but were not provided), for the 'group services introduction program referred to in the business case' is satisfactorily justified by DBP to be a prudent investment for DBP customers; and
- a (new) fourth option that balances the significant cost savings from option 3 and the marginally lower risk of option 2 is a more prudent risk-cost trade-off.

355. Accordingly, we consider that AA5 capex of $3.1m is a reasonable amount to meet the IT asset management objectives.

7.3.5 Corrosion Protection asset class

356. DBP has forecast $14.7m capex over the AA5 period in the 'Corrosion Protection' asset class, as shown in the table below. The proposed AA5 expenditure is $4.5m (23.4%) less than DBP's AA4 capex.

107 Maturity Indicator Level, Australian Energy Sector Cyber Security Framework

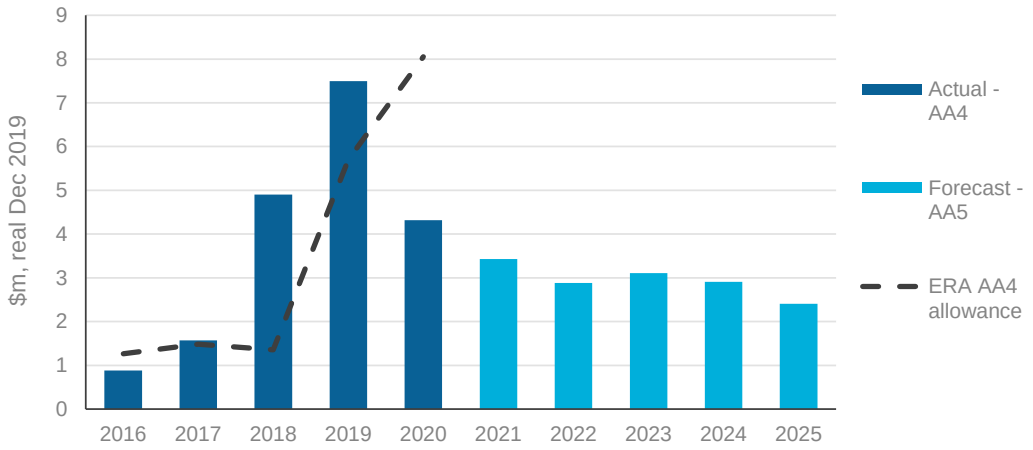
108 DBP's capex model includes two projects only whereas BC30 includes $0.6m allocation for Group Services Introduction Program and 'only' $2.9m for Annual IT asset renewal – our assessment of BC30 (AA5 capex) summarised in Appendix C includes the Group Services Introduction Program)

Table 7.6: DBP's forecast AA5 capex in the Corrosion Protection asset class - $m, real Dec 2019

Relevant Projects By Business Case	AA4 Total	2021	2022	2023	2024	2025	AA5 Total
01 Compressor stations		2.3	2.0	2.4	2.4	1.8	**10.9**
02 Pipeline and MLV		1.0	0.7	0.6	0.4	0.4	**2.9**
15 Meter stations		0.2	0.2	0.2	0.2	0.2	**0.9**
Total	**19.2**	**3.4**	**2.9**	**3.1**	**2.9**	**2.4**	**14.7**

Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_ PUBLIC

Figure 7.7: AA4 actual/estimate and forecast AA5 capex in the Corrosion Protection asset class - $m, real Dec 2019



Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_ PUBLIC

Compressor stations BC01

357. DBP has included five Compressor Stations projects under the Corrosion Protection asset class.

358. In Appendix C we assess the compliance or otherwise of the entire AA5 Compressor Stations BC01 $36.3m capex. We conclude that a level of capex 20% less than DBP's forecast is likely to satisfy the capex criteria. This adjustment (-$2.2m in aggregate for the projects in this asset class) will be applied to the annual expenditure for the five projects in this asset class.

Pipeline and MLV BC02

359. DBP includes six projects in this business case totalling $2.9m under the Corrosion Protection asset class.

360. In Appendix C we assess the compliance or otherwise of the entire AA5 Pipeline and MLV capex. We conclude that a level of capex 10% less than DBP's forecast is likely to satisfy the capex criteria for all but the 'Pig barrel isolation valve replacement' project (which is discussed under the Compression asset class). We propose applying the -10% adjustment (-$0.3m) to the annual expenditure for the six projects in this asset class with the resulting allowance representing what we consider to be a reasonable amount to undertake the planned corrosion protection activities.

Meter Stations BC15

361. DBP has allocated two projects in this business case to the Corrosion Protection asset class:

- Earthing Replacement and AC mitigation of facilities ($0.5m)

- Meter Station Piping repair due to corrosion ($0.4m).

362. In Appendix C we assess the compliance or otherwise of the entire AA5 Metering Stations capex. We also discuss the Meter stations projects under section 7.3.2 (Metering asset class). We conclude that a level of capex 10% less than DBP's forecast is likely to satisfy the capex criteria. We propose applying the adjustment to the annual expenditure for these two projects (i.e. a total of -$0.1m).

7.3.6 SCADA, ECI, Communications asset class

363. DBP has forecast $74.1m capex over the AA5 period in the 'SCADA, ECI and Communications' asset class, as shown in the table below. The proposed AA5 expenditure is $47.3m (176%) more than DBP's AA4 capex actual/estimate of $26.8m in this asset class.

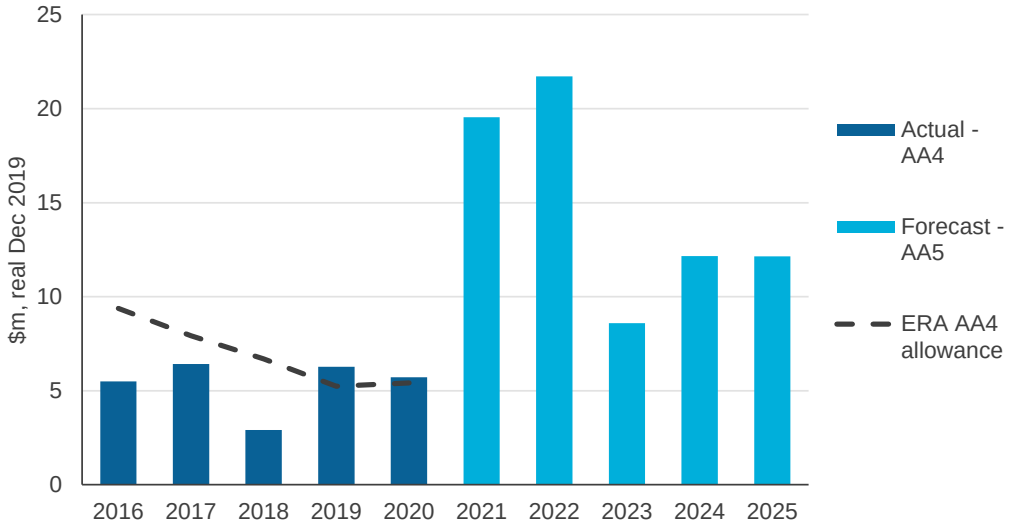
Table 7.7: DBP's forecast AA5 capex in the SCADA, ECI, Comms asset class

Relevant Projects by Business Case	AA4 Total	2021	2022	2023	2024	2025	AA5 Total
01 Compressor stations		2.6	1.0	1.3	3.5	3.7	**12.2**
02 Pipeline and MLV		0.6	0.6	1.1	0.6	0.6	**3.4**
03 SCADA		0.1	0.1	0.1	0.1	0.4	**0.9**
06 GEA control system replacement		0.9	0.0	1.4	3.2	2.8	**8.3**
08 Replacement of northern communications system		15.2	15.3	0.0	0.0	0.0	**30.5**
09 Compressor package control system replacement		0.0	4.7	4.7	4.7	4.7	**18.8**
Total	**26.8**	**19.5**	**21.7**	**8.6**	**12.2**	**12.1**	**74.1**

Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_ PUBLIC

364. The figure below shows that DBP spent less than its AA4 ERA allowance in this asset class for reasons explained in section 6.

Figure 7.8: AA4 actual/estimate and forecast AA5 capex in the SCADA, ECI & Comms asset class - $m, real Dec 2019



Source: EMCa table derived from DBNGP FP_8.6_Capex Forecast Model 2021-2025_ PUBLIC

Compressor stations BC01

365. DBP has allocated 15 projects from this business case under the SCADA, ECI and Communications asset class. As indicated in the table above, the proposed $12.2m is $5.3m more than the corresponding actual AA4 capex.

366. In Appendix C we assess the compliance or otherwise of the entire AA5 Compressor Stations $36.4m capex. That is, we have not assessed the expenditure forecast to complete the 15 individual projects. In appendix C, we conclude that a level of capex 20% less than DBP's forecast is a reasonable amount to manage the identified risks. The basis for our conclusion is that DBP has demonstrated that it is able to manage the risks associated with compressor stations while spending less than forecast by either deferring work or delivering the work for less than forecast. We propose to apply the total adjustment of -$2.4m proportionately to the annual expenditures for the 15 projects in this asset class.

Pipeline and MLV BC02

367. DBP has allocated six projects from this business case under the SCADA, ECI and Communications asset class. As indicated in the table above, the proposed $3.4m is $1.2m more than the corresponding actual AA4 capex.

368. In Appendix C we assess the compliance or otherwise of the entire AA5 Pipelines and MLV business case capex of $9.5m. We conclude that a level of capex 10% less than DBP's forecast is likely to satisfy the capex criteria for all but the 'Pig barrel isolation valve replacement' project (which is discussed under the Compression asset class in section 7.3.1). The basis for our conclusion regarding the 10% adjustment to the $3.4m capex is that DBP has demonstrated that it is able to achieve the required outcomes whilst spending less than forecast by either deferring work or delivering the work for less than forecast. We propose applying the -10% adjustment (-$0.3m) proportionately to the annual expenditures forecast by DBP for the six projects in this asset class.

SCADA BC03

369. In Appendix C we assess the compliance or otherwise of the entire AA5 SCADA capex of $1.9m. DBP has allocated one of the two AA5 SCADA projects to the SCADA, ECI, and Communications asset class: *SCADA hardware upgrade* ($0.9m). The work involves replacing 21 servers ($0.7m in total) and 14 switches ($0.2m) during the AA5 period. The server capex is based on a 4-5 yearly end-of-life replacement cycle and the switch capex is based on an 8-10 year end-of-life replacement cycle.

370. Based on our experience, both these cycles are consistent with good industry practice. DBP's business case confirms that it has taken into account opportunities to extend the life of the lowest used servers and that its prices for servers and switches are based on vendor pricing. We conclude that the proposed expenditure is reasonable, and we propose no adjustment.

GEA Control System Replacement BC06

371. DBP has allocated all four AA5 projects with total capex of $8.3m under this business case to the SCADA, ECI, and Communications asset class:

- GEA control system replacement [redacted] ($0.9m);
- GEA control system replacement [redacted] ($1.8m);
- GEA control system replacement [redacted] ($2.8m); and
- GEA control system replacement [redacted] ($2.8m).

372. The proposed AA5 capex is $7.8m more than the AA4 actual capex in this asset class. In our assessment of this AA5 business case described in Appendix C, we conclude that:

- the ability of DBP to reallocate approximately 90% of the ERA allowance for GEA Control System replacement without taking undue risk illustrates that DBP's forecast work program is biased towards a conservatively high volume of work; and

- it is likely that DBP can prudently defer replacement of the GEA control systems on [redacted] units from AA5 to AA6 (including by not replacing any units at less than 16 years old) to increase the average age at replacement to only 15.2 years (i.e. which would be only slightly higher than the design life of 15 years) at minimal increased risk.

373. On this basis, we consider that the prudent level of expenditure is likely to be $6.9m (i.e. an adjustment of -$1.4m).

Replacement of Northern Communications System BC08

374. The AA5 business case comprises of one project forecast to cost $30.5m capex which is scheduled to commence in 2021 (i.e. straight after the AA4 Southern communications system replacement project is scheduled to be completed at a cost of $6.9m). It is therefore the largest contributor of the AA5 SCADA, ECI, and Communications asset class capex increase from AA4.

375. As discussed in our assessment in Appendix C, we are satisfied that the project is required, that the scope is reasonable and deliverable, and the cost estimate is reasonable. The factors contributing to our conclusion are:

- the needs analysis is comprehensive, supported by a FEED analysis by an independent engineering expert – the performance of the network is relatively poor for a critical aspect of pipeline operations and equipment is or soon will be obsolete;
- the project follows logically from the replacement of the southern communications network that is being undertaken in the AA4 period;
- whilst the business case presents only three options, the independent report considers options in more depth and breadth, which collectively provide a compelling case for the selected scope and timing of the work; and
- DBP has refined the independent expert's cost estimate, reducing the estimated cost by approximately 10% by deferring some work.

376. On this basis we consider that the proposed activity is prudent and the forecast capex is reasonable. We propose no adjustment.

Compressor Package Control System Replacement BC09

377. The AA5 business case comprises of one project forecast to cost $18.8m capex. This is $12.3m higher than the AA4 equivalent and therefore the second largest contributor to the increased AA5 capex compared to AA4 capex.

378. As discussed in our assessment in Appendix C, DBP's proposed schedule leads to an average replacement age of 17.5 years, which is less than the 'technical design life' of 18 years. In our view, it is likely that DBP will find that it can prudently defer [redacted] of the [redacted] units to AA6, with no units replaced before 17 years of age. This would increase the average age at replacement to 18.5 years at minimal risk. On this basis, we consider that $14.1m is a reasonable amount to manage the control system assets, representing an adjustment of -$4.7m.

7.4 Conclusions

7.4.1 Our findings

379. Our assessment of DBP's proposed AA5 capex is based on DBP's AAI and supporting information. To a significant extent, our assessments are based on our observations from the onsite meetings that we held with DBP, together with information supplied pursuant to EMCa information requests.

380. We have taken a strict view of our obligations to advise the ERA based on the information that DBP has provided us.

381. Overall, we consider that at the business case level, DBP has in all but one case provided a compelling case to take some form of action in the AA5 period. However, this does not mean that we consider the timing, scope, or cost of the work is prudent. Our adjustments are, in the main, derived from our views on the following factors:

- DBP's track record of overstating the timing of work and consequently the likelihood of being able to prudently defer a portion of the work into AA6;
- our assessment that one of DBP's non-selected options is more prudent and/or cost effective than DBP's selection
- our assessment in some cases that DBP has over-estimated the cost of the proposed scope of work within the AA5 period.

382. With only one exception, BC10 – Jandakot accommodation, we formed the view that the scope of work in the business cases is likely to be deliverable.

383. There is only one 'benefits-driven' business case (BC22 IT Enabling) - for which we were not convinced that the estimated benefits are sufficiently robust to justify the proposed capex.

384. We note that DBP identified 14 projects to address Low untreated risks (as discussed in section 3.2.2) which represent 16% of the 88 projects listed. In principle, these projects are potential candidates for deferral as they do not address high operational risks, however we do not specifically recommend that these projects are deferred.

7.4.2 Implied adjustments

385. Our assessed adjustments to DBP's proposed AA5 capex allowance have been applied to each Business case and to each Asset class, as shown in the tables below. For the most part, we have adjusted proposed capex for all or part of specific proposed projects or programs, where we consider that the information DBP has provided for our assessment does not demonstrate that the expenditure is likely to satisfy the capex criteria. For some categories, we have made adjustments based on systemic issues that we have identified and described, and which tend to reflect the preliminary nature of justification as currently presented, or generic issues.

386. The aggregate impact of our assessed adjustments from our assessment of the business cases is a project-related reduction to the proposed AA5 capex of $28.9m, which represents 18% of DBP's proposed capex requirement of $158.6m. Proportionately, this is commensurate with DBP's underspend of planned work in AA4 of approximately 19% of the AA4 allowance.

387. We have also adjusted labour escalation by $1.3m. The total adjustment is therefore -$30.2m (-19%). The proposed and adjusted amounts are also shown in Figure 7.9 below.

Table 7.8: AA5 adjustment by capex business cases - $m, real Dec 2019

Business Case	Total AA5	Poject adjustment	Labour esc. adjustment	Total adjusted
01 Compressor Stations	36.3	-7.3	-0.3	28.8
02 Pipeline and MLV	9.6	-2.0	-0.1	7.5
03 SCADA	1.9	0.0	-0.0	1.9
06 GEA Control System Replacement (CS)	8.3	-1.4	-0.1	6.8
07 Compressor Station Accommodation	5.1	-0.5	-0.1	4.6
08 Replacement of Northern Communications	30.5	0.0	-0.2	30.3
09 Compressor Package Control Systems Replacement	18.8	-4.7	-0.2	14.0
10 Jandakot Facility Redevelopment	8.5	-3.9	-0.1	4.6
11 Maximo and DMZ	2.3	0.0	-0.0	2.3
12 Safety Case	0.5	-0.2	-0.0	0.3
15 Meter Stations	7.9	-0.8	-0.1	7.0
16 Tools	1.7	-0.4	-0.0	1.3
17 Fleet and civil equipment	4.8	-0.5	-0.0	4.2
18 Turbine exhaust replacement	4.9	-1.8	-0.0	3.1
20 CRS	2.9	-0.4	-0.0	2.4
21 IT Sustaining Apps	3.4	0.0	-0.0	3.4
22 IT Enabling	5.2	-3.7	-0.0	1.5
23 IT Security	1.8	-0.3	-0.0	1.5
30 IT Sustaining Infrastructure	4.0	-1.0	-0.0	3.1
Total	**158.6**	**-28.9**	**-1.3**	**128.4**

Source: EMCa analysis derived from DBNGP capex model PUBLIC

388. In the following table, we show the resulting adjusted annual capex, as applied at the Asset Class level.

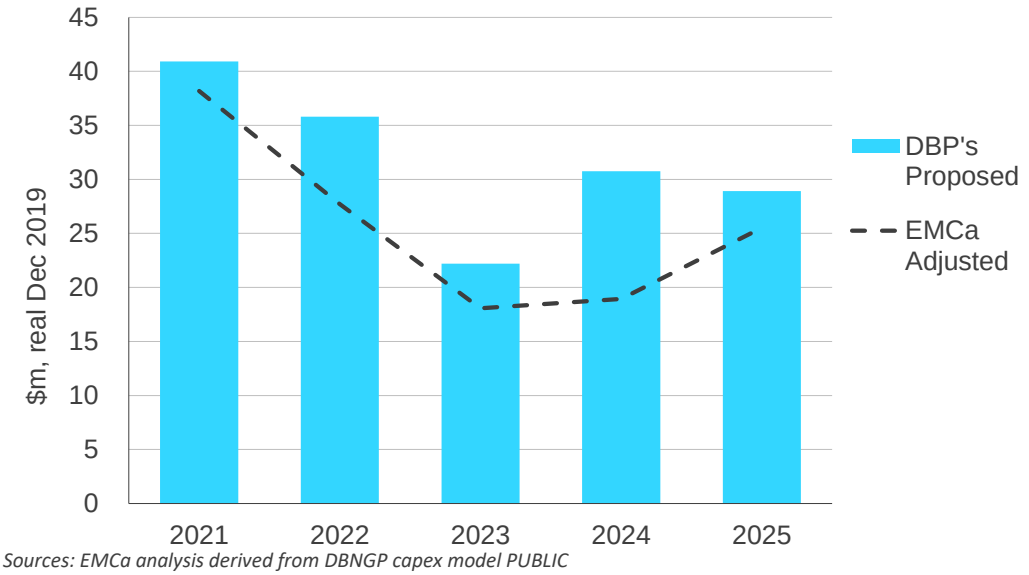
Table 7.9: Adjusted annual AA5 capex by asset class - $m, real Dec 2019

Asset Class	2021	2022	2023	2024	2025	Total
Compression	5.4	3.0	3.7	2.2	2.9	17.2
Metering	1.6	1.1	1.3	1.1	1.2	6.2
Other	2.3	1.1	0.9	0.6	4.7	9.6
Computers & Motor Vehicles	6.7	3.3	2.9	3.9	3.0	19.7
Corrosion Protection	3.1	2.5	2.6	1.9	1.7	11.9
SCADA, ECI & Comms	19.2	16.7	6.7	9.3	12.1	63.9
Total	38.2	27.7	18.1	18.9	25.5	128.4

Source: EMCa analysis derived from DBNGP capex model PUBLIC

389. The following diagram shows the DBP proposed and EMCa adjusted capex forecasts for AA5.

Figure 7.9: DBP Proposed AA5 capex and EMCa adjusted - $m, real Dec 2019



Sources: EMCa analysis derived from DBNGP capex model PUBLIC

8 PROPOSED AA5 OPEX

8.1 Introduction

390. In this section, we first summarise DBP's proposed AA5 opex allowance and the basis on which DBP has sought to justify its proposed expenditure. We then assess the elements of DBP's proposed opex, including how it has applied its forecasting methodology and its assumptions. We consider that some elements of DBP's proposed forecast are not reasonable and, consistent with our brief, we provide an adjusted forecast which we consider provides a reasonable allowance.

8.2 DBP's proposed AA5 opex allowance

8.2.1 Proposed AA5 opex

391. DBP has proposed an AA5 opex allowance of $454.1m (real Dec 2019), with an average of $90.8m per year which compares to AA4 opex actual of $96.6m[109] per year and AA4 ERA allowance of $110.2m[110] per year. Its proposed AA5 opex allowance includes an average of $2.08m per year for recategorisation of some capex to opex as shown in Table 8.1 below.

Table 8.1: DBP AA5 proposed opex - $m, real Dec 2019

Category	2019	2021	2022	2023	2024	2025	Total AA5
Efficient Base Year	60.5	60.5	60.5	60.5	60.5	60.5	302.5
Step changes		0.0	0.0	0.0	0.0	0.0	0.0
Fuel Gas (SUG)		20.4	20.8	21.0	22.0	22.3	106.5
GEA & Turbine overhauls		8.8	7.6	7.6	4.3	2.1	30.4
Capex to Opex		2.3	1.9	2.2	2.2	1.9	10.4
Labour cost escalation		0.4	0.6	0.9	1.1	1.3	4.3
Total forecast opex		**92.5**	**91.4**	**92.1**	**90.0**	**88.1**	**454.1**

Source: DBP opex model – converted to real Dec 2019

392. The following graph shows that DBP's proposed average annual AA5 opex is significantly lower than its most recent actual full year opex (2019)[111], with its AA4 actual opex in each year being markedly less than the ERA's allowance.

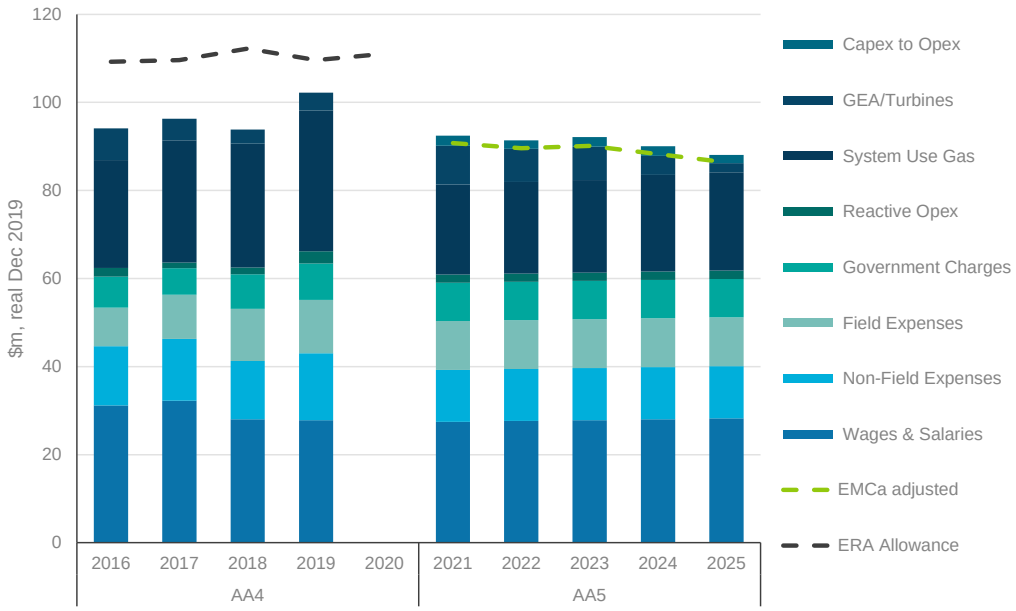
393. As can be seen in the graph, the major contributor to lower opex is SUG – both in comparing DBP's AA4 actual with the ERA allowance and in comparing DBP's AA5 forecast with its AA4 actual. However, the graph also shows reductions in the components that DBP has proposed for its base-step-trend (BST) forecast (which comprise all except the top three components in the stacked columns). Against this, it can be seen that DBP is proposing somewhat more in AA5 for GEA/Turbines work than it spent in AA4, and the addition of the 'capex to opex' category can be seen for AA5 (though this is relatively small).

109 Based on DBP's response to IR EMCa02 actual 2016-2019 converted to real Dec 2019.

110 Based on DBP's response to IR EMCa02 ERA allowance 2016 – 2019 converted to real Dec 2019

111 Provided by GBNGP in response to our Information Request (IR) EMCa02.

Figure 8.1: DBP AA4 actual (2016-2019) and AA4 proposed opex[112]



Source: DBP opex model and DBP response to IR EMCa02 – converted to Dec 2019

8.2.2 Basis on which DBP has sought to justify proposed AA5 opex

394. DBP has developed its opex forecast using a combination of a BST method and bottom-up forecasts. For the BST components, DBP has used 2019 (actual January to September and forecast/estimate October to December) as its base year value. DBP has allowed for 0.69% per annum of real labour escalation cost in its AA5 forecast and has not proposed any step changes.

395. DBP has forecast three separate categories (System Use Gas, GEA & Turbines overhaul and Capex-to-opex) which are based on bottom-up approaches.

8.3 Our assessment of proposed Base Step Trend components of opex

8.3.1 Base year opex

396. To establish its starting base year opex, DBP uses a combination of actual opex from January 2019 - September 2019 and forecast/estimated opex from October 2019 – December 2019, which is $61.79m DBP has adjusted this base year expenditure by reducing the total by $1.29m (real Dec 2019) on three components (Consulting, Insurance and Reactive opex). The effect of adjusting these amounts is to replace the 2019 actual figures for these components, which vary somewhat year-to-year, with the averages over 5 years (for consulting and reactive maintenance) and 6 years (for insurance).

397. This results in DBP's 'Efficient Base Year' value of $60.51m (real Dec 2019).

398. We have reviewed the trend of the cost components which make up this base year figure and we find that they have declined in real terms over AA4. While there are some positive and some negative movements at the component level from 2018 to 2019, in aggregate the base year components that DBP has proposed are less than the equivalent components in

112 In response to EMCa02 - DBP did not provide estimate/forecast expenditure for 2020.

the 2018 actual[113]. We consider that the Efficient Base Year that DBP has proposed is a reasonable figure for this purpose.

399. We note that DBP has suggested that it will update its 2019 base year figure with an 'actuals' figure '*(b)y the time the ERA makes its Draft Decision*'.[114] In response to our information request[115], DBP provided actual 2019 cost information which, for the BST components, sums to $66.17m (in $Dec2019), which is $4.38m higher than the 9 month actual / 3 months forecast that DBP has used in its regulatory proposal. This is a significant variance, that would require explanation should DBP submit it for consideration. Since at this stage it has not, we have confined our assessment to the figures that DBP has proposed.

8.3.2 Step changes

400. DBP has not proposed any 'step' changes.

8.3.3 Labour cost escalation

401. As we describe in section 4.4, DBP's proposed opex includes labour escalation of 0.69% per year, which it has applied directly to labour components of its BST forecast and has also included in its forecast project costs for GEA/turbine overhauls and capex to opex projects. For reasons that we have described in that section, we consider that it is not reasonable to incorporate labour cost escalation in these forecasts.

8.3.4 Productivity

402. The BST opex forecasting methodology can be used to apply a factor for expected productivity improvement over the period. DBP has not proposed such a factor, and we considered whether the absence of such a factor is a reasonable assumption.

403. DBP is a mature operator of the DBNGP and subject to an incentive-based regulatory regime. Taking the 'BST' components of opex only (i.e. ignoring SUG and GEA/turbine overhauls), DBP's AA4 opex averages around 3% less than the ERA's allowance for this period. DBP is incentivised to achieve opex savings within each regulatory period, and it has proposed an 'E factor' incentive scheme to apply from AA5.[116]

404. As an indication of DBP's propensity to achieve opex productivity improvements, we undertook a simple log-log regression to test for productivity improvement within AA4.[117] We found that DBP will have achieved a productivity improvement averaging 0.5% per year in AA4, on the basis that its 2019 opex is represented by the unadjusted base year expenditure that it estimated for the purpose of its BST forecast.[118]

405. We also reviewed the extent to which other regulatory information and precedents for incorporating an allowance for future productivity improvement in the forecast opex. The Australian Energy Regulator (AER) undertook a study on this topic in 2019.[119] While the objective of the AER's study was to determine a reasonable allowance that can be applied to electricity distributors, it included studies on productivity improvements in the gas sector which showed average annual improvements of 0.5% per year. AER considered there to be

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113 While ERA's AA4 allowance is not a factor taken into account in considering the validity of a utility's revealed cost, we nevertheless observe that DBP's 2018 and 2019 base year opex is considerably less than the ERA's AA4 allowance for those years

114 AGIG DBNGP Final Plan 2021-2025 page 60

115 IT EMCa002

116 It is not within our scope to assess this aspect of DBP's proposal; we note only its intent

117 We assumed that the measure of 'output' for productivity assessment purposes was effectively static over AA4, since DBP's covered pipeline length remained the same and, while throughput varied, we would expect there to be only a very weak correlation between gas throughput and opex.

118 For this purpose, we did not subtract DBP's base year efficiency adjustment, in order to account for 'actual' expenditure in the measure, notwithstanding that the final three months for this year is DBP's estimate.

119 Final Decision Paper, *Forecasting productivity growth for electricity distributors*. AER (March 2019)

reasonable comparability between the sectors and, though its study took account of considerable other information, its conclusion was to adopt a 0.5% per year productivity growth target for future regulatory determinations.

406. It is also relevant to our consideration that (as shown in section 3.2.5) DBP's opex benchmarks indicate that it is not already at the frontiers of efficiency.

407. On balance, we consider that it is not reasonable that DBP has not included a productivity improvement factor in its current BST-based opex proposal. We consider that it would be reasonable to incorporate a forecast productivity growth factor of 0.5% per year, in determining a prudent and efficient forecast opex allowance. We arrive at this view on the basis of DBP's recent history of annual productivity improvement, its consistency with AER's long term assessment of rates of productivity improvement in the regulated gas sector, and AER's adoption of this rate for its future application of BST-based opex forecasts for electricity distributors, noting also AER's conclusions regarding comparability with the gas sector.[120] We consider it reasonable to apply this to those components of the forecast that DBP has forecast on a BST basis, but excluding Government Charges (since these are not controllable).

408. As a matter for future consideration, we observe that in its response to our information request EMCa02, DBP provided an updated actual 2019 opex amount that is $5.7m higher than the adjusted base year figure that it has currently used. If DBP was to re-propose a BST forecast using this figure as a base, we have assessed that it would imply that its productivity had deteriorated by around 1.6% per year over AA4, and this deterioration would then be embedded in its AA5 opex forecast. In this circumstance, a re-consideration of the efficient base year value would be warranted.

8.4 Our assessment of proposed bottom-up components of opex

8.4.1 Gas Engine Alternator (GEA) & Turbine overhauls

What DBP Proposed

409. DBP forecasts $30.32m (real Dec 2019) for GEA and Turbine overhauls for the upcoming AA5 period from 2021 – 2025. This is $6.07m or about 25% higher than DBP's actual/estimated spend in AA4, which was $24.25m[121] as shown in Table 8.2 below.

Table 8.2: GEA & Turbine overhauls (AA4 and AA5) - $m, real Dec 2019

Category	Total AA4	2021	2022	2023	2024	2025	Total AA5
GEA overhaul	3.8	1.0	1.0	1.0	1.0	1.0	5.1
Turbine overhaul	20.4	7.8	6.5	6.5	3.3	1.0	25.2
Total	**24.3**	**8.8**	**7.5**	**7.6**	**4.3**	**2.1**	**30.3**

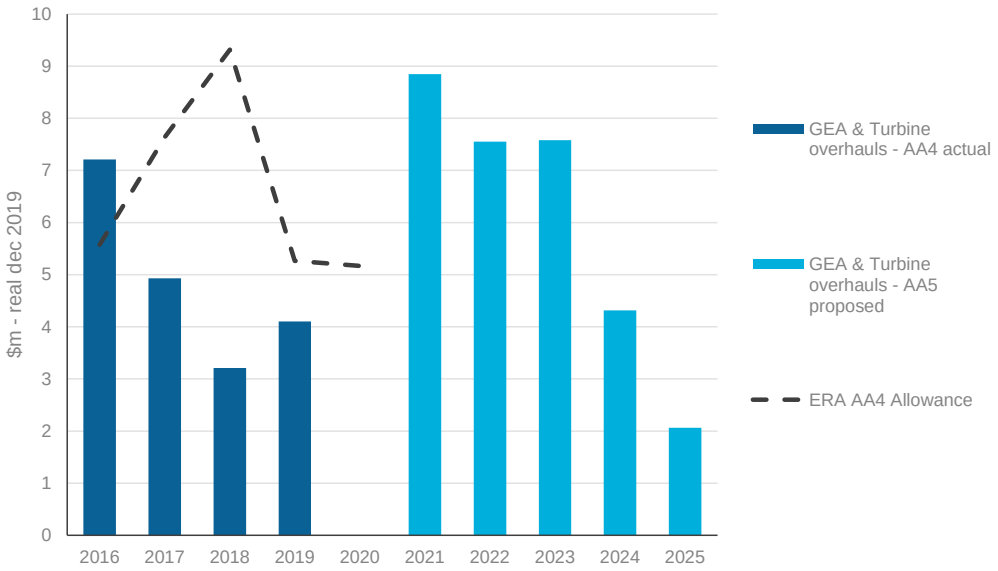
Sources: Opex Business case and DBP response to EMCa40 – converted both to real Dec 2019

410. Figure 8.2 shows the trend graph of DBP actual and ERA-approved expenditure on GEA and Turbine overhauls in AA4 and DBP's forecast expenditure for AA5.

120 For example, Regulatory Proposals from Powercor, CitiPower and United Energy have proposed opex forecasts that incorporate a 0.5% per year productivity improvement, consistent with the AER's March 2019 Decision.

121 $24.25m is based on DBP's response to EMCa40, and which we have converted to real December 2019.

Figure 8.2: GEA/turbine expenditure in AA4 and AA5 - $m, real Dec 2019[122]



Source: DBP opex model & DBP response to EMCa02

EMCa assessment

GEA Overhauls

411. DBP has proposed to overhaul 20 gas engine alternators (GEA's) at a forecast cost of $5.1m during AA5, compared with 16 overhauls during AA4 which cost $3.8m.

412. DBP stated in its response to our Information Request (IR) EMCa40 that the schedule for GEA overhauls is driven by the run-hours on each engine (or calendar hours for low utilisation machines) and OEM recommendations. Run-hours are largely driven by site power requirements, which are in turn influenced by throughput, but also by site ambient conditions and occupancy by staff.

413. We consider that the management of run-hours on a per-site and per-machine basis is prudent with significant operational history to support decision making. It is reasonable to expect that the forecast number of engines will reach the required run-hours during AA5.

414. We also consider that the forecast expenditure on GEA overhauls during AA5 is reasonable. The forecast unit costs are only marginally higher for AA5 than for AA4, and within reasonable forecasting accuracy.

Gas Turbine Overhauls

415. DBP has proposed to overhaul 7 gas turbines and has allowed for 1 premature failure at a forecast cost of $25.2m during AA5, compared with 6 overhauls and 3 premature failures during AA4 which cost $20.4m. The increase in forecast cost is driven by higher unit costs for overhauling [redacted] by additional work required [redacted] due to findings from investigations into premature failures.

416. The schedule for turbine overhauls is driven by the run-hours on each engine, which feeds into OEM warranty provisions. Run-hours are largely driven by throughput and are managed by configuring the pipeline daily to deliver customers' requirements.

417. To optimise run-hours and compressor performance across the fleet, DBP does, from time to time, swap engines between low and high utilisation sites. Accordingly, run-hours are managed across the entire fleet as well as on an individual engine basis.

122 In its response to EMCa02, DBP provides the actual figure for AA4 from 2016 – 2019 and did not provide the estimate/forecast expenditure for 2020.

418. After reviewing DBP's business case and its response to our information request , we consider that DBP's approach to managing its gas turbine fleet is reasonable and in line with sound industry practice. DBP works closely with the OEM's, particularly [redacted], to optimise operation of its fleet. The KPI's are in line with the performance standards required to meet contractual obligations and the process DBP uses to approve any deferral or cancellation of works is consistent with this management philosophy.

419. We also consider that the forecast cost difference between AA4 and AA5 is reasonable given the significant technological and factory support differences between [redacted] and [redacted] machines. The [redacted] units are aero-derivative machines whereas the [redacted] are heavy industrial units. [redacted] provides an exchange service, effectively managing all installed machines as part of a global fleet, whereas [redacted] overhauls each machine as an individual unit. The [redacted] approach offers its customers a lower unit cost from efficiencies provided by its global fleet approach.

420. We consider that the proactive measures which DBP has allowed for to minimise early stage failures on [redacted] machines are prudent, given the operational and failure history of the machines.

Optimising overhaul expenditure

421. While we consider that DBP's approach to managing its GEA and Turbine overhaul costs is prudent, we consider that its forecast does not represent a 'best estimate' of the required expenditure. In AA4, DBP spent $6.1m (in $2019 terms) less than the allowance for such overhauls, a saving of 26%.

422. At our onsite meeting, DBP explained measures that it took to achieve this, which included obtaining overhauled 'swap' machines at lower cost and some overhaul costs being offset by insurance claims. DBP also explained the factors that can lead it to be able to extend run hours in some circumstances. From those discussions, we consider that it is likely that DBP will again find that it has opportunities to optimise the management of its fleet, and its overhaul options and unit costs to achieve savings that are not incorporated in its forecast.

423. Not all measures that DBP took in AA4 are repeatable, or at least not to the same extent, however we consider that DBP will find expenditure optimisation opportunities. Accordingly, we propose adjusting this component of DBP's forecast on the assumption that it will achieve 50% of the proportionate savings achieved in AA4. This equates to a 13.2% reduction to its proposed forecast.

8.4.2 Capex to opex projects

What DBP Proposed

424. DBP forecasts $10.4m of new opex categories (capex-to-opex) as shown in the Table 8.3. These were categorised as capex in the AA4 period.

425. The capex-to-opex categories are works related to asset inspections, other minor pipeline works and small health and process safety initiatives, and which DBP claims are recurrent and operating in nature.

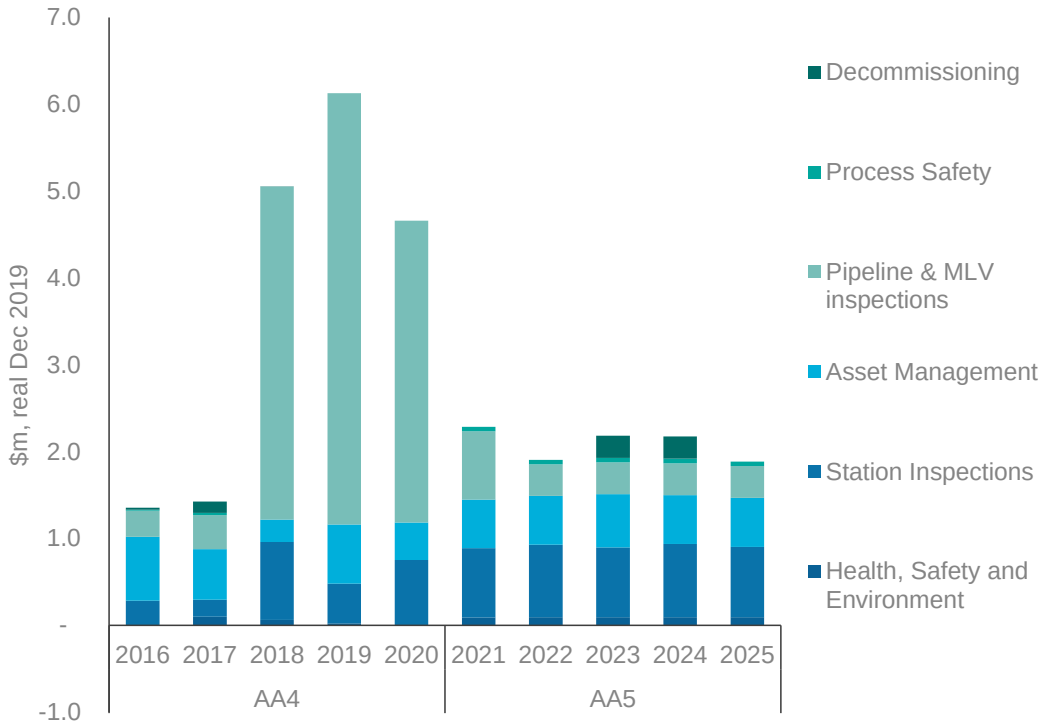
Table 8.3: Capex to opex - $m, real Dec 2019

Category	Total AA4	2021	2022	2023	2024	2025	Total AA5
Health, Safety and Environment	**0.2**	0.1	0.1	0.1	0.1	0.1	**0.5**
Station Inspections	**2.6**	0.8	0.8	0.8	0.8	0.8	**4.1**
Asset Management	**2.7**	0.6	0.6	0.6	0.6	0.6	**2.9**
Pipeline & MLV inspections	**13.0**	0.8	0.4	0.4	0.4	0.4	**2.2**
Process Safety	**0.0**	0.1	0.1	0.1	0.1	0.1	**0.3**
Decommissioning	**0.2**			0.3	0.3		**0.5**
Total	**18.6**	**2.3**	**1.9**	**2.2**	**2.2**	**1.9**	**10.4**

Sources: DBNGP FP 7.2 - Opex Business cases. Converted to real Dec 2019

426. In Figure 8.3, we show the trend of such expenditure over AA4 and as DBP has forecast for AA5.

Figure 8.3: Capex to opex trend - $m, real Dec 2019



Sources: DBNGP FP 7.2 - Opex Business cases. Converted to real Dec 2019

EMCa assessment

Categorisation as opex

427. We have assessed the nature of this work, which involves inspections and expenses related to managing its existing assets, in relation to employee health and safety and environmental management. Our assessment included reviewing the report on this that DBP provided.[123] While DBP continues to identify some of this work as 'projects' in some of its documentation, we are satisfied that work of this nature, and which is forecast as almost constant annual routine expenditure, is best classified as opex.

123 DBNGP FP_7.4 Expenditure Classification Review (Review by BDO)

Health, Safety and Environment (Opex business case DBP04)

428. DBP proposes to spend $0.46m during AA5. This would equate to an increase of $0.28m compared to its expenditures in AA4, as notified in its Business Case.

429. In its responses to our Information Request[124], DBP states that each year DBP set aside funds ($90-$120k) to undertake reactive HSE capex projects driven by staff HSE Committees and recommended changes in legislation. If no necessary projects were identified, the funds may be released for use in other areas.

430. Since DBP submitted its AA5 proposal (which included actual and forecast capex as of September 2019), additional initiatives requiring capital spend were delivered and will increase the spend in AA4 to $0.24m. This follows total spend of around $430k in the previous AA3 period, meaning that DBP's average expenditure across AA3 and AA4 would be around $0.34m per period. In its response to our information request, DBP refers also to the impact of the covid-19 pandemic and its implications.

431. On the basis of the information above, we consider it reasonable that DBP will incur higher HSE expenditure than it has in AA4, and that its forecast of $0.46m during AA5 is reasonable.

Station Inspections (Opex business case DBP13)

432. DBP proposes to inspect 50 pressure vessels and 70 pressure relief valves at compressor stations and meter stations, and 14 compressor bundles in storage during AA5. The forecast cost for this work is $4.09M. This is $1.5M higher than the inferred actual cost for AA4, although a direct comparison is not practical as this work was included in a broad category of station 'subsequent works' for AA4.

433. The inspections of pressure vessels and pressure relief valves complies with statutory requirements as denoted in DBP's Asset Management Plan. It appears that some of the cost differences between AA4 and AA5 are due to improved activity-based cost capture, rather than a material difference in activities.

434. The regular inspections and re-preservation of compressor bundles is prudent. The compressor bundles are valuable assets for which the Original Equipment Manufacturers (OEM's) do not offer an exchange service, either for upgrades or for maintenance or repair. The bundles in storage have been recovered from sites during upgrade works to increase pipeline capacity and can be re-installed to match gas turbine compressor efficiency with throughput as throughput varies over time.

435. While a comparison with AA4 actual expenditure is problematic as noted above, the cost breakdown which DBP has provided appears reasonable. We observe that some unit cost reductions from efficiencies identified during AA4 have been included in the AA5 forecasts.

436. On balance, we consider that DBP's forecast AA5 expenditure is reasonable.

Asset Management (opex business case DBP14)

437. DBP forecasts to spend $2.9m in the forthcoming AA5 period. This is an increase of $0.2m or 6.5% compared to $2.7m DBP spent in AA4 period.

438. In its business case, DBP states the increases are related to the following:

- *"The expansion programs which drive increases as additional assets that have been added to the gas transmission system that need to be managed and maintained; and*
- *As work volumes increase and improvement initiatives are assessed and implemented, MoC expenditure has been increasing."*

439. This is an ongoing program and according to DBP this level of expenditure is likely to continue across future AAs.

440. DBP's business case for this program provides information on the activities that DBP undertakes. However, we consider that asset management is effectively a BAU activity and,

[124] EMCa43

while the increase that DBP proposes is relatively small, we consider that DBP has not justified the need for the proposed increase. Our understanding, also, is that the 'additional assets' that DBP refers to are essentially uncovered assets.

441. We therefore consider that DBP's allowance for this item should be adjusted back to its AA4 level, reducing it by $0.2m.

Pipeline & Mainline Valve inspections (opex business case DBP019)

442. DBP proposes to inspect the above/below ground interface piping at 33 pipeline and MLV sites, 6 pressure vessels, 19 pressure relief valves and the interface piping at 63 locations where it is located within buried pits or under insulation each year during AA5. DBP has forecast that the work will cost $2.25m.

443. In AA4, DBP has spent $13m including $12.3m for in-line inspection (ILI) pigging which will not be required in AA5. For equivalent line items in AA4, DBP's forecast for AA5 is $1.6m higher than in AA4 as shown in the Table 8.4 below.

Table 8.4: Pipeline & MLV Inspection - $m, real Dec 2019

Category	AA4	AA5	Variance
ILI pigging	12.3		-12.3
Above/below ground	0.3	0.7	0.4
Pressure vessel	0.2	0.3	0.1
Pressure relief valve	0.1	0.8	0.7
Under insulation and within buried pits		0.4	0.4
Total	**13.0**	**2.3**	**-10.7**

Sources: DBNGP FP 7.2 - Opex Business cases. Converted to real Dec 2019

444. We consider that the proposed inspections of above/below ground interfaces and of the interfaces of piping within pits and under insulation are prudent, especially in the light of findings about external pipe corrosion following the catastrophic failure on Varanus Island in 2008. These findings, some of which were not available to industry until relatively recently due to litigation between various parties involved in or impacted by the incident, demonstrate that there is a high risk of corrosion at these interfaces due to conventional protective measures being less effective than for buried pipe. A more intensive and systematic inspection regime than was historically the case has been accepted as good industry practice and incorporated into DBP's Asset Management Plan. The removal of tape at above/below ground interfaces and applying a different coating to protect the pipe at the interfaces is part of this regime.

445. The inspections of pressure vessels and pressure relief valves complies with statutory requirements as captured in the Asset Management Plan. We understand that some of the cost differences between AA4 and AA5 are due to improved activity-based cost capture, rather than a difference in activities.

446. A comparison with AA4 actual expenditure requires adjustment for removal of ILI, which in AA4 included much of the inspection work proposed under this work stream, and the inclusion of the more stringent inspection regime required to meet industry practices in the light of the findings from the Varanus Island incident. While precise adjustments for these factors is not possible, our assessment is that the proposed work plan is reasonable for a period which does not include any ILI.

447. In summary therefore, we consider that the forecast expenditure in AA5 is reasonable and is comparable with the inferred costs for AA4 for this work stream.

Process Safety (opex business case DBP24)

448. DBP forecasts to spend approximately $260,000 in the AA5 period compared to $40,000 in AA4.

449. DBP states that Department of Mines, Industry Regulation and Safety (DMIRS) has advised Process Safety Indicators will be required under WA Safety Regulations. In its business case, DBP also suggests further justifications for the increase which are that:

- AA4 expenditure related to the introduction of a new system; and
- AA5 expenditure relates to ongoing evolution, implementation and continuous improvement of the system, as well as ongoing training for staff.

450. While DBP has provided considerable information in its business case on what it has included in this category, we consider that it essentially describes business-as-usual activities for which we can see no compelling reason for an increase of the magnitude that DBP has sought. We therefore consider that DBP's allowance for this item should be adjusted back to its AA4 level, reducing it by $175,000.

Decommissioning

451. DBP forecasts to spend $0.51m during AA5 for decommissioning of assets which are no longer required to comply with statutory or contractual obligations. This compares with $0.36m in AA4.

452. DBP states that this level of expenditure forecast for AA5 is not likely to continue and that at this stage there are no further assets identified for decommissioning in AA6.

453. The assets proposed by DBP to be decommissioned are all redundant, with no apparent prospect for future use. DBP has identified assets at 6 sites:

- HiSmelt Meter Station & Offtake (decommission – onsite)
- Carnarvon Power Station Lateral (mothball)
- Westlime (decommission – dismantle)
- Mondarra Meter Station (decommission – onsite)
- LM500 water bath heaters (5) (decommission – dismantle)
- Eneabba MS (decommission - onsite)

454. After assessing DBP's opex business case, we consider that DBP's approach and proposed expenditure are reasonable.

Observations on future forecasting methodology for these components

455. We consider it useful that for AA5 DBP has forecast the capex to opex projects separately from its BST opex forecast, because they represent work that was previously capitalised and the separate forecast provides transparency and an ability to trend underlying opex. However, with the exception of the ILI Pigging component of Pipelines an MLV Inspections, these are essentially BAU recurrent expenditures at a level equivalent to around $2m per year.

456. If BST is to be used for future regulatory proposals, then it would be more appropriate to include these items in that approach.

8.5 Conclusions

8.5.1 Our findings

457. We consider that DBP's proposal of those components of its opex that it has forecast using BST, is a reasonable estimate of its requirements except that we do not consider it reasonable to allow for a real labour cost escalation factor and we consider that an allowance for productivity growth should be made.

458. We consider that DBP's proposed recategorization of certain minor projects from capex to opex is also reasonable. However, we consider that there are aspects of some of the

proposed expenditure for which DBP has not justified increases compared with its AA4 levels of expenditure.

459. DBP's forecast for GEA and turbine refurbishment is based on standardised assumptions relating to throughput and run-hours. In AA4, DBP managed to make considerable savings against a forecast that was similarly based. We consider that DBP will find opportunities to prudently optimise management of its fleet and to reduce overhaul expenditure from the proposed level. Recognising that not all opportunities that it has taken in AA4 will necessarily be available in AA5, we nevertheless consider that a reasonable forecast would allow for DBP to achieve around 50% of the savings that it achieved in AA4.

460. As a holding value in the adjustment tables below, we retain DBP's forecast SUG value.[125]

8.5.2 Implied adjustments

461. Our assessment of adjustments results from:

- Removing DBP's proposed real labour cost escalation of 0.69% per year;
- Allowing for efficient management and cost savings opportunities that we consider DBP will achieve in its GEA and Turbine overhaul requirements; and
- Allowing for adjustments to two of minor projects within DBP's proposed 'capex to opex' expenditure;
- Allowing for annual productivity improvement of 0.5%, applied to BST components other than Government Charges.

462. The adjusted forecast opex allowance is shown in the table and figure below.

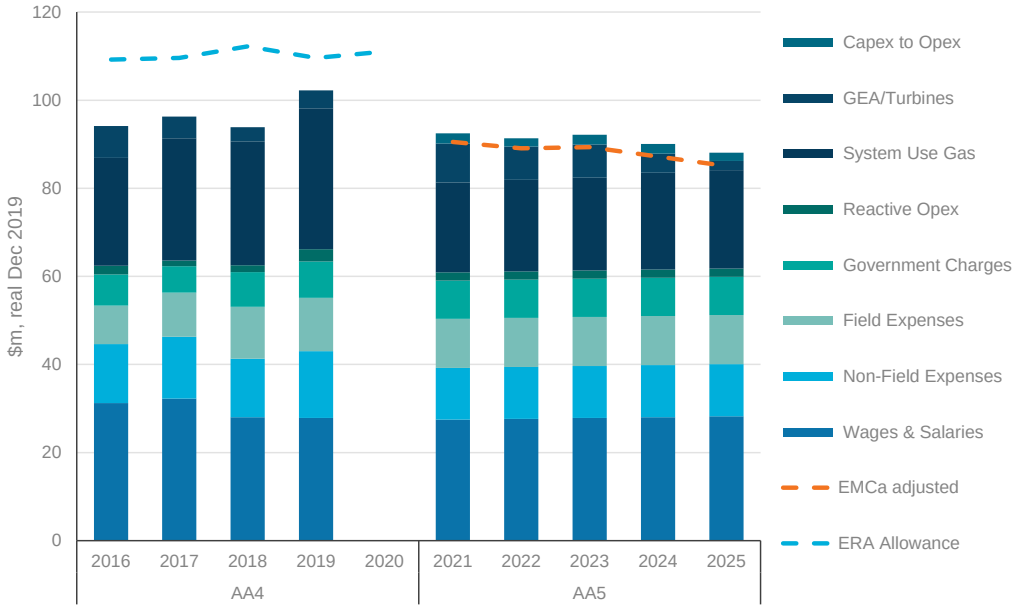
Table 8.5: DBP proposed opex allowance and EMCa adjustment - $m, real Dec 2019

Category	2021	2022	2023	2024	2025	TOTAL
Wages & Salaries	27.5	27.6	27.8	28.0	28.2	139.2
Field expenses	11.1	11.1	11.1	11.1	11.1	55.6
Non-field expenses	11.8	11.8	11.8	11.8	11.9	59.1
Government Charges	8.7	8.7	8.7	8.7	8.7	43.5
Reactive Opex	1.9	1.9	1.9	1.9	1.9	9.4
System Use Gas	20.4	20.8	21.0	22.0	22.3	106.5
GEA/Turbines	8.8	7.6	7.6	4.3	2.1	30.4
Capex to Opex	2.3	1.9	2.2	2.2	1.9	10.4
TOTAL DBP proposed	**92.5**	**91.4**	**92.1**	**90.0**	**88.1**	**454.1**
Adjustment						
GEA/Turbine	*-1.2*	*-1.0*	*-1.0*	*-0.6*	*-0.3*	*-4.0*
Process Safety	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-0.2*
Asset Management	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*-0.2*
EMCa labour escalation	*-0.4*	*-0.7*	*-0.9*	*-1.1*	*-1.3*	*-4.5*
Forecast Productivity	*-0.3*	*-0.5*	*-0.8*	*-1.0*	*-1.3*	*-3.9*
Total Adjustment	***-2.0***	***-2.3***	***-2.8***	***-2.8***	***-3.0***	***-12.9***
Total EMCa adjusted	90.5	89.1	89.3	87.2	85.1	441.2

Source: EMCa analysis derived from DBNGB opex model

125 Please refer to section 5.3.5 for our conclusions from our assessment of SUG.

Figure 8.4: DBP AA5 opex and EMCa adjusted[126]



Source: EMCa analysis derived from DBNGB opex model (PUBLIC) and DBP's response to EMCa02 in which DBP provided actual expenditures from 2016-2019.

126 In response to IR EMCa02, DBP did not provide the estimated/forecast expenditure for 2020.

9 DEPRECIATION AND ASSET ECONOMIC LIFE ASSUMPTIONS

9.1 Introduction

463. For AA5, DBP has proposed changes to several parameters that would increase its regulatory depreciation allowance, as follows:

- Reducing the depreciation life for metering assets and for 'Other depreciable assets';
- Introducing new asset categories for Cathodic Protection, SCADA, ECI and Communications and for Computers and Motor Vehicles, and shifting assets into these categories from existing categories; and
- Capping depreciation lives for all assets, such that their remaining lives are capped at 39 years; that is, to be fully written off by 2059.

464. DBP has proposed that the changes above would apply both to new assets (i.e. AA5 capex) and to existing assets.

465. In this section, we summarise the changes that DBP has proposed, and its associated rationale and provide our assessment of these proposals.

9.2 Relevant information from public submissions

9.2.1 Changes to asset lives and proposed new asset categories

466. Wesfarmers refers to DBP's proposal to shorten the asset lives for the 'Other' category from 30 years to 10 years, and notes that Incenta in its report to DBP highlighted concerns with this for the large generators and inlet scrubbers included in this category. Wesfarmers notes that Incenta also explains that '*the re-categorisation may result in a "price shock" due to the new alignment of physical assets and the regulated asset base and that instead, AGIG has opted for a transitional arrangement to be implemented. However, AGIG's customers and the ERA have not been informed of the quantum of this transitional arrangement.*'[127]

467. Wesfarmers states that it considers DBP's '…*proposed re-categorisation of assets into more precise asset classes is a fair and equitable suggestion so long as it is more reflective of the technical life of these assets*.'[128] Wesfarmers notes that Incenta has referred to the re-categorisations producing price shock, and that DBP has adopted 'transitional arrangements'. However, Wesfarmers is concerned that DBP's approach lacks transparency. [129]

9.2.2 Foreshortening asset lives based on assessment of the overall economic life of the DBNGP

468. Several submitters express significant concerns with DBP's proposal to cap the economic lives of its assets to the year 2059 for regulatory depreciation purposes. The main concerns are:

- There is a wider range of uncertainty for the long-term future uses and therefore the value of the DBNGP, than has been acknowledged and taken into account in DBP's proposal and supporting analysis; and

127 Wesfarmers submission, page 10

128 Ibid

129 Ibid

- The long-term gas price forecast that DBP and its consultants have used in assessing economic value out to and beyond the middle of this century, is considerably higher than current gas prices. In the opinion of the submitters, there are good reasons to believe that low gas prices will continue, for reasons that include the threat to the gas sector posed by the decreasing cost of alternatives.
- While acknowledging the principles of analysis that DBP has presented, it is too early to adopt such a foreshortening and that a range of more favourable gas scenarios are plausible and should be considered.

469. Wesfarmers, for example, states that '*pricing the risk that the pipeline's long term role in Western Australia's energy landscape into the total revenue and tariff calculations in AA5 through a reduction in the standard asset lives (and therefore accelerating the depreciation schedule used in the total revenue calculation) seems premature and would not appear to be consistent with the depreciation criteria required by the NGR.'*[130]

470. Wesfarmers states that it '…*considers that this shows there is insufficient evidence to reasonably conclude that these issues will, or are reasonably likely to, result in the utilisation of the DBNGP declining significantly such that it will cease being utilized before the technical lives of the assets that make up the DBNGP.'*[131] Wesfarmers also considers that DBP has not demonstrated that the increase in tariffs meets the NGR criteria of promoting efficient growth and disagrees with assumption that depreciation should allow for the pipeline to be fully depreciated. [132]

471. CITIC considers that '*whilst is accepted that an accelerated depreciation may be applicable in the general sense, CPM believe that it is too early to adopt such for AA5 on the basis that our operations are expecting a gas supply will be available from the DBNGP for the long term way beyond that proposed by AGIG.* CPM *'…request the Authority to consider a 2070 timeline for depreciation to apply for AA5 and for the acceleration to again be considered in the next review in AA6*.'[133]

472. gasTrading considers that DBP has overstated the value of renewables and understated the value of gas in its assessment of the economic foreshortening of the life of the pipeline. gasTrading criticises the work undertaken by ACIL Allen to support DBP's forecasts as being '….*woefully out of step with the current Western Australian gas market.*'[134] Noting that ACIL Allen's low gas price scenario is $6/GJ,[135] gasTrading refers to current spot prices being near $2/GJ and with contract prices below $5/GJ. Therefore, gasTrading considers that the gas price scenarios that ACIL Allen used to support its analysis are at least 20% above today's long-term contract price expectations.[136]

473. gasTrading questions the way in which the costs of intermittent renewables have been directly compared with the cost of dispatchable fossil fuel generation providing an overly unfavourable comparison with gas, without allowing for their intermittency. gasTrading states that gas at $5/GJ essentially equates to electricity at $50/MWh and that, at this price, gas should remain viable for electricity generation.[137]

474. gasTrading makes the point that '*ACIL Allen did not consider more broadly the possible impacts of electrification on gas demand'*[138] and that low hydrogen costs, such as have been assumed, will themselves suppress gas prices.[139]

130 Wesfarmers submission, page 3

131 ibid

132 Ibid, page 4

133 CITIC submission, page 3

134 gasTrading submission, page 3. The references are to attachments which deal with the assessment of economic life, but express a view regarding the ongoing role of and demand for natural gas transportation.

135 gasTrading submission, page 17

136 Ibid page 16

137 Ibid, page 17

138 Ibid page 3. In context, this is a reference to increasing adoption of EVs and electrification of transport

139 Ibid, page 17

475. In summary, gasTrading states that '*These scenarios above could increase demand for natural gas, they may also lower it. The principal concern being that we are being asked to guess a future where the possibility is much broader than those presented by DBP and ACIL Allen.'*[140]

9.3 Changes to asset lives for specific asset categories

9.3.1 What DBP has proposed

476. DPB has proposed to:

- reduce the depreciation lives for its meters from 50 years to 30 years, and
- reduce the depreciation lives for its 'other depreciable assets' from 30 years to 10 years.

9.3.2 Our assessment

DBP's proposal to reduce the economic life assumptions for meters is reasonable

477. DBP's proposal to reduce the asset life for meters is based on claimed industry practice. DBP notes, for example that the regulatory asset lives for metering assets are 30 years for the GGP, 40 years for the Roma to Brisbane pipeline and 30 years for the Victorian transmission system. It is also at the upper end of the range of 30 to 50 years that ERA publishes in its Guidelines for Non-scheme Pipelines.[141]

478. DBP puts greater weight on the regulatory asset life of 30 years that ERA has allowed for the GGP, since this has been approved by the ERA. In its report for DBP, Incenta compares the metering asset lives in each of the Australian jurisdictions and concludes that '*the proposed revision to this life is reasonable*.'[142]

479. We consider that there is a strong case to reduce the regulatory lives of metering assets from 50 years, which is higher than all other benchmarks, and that 30 years is a reasonable value, based on regulatory precedence and on the reasonable expectation of the economic lives of these assets in the DBP.

It is not reasonable to reduce the economic life of all assets in the 'Other' category, to 10 years

480. DBP proposes to reduce the regulatory asset life of 'Other Depreciable Assets' from 30 years to 10 years. DBP has not provided information on the rationale for this change either in its Final Plan or in its relevant attachment to that plan (Attachment 9.1). We therefore rely for our assessment on the Review of Asset Categorisation that DBP commissioned from Incenta[143] for the necessary background information.

481. In its report, Incenta states that it analysed the capital expenditure within this category. In summary, it found that this comprises expenditure for assets such as office fit-outs furniture, staff amenities, tools, new maintenance, and administrative buildings. Incenta considers that it is reasonable to assign a 10-year life to such assets. In the case of administrative buildings, Incenta states that it holds this view only because there was very little capex on these items, and for the desirability of keeping regulatory calculations simple.

482. Incenta also identifies expenditure on large generators and inlet scrubbers assigned to this category and finds that these account for approximately half of the capex from 2005 to 2020 that is now in this category. Incenta finds that these assets were originally classified as 'compression' but were classified as 'other' in 2010 (including, it appears, retrospectively

140 Ibid, page 4

141 DBP FP 9.1 Categorisation of our Capital Base , pages 2 and 3. Also Incenta

142 DBNGP FP 9.4 Review of asset recategorisations, Incenta, page 10

143 Ibid

back to 2005). At that time, compression and 'other' both had regulatory lives of 30 years, however with the proposed change to 10 years for 'other' this now materially alters the regulatory economic life applied to these assets.[144]

483. In its advice to DBP, Incenta suggests that this treatment is not appropriate. We quote from Incenta's finding on this in full:

> *'(W)e have a concern as to whether leaving the large generators and inlet scrubbers in the "Other" category is appropriate given the proposal that the life for this category be lowered to 10 years…..'.*[145]

484. Incenta further states that

> *'In our view, consideration should be given to transferring those assets to the "Compression" category given the proposed reduction in the life of the "Other" category to 10 years.'* [146]

485. Consistent with Incenta's advice to DBP, we consider that it is not reasonable to assign only a 10 year life to large generators and inlet scrubbers, and that they should be assigned to a category with 30 years' life (as has been the case to date). The submission from Wesfarmers is consistent with our conclusion on this.[147]

486. We also consider that it is not reasonable to assign a 10-year life to administrative buildings. As a matter of principle, we consider that these should be assigned to a category with an economic life of at least 50 years. This would be consistent with regulatory lives applied to buildings and depots in other regulatory decisions.[148]

Our conclusion

487. We conclude that:

- It is reasonable to reduce the economic life for DBP's meters; and
- It is not reasonable to reduce the economic life for large generators, inlet scrubbers and administrative buildings within the 'other assets' category, from 30 years to 10 years. It is however reasonable to reduce the regulatory economic lives of the remaining assets within this 'other' category, to 10 years as DBP has proposed.

9.4 Proposed new asset categories

9.4.1 What DBP has proposed

488. DBP proposes three new asset categories, as follows:

- Cathodic protection (15 years);
- SCADA ECI and Communications (10 years); and
- Computers and motor vehicles (5 years).

489. In a total 2021 RAB value that DBP states as $3,331 million (in Dec $2020), these categories would have asset values of $59m, $105m and $32m respectively transferred into them from existing categories.[149] The majority of these have been transferred from 'Other Depreciable' ($79m); Pipelines ($61m) and Compression ($48m), where they would have had regulatory lives of 30 years, 70 years and 30 years respectively. DBP states that the

144 Ibid, pages 10 and 11

145 Ibid, page 2

146 Ibid, page 11

147 See section 9.2.1

148 See for example those reported in Incenta report, Table 1 (page 9)

149 DBNGP FP 9.1 Categorisation of our Capital Base (page 8)

transfer of these assets into these new categories gives rise to $132 million of additional depreciation in AA5.

9.4.2 Our assessment

The proposed introduction of new asset categories is reasonable

490. DBP's consultant provides supporting advice for establishing these new asset categories and for the transfer of relevant assets. In summary, Incenta finds that the these or similar categories are used by other regulated energy utilities, including GGP, and with similar economic lives. Incenta's advice to DBP is that '*….the application of these additional three categories and the lives proposed is reasonable and appropriate*'.

491. Incenta also reviewed the mechanics of DBP's reclassification and found its data quality to be adequate and its calculations to be correct.

Our conclusion

492. We consider that the three new categories are appropriate. We consider that it will result in regulatory depreciation of these assets that more closely reflects their economic lives, and that it aligns satisfactorily with Australian regulatory precedents for such asset types.

9.5 Foreshortening asset lives based on assessment of the overall economic life of the DBNGP

9.5.1 What DBP has proposed

493. DBP has proposed a significant and overarching change to the way in which its assets are depreciated for regulatory purposes. In summary, DBP proposes that the economic life of its pipeline is likely to be constrained by two factors:

- *'technological change, particularly in respect of renewable energy; and*
- *policy change in respect of decarbonisation.'*[150]

494. DBP notes that renewable energy sources have become rapidly cheaper and this trend is forecast to continue. Those sources also tend to be distributed technologies, that can be deployed closer to centres of demand, such as the Perth region. DBP foresees a time when the value of its gas transport service from the north of WA to the Perth region will likely fall below a building block regulatory price.

495. DBP considers that Federal and WA government carbon emissions policies will also tend to diminish the demand for gas transportation and ultimately may put a hard limit on the pipeline's economic life. DBP refers to the Federal Government's 28% carbon reduction target by 2030,[151] and also to the WA government's announced commitment to achieving net zero for the state by 2050.

496. To reflect these factors, DBP proposes to cap the remaining economic life of all assets at 39 years (from 2020) – in other words, to the year 2059. This figure is based on modelling that DBP commissioned from ACIL Allen, and which in turn is based on an economic framework developed by economists Crew and Kleindorfer.[152] In summary, this framework holds that there is an optimal regulatory depreciation schedule which will depreciate the regulated assets such that revenues recovered through the combination of regulatory depreciation (up to the point of competitive price cross-over) and subsequent recovery from prices limited by

150 DBP Final Plan, page 97

151 Relative to 2005 levels

152 Crew, M and Kleindorfer, P, 1992, *Economic Depreciation and the Regulated Firm under Competition and Technological Change*, Journal of Regulatory Economics, 4(1), 1992, 51-61. As referred to in Attachment FP9.2, *Assessment of the economic life of DBP*, (page 18)

competition, will be sufficient (in NPV terms) to recover the efficient costs of the investment. Once modelled, this tends to imply increasing the rate of depreciation through to the point of competitive price cross-over.

497. ACIL Allen's modelling explores some scenarios, from which DBP proposes a depreciation profile that would cap the economic life of all of the DBNGP assets to no later than the year 2059.

9.5.2 Regulatory precedence

498. In its recent proposal to AER, Jemena Gas Network (JGN) proposed to change the standard asset lives to new economic lives for new investment. Jemena proposed this to address potential cost recovery uncertainties caused by issues, such as a forecast short term declining gas usage trend, the Australian Energy Market Operator's (AEMO) forecast gas supply shortfall, and the NSW Government's 2050 carbon neutral target. On similar grounds to DBP, Jemena proposed that these factors will limit the remaining economic lives of its distribution pipeline assets.

499. In Jemena's case, its proposed change would not apply to its investments already made. The table below shows the specific assets for which Jemena proposed to change to new capped economic lives.

Table 9.1:Jemena proposed changes to asset lives for new investment

Asset Class	Current standard lives (years)	Proposed standard lives for new investment (years)
Trunks	80	50
High pressure mains	80	50
Meters/meter reading devices	20	15
Medium pressure mains	50	30
Medium pressure services	50	30

Sources: JGN – Att 7.10 Table 1-1, page 1

500. In its draft decision the AER has not accepted the proposed reductions to the standard asset lives for the 'Trunks', 'HP mains', 'MP mains' and 'MP services' (pipeline) asset classes, for the following reasons:

- The AER does not consider there is sufficient evidence to conclude that the issues raised by JGN will result in the utilisation of its network significantly declining. AER believes the assumption that the issues raised by JGN that would have the effect of reducing the expected economic life of its assets, are speculative at this point in time and have not been adequately established by evidence-based forecasts;
- While there is still much uncertainty about the viability of hydrogen gas at this stage, AER considers the introduction of hydrogen gas could have a substantial positive impact on the future of gas distribution networks;
- The AER was not satisfied that the proposed reductions to the standard asset lives will promote the long-term interests of consumers, as it will result in an inefficient tariff path; and
- The AER was also not satisfied that the proposed asset life reductions will promote efficient investment in, provision of or use of pipeline services, or that they appropriately address the costs and risks of the potential for under- or over-investment or use of pipelines.

9.5.3 Our assessment

All assessment of economic life involves forecasts

501. Any view of the economic life of an asset implies a forecast, whether this is based on 'general industry practice' for certain asset types, or as in this case, on an assessment of the economic life of the DBNGP overall. In its submission, gasTrading refers to '*…being asked to guess a future…*' and suggests that DBP's consultants should not '*…be so confident of gas prices in over 60 years' time.*'

502. DBP and its consultants sought to address this uncertainty through modelling a number of scenarios, which is a rational approach to deal with long-term assessment spanning many decades, at a time when energy technologies and demand pattern are in a state of considerable flux. We do not consider it reasonable to consider the relevant forecasts to be guesswork, or to imply that DBP and its consultants have overstated confidence in their forecasts.

503. The key issue with regard to the forecasts that DBP and its consultants have made, is to recognise that the economic life assumptions inevitably rely on forecasts, to understand the assumptions that affect these forecasts and to be able to consider the extent to which the forecasts are based on plausible and unbiased scenarios.

There are reasonable counter scenarios to those that DBP and its consultants have relied on and which DBP has not adequately considered

504. There is a wide range of plausible scenarios that could be considered in assessing the economic life of the DBNGP. Reductions in DBNGP throughput are already evident over AA4 and may be indicative of the factors that DBP forecasts to increasingly affect the economics of its pipeline – namely increased distributed renewables penetration closer to the centres of demand.

505. The extent to which any such reductions in use and economic value might be driven by WA-specific carbon reduction policies or driven by technological change and reducing price of competitive sources of energy, is a moot point. While the Federal and WA Governments targets and commitments do not precisely align, they both point to a considerably reduced carbon economy over the coming decades and the inevitability of continued and further policy measures. There is also merit in DBP's position that more onerous carbon standards and associated policies elsewhere is likely to reduce the relative cost of alternatives, thus aligning the objectives and outcomes of cost reduction and carbon abatement.

506. However, there are equally plausible scenarios that may see the DBNGP well-utilised for many years to come. We consider that viewpoints expressed in submissions are relevant, for example: views that WA gas prices may remain low spurring demand for a range of purposes; the potential for additional gas requirements associated with further mining and manufacturing development in WA; and the continuing competitiveness of gas for dispatchable power generation allied with increased electricity demand for EVs. Submitters also refer to the use of the pipeline for hydrogen transportation (as does DBP) and the effect that cheap hydrogen (once available) will have in effectively capping natural gas prices.

507. DBP, its consultant, and submitters have in total provided a significant amount of information of relevance. After reviewing this material, however, we are inclined to the view that the DBP submission is weighted towards scenarios that lead to the economic life limitation and consequent increase in AA5 depreciation that it has proposed, and that counter-scenarios have either not been considered by DBP or have too readily been dismissed.

The economics of long-distance transportation differs from that for distribution

508. In its Jemena decision, AER has pointed to possible re-purposing of natural gas distribution networks to include hydrogen (for example). We consider however that the economics of gas distribution, and the ability to introduce hydrogen into a gas distribution network is different from the hydrogen scenario economics for a long distance pipeline such as the

DBNGP that was built specifically to transport gas from WA's major northern natural gas resource to its Perth region load centres.

509. We consider that there is merit in DBP's argument that the future value of transporting gas over its pipeline will ultimately derive from opportunities to arbitrage between assumed lower costs of production in the north as opposed to higher cost sources closer to the Perth region. However, even if this is the case, DBP has not demonstrated that this arbitrage value is likely to limit the economic value of the pipeline to the extent that regulatory depreciation should be adjusted starting from AA5.

It is reasonable in principle to deal with the limited life of the pipeline through depreciation

510. On a 'cycle of replacement' basis, it is reasonable to depreciate individual assets that comprise the pipeline based on the economic lives of those individual assets. The economic considerations in this definition of 'economic life' essentially relate to replacement economics and associated timing. However, if the pipeline overall is assumed to have a finite economic life, then this then becomes the binding constraint on the economic life of the individual assets. Moreover, this defines their economic lives as opposed to their technical lives, which may be longer.

511. The economic literature quoted by DBP provides what we consider to be a reasonable framework for continuing to depreciate regulated assets (for tariff determination purposes) in the face of an assumed 'market-related' limit on the value of the pipeline that will bind at some point in the future. For reasons stated in that literature, there is also a reasonable case to be made for commencing that revised depreciation path early - once the future limit is recognised - regardless of the uncertainties around forecasting the specifics of when and at what rate the market value of the assets will decline, as this reduces the risk of being unable to achieve an orderly write-off and associated value-recovery from the investment.

512. We have reviewed the modelling that DBP has reported in its assessment, and we consider that the methodology described provides a reasonable basis for re-profiling depreciation of DBP's pipeline assets.

Our conclusion

513. We consider that DBP has not yet provided a sufficiently compelling case to cap the economic lives of its existing and new assets, to the year 2059 as it has proposed.

514. We consider that the conceptual framework for placing such a cap is conceptually sound and may at some time provide a logical basis for applying such a cap. We also acknowledge that as with any forecasts, the assumptions needed for the assessment under this framework will never be known with certainty. However, we consider that DBP's proposal is weighted towards scenarios and logic that support its proposal and provide insufficient recognition of counter-arguments and equally plausible assumptions that would not support its proposal.

515. We suggest that a broader assessment and a compelling response to matters raised in submissions could allow this aspect of DBP's proposal to be reassessed for AA5, or if not, it would be open to DBP to resubmit a similar proposal at some time in the future.

9.6 Conclusions

9.6.1 Our findings

516. We conclude that:

- It is not reasonable for DBP to reduce the economic lives of its large generators, inlet scrubbers and administrative buildings, through their inclusion in DBP's category of 'other' assets and DBP's proposed reduction in the economic life for these assets from 30 years to 10 years;

  - Except for those assets, we consider it is reasonable for DBP to reduce the economic life for 'other' assets to 10 years;
- It is reasonable to add the three proposed new asset categories for Cathodic Protection; SCADA ECI and Communications and for Computers and Motor Vehicles, and the economic lives DBP proposes for these new categories are reasonable; and
- DBP has not made a sufficiently compelling case to adopt a cap on the economic life of individual assets, based on an assumed limited future value of the pipeline, starting from AA5. Therefore, based on the information and assessments that DBP has provided, we consider that it is not reasonable to increase regulatory depreciation for such purpose, in AA5.

9.6.2 Implications

There is insufficient transparency of the implications

517. We consider that DBP has not provided an adequate level of transparency on the implications for depreciation or of the tariff implications of the changes that it has proposed. Wesfarmers has made a similar point.[153]

518. Taking all of the proposed changes together, we would expect DBP to demonstrate the effect on AA5 depreciation and on its proposed AA5 reference tariffs, separately for each of:

- The specific changes to asset lives of existing categories;
- For the "Other' category, the effect of reducing from 30 years to 10 years the lives of large generators and inlet scrubbers and administrative buildings; and
- The effect of foreshortening the economic life of the DBNGP overall, by capping asset lives to the proposed time of 2059, and of some alternative and later years.

519. This analysis would help to assess the materiality of each of the changes that DBP has proposed and the implications of such aspects of its proposal as are accepted.

[153] See section 9.2.1

APPENDIX A – REVIEW FRAMEWORK

1. In this appendix we firstly provide a summary of the requirements of the National Gas Law (NGL)[154] and the National Gas Rules (NGR)[155], and describe the review framework (based on the requirements of the NGL and NGR) that we have applied in our assessment of the capex and opex proposals included in DBP's revised access arrangement.
2. We have not been requested by the ERA to document compliance of the capex and opex proposals with the individual rules and tests included in the NGR as a part of our assessment.

9.6.3 National Gas Law and National Gas Rules

3. As the owner (service provider) of a covered pipeline, DBP is required to submit a full AA to the ERA and to obtain its approval for the price and non-price terms and conditions of access to the reference service(s) DBP provides through the DBNGP.
4. When assessing the Access Arrangement, the ERA is required to have regard to:
   - the Access Arrangement provisions set out in Part 8 of the NGR;
   - the price and revenue regulation provisions set out in Part 9 of the NGR; and
   - the National Gas Objective (NGO) and the revenue and pricing principles (RPP) set out in sections 23-24 of the NGL.
5. Of particular relevance in this context are the provisions the ERA is required to consider when assessing the capex and opex elements of DBP's AA5 Proposal, which are set out in Part 9 of the NGR. An overview of these provisions is provided below.

Capex provisions

6. By virtue of the operation of rules 77(2)(b) and 78(b)[156], the ERA is required to carry out both:
   - an ex-post assessment of the capex incurred (or to be incurred) by DBP in AA4 to determine whether it satisfies the conforming capex criteria in rule 79(1); and
   - an ex-ante assessment of the capex DBP proposes to incur in AA4 to determine whether it is likely to satisfy the conforming capex criteria in rule 79(1).
7. Conforming capex is defined in rule 79(1) as capex that satisfies the following criteria:
   - the capex 'must be such as would be incurred by a prudent service provider acting efficiently, in accordance with good industry practice, to achieve the lowest sustainable cost of delivering services' (the 'prudent service provider test') (r. 79(1)(a)), and
   - the capex must be justifiable on one of the following grounds (r. 79(1)(b)):
     a. the overall economic value of the expenditure is positive (the 'economic value test') (r. 79(2)(a)) [157]; or

[154] The National Gas Access (WA) Act 2009 adopts a modified version of the National Gas Law (National Gas Access (Western Australia) Law).

[155] Under the National Gas Access (Western Australia) Law, the National Gas Rules applying to Western Australia is version 1 of the National Gas Rules, as amended by the AEMC in accordance with its rule making power under section 74 of the National Gas Access (Western Australia) Law.

[156] Rule 77(2) sets out how the opening value of the capital base at the commencement of a new AA period is to be calculated, while rule 78 sets out the value of the capital base during the AA period is to be calculated. In short, these two rules only allow conforming capex to be rolled into the value of the capital base.

[157] Rule 79(3) sets out the matters to be considered when applying the economic value test. In short, this rule only allows consideration to be given to the economic value directly accruing to the service provider, gas producers, users and end-users when determining whether the overall economic value of the capex is positive.

a. the present value (PV) of the expected incremental revenue exceeds the PV of the capex (the 'incremental revenue test') (r. 79(2)(b)) [158]; or

b. the capex is necessary to:

- maintain and improve the safety of services (r. 79(2)(c)(i)); or
- maintain the integrity of services (r. 79(2)(c)(ii)); or
- comply with a regulatory obligation or requirement (r. 79(2)(c)(iii)); or
- maintain the service provider's capacity to meet levels of demand for services existing at the time the capex is incurred (r. 79(2)(c)(iv)); or

c. the capex is divisible into two parts, with one part referable to incremental services and justifiable under 79(2)(b) and the other part referable to a purpose under 79(2)(c) and justifiable on this basis (r. 79(2)(d)).

8. Conforming capital expenditure that is included in an access arrangement revision proposal must be for expenditure that is allocated between:

a. reference services;

b. other services provided by means of the covered pipeline; and

c. other services provided by means of uncovered parts (if any) of the pipeline, in accordance with rule 93.

9. Finally, in determining whether capex is efficient and complies with other criteria prescribed in the rules, rule 71 states that the ERA may, without embarking on a detailed investigation, infer compliance from the operation of an incentive mechanism or any other basis the ERA considers appropriate. It must, however, consider, and give appropriate weight to, submissions and comments received.

Conforming capex vs non-conforming capex

10. Where the capex proposed by DBP (in whole or in part) is found to:

- satisfy rule 79, it will be considered conforming capex for the purposes of rules 77(2) and 78 and rolled into the capital base (i.e. it will be included in the derivation of the reference tariff(s)); or
- not satisfy rule 79, it will be considered non-conforming capex and excluded from the capital base (i.e. it will be excluded from the reference tariff(s)).

11. In this context that while non-conforming capex cannot be recovered through the reference tariff(s), DBP may still undertake this form of capex and either:

- recover that expenditure, or a portion thereof, through a surcharge (r. 83) or a capital contribution (r. 82); or
- include the investment in a notional fund, referred to as the 'speculative capital expenditure account', which may be rolled into the capital base at a later date if the capex is found to satisfy the conforming capex criteria (r. 84).

Opex provisions

12. The criteria the ERA is required to consider when assessing DBP's proposed opex for AA5 are set out in rule 91 of the NGR, which is reproduced below:

[158] Rule 79(4) sets out what is to be considered when applying the incremental revenue test. In short, this rule requires:

a tariff to be assumed for the incremental services based on (or extrapolated from) prevailing reference tariffs, or an estimate of the reference tariffs that would have been set for comparable services if those had been reference services; and

incremental revenue to be taken to be the gross revenue to be derived from the incremental services less incremental opex; and

the discount rate is to be based on the rate of return implicit in the reference tariff.

Operating 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 delivering pipeline services.

13. The forecast of required operating expenditure of a pipeline service provider that is included in the full access arrangement must be for expenditure that is allocated between:

    a. reference services;

    b. other services provided by means of the covered pipeline; and

    c. other services provided by means of uncovered parts (if any) of the pipeline, in accordance with rule 93 (allocation of total revenue and costs).

14. In a similar manner to capex, rule 71 states that in determining whether opex is efficient and complies with other criteria prescribed in the rules, the ERA may, without embarking on a detailed investigation, infer compliance from the operation of an incentive mechanism or any other basis the ERA considers appropriate. It must, however, consider, and give appropriate weight to, submissions and comments received.

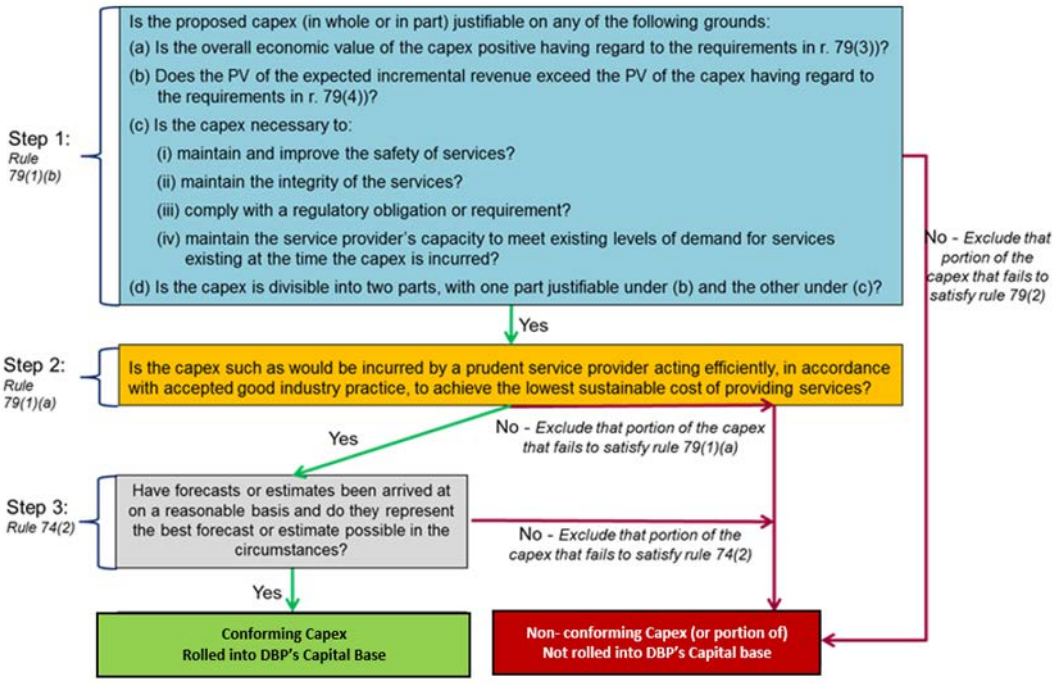
9.6.4 Assessment framework

15. An overview of the frameworks we have used to assess DBP's capex and opex proposals is provided below.

Capex assessment framework

16. The framework we have used to assess whether the capex incurred (or to be incurred) by DBP in AA4 and its proposed capex for AA5 can be considered conforming capex is depicted in the figure below.

Figure 9.1: Capex assessment framework



17. As the figure above highlight highlights, the framework consists of three steps, which are based on the specific requirements set out in rules 79 and 74(2). Where there is discretion as to which ground is relevant under rule 79(2), we have based our assessment on the grounds that DBP has identified, and we have reviewed the evidence DBP has provided in

support of this ground. Further detail on the matters we have considered in each step is provided below.

Step 1: Is the expenditure justifiable on a ground set out in rule 79(2)?

18. The first matter we have considered when assessing DBP's capex proposal is whether the expenditure can be justified on any of the grounds set out in rule 79(2).

19. For those capex projects (or a portion thereof) that DBP has claimed the economic value is positive (r. 79(2)(a)) or that the expenditure satisfies the incremental revenue test (r. 79(2)(b)), we have had regard to a range of matters, including:

- rules 79(3) and 79(4), which set out how the economic value of a project and the present value of incremental revenue are to be calculated; and
- the analysis DBP provided in support of its claim and its underlying assumptions.

20. For those capex projects (or a portion thereof) where DBP has claimed the expenditure is necessary to maintain the safety or integrity of the services, comply with a regulatory obligation and/or maintain the capacity to meet existing levels of demand (r. 79(2)(c)), we have, amongst other things, had regard to:

- DBP's Asset Management Plan (AMP);
- DBP's Safety Case (Safety Case) and the formal safety assessments (FSA) carried out by DBP;
- the Gas Standards (Gas Supply and System Safety) Regulations 2000;
- Australian Standard AS2885 (Pipelines – Gas and Liquid Petroleum Pipelines);
- other regulatory requirements that DBP is required to comply with; and
- the analysis DBP provided in support of its claim and its underlying assumptions.

21. As the figure above indicates, if the capex project in whole, or in part, is found to:

- be justified under rule 79(2), we have then considered whether it satisfies the prudent service provider test in rule 79(1)(a) (Step 2); and
- not be justified under rule 79(2), then we have deemed the expenditure to be non-conforming capex.

Step 2: Does the capex satisfy the prudent service provider test in rule 79(1)(a)?

22. The second matter we have considered is whether the proposed expenditure on capex projects that are justified under rule 79(2) is 'such as would be incurred by a prudent service provider acting efficiently, in accordance with good industry practice, to achieve the lowest sustainable cost of providing the service'.

23. In conducting this assessment, we have considered a range of matters (some of which are more or less relevant to particular projects or programmes of work), including:

- the project governance framework employed by DBP, the key elements of which are DBP's: business planning process; AMP and Safety Case; investment governance arrangements; IT strategy and AMP; forecasting methodology; procurement policies; and risk management plan;
- the project management and procurement processes employed by DBP on particular projects and the nature of any outsourcing arrangements it has entered into (e.g. competitive tender or related party transaction);
- DBP's capability to deliver the proposed projects efficiently in the time proposed;
- the extent to which DBP has adequately assessed and accounted for any benefits from productivity or efficiency enhancing programs (benefits realisation);
- the actual costs incurred by DBP in AA4 relative to what it has proposed for AA5;
- DBP's compliance with Australian standard AS2885; and

- benchmarking of approaches and/or costs against other gas pipelines and/or regulated businesses provided by DBP.

24. As the figure above indicates, where the expenditure in whole, or in part, is found to:

- satisfy the prudent service provider test, we have considered whether the proposed expenditure satisfies rule 74(2) (Step 3); and
- not satisfy the prudent service provider test, then we have excluded that portion of the expenditure that is deemed to fail this test.

Step 3: Do any forecasts or estimates comply with rule 74(2)?

25. The final matter we have considered is whether the forecasts or estimates underlying those capex projects that are justifiable under rule 79(2) and satisfy the prudent service provider test, have been arrived at on a reasonable basis and represent the best forecast or estimate possible in the circumstances, as required by rule 74(2).

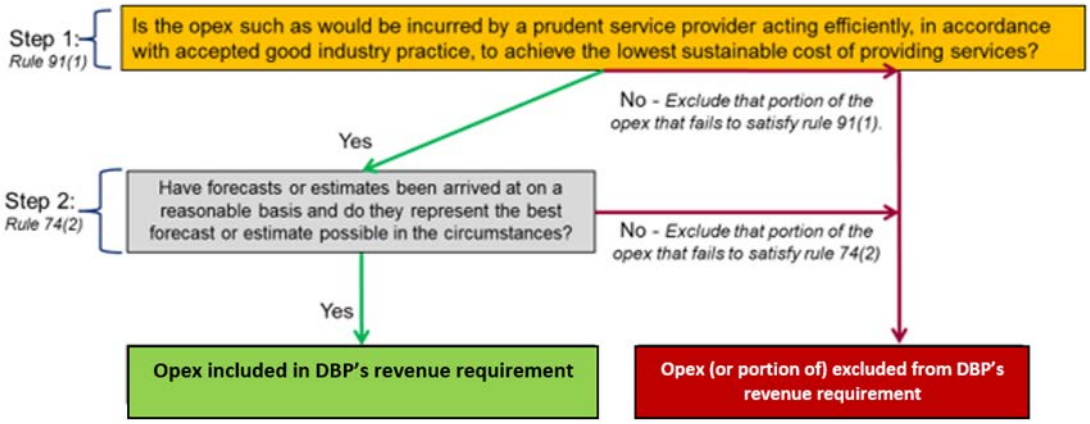
26. As the figure above highlights, where the forecasts and/or estimates are found to:

- satisfy this rule, the proposed expenditure has been deemed to comply with the conforming capex criteria; and
- not satisfy this rule, then we have excluded that portion of the expenditure that fails to satisfy this rule, on the grounds that a prudent service provider would not expect to incur this expenditure (r. 79(1)(a)).

Opex assessment framework

27. The figure below sets out the framework we have used to assess DBP's proposed AA5 opex.

Figure 9.2: Opex assessment framework



28. The questions considered under steps 1 and 2 of this framework are broadly the same as those considered under steps 2 and 3 of the capex assessment framework. The matters that we have considered when applying this framework are therefore largely the same as those set out in the earlier section of this Appendix, albeit focused on opex rather than capex.

29. The only additional matters that we have considered under Step 1 of this framework, which are not relevant to capex are:

- the methods used by DBP's parent company (the AGIG) to allocate corporate overheads to the DBNGP and the extent to which:
- AGIG provides services that justify this as an expenditure item recoverable through regulated tariffs; and
- there is any overlap in services provided by DBP and the AGIG; and

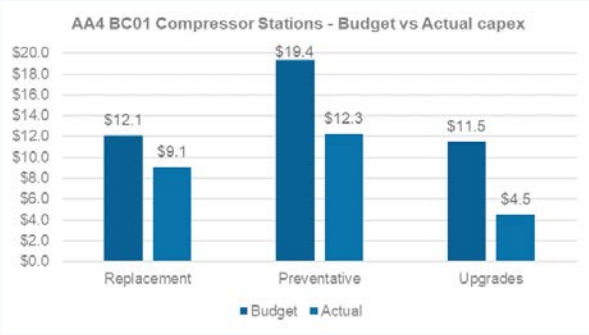
- the nature of any discretionary opex projects proposed by DBP (e.g. business development and marketing) and the extent to which these projects are expected to yield a net economic benefit for consumers.

APPENDIX B – ASSESSMENT OF AA4 CAPEX FROM SELECTED CAPEX BUSINESS CASES

B.1 Notes

- All capex numbers quoted in this Appendix are in June 2019 base unless stated otherwise
- Unless stated otherwise quoted information is drawn from the respective business cases in Attachment 8.5

B.2 DBP category expenditures and EMCa assessments

01 Compressor station	**Background** DBP's approved capex for work on compressor stations in the AA4 period was $43.0m. As shown in the graph, DBP underspent in each category with the collective actual AA4 capex forecast to be $25.9m. DBP advises[159] that the main reason for the underspend was 'reprioritisation of resources due to a number of emerging priorities in other work programs.' (refer to BC 15 discussion, below). DBP advises that the major works delayed to the AA5 period include: • Installation of fire suppressant systems at four Stage 3A Compressor Station (CS) units • One of two CS refurbishment projects (at CS2), due to a cyclone.  DBP also advises that the estimated $2.6m ($Dec 2020) capex directed to Compressor station inspections was a component of Compressor station subsequent costs and is captured under this project.[160] **Assessment** DBP underspent the collective ERA allowance for this business case by 41% or $15.2m if the overspend in BC13 (Compressor station inspections) is bundled with BC01. We asked DBP how it decided which AA4 projects to defer or otherwise not proceed with in the AA4 period in Information Request (IR) EMC09. DBP's response presented DBP's risk ranking tool and the risk scores for all its AA4 projects.

159 Attachment 8.5, p12

160 Reported as a $2.6m overspend under BC13 in EMCa01_AA4 Capex_Confidential v2 (tab AA4 Analysis Dec $20)

	From this information it is not practicable for us to discern what projects DBP deferred (due to the lack of referencing of the myriad of projects to the Business Case). We also asked DBP for close-out reports (per IR EMCa03). No specific information was provided regarding deferment of refurbishment of CS2,[161] although we note that the Close out reports for Compressor station subsequent costs indicate that the ERA allowance of $5.3m was underspent by $2.8m. We therefore assume that many other projects under the 'Compressor Station' program were deferred or deemed unnecessary. Other work may also have been deferred to AA5. We consider that DBP's residual capex strongly indicates that DBP overstated the individual and collective risk of the AA4 Compressor station projects and/or it proposed undertaking low risk projects unnecessarily. We have taken this into consideration in our assessment of DBP's proposed AA5 capex for Compressor Stations. In deciding whether the actual expenditure was likely to be prudently incurred, we took into account the following: • DBP has a risk-based prioritisation tool ('risk ranking tool') which it applied to determine which projects could be deferred or staged to allow for 'budget' to be reallocated to higher priority projects (i.e. in this case, to address the higher priority work at meter/odorant stations described above resulting from unexpected incidents) • it is consistent with good industry practice to assess and reassess priorities on an ongoing basis and to test the prudency of the work program in taking into account changed circumstances • as discussed in section 3: – we are satisfied that DBP's risk ranking tool is a satisfactory means of prioritising and re-prioritising work – DBP has a governance structure that provides the decision-making capacity and knowledge to enable decisions to be made regarding re-prioritisation of work, assisted by the risk ranking tool • we are satisfied that DBP's procurement practices are commensurate with good industry practice. We are therefore satisfied that the actual compressor stations capex incurred was likely to be consistent with what would be undertaken by a prudent operator and at a reasonable cost.
03 SCADA	**Background** DBP's approved capex for work on its SCADA systems was $39k (for alarm management). It estimates it will spend $1.9m in the AA4 period related to the following investments:[162] • hardware $1.0m (servers, firewall, switches) driven by Microsoft upgrading its operating system from 32-bit to 64-bit • Master station security and resilience $0.5m driven by audit findings • simulation hardware $0.2m to help improve operational responses (including alarm management). **Assessment**

161 Response to IR EMCa03

162 Response to IR EMCa22

	Hardware – DBP has assessed the highest untreated risk of this work to be Intermediate. It seems reasonable that for ongoing operational integrity of its SCADA system, upgrading to 64bit hardware is required in AA4. DBP notes that it '*…negotiated an extended support agreement with HP for some of its servers, increasing the warranty period to seven years for the least stressed units*.' This is prudent. Master station security and resilience – the focus on cybersecurity globally has increased significantly over the last 5 years. DBP's capability against the energy subsector cybersecurity capability maturity model (ES-CSM2) was assessed in 2018.[163] It shows that DBP had significant gaps across the 78 ES-CSM2 domains to Maturity Indicator Level 3 (the highest level). The ES-CSM2 is the foundation of the Australian Energy Security Board's Australian Energy Sector Cyber Security Framework (AESCSF). It is an existing industry standard that has been adopted globally. On this basis it is an appropriate reference for DBP. Master stations are a critical element of pipeline operation and are vulnerable to cybersecurity breaches. DBP has not provided detailed information about what was achieved for the $0.5m spend. It appears that the SCADA Master station cybersecurity initiatives were undertaken in 2018 and 2019, with the untreated risk rating = High, which is appropriate. Simulation hardware – based on the information provided it appears to be a reasonable initiative to undertake. We consider that the actual AA4 expenditure is likely to satisfy the capex criteria.
09 Compressor Control Systems	**Background** The ERA allowance for replacing two compressor station control systems (at CS7/2 and CS2/2) in AA4 was $3.1m, noting that half of the work at CS7/2 had been done in the AA3 period. The estimated capex is now $6.5m which is to bring forward replacement of the control system at CS4/2, as shown in the table from DBP's response to IR EMCa13. **Assessment** The unit costs were estimated at $1.9m ($2010) but the actual cost was $2.5m. After allowing for escalation, this is an increase of about 20%. DBP explained the cost increase as arising from: (i) exchange rate variation (US/AUS), (ii) OEM 3% annual cost increase, and (iii) increase in scope of works, noting that some units require more changes than others.[164] In response to our IR EMCa32, DBP provided supporting information to explain the reason for the cost increase. The highest inherent risk rating associated with the CS4/2 control system project was High (due to potential loss of gas supply). This is a reasonable rating given the function of the control system. We asked DBP for further information to justify the advancement of the CS4/2 (per IR EMCa32). In its response it outlined that the reasons for bringing forward the CS4/2 work are: • the obsolete operating system of HMI was identified as posing a serious cybersecurity risk • components of the control system were no longer supported by the OEM and the obsolete software could not support recommended software changes *Extract from DBP's response to IR EMCa32* **Year / Cost / Compressor / Activities** 2016 / 1,539 / CS7/2 / Installation and commissioning 2017 / 2,486 / CS2/2 / Design, procurement, installation and commissioning 2018 / (77) / CS2/2 / Design, procurement, installation and commissioning 2019 / 2,445 / CS4/2 / Design, procurement, installation and commissioning 2020 / - / - / No activities required, next replacements falling due in AA5

[163] It is not clear from the documentation whether this was a self-assessment or an independent assessment

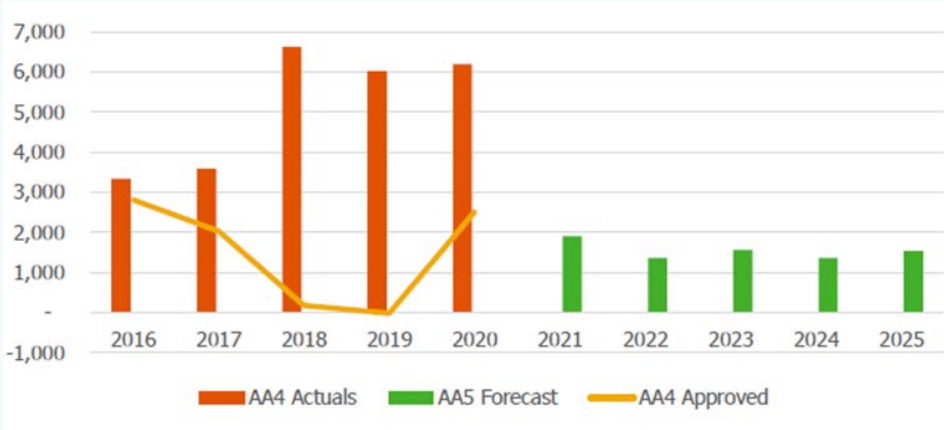
[164] BC09 (Attachment 8.5, p166)

	• the unit was '*nearing the end of its technical design life'.* On the basis of the information provided, the cost increase is reasonable, and the capex is likely to satisfy the capex criteria.
10 Jandakot accommodation	**Background** The ERA allowance in AA4 for refurbishment of its accommodation at Jandakot was $15k. The actual capex was $284k for replacement of a demountable unit at the depot. **Assessment** No other information about the project has been provided by DBP however we understand the assessment was based on condition, not age. The untreated risk was assessed to be either Low (2016 and 2017 assessments) or Intermediate (2018 assessment).[165] Based on supplementary information received at the on-site meeting with DBP that the condition of the refurbished accommodation was unacceptable (based on safety), we consider that the actual AA4 capex was prudently incurred. We are satisfied that DBP's procurement policy and practices are adequate to ensure a competitive price for the work. We therefore consider the incurred cost is reasonable.
11 Maximo & DMZ	**Background** Maximo is an IBM maintenance management software system. DMZ (Demilitarised Zone) is a perimeter network used to separate and provide cyber security of OT tools and systems from the rest of DBP's IT tools and systems. There was no AA4 ERA allowance for annual updates, patches, and enhancements to Maximo nor the DMZ software and hardware. However, it undertook $1.4m capex in AA4 on: • Lifecycle-driven upgrades ($0.5m): control room, EOC1 MMI equipment, operations facilities, OT DMZ hardware • Routine software refreshes ($0.1m) • Cybersecurity ($25k) • Maximo business case process redesign ($0.7m). **Assessment** Lifecycle-driven upgrades and routine software refreshes are typical recurrent expenditure and would normally be planned for with the forecast capex based on historical costs. It is not clear why DBP did not forecast capex for these activities, although the work may have been part of the discontinued 'subsequent costs' category. We note that in AA5 Business Case 21 (Attachment 8.5, p323) there was a 'delay to DBP's planned Maximo upgrade' which offset other capex increases. The Cybersecurity work is consistent with DBP's strategic direction. The Maximo business process redesign project is a continuous improvement project arising from an audit. The claimed benefits include '*data capture will change to better reflect data reporting requirements…with improved transparency and alignment within and across financial years.'*[166] The project benefit is stated only in terms of reduced risk (to Intermediate). The project started in 2019 and is scheduled for completion in 2021. Good practice dictates that a benefits-driven project is supported by an options analysis that includes an NPV analysis to demonstrate that the project has a reasonable prospect of delivering a material net benefit (i.e. accounting for uncertainty of delivered costs and benefits). DBP has not followed this practice. However, our concerns in this regard are offset by its staged approach, testing the benefits realisation via a pilot phase and revisiting the project approach to '…*align with Maximo's capability and to produce a new custom application to address [other [improvement outcomes].*'[167] The re-configuration was trialled at several sites in 2019 '*to ensure the best*

165 EMCa09_AA4 SIB Risk Ranking_Confidential (version 1)

166 Business Case 11 (Attachment 8.5, p204)

167 Response to IR EMCa21

	workable philosophy and associated business processes could be embedded within the tool to maximise benefit for us.' The results of the trial are described DBP's response to our IR EMCa21. We are satisfied that the approach was a reasonable means of determining that the balance of the project was worth progressing with the balance of the work project. DBP provided cost breakdowns for the work completed and for the cost and activities remaining. Given our view that DBP's procurement policy is commensurate with good industry practice, and the information in the response, we also conclude that the to-be-incurred cost is likely to be reasonable. We therefore propose no adjustment.
15 Metering station	**Background** The ERA allowance for meter stations upgrades and repairs was \$8.1m. The estimated actual capex is \$26.4m, a \$16.3m variance driven by three unforeseen events/projects: • Overpressure incident at Kwinana Power station • Valve failures at Alcoa • Odorant spills. DBP primarily re-prioritised 'budget' from Compressor Stations (BC01) to enable the overspend on metering stations. *Extract from BC15*  **Assessment** Overpressure incident – DBP reports working with the DMIRS[168] to endorse a new meter set design, which has or will cost c\$11m incremental capex to install at relevant meter stations to reduce the risk of downstream pressurisation to an acceptable level. This is a reasonable response to the incident. Valve failure – valve failure was due to corrosion and an incremental cost of \$5m was required to repair and reconfigure the pipework to allow maintenance in the future. DBP advise that preventative maintenance was not undertaken because of the existing configuration / disruption to Alcoa production. DBP does not mention the disruption cost of the incident or the repair, however it was prudent to rectify the configuration issue as part of the repair work. Odorant system – the incremental cost to fix what DBP advise was an unreliable odorant system and to upgrade measurement equipment at the same time was \$1m. This is a reasonable approach. We consider that the actual AA4 expenditure is likely to satisfy the capex criteria.
17 Fleet & civil	**Background** The ERA allowance for its fleet and civil equipment assets was \$3.8m. It expects to actually spend \$5.2m, an increase of \$1.4m (+37%). DBP's current asset management process includes targeting vehicles five years old or between 150,000km and 250,000 km for replacement based on '*an assessment of escalating maintenance costs and increased risk profile after these milestones.*'[169] DBP advises that (i) it

168 Department of Mines, Industry, Regulation and Safety

169 BC17 (Attachment 8.5, p266)

	reallocates higher mileage vehicles to locations which are more benign for the vehicle, and (ii) the average distance covered by vehicles disposed of in the AA4 period was 237,000 km. DBP's replacement of civil equipment (trucks, graders, tractors, etc) exceeded the ERA Allowance of $0.2m by $0.4m.[170] No explanation is given for the Civil equipment increase in the business case. **Assessment** Vehicles: we consider that DBP's vehicle asset management practice is sound as evidenced by the average mileage at replacement of the vehicles at 237,000km. However, DBP does not explain in the business case why it will overspend the ERA allowance by 36%. DBP advised in response to IR EMCa44 that (i) it replaced [redacted] in CY2016, [redacted] more than the average in the subsequent years, due to delivery delays in 2015, and (ii) the average actual vehicle cost was [redacted], not the expected [redacted] (i.e. an increase of 6%). Whilst the reasons for the delivery delay are not stated, in our experience such delays are not uncommon. The actual cost of the delivered vehicles is within 6% of the estimate made several years prior. Again, we consider this variation to be reasonable. Overall we consider the incurred capex to be reasonable. Civil equipment: in response to IR EMCa44, DBP identifies urgent replacement of an odorant transport vessel in 2019 ($0.2m) as the major driver of the cost increase – this is reasonable. However the balance of the overspend (approx $0.2m) is not explained.[171] However, we are satisfied that DBP's civil fleet asset management practices are commensurate with GIP and we consider that it is likely that the remaining overspend of $0.2m is likely to be reasonable. In summary, in our view DBP actions are consistent with good industry practice and the incurred capex is reasonable. We propose no adjustment.
21 IT Sustaining Applications	**Background** The ERA allowance for this capex category was $2.9m. It forecasts spending $6.5m, an increase of $3.6m (+$124%). DBP advises in BC21 that the largest contributor to the overspend was its finance system: • $0.5m in 2016 and 2017 on unplanned updates, and • $3.0m planned upgrade in 2020. A further $1.0m increase in AA4 was for implementing an AGIG email system, Office 365 and other update projects (Pay Global, INX, CAD and Windows, SPOT journey) offset by a delay to its Maximo upgrade (see BC11, above). DBP further advise that the variations from the ERA allowance were '…*caused due to the ad-hoc approach towards application lifecycle management which will be corrected for under the proactive approach recommended in AA5.'*[172] **Assessment** MS Dynamics AX ('Dynamics') In response to our IR EMCa22, DBP advises it spent $2.6m on Dynamics prior to Go Live in 2015 which included numerous unsuccessful attempts to resolve configuration issues. Following Go Live it spent another *'…$642k on product enhancements and product releases (17 in total) based on the priority issues where the system has not met our requirements…despite these efforts the system remains sub-optimal).*[173] This capex was incurred in 2016-2019. DBP advised at the on-site meeting that, with the benefit of hindsight, it considered the decision to move from SAP to Dynamics was poor. Our review of information provided in response to our IR EMCa45 confirmed that DBP undertook

170 EMCa25_AA4 Capex_Confidential_Updated model for Asset Class

171 DBP refers in its response to the ERA allowance of $0.37m. This does not align with the capex models which we have been provided and which we have relied upon for our analysis

172 Business Case 21 (Attachment 8.5, p328)

173 i.e. $1240 higher than the $0.5m quoted in BC21

	further enhancement work post Go Live in the AA4 period, which was problematic to implement (e.g. due to lack of a middleware tool and customisations from previous releases of Dynamics). DBP's preferred Option 2 in its AA5 capex proposal is to commence replacing Dynamics in 2020 because it 'comes out of support' at the end of 2021 and because it is a 'sub-optimal system'. Our concerns with DBP's Option 2 analysis are: • the expected $3.0m capex in 2020 is part of an 'Interim DBP finance solution' that according to BC21 is forecast to cost a further $2.0m capex in AA5 (plus change management charges plus opex). AGIG's IT initiative roadmap[174] notes that *'[t]he interim DBP finance solution is still subject to further investigation, and an indicative timeline is entered here for completeness'*. The roadmap shows work on the 'Interim DBP finance solution' across Q3 and Q4 of 2020 and Q1 of 2021. DBP's response to IR EMC34 appears to update the forecast capex for implementing the interim solution to $4.2m and updates the timing to start no sooner than the fourth quarter 2020 (i.e. a delay of at least 3 months). This would have the effect of significantly reducing the capex in 2020 for the currently expected $3m, deferring the balance into AA5 • an NPV analysis is not available to assist comparative analysis (i.e. with the other options) • it does not consider the total cost of the Finance Management System initiative (I-03 in the business case) – it does not account for the $3.0m cost in 2020, and so the presentation of the initiative cost of $2.25m is understated by $3.0m. With this correction, the total capex of Option 2 would be 20% higher than Option 3. BC21 also discusses Option 3, which is to delay the replacement of Dynamics until the planned AGIG-wide 'One ERP' solution is adopted in 2023. The identified advantages of the option are: (i) move $3m from 2020 to 2023, (ii) reduce DBP-only costs by sharing system design and integration across the group, and (iii) reduce the likelihood of having to do two finance system migrations in the space of five years. The identified disadvantage is that it: '…*exposes [DBP] to significant risk associated with no system or security updates over a further three year period…*' On the basis of this disadvantage, the option is dismissed. Our concerns with DBP's Option 3 analysis are: • the sub-option of securing extended support for Dynamics from Microsoft is dismissed as too expensive, but this is made without a robust analysis of the risk mitigation and cost deferral benefits afforded by this tactic • there is no explicit consideration of the sub-option (or separate option) of bringing forward the AGIG-wide 'One ERP' project to reduce the exposure risk for DBP (perhaps in combination with extended support for Dynamics) • there is no consideration of the sub-option (or separate option) of deferring the commencement of the interim solution to Q1 2021, which would still leave time for commissioning before the OEM support finishes for Dynamics. In summary, we consider that DBP has not provided sufficiently compelling information to support undertaking the MS Dynamics AX replacement program in the AA4 period. Other AA4 capex DBP's ERA approved capex for other IT sustaining applications in the AA4 period was $2.0m. It now forecasts spending $3.1m. Seven of the ten IT initiatives had zero ERA allowance. This is indicative of poor IT asset management, which DBP appears to acknowledge in its comments regarding its '*ad hoc approach'*. DBP has not adequately explained this overspend (i.e. why spending on other initiatives could not be reduced). In the absence of this information, we cannot be confident that the $1.0m overspend satisfies the capex criteria. Overall, we consider that $2.9m (i.e. the ERA allowance) is likely to satisfy the capex criteria for IT Sustaining Applications.
23 IT Security	**Background** DBP made no separate allowance for IT security projects in AA4. Its estimated AA4 spend is $1.4m, including:

[174] AGIG IT Roadmap_Confidential, p2

	• $0.9m developing and implementing its Cybersecurity Framework • $0.5m on standardising rights and role-based access and implementing multifactor authentication. **Assessment** DBP initiated an assessment of its cybersecurity maturity against the AESCSF in CY2017. As discussed in our assessment of BC03, above, DBP had significant gaps across the 78 ES-CSM2 domains to Maturity Indicator Level 3 (MIL3, the highest level). Whilst DBP has not provided the detail underpinning the expenditure in 2018 and 2019, we note that the untreated risk ranking was High and DBP prioritised this work despite the competition for capex to address the failures at metering stations discussed under BC15, above. Given the global and Australian energy sector emphasis on cybersecurity that has emerged in the last five years, we consider it reasonable to assume that, guided by its ES-CSM2 assessment, DBP appropriately prioritised and undertook prudent initiatives. We consider that the actual AA4 expenditure is likely to satisfy the capex criteria.
26 Comms	**Background** DBP forecasts $2.3m capex compared to $0.8m approved for general communications activities in AA4, an overspend of $1.5m. DBP's unplanned activities were: • replacement of UHF radios ($1.1m) due to an ACMA requirement for a change to the 800MHz band • upgrading network cabling and ethernet extenders at compressor stations ($0.4m) because the old cabling could no longer handle data transfer requirements • telecommunications resilience ($0.4k) in response to communications system outages experienced in 2017. DBP advises that the planned activities were delivered 4% less than the ERA allowance '*except for repairs to huts at repeater sites where the planned repairs have been deferred and rolled into the Northern Communications Replacement (DP08)'*. **Assessment** DBP allowed $0.4m for the repeater hut repair work over the period 2016- 2018. The work had an untreated risk rating of 'Intermediate'. The untreated risk rating of each of the three unplanned activities was High. Based on the descriptions, the extra work was required and the decision to defer the repeater hut work to integrate it with the proposed AA5 Northern Comms project was prudent. We consider that the actual AA4 expenditure is likely to satisfy the capex criteria.

27 Office relocation	**Background** DBP allowed no capex in AA4 for office relocation. It now estimates that will spend $4.2m capex in AA4 on moving from its current premises. The current office includes provisions for 140 staff and DBP's pipeline control room, Operational Technology server room, and Communications server room. DBP describes three options, summarised in the table. Other options were also considered but were not shortlisted because they were inferior to the three considered in detail. The review was triggered by the expiry of the existing lease in mid-2020. The capex for the relocation provides for fit out of the new premises, making good of the current premises, other relocation costs, and replacement of core networking switches/routers at end-of-life. **Assessment** DBP engaged a property advisory firm to provide a 'Strategic Accommodation Report', to identify options and assist with options analysis. The key disadvantages of Option 1 relate to (i) office is in relatively poor condition requiring refit, (ii) operational and technical risks. The office refit leads to a higher NPC than the preferred option without resolving the operational risks to the Control room. Relocating to Osborne Park does not offer any advantages compared to remaining in the CBD. The preferred option is the cheapest overall, despite the lease cost being slightly higher than could be renegotiated for the Esplanade. The business case provides details regarding the estimated opex (lease + outgoings, parking, salary/wage adjustments [Option 3 only], and incremental travel costs [Option 3 only]) and capex (Making good [Options 2, 3], IT/OT infrastructure, fit out and relocation). The costs are based on a combination of commercially negotiated outcomes and supplier quotes. The selected option and cost are likely to satisfy the capex criteria. *Extract from BC27* Table 0.18: summary of cost/benefit analysis **Option** / **Objectives** / **NPC** / **Risks** **Remain at Esplanade and refit** — This option achieves our objectives of delivering for customers and being a good employer, however in the short-term causes the most disruption to the control room (and potentially reliability) and employees in the short-term. It also is not sustainably cost efficient. — $12.7m ($6.2m capex, $6.5m opex) — This option does not adequately address the risk to DBP, and also introduces additional risks in the short-term to People, Reputation, Asset Damage and Supply **Relocate to 140 St Georges Terrace** — This option achieves our objectives of delivering for customers, being a good employer and being sustainably cost efficient — $11.1m ($4.4m capex, $6.7m opex) — This option appropriately moderates the risk to DBP to ALARP **Relocate to 20 Walters Drive, Osborne Park** — This option achieves our objectives of delivering for customers in terms of public safety and reliability, but not customer service, being a good employer in terms of health and safety, but not engagement, and is not the most sustainably cost efficient. — $11.8m ($4.8m capex, $7.0m opex) — This option appropriately moderates the risk to DBP but introduces a new risk to Reputation
28 Southern Comms	**Background** The ERA allowance for replacement communications equipment was $2.1m (Southern Communications Upgrade project). DBP now estimates AA4 capex for the project of $7.0m. This is in addition to $6.8m (real 2016) capex incurred in the AA3 period to replace communications equipment. DBP advises that the project cost variance of +$4.9m was due to removing reliance on [redacted] shared assets. The increased spend will largely occur in 2019 ($1.5m) and 2020 ($3.1m) involving: • installing new equipment on DBP-owned assets (towers, poles, land) rather than on [redacted] assets • redesigning the system configuration so that the DBP southern communications network is no longer connected to [redacted] East Perth Control Centre. DBP advises that the decision to remove reliance on [redacted] shared assets was appropriate because [redacted] advised that: it would no longer permit DBP to use the shared assets unless DBP upgraded the infrastructure

	it planned to sell its communications assets at the East Perth Control Centre (which DBP relies on). **Assessment** We asked DBP five questions regarding its revised solution:[175] • provide evidence to support the advice from [redacted] regarding use of shared assets (including gifting of new shared assets) and selling its assets at East Perth Control Centre that triggered DBP's decision to adopt Option 2 (p423, Attachment 8.5) • explain the restrictions on infrastructure access to perform upgrades and why they would 'continue to delay the replacement of the end of life, failing communications equipment' (p423). • explain the statement: 'Our recent experience negotiating access with [redacted] also poses a new risk, which is the failure to be able to maintain our assets in a prudent and timely manner.' (p424). • explain why the cost of work in table 0.6 (page 424) is significantly higher than the $1.9m (real 2016) to replace communications equipment on [redacted] shared infrastructure assets approved by the ERA for AA4 (p416) • provide the detail (including sources) of the cost estimate of $1.5m in 2019 and $3.0m in 2020 shown in Table 0.8 (p426) and an update of the actual and forecast expenditure. Our assessment of DBP's responses is: • evidence – DBP provided a combination of extracts from and copies of correspondence that provides sufficient evidence that DBP's claims regarding [redacted] revised approach to use of shared infrastructure was as reported in the business case • restrictions and maintenance – whilst we do not consider the restrictions on access for maintenance and repair of DBP's assets imposed by [redacted] to be a major impediment, having separate infrastructure will be more operationally efficient for DBP because it does not need to seek approval from [redacted] and availability of a [redacted] escort to enable DBP to work in its assets under the new configuration • increased cost – the difference in cost between the forecast provided in the 2016 access arrangement proposal and the 2019 cost estimate is due to a change in project scope. DBP provided a comparison of the original and revised scopes of work - the original proposal put forward as part of the 2016 access arrangement was to upgrade equipment on the existing [redacted] infrastructure. However, as described above, access to [redacted] infrastructure was limited, so it decided to move the communications equipment to DBP's own infrastructure requiring construction of additional towers and communications infrastructure, which leads to the higher overall project costs. We are satisfied with this explanation. • cost estimate - DBP provided a breakdown of the cost estimates. Based on the detail provided and because we are satisfied that DBP's procurement process and practices are commensurate with good industry practice, we consider the costs incurred to be reasonable. DBP advises that it has negotiated with the Department of Planning, Lands and Heritage and relevant local governments regarding approval of the new infrastructure assets for the revised project. The project should be able to be delivered in 2020. We consider that the actual and estimated expenditure on this project is likely to satisfy the capex criteria.
30 IT Sustaining Infrastructure	**Background** The ERA allowance was $1.1m. DBP estimates it will spend $1.8m capex. DBP advises that the $0.7m variance is due to: • $0.2m L6 office refit & AV upgrade to medium-sized meeting rooms • $0.3m Citrix upgrade to address server issues by bringing forward the transition to 'virtual servers'

[175] EMCa24

	• $0.3m end-user equipment replacement at end-of-life. **Assessment** Office refit & AV upgrade – from DP's response to IR EMCa09, it appears that this work was undertaken in FY2016/17. With the benefit of hindsight, this work is likely to have been a waste of money due to the recent decision to relocate from it's current , however it is likely to have been a reasonable decision at the time, with the working assumption that DBP was to remain at its current premises. Citrix upgrade – moving to an off-premises (cloud) solution rather than retaining on-prem physical assets is consistent with good industry practice and consistent with IT industry trends. Hardware renewal – the business case does not elaborate on why there was no ERA allowance, however because we are satisfied with DBP's end-user equipment renewal criteria, we are satisfied that this expenditure is likely to be warranted. In summary, we consider that the actual and estimated expenditure on this project is likely to satisfy the capex criteria.

APPENDIX C – ASSESSMENT OF AA5 BUSINESS CASES

C.1 Notes:

- All capex numbers quoted in this Appendix are in June 2019 base unless stated otherwise (i.e. as reported in business cases in Attachment 8.5)
- Unless stated otherwise quoted information is drawn from the respective business case.
- We present DBP's proposed capex profile across the 5 years of the AA5 period for each business case in an embedded table – each table is derived from DBP's AA5 Capex Model[176] and in $Dec 2019 – in some cases there are material difference between the stated business case capex amounts and the equivalent projects in the Capex Model. Our adjustments are based on the capex model, adjusted to $Dec 2019.
- References to '*capex incurred in AA4'* or similar expression is shorthand for *'incurred or expected to be incurred in the balance of the AA4 period'*
- Unless mentioned otherwise, DBP advises that 'all costs have been estimated based on historic costs delivering the same, or similar work, supplier pricing and an asset management schedule.

C.2 DBP proposed category expenditures and EMCa assessments

01 Compressor stations	**Background** DBP propose spending $9.7m more than incurred in AA4. DBP states that the program of capital works is '… *necessary over the next five years to ensure the DBNGP's compressor stations are operating safely, reliably, within acceptable risk tolerances, and are providing a level of performance consistent with that expected by customers.*' The business case covers work in three categories: • end-of-life replacement – 16 projects totalling $16.5m ($Jun 19) for replacement of rotating equipment, electrical control and instrumentation (ECI), power supply, and mechanical equipment • proactive works – 7 projects totalling $12.5m for protecting compressor station assets from corrosion and safety hazards, or required to maintain current performance or improve deteriorated performance • upgrades – 10 projects totalling $6.5m on corrosion protection systems, ECI, software, rotating and mechanical equipment. DBP considered three options:

Compressor stations ($m, Dec 2019)

2021	2022	2023	2024	2025	Total
9.63	5.23	5.87	7.37	8.26	36.35

[176] DBNGP FP_8.6_Capex Forecast Model 2021-25_CONFIDENTIAL

	Option 1 - Maintain the volume of activity and expenditure levels undertaken during the AA4 period ($26m) Option 2 - Move to a replacement on failure policy for all compressor stations projects ($47 to $53.3m) Option 3 - Deliver the volume and activities identified in the AMP ($35.6m) [recommended]. **Assessment** DBP has combined 34 projects under the single business case and it is beyond our scope to assess the prudency of each. We have therefore assessed the proposed expenditure as a whole. Compressor station assets are critical to the operation of the DBNGP. DBP's AMP is based on using manufacturers' guidelines and refresh/support timing to determine the nature and timing of replacement, upgrade proactive activities. We consider that: DBP's stated driver for the increase compared to AA4 capex (i.e. timing of 15 and 30 year replacement cycles falling due) is reasonable DBP's pipeline supply performance reliability of 100% for the last two years indicates that there is some (small) scope for reducing investment and still satisfying the reliability target DBP's options analysis is limited in its scope – we believe that an option based on a capex level between options 1 and 3 is likely to be more prudent. Our proposed 'option 3a' recognises that DBP demonstrated in the AA3 and AA4 periods that it is able to prudently defer or deliver for less than the ERA allowance, a portion of its of work planned at the commencement of a 5-year regulatory period; sources of deferment differ between asset types: e.g. for rotating equipment, the operating duty turns out to be less than forecast; for static equipment, the condition may be found to be acceptable; for software, support can sometimes be prudently extended. Nonetheless, DBP has demonstrated in the AA4 period that it was able to prudently defer expenditure as a result of one or more of the following: • finding cheaper ways of undertaking the work • finding that the condition of the asset(s) was sufficient to allow deferral • integrating proposed projects with other, related projects at a lower combine cost • de-prioritising lower priority work in favour of higher priority work. On this basis, and by applying our judgement based on our industry experience, we consider a reduction of 20% to the proposed option 3 cost (-$7.1m) is likely to provide for a reasonable capex level to achieve the desired asset management objectives for the AA5 period.[177]
02 Pipeline & Main Line Valves	**Background** DBP propose spending $3.2m more than incurred in AA4. The majority of the increase, $2.2m, is for the replacement of end-of-life pig barrel isolation valves and work signage. The business case covers work in three categories: end-of-life replacement, proactive works, and upgrades. DBP state that *'[t]he ongoing capex program is necessary to allow primary asset (the pipeline) to operate with minimal direct and costly repair or replacement of the pipeline itself, maximising the DBNGP's design life.'* Pipeline and MLV ($m, Dec 2019) 2021: 2.04 | 2022: 1.68 | 2023: 2.40 | 2024: 1.94 | 2025: 1.56 | Total: 9.61 DBP considered three options: Option 1 - Maintain the volume of activity and expenditure levels undertaken during AA4 ($6.2m) Option 2 - Move to a replacement on failure policy for all pipeline and MLV assets ($13.1m - $14.1m) Option 3 - Deliver the volume and activities identified in the AMP ($9.4m) [recommended].

[177] If DBP had not deferred a significant amount of activity from AA4 to AA5, our proposed adjustment would have been higher

	Assessment DBP has combined 14 projects under the single business case and it is beyond our scope to assess the prudency of each. We have therefore assessed the proposed expenditure as a whole. Pipeline and main line valve assets are critical to the operation of the DBNGP. DBP's AMP is based on using manufacturers' guidelines and refresh/support timing to determine the nature and timing of replacement, upgrade proactive activities. We consider that: • DBP's stated driver for the increase compared to AA4 capex that a significant number of pipeline and MLV assets are at or will reach the end of their design life is commensurate with good industry practice • DBP's pipeline supply performance reliability of 100% for the last two years indicates that there is some (small) scope for reducing investment and still satisfying the reliability target • DBP's options analysis is limited in its scope – we believe that an option based on a capex level between options 1 and 3 is likely to be more prudent. Our proposed 'option 3a' recognises that DBP demonstrated in the AA3 and AA4 periods that it is able to prudently defer or deliver for less than the ERA allowance, a portion of its of work planned at the commencement of a 5-year regulatory period; sources of deferment differ between asset types: e.g. for rotating equipment, the operating duty turns out to be less than forecast; for static equipment, the condition may be found to be acceptable; for software, support can sometimes be prudently extended. Specifically, • DBP proposes commencing pig barrel isolation valve replacements in 2023 so that the in-line inspections scheduled in AA6[178] can be commenced – we consider the start of this program can be delayed by 2 years because, based on our experience and the amount of time DBP itself has allowed for each valve isolation replacement, the valve replacement work can be undertaken in the year prior to the scheduled inline inspections. This results in a deferral of $1.2m capex into AA6 • DBP found efficiencies and deferral opportunities in the equivalent AA4 business case and as a result underspent the ERA allowance by 15% despite spending extra on pipeline interface corrosion and Working at Height compliance. After reviewing the proposed balance of work, we consider that DBP will reasonably require 10% less (-$0.8m) to achieve its asset management objectives. We therefore propose a total reduction of $2.0m (-21%) to the proposed amount for the AA5 period to provide a reasonable level of allowance.
03 SCADA	**Background** SCADA ($m, Dec 2019) 2021: 0.13 | 2022: 1.68 | 2023: 2.40 | 2024: 1.94 | 2025: 1.56 | Total: 7.71 DBP propose spending $0.1m more than incurred in AA4. The cost estimate is '*based on identifying the number of server replacements required and the appropriate unit cost of each. For software, the cost estimate is based on a quote provided by the* [redacted].' DBP considered three options: Option 1 - Maintain the volume of activity and expenditure levels undertaken during AA4 ($1.8m) Option 2 - Move to a replacement on failure policy (upwards of $1.8m) Option 3 - Deliver the volume and activities identified in the AMP ($1.9m) [recommended]. **Assessment** We concur with DBP's statement that *'[a] failure of SCADA hardware or software can result in the loss of visibility of the asset. In the event of a loss of visibility to a remote site, decisions and protocols developed to maintain safety and efficiency at the affected area are impeded or shut down.'* DBP has supported its proposed capex as follows:

[178] Possibly a year later than planned for some of the ILI program, but this incurs minimal risk

	• the server replacement recommended by the OEM is 4 years – DBP's timing for replacement is based on stretching the replacement time to 6 years • the cost estimates are current, with the large capex in 2024 for upgrading the current version of Scada software [redacted] based on a recent quote from [redacted] • [redacted] • the AA5 proposed capex is commensurate with the AA4 capex. On this basis, we consider that the proposed expenditure is likely to be incurred by an efficient operator acting in accordance with good industry practice and that the capex is reasonable.
06 GEA Control System Replacement	**Background** GEA Control System Replacement ($m, Dec 2019) 2021: 0.92 | 2022: - | 2023: 1.38 | 2024: 3.23 | 2025: 2.77 | Total: 8.30 DBP propose spending $7.6m more than incurred in AA4, noting that *'[t]here was an allowance of $5.8 million (real 2019) in AA4 for GEA controls, allowing for upgrades and rationalisation projects. However, the majority of GEA expenditure during AA4 was deferred to allow resources to be focused on other emerging priorities across the broader capital works program. The [redacted] that was incurred needed to replace key components the GEA at CS8, which was experiencing deterioration in performance.* DBP considered three options: Option 1 – upgrade all unit control systems to the latest version in AA5 ($12.2m) Option 2 - Move to a replacement on failure policy (upwards of $12.2m) Option 3 - Deliver the volume and activities identified in the AMP ($8.1m) [recommended]. **Assessment** The ability of DBP to reallocate approx 90% of the ERA allowance without taking undue risk illustrates again that DBP's work program is biased towards a conservative volume of work (and therefore cost forecast). In this case, DBP states that it was '*…able to defer most of the AA4 works by using obsolete spares that have been recovered from other units. This has provided a temporary fix. However, this short term reactive approach is not a sustainable strategy for AA5.*' It is reasonable to expect that the deferred work will need to be undertaken in the AA5 period, however our analysis shows that despite the 15 year design life, [redacted] are planned for replacement at less than 15 years old, whilst [redacted] are planned to be replaced at 16 years old in the AA5 period. [redacted] GEA control systems that will be 18-20 years of age at the time of replacement are planned for AA6. DBP's proposed replacement program has an average replacement age of 14.7 years. By deferring replacement of [redacted] from AA5 to AA6, and not replacing any units at less than 15 years old, (i) the average replacement age increases to only 15.2 years, and (ii) based on our experience, the increase in operating risk is small. According to its own plan, DBP is capable of replacing [redacted] per annum, so all the remaining AA6 units can be replaced within the first 2 years of AA6, resulting in minimal risk increase. If the units fail in service, it appears they can be replaced at the same unit cost (according to DBP's Option 2 costing). On this basis, we consider that a prudent operator would require $6.9m to manage the risks in the AA5 period, representing an adjustment of -$1.4m.
07 Compressor station accommodation	**Background** Compressor Station Accommodation ($m, Dec 2019) 2021: 1.02 | 2022: 1.02 | 2023: 1.02 | 2024: 1.02 | 2025: 1.03 | Total: 5.11

DBP propose spending $2.7m (47%) more than incurred in AA4, with the reasons given for the increase as: (i) continuing the refurbishment of accommodation at all compressor stations over a 10 year period which commenced in AA4 and which is expected to end by 2025, (ii) the accommodation facilities need renovating and the structural integrity needs to be checked (iii) sealing of the structures to outside snakes and vermin ingress, and (iv) the scope of work also includes work on other buildings on site that need refurbishment.

DBP considered three options:

Option 1 – continue to operate existing accommodation without upgrade ($0.5m)

Option 2 – Refurbish existing accommodation ($5.0m) [recommended]

Option 3 – Install new accommodation ($16.3m)

Assessment

We consider that it is reasonable for DBP to undertake the remaining work in the 10 year refurbishment project due to the condition of the assets.

There appears to be an error in DBP's table 0.13 which summarises the cost of the three components of expenditure. DBP's capex model, provided in response to IR EMCa01, shows $5.0m for the business case. Based on other information in the business case we assume that the sums in table 0.13 for noise & heat mitigation and for building reinforcement is accurate, but the total for kitchen etc work should be $1.3m, rather than the $1.6m shown in the business case.

All the work on fitness facilities and bathrooms was completed in AA4. Most of the kitchen etc work – the exceptions being work scheduled in AA5 at CS2, CS4 (kitchen only), and CS9.

Based on the actual average costs for this work in AA4, the required capex is $0.8m, which is $0.5m less than proposed by DBP.

On this basis, we consider that the reasonable level of expenditure is likely to be $4.5m.

Table 0.5: Summary of accommodation refurbishments by year

Compressor Station	External Fitness	Kitchens, carpets, curtains and painting	Demountable accommodation improvements	Bathrooms
CS1	2018	2018	2022	2015
CS2	2018	2021	2021	2016
CS3	2019	2020	2022	2015
CS4	2019	2020 and 2021	2023	2016 and 2017
CS5	2019	2018 and 2019	2023	2013
CS6	2019	2019	2024	2016 and 2017
CS7	Nil Required	Nil Required	2024	2016 and 2017

Table 0.13: Accommodation refurbishment - cost by activity

Activity	AA5 total
Noise & heat mitigation on the accommodation units	1,000
Building reinforcement in cyclone prone areas and demountable refurbishment.	2,700
Finish kitchen, carpets, curtains, painting and any outstanding bathroom issues	1,600
Total	**5,000**

08 Replacement of Northern Communication System

Background

Replacement of Northern Communications ($m, Dec 2019)

2021	2022	2023	2024	2025	Total
15.25	15.29	-	-	-	30.54

The DBNGP comms network provides SCADA for all compressor stations, MLVs, meter stations, and associated facilities. It also provides the *telephony, mobile voice radio, corporate ethernet, and maintenance LAN (CSN) connections*', including to head stations at Jandakot and the CBD head office. DBP propose spending $30.0m on the replacement of its Northern Comms system, which is $20.9m more than on its southern comms replacement project being undertaken in AA4. The higher cost is because the northern section is much larger than the southern section (e.g. six times as many repeater stations). DBP engaged Calibre to assess the performance and quality of the DBNGP comms network. It provided a cost estimate to replace the failing/obsolete communication equipment, identified the poor condition of a number of critical assets, and outlined two options for asset replacement. DBP advises that it '*…considered the recommendations put forward by Calibre and …have sought to defer capital works where safe and prudent to do so…*' DBP considered three options:

Option 1 – take a reactive approach to addressing issues with the system as they arise ($39.0m)

Option 2 – replace the northern communications system with modern, fit for purpose equipment ($30.0m) [recommended]

Option 3 – replace the northern communications system with fibre optic cable ($99.6m)

Assessment

The northern communications system was upgraded in 2009. DBP advises that the cost per site is approx 40% lower than for the southern communications upgrade (because DBP owns the northern comms assets).

We consider that the [redacted] report is comprehensive:

Table 0.3: Northern communications equipment alarms over the last four years

	2016	2017	2018	2019
Total number of communications alarms	25,960	65,881	44,816	45,045

- it examines the issues and risks with the existing communications systems in detail, covering the 12 major asset components and reviewing:
  - the deteriorating reliability (refer for example to table 0.3)
  - equipment obsolescence, lack of spare parts and other condition-related issues leading to increasing risk of failure of what is a critical asset for operation of the DBNGP – in our view the report presents a compelling 'needs' analysis which justifies action within the AA5 period
- it identifies and discusses the costs and benefits of options for each of the major components:
  - Microwave radio replacement – six options, including the preferred future configuration, and five alternatives based on configurations and budget costings from four equipment suppliers
  - SDH[179] and PDH[180] microwave replacement – three options, with costing based on the assumption that the preferred approach would be carried out as part of the recommended microwave link upgrade, not in isolation
  - Fibre optic cable installation options and budgetary costs
  - Voice mobile radio replacement options and budgetary costs
  - Power systems replacements and budgetary costs
  - Radio hut/shelter replacement or upgrade options and budgetary costs
  - Network management system replacement
  - Telephony replacement options and budgetary costs
  - SCADA and communications and network backup approach and budgetary costing

The conclusions and recommendations (with [redacted] are largely consistent with DBP's proposal.

DBP has reduced [redacted] recommended scope and cost of work of approximately $34m to approx $30m. We consider the scope of works and the timing of the works to be consistent with the undertakings of a prudent operator and that the capex represents a reasonable estimate.

We therefore propose no adjustment.

09 Compressor Package Control System Replacement

Background

DBP propose capex of $18.4m to replace [redacted], which is $12.1m more than incurred in AA4 ([redacted]. DBP advise that '[redacted]

Compressor Package Control Systems Replacement ($m, Dec 2019)

2021	2022	2023	2024	2025	Total
-	4.69	4.70	4.71	4.73	18.84

179 Synchronous Digital Hierarchy

180 Plesiochronous digital hierarchy

DBP replaces the turbine control systems after 18 years due to lack of OEM support after that time – DBP advises that once the OEM '*…no longer provides technical support or spare parts…the equipment quickly becomes incompatible with current systems.'* The units for which turbine control systems are to be replaced are predominantly [redacted] DBP has identified three options:

Option 1 – upgrade all remaining turbine control systems to the latest version in AA5 ($39.1m)

Option 2 – replace on failure ($27.6m)

Option 3 – upgrade the number of turbine control systems identified in the AMP (eight) with new technology as they become obsolete/reach end of life ($18.4m) [recommended]

Assessment

DBP plans to replace [redacted] turbine unit control systems per annum from 2022 – 2025. Whilst we consider that Option 3 is preferable to Options 1 and 2, we explored the possibility of prudently deferring some replacement into the AA6 period. We asked DBP a series of questions in IR EMCa13. The responses were sufficient to convince us that:

- end-of-life is largely determined by age for planning purposes (which corresponds to cessation of OEM support), but age is not an absolute determinant of the replacement date
- alternatives to OEM support is not viable in this case
- DBP will employ the strategy of using spares from replaced systems to extend the remaining life of the remaining [redacted] systems
- scheduling the replacement of compressor packages in blocks gives DBP economies of scale in the purchase of equipment and project delivery.

However, one aspect of the EMCa13 response is inconsistent with the information in the Business case:

- Table 0.6 shows that four of the control systems are planned to be replaced at less than 18 years
- BUT DBP's response states that '*The existing systems installed are limited service phase and will hit end of life in 2022.'*
- DBP's proposed schedule effectively has an average replacement age of 17.5 years, which is less than the technical design life of 18 years. We consider that by employing its life extension strategy (using 'cannibalised' parts from replaced units), it can prudently defer t[redacted] of the [redacted] units into AA6, with no units replaced before 17 years of age. This would increase the average age at replacement to 18.5 years.

Table 0.6: Turbine unit control systems scheduled for replacement

Facility	Unit	Installation	Replacement	Age at replacement
CS1	2	2006	2025	19
CS2	3	2006	2024	18
CS3	3	2006	2022	16
CS4	3	2006	2024	18
CS6	3	2006	2022	16
CS7	3	2006	2023	17
CS9	2	2006	2023	17
CS10	3	2006	2025	19

On this basis, we consider that the reasonable level of expenditure is $13.8m for the AA5 period (i.e. an adjustment of -$4.6m).

10 Jandakot Site Redevelopment

Background

DBP propose capex of $8.3m to construct of a '*purpose-built facility in Jandakot to provide backup SCADA control room, server and communications facilities, warehousing, modern office and training facilities, and accommodation for the Transmission Operations division. This redevelopment will replace existing 30 year old facilities which no longer meet business requirements, operational or safety needs*.' DBP advises that the facility currently imposes significant safety, security and operational constraints. The

Jandakot Facility Redevelopment ($m, Dec 2019)

2021	2022	2023	2024	2025	Total
0.53	-	-	4.10	3.91	8.53

project is planned to commence in 2022 with a survey, followed by several years of design, approval, and procurement before construction in 2024 and 2025.

DBP has identified five options:

Option 1 – reactive approach to addressing issues ($2.3m)

Option 2 – redevelop facilities on the existing site ($8.3m) [recommended]

Option 3 – lease a new facility ($8.5m opex)

Option 4 – build new facilities at a different location (not costed)

Option 5 – staged redevelopment (defer to AA6).

Assessment

Cost-Benefit

We asked DBP a series of questions related to this business case in IR EMCa19; furthermore, in response to our IR EMCa08 we received DBP's NPV analysis for this business case. From DBP's responses we are satisfied that:

- the current facilities will need to be improved to offset the risks and constraints outlined in the business case within the next 10 years
- leasing warehouse facilities and/or training facilities at a nearby location has been considered by DBP as part of its options analysis and it is not a sustainable long term alternative to the proposed redevelopment
- of the options identified, options 2 and 5 are superior to the other options (on the basis of risk mitigation and/or NPC)
- DBP has considered means of reducing the need for hotel nights for regional staff engaging in training at the Jandakot depot e.g. by changing the staff rosters
- Option 5 delivers approximately the same outcome as option 2 in physical terms (i.e. the scope is the same) albeit with a one year delay. The NPC reduction compared to option 2 from deferring the capex in 2024 and 2025 by one year is likely to be offset by ongoing operating costs (accommodation, warehouse stock damage, training opex).

Timing

The current development is on a class A water mound with imposed limits on development which may constrain DBP's proposed redevelopment, particularly given the proposed establishment of what is effectively a hotel on the site to provide overnight accommodation. DBP has allowed only 6 months for the approvals process involving environmental, heritage and Class A water mount approvals to be secured. In our view DBP has not demonstrated that it has adequately considered the likelihood of a more protracted approvals process which are typical with projects of this nature.

We consider that the project is likely to be delayed by at least 12 months and that Option 5 is a more likely scenario. The delay will incur additional opex (stock losses/damage, hotel nights). In our view, AA5 capex of $4.0m is likely to satisfy the capex criteria (i.e. an adjustment of -$3.8m).

11 Maximo and DMZ

Background

Maximo and DMZ ($m, Dec 2019)

2021	2022	2023	2024	2025	Total
1.52	0.16	0.16	0.30	0.16	2.30

Maximo is DBP's asset management software and DMZ is a network used to separate and provide cyber security for DBP's OT tools and system from the rest of its tools and systems. DBP's business case is based on: upgrading DMZ; reconfiguring, upgrading and patching Maximo; and firewall and server replacement. DBP proposed capex of $2.2m, which is $0.9m more than in AA4. DBP advises that '*[s]imilar to other core IT systems, the OT systems need ongoing application renewal to maintain the integrity of the OT environment and manage technology risks*.' DBP has considered three options:

	Option 1 – replace on failure (cost estimated to be higher than for option 2) Option 2 – replacement consistent with the AMP ($2.2m) [recommended] Option 3 – defer everything to AA6 apart from annual patching ($0.4m) DBP advises that the Option 3 cost has been based on relevant historical information or information provide by supplier. **Assessment** The DMZ capex will provide ongoing patching (2022, 2023, 2025), and security-driven upgrades. The Cisco firewall and server capex is driven by standard end-of-life replacement. The Maximo-related work includes standard maintenance investment (updates and patches) but the biggest investment is the continuation of the 'Maximo Business Process Redesign' project which was initiated in 2019. Refer to our comments on the business case in Appendix B. In IR EMCa21 we requested DBP to further information on the AA5 cost estimates (specifically the '*manufacturers guidance')*. DBP's response has satisfied us that: • the DMZ patching and upgrades and firewall and server replacement costs are reasonable as they are based on a combination of recent actual costs and quoted prices for service and hardware • the standard cost of the Maximo patching is based on relatively recent information • the costs of the Maximo Business Process Redesign project are reasonable given that DBP has provided an adequate work breakdown and actual or estimated costs for each component of the work. We are satisfied that it is prudent for DBP to proactively undertake the proposed activities in AA5 and that the cost estimate for the work is reasonable. On this basis we are satisfied that the proposed expenditure is likely to be reasonable.
12 Safety Case Revisions	**Background** Under the Petroleum Pipeline Act (1969) and the associated Petroleum Pipelines (Management of Safety of Pipelines Operations) Regulations 2010, DBP is required to submit a revised safety case to the respective Minister every 5 years. Compliance with AS 2885 is also required. DBP advises that the current Safety case was accepted by the Minister in November 2016. A revised Safety case must therefore be submitted by November 2021. DBP has forecast $0.5m capex to revise the current Safety case. The approach is '*…broadly consistent with the review undertaken in 2015/16…'* DBP spent $442k in AA4 and $0.2m in AA3 on developing the current version. DBP has identified two options: ption 1: undertaken the work with internal resources ($0.5m) [recommended] Option 2: undertake the work with external resources ($0.6m). **Assessment** DBP has an obligation to produce a revised Safety Case by 2021 therefore it is prudent for DBP to propose expenditure for revising the current version in the AA5 period. We consider that using internal resources is preferable to using external resources given the cost savings and what we expect will be a relatively straight forward and incremental update of the current version. Based on the incremental nature of the work (as identified by DBP), we consider that approximately 50% of the $0.6m expenditure to produce the 2016 version is likely to be required to develop the 2021 version. Any cost involved with incorporating the non-covered pipeline assets introduced since the 2016 version of the safety case was approved should be charged to the un-covered assets. We consider that forecast capex of $0.3m is a reasonable amount to produce the updated Safety Case (i.e. an adjustment of -$0.2m).

Safety Case ($m, Dec 2019)

2021	2022	2023	2024	2025	Total
0.51	-	-	-	-	0.51

15 Meter Stations	**Background** Meter Stations ($m, Dec 2019) 2021: 1.94 | 2022: 1.39 | 2023: 1.59 | 2024: 1.39 | 2025: 1.58 | Total: 7.89 DBP owns and operates 58 meter stations on the DBNGP. The forecast AA5 capex is $7.7m compared to AA4 capex of $25.8m. DBP's business case states that '*It is a requirement to maintain meter stations appropriately in order to conform to our Shipper Standard Contracts and relevant Australian Standards (including AS2885, AS3000 and AS60079). Furthermore, each facility is bound by a unique set of compliance requirements for safety (as captured by the DBNGP Safety Case), gas specification (odorant content, gas quality, gas pressure, gas temperature) and gas measurement systems (measurement uncertainty and data quality).* The proposed program of work includes asset replacement, upgrades and preventative maintenance. DBP advise that the AA5 capex is much forecast to be much lower than the AA4 capex because there were a number of one-off incidents: overpressure incident at Kwinana, valve failures at Alcoa, and odorant spills. Refer to our BC15 assessment in Appendix B. DBP has identified three options: Option 1: maintain the volume of activity and expenditure levels in the AA4 period ($25.8m) Option 2: move to a replacement on failure policy ($11.6m) Option 3: Deliver the volume and activities identified in the AMP ($7.7m) [recommended] **Assessment** DBP has identifies 10 projects under the Metering Stations business case, however it is beyond our scope to assess the prudency of each. We have therefore assessed the proposed expenditure as a whole. The proposed activities are based on standard upgrades and asset replacement according to the schedules in the AMP. DBP advise that it will explore '*a small number of emerging techniques and technologies'*. We consider that DBP's options analysis is limited. Option 1 is of no value given that it is based at a level to meet what DBP itself described as one-off incidents. Good industry practice is to adopt preventative not reactive management of meter station assets. A proactive replacement and maintenance approach also complies with the requirements of the relevant Australian Standards. Option 3 does not recognise DBP's demonstrated ability in the AA3 and AA4 periods to prudently defer or deliver planned work[181] for less than the ERA allowance. Of the ten projects, we consider that based on its 'track record' DBP is likely to be able to prudently reduce its expenditure on five[182] of them. These projects either have one or more of the following characteristics: consistent annual expenditure, high annual capital cost and what appear to be rounded-up estimates. We consider a reduction of 10% to the proposed option 3 cost (i.e. an adjustment of -$0.8m) is likely to result in a reasonable AA5 capex allowance.
16 Tools	**Background** Tools ($m, Dec 2019) 2021: 0.38 | 2022: 0.28 | 2023: 0.28 | 2024: 0.28 | 2025: 0.46 | Total: 1.68 DBP has identified four categories of tools which have varying limited useful life, depending on the category of tool: TAM (engineering, land management and system development related), TOM (mainline, facilities, and field technical services and operations related), Borescope, Emergency response (to undertake emergency repair and held in containers). DBP proposes $1.6m capex in AA5 which is $0.4m (+33%) higher than in the AA4 period. DBP explains the higher forecast as arising from:

[181] That is, planned at before the start of the regulatory period

[182] Earthing replacement and AC mitigation of facilities, Meter station valves and control valves overhauls, Heater fuel gas train replacement at meter stations, MLV and meter station hazardous area inspection and rectification works, Meter station piping repair

'An increase in TAM costs (previously captured under subsequent costs)

An increase in the number of tools required with more employees appointed due to an increase in the asset

An increase in borescope replacement expenditure due to the requirement of two replacement cycles rather than one in the period.'

Table 0.5: Comparison of costs AA4 and AA5

	AA4 cost ($'000)	AA5 cost ($'000)	Variance cost ($'000)
TAM tools	171	375	204
TOM tools	883	1,000	117
Borescope replacement	84	200	116
Emergency response equipment replacement	-	70	70
Other	81	-	(81)
Total	**1,219**	**1,645**	**426**

DBP has identified two options:

Option 1: replace tools on failure (>$1.6m)

Option 2: proactive tool replacement ($1.6m)

Assessment

Replacing operational tools on failure is not consistent with good industry practice. From our review of the four components of the cost forecast, we consider that:

- the TOM and TAM tools increases appear to relate at least in part to the addition of un-regulated assets which were purchased/commissioned during the AA4 period and therefore should not be attributed to the covered asset
- the AA4 cost for the borescope was $84k; no explanation is provided of why the cost for two in AA5 is estimated to be $200k
- the emergency response equipment replacement is likely to be reasonable.

On this basis we consider that capex of $1.3m is a reasonable amount for the AA5 period (i.e. a reduction of $0.3m) which is equivalent to the AA4 expenditure on tolls with an allowance for 2 x borescopes at the historical unit cost.

17 Fleet & Civil Equipment Replacement

Background

DBP owns a fleet of vehicles and civil equipment which is used to inspect, maintain, and repair the DBNGP and which are replaced based on age and/or condition. The AA5 forecast is $4.7m which is $0.5m less than the AA4 capex. DBP has identified three options:

Fleet and civil equipment ($m, Dec 2019)

2021	2022	2023	2024	2025	Total
1.03	0.83	1.03	0.83	1.04	4.75

Option 1: undertake the same volume of activity as in AA4 ($5.1m)

Option 2: replace on failure ($4.7m+)

Option 3: replace consistent with the AMP ($4.7m)

Assessment

DBP's replacement schedule is based on forecast vehicle km (between 150k km and 250k km or 5 years). The trigger for civil equipment is 8 years. These triggers have been based on historical performance (including escalating maintenance costs). DBP also advises that it '… *may elect to extend the useful life of a fleet vehicle and/or civil equipment asset if assessment of the same identifies this to be a prudent act…'* We consider that this is a reasonable asset management approach for both categories of expenditure.

Vehicles

DBP has assumed an average vehicle replacement rate [redacted] However, as discussed in Appendix B Business Case 17, DBP's average annual vehicle replacement from 2017 – 2020 of [redacted] contradicts the information

	in Table 0.9 in BC17.[183] DBP does not explain satisfactorily why it expects this average annual replacement rate to be exceeded in AA5 given the relative homogeneity of the fleet. We consider that based on the information provided, a prudent operator would assume replacement of [redacted] over the AA5 period. Civil equipment The cost is reasonable as it is the same as for AA4 and without any expectations of increased or reduced replacement activity in AA5. We consider this approach to costing to be consistent with good industry practice. Conclusion We consider that AA5 capital expenditure of $4.3m (i.e. an adjustment of -$0.45m) is a reasonable allowance.
18 Turbine Exhaust Replacement	**Background** Turbine exhaust replacement ($m, Dec 2019) 2021: 1.21 | 2022: 1.12 | 2023: 0.87 | 2024: 0.87 | 2025: 0.87 | Total: 4.94 DBP recommends replacing [redacted] turbine exhaust systems which have reached end-of-life at a total estimated cost of $4.8m, $4.4m more than incurred in AA4 ($0.4m vs $1.7m ERA-approved capex). DBP advises that (i) as exhausts age they are more susceptible to thermal stress corrosion and cracking; (ii) exhaust failure can expose the compressor to excessive heat or pressure; (iii) stainless steel exhausts installed during ACS (i.e. stage 1) have a useful life of 35 years which may be extended by 2 years by patching, (iv) stainless steel lined exhausts installed in stages 2 and 4 have a useful life of 17 years; (v) stainless steel exhausts installed during stages 3 and 5 have a 20 year useful life, (vi) each of the 10 compressor stations has two GTs (so two turbine exhausts). DBP has identified three options: Option 1: proactively replace turbine exhausts on condition once they have reached End-of-life per AMP ($4.8m) [recommended] Option 2: replace all turbine exhausts that have reached 20 years age in AA5 ($10m) Option 3: move to a replacement on failure policy ($3.4m). Table 0.5: Turbine exhaust replacements in AA5 ($'000) CS2/2 | Stage 3 | 1999 | [redacted] CS5/1 | ACS | 1991 | [redacted] CS5/2 | ACS | 1991 | [redacted] CS6/2 | Stage 2 | 1997 | [redacted] CS7/2 | Stage 3 | 1999 | [redacted] CS8/1 | ACS | 1991 | [redacted] CS8/2 | ACS | 1991 | [redacted] Total | [redacted] **Assessment** Timing Option 1 is based on proactive replacement which is consistent with good industry practice; it is superior to options 2 and 3 given the criticality of the plant and the repair time described in DBP's response to our IR EMCa15. DBP used 'patchwork' in 2008 on [redacted] allowing deferral of replacement until at least 2021 (13 years) and yet DBP has assumed: • life extension of 2 years (to 37 years) from patching of ACS CS units • replacement [redacted] years old– this appears to be overly conservative. Through IR EMCa14 we queried why patching was not planned for the ACS units scheduled for replacement in AA5. In its response, DBP advised that the exhausts are of rectangular profile and less likely to be suitable for patch repair. Nonetheless, it states in the business case that patching affords 2 years extension. In our view, DBP has not provided sufficiently compelling information in its response to explain why it is replacing the [redacted] at less than 35 years old and why patching would not be effective (i.e. for at least 2 years life extension). In

[183] 16 vehicles were replaced in CY2016 due to delays to delivery of 8 vehicles from 2015 (per DBP's response to IR EMCa44)

	the absence of compelling information to the contrary, we consider that [redacted] are likely to be prudently able to be deferred until AA6 (a combined roll-out of $1.7m). Cost Given that DBP has recent experience with turbine cost replacements we consider the unit costs are reasonable. DBP has allowed for $85k for further inspection of the CS6/2 exhaust – we consider this is likely to be uneconomic given that the exhaust will be 7 years past its typical useful life by then. On this basis we consider that $3.0m capex is likely to be a reasonable level for the AA5 period (i.e. an adjustment of -$1.8m) for replacing [redacted] turbine exhausts.
20 CRS	**Background** DBP proposes AA5 capex of $2.8m to modernise its Customer Reporting System (CRS) from Java to HTML5, gain control the source code, and provide better flexibility and response time. This is $2.0m higher than the AA4 capex. DBP has identified four options: Option 1: do nothing – continue with CRS and [redacted] with current support and technology platform ($0.8m); Option 2: continue with CRS [redacted] with enhanced support and technology platform ($2.8m) [recommended] Option 3: continue with CRS and move to a new vendor with enhanced support and technology platform ($2.2m); and Option 4: implement a replacement for CRS ($2.9m - $9.8m). **Assessment** [redacted] We asked DBP five questions in IR EMCa18 regarding its options analysis: [redacted] *(b) DBP advises that Option 3 has the potential for a higher price than option 2 - but this is not substantiated in the business case (p308). Please provide DBP's best estimate for including the transition cost for this option and the assumptions underpinning the advice* *(c) Please explain why DBP has used the average of the range of prices received from vendors - for example, what was wrong with the cheapest offer?* *(d) Please explain why the NPV analysis for option 4 assumes the capex is incurred in 2020 but the majority of capex for Option 2 is in 2023? (per EMCa08-1_DBP20.01_2_NPC analysis)* *(e) Please explain the basis for the total support costs for Options 2 and 4 of $135k (per EMCa08-1_DBP20.01_2_NPC analysis)'* DBP's responses are summaries as follows: • [redacted]

CRS ($m, Dec 2019)

2021	2022	2023	2024	2025	Total
0.61	0.25	0.15	1.68	0.15	2.85

Table 0.16: Total costs - Option 3

	2021	2022	2023	2024	2025	Total AA5	10yr NPC
Capex	1,540	250	150	150	150	2,240	3,090
Opex	135	135	135	135	135	675	1,124
Total	1,675	385	285	285	285	2,915	4,214

Table 0.3: AA5 forecast expenditure

($'000)	2021	2022	2023	2024	2025	AA5
Capex - CRS platform improvements	603	250	150	1,635	150	2,787
Opex - CRS support	135	135	135	135	135	675
Total expenditure	738	385	385	1,770	385	3,462

	• DBP has provided its cost assumptions which result in the option 3 cost estimate increasing to $2.4m • [redacted] • option 2 can be upgraded in two stages; options 3 and 4 cannot • support costs are estimated based on a minimum support of a certain number of days per month at a known hourly rate. On the basis of the information provided we conclude that: • options 1 and 4 are inferior to options 2 and 3 • option 2 ties DBP to a formerly unresponsive vendor for the foreseeable future; the proposed minimum support contract mitigates the risk of non-performance, but the overall cost of the option is relatively high • option 3 should be able to be implemented in stages (i.e. like Option 2); [redacted] is $0.4m (-16%) albeit with increase transition risk (which is offset by the $120k provision for transition support) • option 3 is likely to achieve the same or better outcomes as option 2 at a significantly lower cost; risks are manageable with extra transition support provision We consider that expenditure of $2.4m is likely to be a reasonable allowance in the AA5 period to modernise the CRS (i.e. an adjustment of -$0.4m).
21 IT Sustaining Applications	**Background** IT Sustaining Apps ($m, Dec 2019) 2021: 1.59 | 2022: 0.84 | 2023: 0.42 | 2024: 0.36 | 2025: 0.17 | Total: 3.38 DBP propose AA5 capex of $3.3m deliver ongoing application renewal to maintain the integrity of the overall IT environment, manage technology risks and prevent material outages that impact the ability of the business to function. DBP state that '*[t]his is a continuing program of work that is lower than the prior period due to an informed investment approach rather than an ad-hoc approach*.' DBP has considered three options: Option 1: do nothing differently – continue with current IT applications and ad-hoc approach to maintaining them ($3.5m) Option 2: deliver proactive IT Sustaining Application initiatives ($3.3m) [recommended] Option 3: deliver proactive IT Sustaining Application initiatives but wait for the AGIG wide ERP solution ($5.7m). **Assessment** MS Dynamics replacement Refer to the assessment of the AA4 capex in Appendix B (i.e. for BC21) DBP's preferred Option 2 capex of $3.3m includes $2.0m for implementing SAP Hana as a continuation of the MS Dynamics replacement project planned to be initiated in AA4 (total cost = $5m). The conclusion of our assessment of the AA4 capex proposed $3m to be incurred in 2020 as part of DBP's planned replacement of MS Dynamics with SAP Hana over the period 2020-2021 is that (a) the project is likely to be delayed such that major capex will be deferred from AA4 to AA5, (b) the project should be combined with the One ERP project (with the aim of avoiding two financial system projects within the space of a 2-3 years and to reduce the overall cost to DBP), and (c) the project cost to DBP is likely to be significantly reduced by amortising the implementation of SAP Hana across the whole of AGIG's business.[184] On this basis we consider that the $2.0m planned for the project in

[184] DBP's response to IR EMCa34 provides an updated project cost of $4.2m capex

	AA5 is likely to be sufficient as DBP's share of the One ERP project to replace MS Dynamics, including the extra support costs for MS Dynamics beyond the currently-planned late 2021 decommissioning. Other capex The drivers for the work described in the business case to maintain the integrity of the IT systems and applications are commensurate with good industry practice. The costs for the four initiatives and the program change management appear to be based on reasonable assumptions (including relevant historical costs and vendor pricing). We propose no adjustment to the proposed capex on the grounds that it is consistent with what a prudent operator would incur, and the estimated cost is reasonable. Overall adjustment We consider that no adjustment is required to upgrade DBP's MS Dynamics system and to undertake the other initiatives.
22 IT Enabling	**Background** DBP intends that the IT Enabling project accelerates productivity and asset performance. DBP proposes three initiatives: Business Intelligence ($1.8m), Data management and analytics ($1.7m) , Digital transformation ($1.7m), and Program and change management (included in the other three initiative costs). The forecast capex is $5.1m. DBP estimates the tangible benefits at $8.1 million over 10 years and the 10-year capex at $6.6m. The NPV is $0.5m. There was no AA4 allowance or related capex for 'IT enabling' in AA4. DBP has identified three options: Option 1: do nothing differently – continue with current approach to reporting, document management and collaboration ($0m) Option 2: deliver customised IT Enable initiatives ($5.1m) [recommended] Option 3: deliver out-of-the-box BI initiative only ($1.6m) **Assessment** DBP states that '*Our existing reporting, information management and decision making systems are disparate, difficult to access, inefficient and limiting our ability to make informed and efficient decisions, drive further efficiencies, comply with regulatory obligations and make a range of other improvements to Shipper service delivery, the safety and integrity of services without significant manual effort.'* DBP claims that the untreated risk is High, but its risk analysis states that '*most of DBP's decision's are based on timely, reliable, and accurate information'* undermines the claim that the 'enabling' initiatives are necessary on the basis of addressing a high risk. We therefore consider that if the initiatives are to proceed, each should be supported by a robustly-derived NPV that achieves the equivalent of a hurdle rate (IRR) of 20% or more. In response to our IR EMCa08, DBP provided the NPV analysis for the proposed initiatives. Issues include: • the proposed BI, data analytics, and digital transformation initiatives are at the early stages of planning - the benefits and costs are preliminary • the approach and benefits are based on AGN gas distribution experience and rules of thumb, which in our view may not translate fully to management of a linear transmission pipeline • 60% of the claimed $0.5m NPV is derived from the BI initiatives based on the rule of thumb benefit – but the DBNGP has only about 20 customers, so how much benefit will BI really bring?

BC22 IT Enablings ($m, Dec 2019)

2021	2022	2023	2024	2025	Total
1.47	1.27	1.34	0.55	0.57	5.20

Table 0.3: Summary of AA5 forecast by initiative ($'000)

Initiative	2021	2022	2023	2024	2025	Total AA5
I-10 & 11 Business Intelligence	775	641	398	0	0	**1,814**
I-12 Data Management and Analytics	0	0	765	449	458	**1,672**
I-13 & 14 Digital Transformation	684	618	158	98	98	**1,656**
	1,459	**1,259**	**1,321**	**547**	**556**	**5,142**

	• at $0.5m NPV, the net benefit is marginal – DBP has not presented a sensitivity analysis and we consider that it unlikely the project would be viable under a range of cost-benefit scenarios (e.g. the positive NPV can be erased with a10% cost increase). Whilst there are likely to be benefits from the proposed initiatives, in our view DBP has not adequately demonstrated that the benefits of the five initiatives are likely to be sufficiently high or robust to justify proceeding on the basis proposed. We consider it more likely that a reduced scope of work targeted at realising the highest tangible benefits will result in a viable project of smaller scope. A pilot project may be an appropriate first step in proving the costs and benefits. Given DBP is likely to be occupied with its financial management upgrade which (see BC21) and other IT-projects in the first few years of AA5, we also consider that the start of the work should be deferred until 2023. Based on our experience, we estimate that a pilot project followed by targeting the highest benefits only (i.e. from the BI initiatives) is likely to lead to the best return for investment and provide a platform for developing further cost-saving initiatives in AA6 (which may be self-funding). Based on our judgement, we propose an adjustment of -$3.6m, resulting in a residual amount of $1.5m to access the highest tangible benefits.
23 IT Security	**Background** DBP's objective is to comply with AESCSF MIL3[185] level of cybersecurity in AA5. DBP identifies three key aspects to DBP's proposed capex on cybersecurity: Cyber resilience, Technology and governance architecture, Data protection and privacy. In addition, DBP has made provision for program and change management. DBP has identified three options: IT Security ($m, Dec 2019) 2021: 0.39 | 2022: 0.57 | 2023: 0.36 | 2024: 0.23 | 2025: 0.23 | Total: 1.78 Option 1: do nothing differently – continue with current reactive approach to cyber risk ($1.4m) Option 2: deliver proactive IT Security program to achieve goal maturity level MIL 3 in AA5 ($1.7m) [recommended] Option 3: deliver proactive IT Security program to achieve goal maturity level MIL 3 in AA6 ($1.4m) There was no allowance in AA4 for cyber security as a stand-alone initiative. DBP's actual AA4 capex is $1.4m. **Assessment** Refer to AA4 assessment of IT Security in Appendix B. DBP states that '*Although we do not appear to be materially at risk from storing what most people think of as 'sensitive' information, staff records and some customer information does fall into this category.'* Yet, DBP rates the untreated risk as 'High' stating that '*any threat to confidentiality, integrity or availability of that information, or the information assets…[poses] a major risk to DBP's operations.'* Whilst we are satisfied that DBP needs to continue to improve its cyber security maturity, it has not provided sufficient evidence that the untreated cyber security risk is High. We also note that: • DBP has or plans to implement a large number of new or upgraded systems and hardware as part of its AA4 and AA5 work program since its 2017 AESCSF assessment all of which include 'improved cybersecurity resilience' as a feature. DBP's BC23 covers nine cyber security projects • a large number of the projects or aspects of the AA5 projects appear to be BAU activities or closely related to work undertaken in AA4 (e.g. *'Develop an approach that ensures all systems implemented by DBP are 'secure by design'…;* '*Define appropriate network architectures and processes to enable the effective management of IT, IoT, and OT devices'*). On this basis we consider that Option 3 (complete MIL3 in 2026 rather than 2025) or delivering the initiatives in AA5 at the same $1.4m cost is more likely to satisfy the capex criteria given the lack of a strong business case for achieving Option 2.

[185] Australian Energy Sector Cyber Security Framework; Maturity Indicator Level

	We therefore consider that AA5 capex of $1.4m is represents a reasonable amount that would be required by a prudent operator (i.e. an adjustment of -$0.3m).
30 IT Sustaining Infrastructure	**Background** DBP proposes capex of $4.0m in AA5. The key aspects of the BC30 are: *Refresh key infrastructure including desktops and telephony in line with our lifecycle management plan, incorporating the office relocation where necessary; Maintain a stable technology environment that is current../and fit for purpose; Align DBP to good industry practices around data driven IT asset lifecycle management.'* DBP has identified three options: IT Sustaining infrastructure ($m, Dec 2019) 2021: 0.75 | 2022: 1.04 | 2023: 0.46 | 2024: 0.70 | 2025: 1.09 | Total: 4.05 Option 1 – break-fix approach – ad-hoc approach, replacing assets as they break or move out of vendor support ($1.5m) Option 2 – deliver proactive IT Sustaining Infrastructure initiatives on a 3/5 year asset replacement schedule ($4.0m) [recommended] Option 3 – deliver proactive IT Sustaining Infrastructure initiatives on a 5/7 year asset replacement schedule ($2.6m). Approved capex for similar works in AA4 was $1.1m. DBP's actual AA4 capex is $1.8m. **Assessment** DBP proposes an increase of $2.2 million compared to AA4 to '*remediate historic underinvestment, formalise the current asset lifecycle approach, introduce group services and support our IT Enabling, IT Security and IT Sustaining Applications programs of work.'* We consider that options 1 and 3 will gradually lead to excessive 'technology debt' that is less cost effective over time. We therefore focussed on the costs and benefits incorporated in option 2. Via IR EMCa20 we asked DBP the following questions/requests of relevance to Option 2: *'(b) Provide further explanation of the benefits and cost of introducing 'group services' in AA5* *(c) Explain what forecast capex is expected to be incurred to support IT Enabling, IT Security and IT Sustaining Applications programs of work and where in Table 0.7 this expenditure is allocated (and in what years) (p452, Attachment 8.5)* *(d) Confirm or otherwise that there is no double counting of capex (or opex) between the provisions in this Business Case with Business cases DBP22, DBP23, and DBP21.'* We were satisfied with the information provided in DBP's responses to questions (c) and (d) which alleviated our concerns regarding potential double counting of support and other capex for the work described in BCs 21, 22, and 23. We are otherwise satisfied that the replacement of IT infrastructure to maintain a stable technology environment is aligned to good industry practices. However, we were not satisfied that $0.6m on integrated group services is a prudent and efficient use of capital given the costs apparently allocated to DBP driven by AGIG-wide initiatives. DBP did not provide a cost-benefit analysis in response to our Information Request EMCa08 and so we cannot verify that there are net benefits from this aspect of the project. In our view DBP has not demonstrated that the proposed near four-fold increase in IT sustaining infrastructure expenditure in AA5 from the AA4 ERA allowance level of $1.1m is warranted, nor is a more than doubling of the actual AA4 expenditure of $1.8m. We do however consider that an increase is required to progressively balance the risks associated with growing technology debt and cost. Similar to our assessments of aspects of DBP's pipeline asset renewal programs, we consider that in practice DBP has demonstrated that replacement of assets in practice allows for slightly longer intervals with minimal increased risk but significant (>10%) cost deferral. Overall, we consider that a fourth option that balances the significant cost savings from option 3 and the marginally lower risk of option 2 would appear to represent a better risk-cost trade-off for the purpose of determining an allowance. On this basis we estimate $3.1m is likely to be sufficient to manage the technology risks and to support whatever portion of the shared services benefits are not self-funding after amortisation of costs across the AGIG business as a whole. This represents an adjustment of -$0.9m.