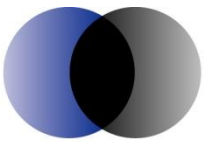
Review of Demand Forecasts for Amadeus Gas Pipeline

For the Access Arrangement period commencing 1 July 2011

Prepared for the Australian Energy Regulator

Draft – 18 April 2011



ACIL Tasman

Economics Policy Strategy

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1 Background

The Australian Energy Regulator (AER) engaged ACIL Tasman to review the adequacy and appropriateness of the methodology used by NT Gas Pty Limited ("NT Gas") to develop forecasts of demand in its Amadeus Gas Pipeline (AGP) for the access arrangement period commencing 1 July 2011, as set out in the proposed access arrangement information submitted by NT Gas.

The *National Gas Rules* (NGR 72(1)(a)(iii)) require the access arrangement information provided by the service provider to include usage of the pipeline over the earlier access arrangement period showing:

- minimum, maximum and average demand
- customer numbers in total and by tariff class.

In making a decision whether to approve or not to approve an access arrangement proposal, the AER is required under rule 74 of the NGR to be satisfied that forecasts required in setting reference tariff(s) are arrived at on a reasonable basis and represent the best forecast or estimate possible in the circumstances.

The process followed by the AER for assessing proposed access arrangements and access arrangement revisions is set out in the Final Access Arrangement Guideline published in March 2009(AER, 2009).

2 This report

A key part of the information submitted by a service provider in support of a proposed access arrangement is a forecast of the level of demand for the reference services provided, over the course of the access arrangement period. This typically involves forecasting demand for services for a period of five years from the commencement date of the new access arrangement. It is important to ensure that the forecasts represent best estimates arrived at on a reasonable basis because:

- Demand forecasts may impact the forecast capital expenditure required to meet the new demand of prospective users or the increased demand of existing users and may therefore influence forecast revenue.
- Demand forecasts influence the tariffs set to meet forecast revenue in each year of the access arrangement period, and how this revenue is to be allocated between tariff classes for different reference services.

2.1 Approach to the review

In undertaking this review, ACIL Tasman has considered the following issues:

1. the adequacy of the overall approach and methodology
2. the reasonableness of the assumptions
3. the currency and accuracy of the data used
4. the account taken of key drivers
5. whether the methodology has been properly applied.

The review has been undertaken as desktop analysis into the methodology, data and parameters, and assumptions used to develop the demand forecasts, as described in the access arrangement information (NT Gas, 2010a) and the supporting confidential access arrangement submission (NT Gas, 2010b). ACIL Tasman has used its own knowledge of Australian gas markets to test assumptions.

3 The Amadeus Gas Pipeline

This section provides a brief overview of the AGP, its history, ownership and operations, based on information provided by NT Gas in its access arrangement submission (NT Gas, 2010b).

3.1 Ownership

ANZ Leasing, a consortium of financial institutions owns the AGP. NT Gas as trustee of the Amadeus Gas Trust leases the AGP from ANZ Leasing under a leveraged lease arrangement. NT Gas is also the licensee and operator of the AGP.

Beneficial ownership of NT Gas is APA Group 96% (through two wholly-owned subsidiary companies, Agex Pty Ltd and Sopic Pty Ltd); PWC 2.5% (through Darnor Pty Limited) and Centrecorp Aboriginal Investment Corporation Pty Ltd 1.5%.

APA Group provides the labour resources under an employment service agreement.

3.2 Development and construction

Natural gas was discovered at the Amadeus Basin, near Alice Springs, in the Palm Valley and Mereenie fields during the mid 1960s. The first commercial production from the fields commenced in September 1983 following construction of a 150 km pipeline to Alice Springs (now owned and operated by Envestra), where gas was used for base load electricity generation by the then Northern Territory Electricity Commission.

In the mid 1980s the Northern Territory (NT) Government commenced a feasibility study of the gas reserves in the Amadeus Basin and an assessment of the economics of hauling natural gas to Darwin via pipeline, to allow delivery to both the Channel Island power station near Darwin (initially designed to run on coal) and the Katherine power station.

NT Gas was formed from a consortium of companies to finance, construct, commission and operate the AGP (then called the "Amadeus Basin to Darwin Pipeline" or ABDP). The pipeline was commissioned in December 1986 and first gas delivered to the Power and Water Corporation (PWC) in January 1987.

After commissioning of the ABDP a number of lateral pipelines were constructed to interconnect with the main line, including:

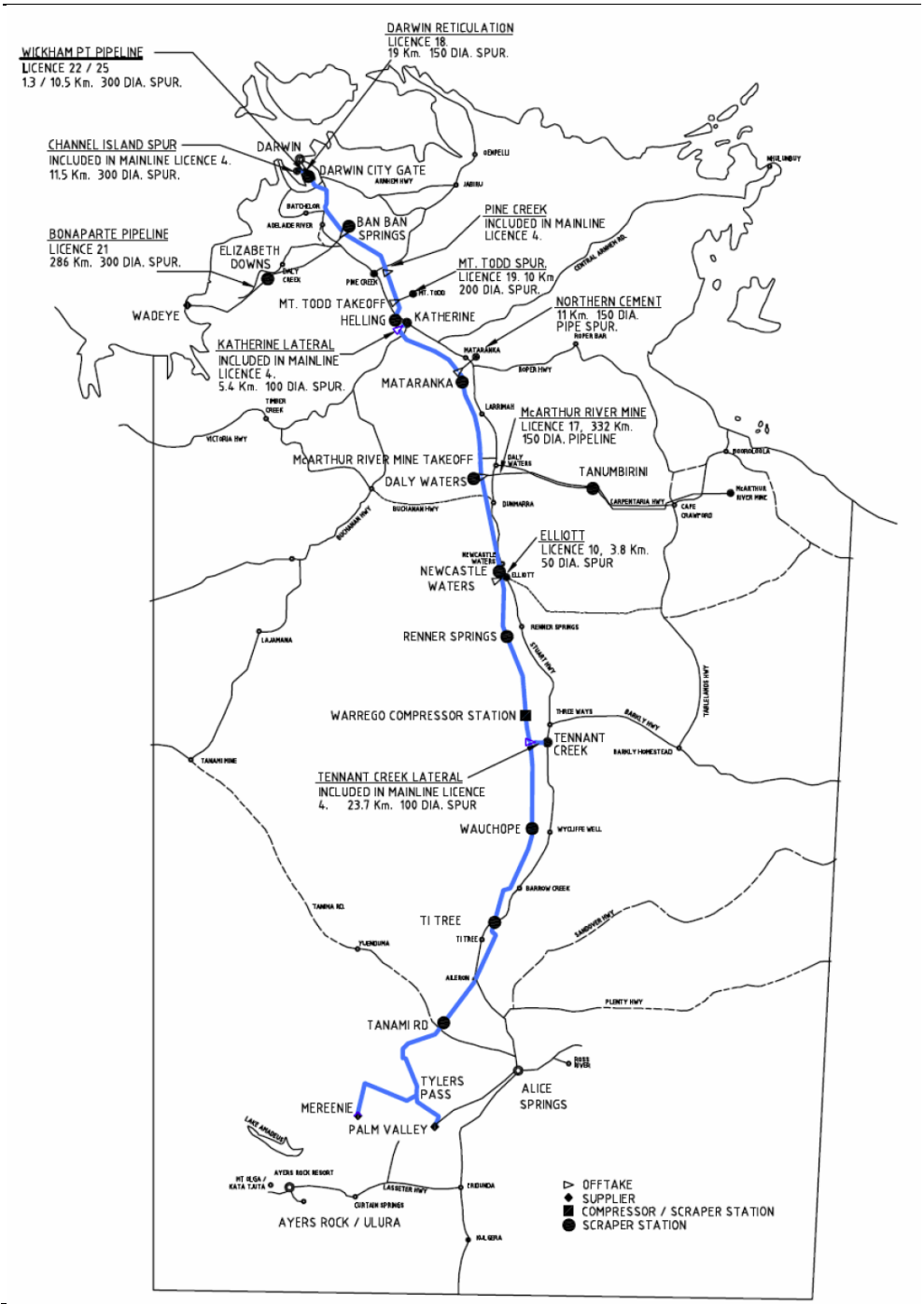
- Cosmo Howley pipeline which was commissioned in 1988 and gas supplied to fuel the power station at the Cosmo Howley mine. In 2004–05 the power station ceased electricity generation and the Cosmo Howley pipeline was decommissioned in 2008;
- Elliott pipeline, commissioned in 1989. Gas is supplied to fuel the power station at the Elliott township;
- Manton pipeline, commissioned in 1989 with gas supplied to fuel a temporary power station at Manton. The power station ceased electricity generation before the start of the current access arrangement period and no gas has flowed to this delivery point during the current period. NT Gas advises that the Manton pipeline is currently undergoing decommissioning;
- McArthur River pipeline, commissioned in February 1995. Gas is supplied to fuel the power station at the McArthur River mine;
- Darwin City Gate to Berrimah pipeline, which was commissioned in January 1996 to supply gas to commercial and industrial users in the Darwin area; and
- Mt Todd pipeline, commissioned in October 1996 to supply gas to fuel the power station at the Mount Todd mine. Operations at Mt Todd were suspended in November 1997. The line was for a short period early in the current access arrangement period for electricity generation fed into the Darwin/Katherine grid, but the Mt Todd lateral is currently idle.

During the current access arrangement period a new delivery point, which when needed can also operate as a secondary supply point, was also commissioned in 2007 at Weddell, located near the Darwin LNG facility on Wickham Point.

Finally, a major new supply point was added to the pipeline at Ban Ban Springs (commissioned in 2008) to allow gas delivered from the Blacktip field via the Bonaparte Gas Pipeline (APA Group) to be delivered into the AGP system.

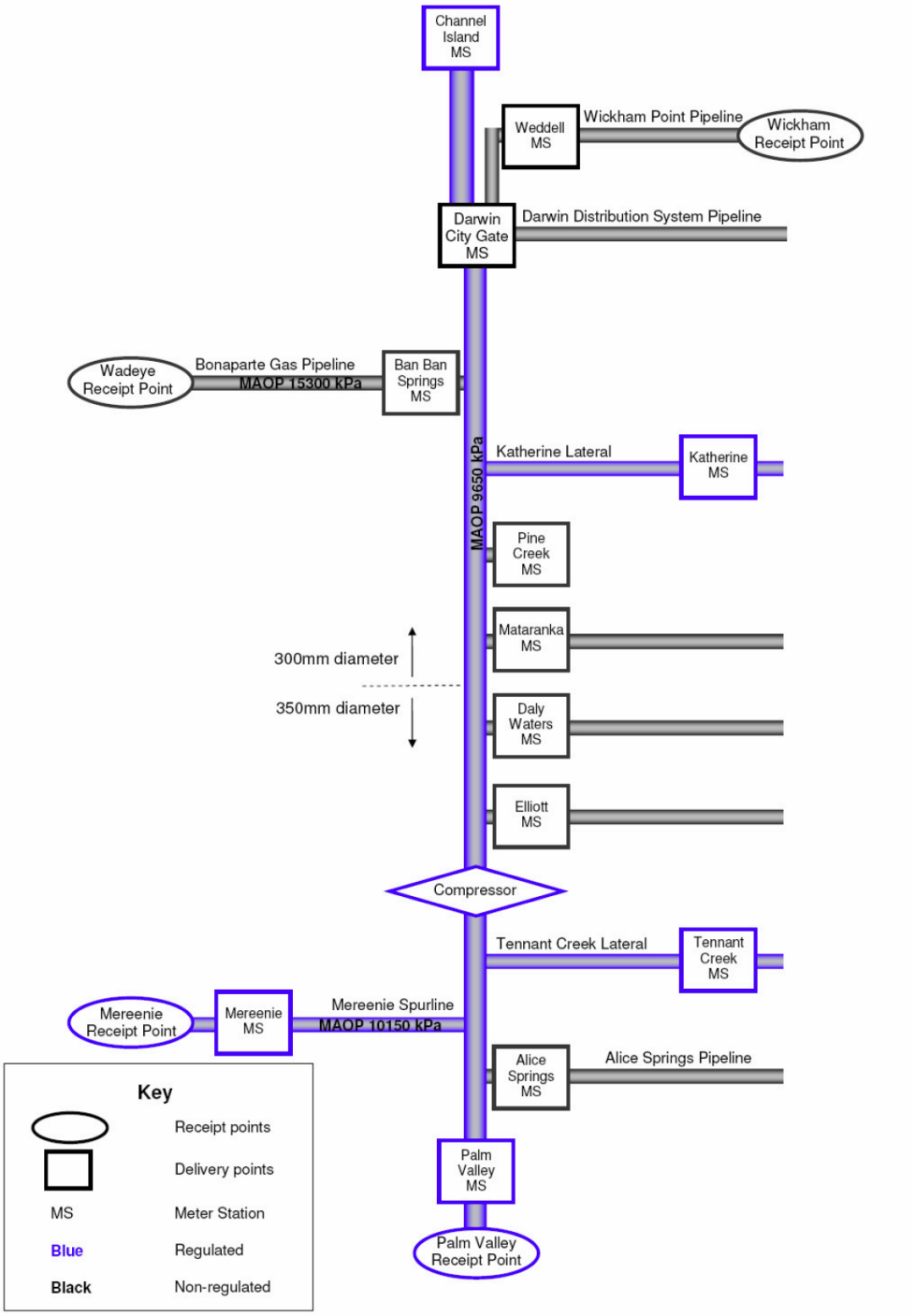
Figure 1 provides a map of the AGP and the other pipelines with which it connects. Figure 2 is a schematic diagram of the NT Gas pipeline system.

Figure 1 **Map of the Amadeus Gas Pipeline**



Source: NT Gas Pipeline access arrangement submission *(NT Gas, 2010b, Fig 1.1)*

Figure 2 **NT Gas pipeline schematic**



Source: NT Gas Pipeline access arrangement submission *(NT Gas, 2010b, Fig 1.2)*

3.2.1 System characteristics

The AGP was initially constructed with no compressor stations and could transport a maximum of 44 TJ/day. In 1995, a compressor station at Warrego (40 km north of Tennant Creek) was commissioned. The compressor station

increased nominal capacity to 55 TJ/day. The connection of the Bonaparte Gas Pipeline during 2009–10 further increased the capacity of the pipeline to 104 TJ/day (notional).[1] The large increase in capacity resulting from the connection of the Bonaparte Gas Pipeline is a function of both gas pressure and the distance travelled by gas. Gas enters the pipeline at Ban Ban Springs at close to the maximum allowable operating pressure (MAOP) of the AGP due to the higher MAOP of the Bonaparte Gas Pipeline, and travels a much shorter distance before offtake compared to gas injected from the Amadeus Basin. This has the effect of increasing the capacity of the pipeline.

3.2.2 Changes in operation of the pipeline

Declining reserves in the Amadeus Basin through the current access arrangement period led PWC, the principal user of the pipeline, to seek a new source of gas supply. Consequently in 2006 PWC entered into a 25-year gas sales agreement with ENI for supply of gas from the Blacktip field in the Bonaparte Basin. At the same time, PWC concluded a gas transportation agreement with Australian Pipeline Trust (now APA Group) to construct a gas pipeline to bring the gas from Blacktip to the existing Amadeus Basin Darwin Pipeline.

The development of the new gas supply point at Ban Ban Springs connecting the Bonaparte Gas Pipeline to the AGP, together with ongoing decline in the quantity of gas being injected into the AGP from the Amadeus Basin, has changed the predominant direction of flow of gas on the AGP to a southerly flow south of Ban Ban Springs.

These operational changes have implications for the transportation services provided by NT Gas on the ADP.

3.3 Historical performance

3.3.1 Customer numbers

The historical customer numbers for AGP by delivery point are shown in Table 1.

Note that the customer numbers by delivery point are not additive: use of the pipeline is dominated by PWC, which is the only user at a number of delivery

[1] The 104 TJ/day capacity is said to be notional because, as noted by NT Gas in the access arrangement submission (NT Gas, 2010b, p. 37) the expected capacity of 104TJ/day based on modeling results for delivery of gas from the Bonaparte Gas Pipeline. This value has not been verified through actual conditions and could vary depending on the location of load.

points, providing gas on a delivered basis to end users. Other users are mostly short-term mining ventures.

Table 1 **Historical customer numbers by delivery point**

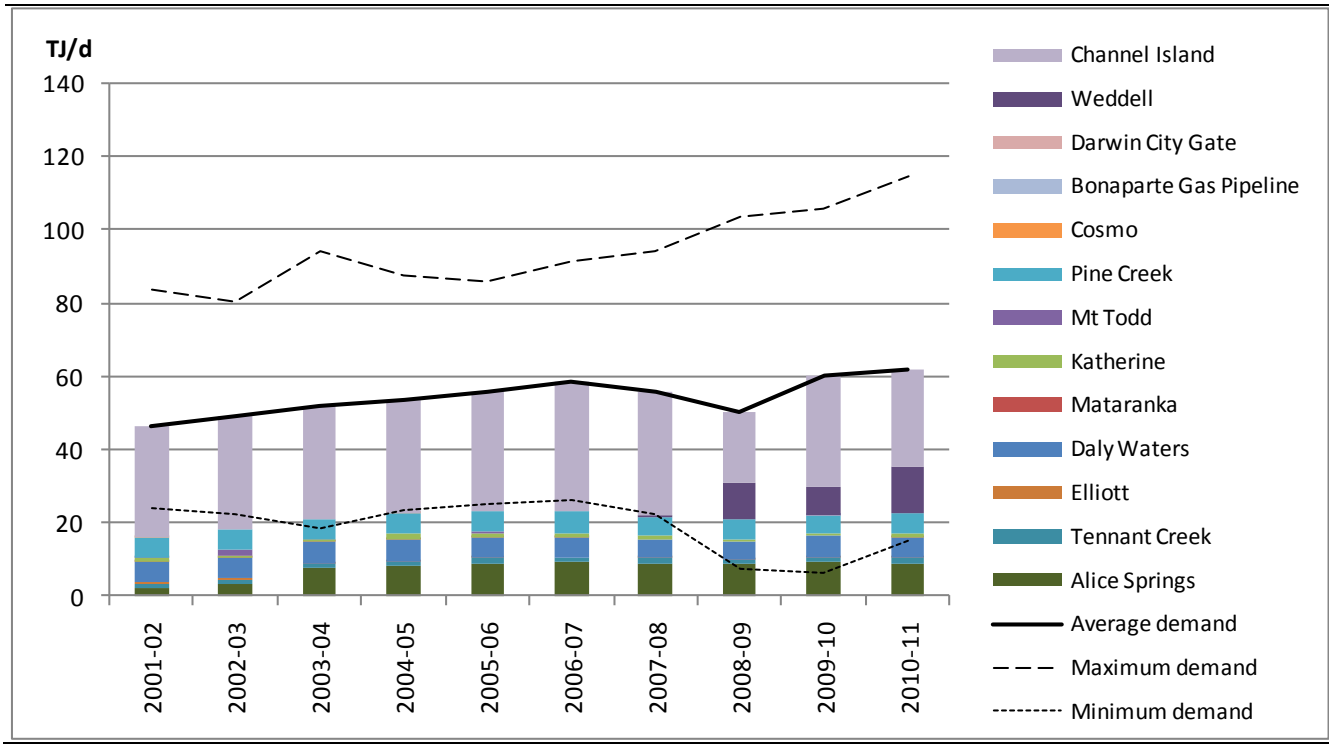
	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11 Est
Alice Springs	1	1	1	1	1	1	1	1	1	1
Tennant Creek	2	2	2	1	1	1	1	1	1	1
Elliott	1	1	1	1	1	1	1	1	1	1
Daly Waters	1	1	1	1	1	1	1	1	1	1
Mataranka	1	1	1	1	1	2	2	1	1	1
Katherine	2	2	2	1	1	1	1	1	1	1
Mt Todd	1	1	0	0	1	0	0	0	0	0
Pine Creek	1	1	1	1	1	1	1	1	1	1
Cosmo	1	1	1	1	0	0	0	0	0	0
Bonaparte Gas Pipeline	0	0	0	0	0	0	0	1	1	0
Darwin City Gate	1	1	1	1	1	2	2	2	1	1
Weddell	0	0	0	0	0	0	1	1	1	1
Channel Island	2	2	1	1	1	1	1	1	1	1

Data source: AGP AA RIN pro formas.xls

3.3.2 Gas demand

Historical gas demand by delivery point for the AGP is summarised in Figure 3 and Table 2.

Figure 3 **Historical gas demand by delivery point**



Data source: ACIL Tasman compilation of data presented in AGP AA RIN pro formas.xls

Note: Values for 2010–11 are forecast estimates.

As can be seen from Figure 3, the majority of the gas transported in the AGP is delivered to the Channel Island power station at Darwin and the nearby Weddell Power Station (since 2008). Other substantial demand locations are Alice Springs, Daly Waters (Macarthur River Mine) and Pine Creek.

Table 2 **Historical gas demand (max, min, avg) by delivery point (TJ/d)**

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11 (Est.)
Alice Springs										
Minimum demand	-	-	-	3.6	6.2	6.1	4.1	1.3	4.2	5
Maximum demand	7	12	31.2	12.4	12.7	13.1	13.3	13.4	14.5	15.3
Average demand	2	3.2	7.6	8	8.9	9.2	9	8.7	9.3	9
Tennant Creek										
Minimum demand	0.4	0.7	0.1	0.3	0.7	0.2	0.6	0.7	0.5	0.5
Maximum demand	2.7	2.3	1.9	1.8	2.3	1.7	1.7	1.8	1.8	1.9
Average demand	1.5	1.4	1.1	1.2	1.3	1.2	1.2	1.2	1.2	1.3
Elliott										
Minimum demand	0	0	0	-	-	-	-	-	-	-
Maximum demand	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Average demand	0.1	0.1	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1
Daly Waters										
Minimum demand	1.7	0.4	1.6	1.5	0.6	1.3	0	-	1.2	-
Maximum demand	7.1	9	7.3	7.6	6.9	6.4	7.4	10.9	7.7	8
Average demand	5.6	5.9	5.9	6	5.5	5.3	5	5	5.7	5.5
Mataranka										
Minimum demand	-	-	-	0	-	-	-	-	-	-
Maximum demand	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	-	0.2
Average demand	0.1	0.1	0.1	0.1	0.1	0.1	0	0	-	0.1
Katherine										
Minimum demand	-	-	-	-	-	-	-	-	-	-
Maximum demand	5	3.6	4.3	5.9	5.5	6.2	4.5	5.4	4.2	11.8
Average demand	0.9	0.4	0.5	1.6	0.9	1.4	1	0.6	0.6	1.1
Mt Todd										
Minimum demand	-	-	-	-	-	-	-	-	-	-
Maximum demand	3.3	1.6	-	-	0.7	-	-	-	-	-
Average demand	0.2	1.6	-	-	0.7	-	-	-	-	-
Pine Creek										
Minimum demand	2.5	1.7	0.5	2.6	1.7	3.1	2.6	2.2	0.5	0.5
Maximum demand	6.7	6	5.8	7.1	6.2	6.9	5.9	7.1	6.4	7
Average demand	5.3	5.4	5.4	5.5	5.4	5.7	5.1	5.5	5.2	5.4
Cosmo										
Minimum demand	-	-	-	-	-	-	-	-	-	-
Maximum demand	1.3	0.4	0	1.3	-	-	-	-	-	-
Average demand	0.1	0	0	0.1	-	-	-	-	-	-
Bonaparte Gas Pipeline										
Minimum demand	-	-	-	-	-	-	-	-	-	-
Maximum demand	-	-	-	-	-	-	-	8.5	9	-
Average demand	-	-	-	-	-	-	-	0	0.2	-
Darwin City Gate										
Minimum demand	0	0	0	0	0	0	0	0	0	0
Maximum demand	0	0	0	0	0	0.1	0.5	0.3	0	0
Average demand	0	0	0	0	0	0	0	0	0	0
Weddell										
Minimum demand	-	-	-	-	-	-	-	-	-	-
Maximum demand	-	-	-	-	-	-	9.3	18.5	17.5	18
Average demand	-	-	-	-	-	-	0.8	9.9	7.7	12.8
Channel Island										
Minimum demand	19.3	19.6	16	15.5	15.7	15.3	14.9	3.4	-	9
Maximum demand	50.1	45.3	43.4	51.2	51.2	56.5	51.2	37.2	44.5	52
Average demand	30.6	31.1	30.9	31.2	32.9	35.6	33.5	19.4	29.9	26.6

Data source: AGP AA RIN pro formas.xls

A notable feature of the historical gas demand is the significant dip that occurred between 2006–07 and 2009–10, before returning to trend in 2010–11.

NT Gas has explained that the reason for the drop in observed demand was a significant shortfall in the availability of gas reserves from the Amadeus Basin from September 2007 to August 2009. During this period, gas used in electricity generation for the Darwin and Katherine loads was supplemented by diesel generation, and the load at Weddell was supplied from the Wickham Point Pipeline (from the Conoco Phillips LNG facility). With the commissioning of the Blacktip gas field and the Bonaparte Gas Pipeline commencing deliveries into the AGP at Ban Ban Springs in 2009, utilisation of the AGP returned to levels consistent with the previous growth trend.

NT Gas has shown that, after adjusting for the period of fuel substitution, the underlying gas demand trend over the current access arrangement period shows a relatively steady increase of 3.2 per cent per year (NT Gas, 2010b, p. 33).

3.3.3 Capacity utilisation

NT Gas has calculated the capacity of the pipeline as the amount of gas the AGP can deliver on a daily basis over a two week period while maintaining line pack and delivery point pressures. Under south to north free flow conditions, the capacity of the pipeline is calculated by NT Gas to be 44 TJ/day. With the Warrego compressor operating, south to north capacity increases to approximately 54 TJ/day. These conditions were in place on the pipeline until 2009–10, when the capacity of the pipeline notionally increased to 104TJ/day with the connection of the Bonaparte Gas Pipeline.

Actual capacity values over the early years of the period were impacted by the mix of gas coming from the Palm Valley and Mereenie gas fields and their relative heating values. As a result, the capacity of the pipeline increased by around 3% in 2005–06 as a result of an increase in the proportion of Mereenie gas—which has a slightly higher heating value compared to Palm Valley gas—in the supply mix. As previously discussed, the significant change in capacity of the pipeline resulting from the connection of the Bonaparte Gas Pipeline is a function of both gas pressure and the distance travelled by gas entering the AGP from the Bonaparte Gas Pipeline at Ban Ban Springs.

NT Gas has calculated historical utilisation using actual maximum demand in each year divided by the corresponding capacity of the pipeline. The result are shown in Table 3.

Table 3 **Historical capacity utilisation**

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Pipeline capacity (TJ/d)	54.1	54.1	54.1	54.1	55.6	55.6	55.6	55.6	104	104
Utilisation of pipeline capacity %	108	103	102	108	105	110	107	96	75	77

Data source: NT Gas access arrangement submission, Table 5.4

Utilisation of the pipeline up until 2008–09 exceeded capacity of the pipeline by a small factor of up to 10%.[2] The reduction in utilisation of the pipeline in 2008–09 corresponded with the shortfall in gas availability resulting in diesel substitution for gas in electricity generation at Channel Island.

The large increase in nominal capacity following connection of the Bonaparte Gas Pipeline has led to a reduction in percentage utilisation of the pipeline, however daily usage has continued to increase in line with the historical trend over this period.

NT Gas also notes that there has been an increase in the 'peakiness' of gas demand, with average daily peak demand being 117 per cent of average demand in 2001–02, but rising to 130 per cent in 2010-11. NT Gas attributes this trend to increased peakiness of electricity generation, and cite research that identifies increased utilisation of domestic reverse cycle air conditioning in the NT as the main contributing factor. We note that this trend, and its interpreted cause, is consistent with experience elsewhere in Australia.

4 Demand and utilisation forecasts

4.1 Forecast methodology and assumptions

The demand forecasts contained in the revised access arrangement information have been developed by the NT Gas and the basis for their derivation is set out in the confidential submission accompanying the access arrangement information (NT Gas, 2010b).

The forecast of **average demand** for each delivery point have been based on an analysis of:

- historic trends in gas volumes and maximum demand for each delivery point, taking account of periods of forced fuel substitution brought about by the temporary shortfall in gas availability from 2007 to 2009; and
- the drivers for gas demand for each delivery point.

These forecasts have then been checked against available PWC forecasts and other information on gas inputs into the pipeline to deliver both a bottom up and top down forecast for each delivery point and for the pipeline as a whole. NT Gas considers that its forecast is arrived at on a reasonable basis, and represents the best forecast or estimate possible in the circumstances.

[2] Utilisation factors greater than the capacity occur where there have been a number of short term unsustainable overruns in gas usage.

In the absence of information from NT Gas's primary customer PWC regarding longer term forecasts of gas deliveries into the pipeline at Ban Ban Springs and expected end user demand, NT Gas has used historic demand information for each delivery point, including known load characteristics, to develop a forecast for each delivery point. This process was assisted in the early part of the forecast period (2010–11) by PWC annual demand forecasts provided to NT Gas under existing contractual arrangements.

To forecast **maximum demand** for each delivery point, NT Gas has adopted a number of approaches depending of the nature of demand at each point.

For Tennant Creek, Pine Creek and Elliott, NT Gas has forecast maximum daily demand in line with the gas requirements to fuel the maximum output of generators installed at these sites. Maximum demand for these sites does not grow over the period, as generation capacity is not expected to be increased at these sites.

For Daly Waters (Macarthur River mine), Mataranka and Darwin City Gate, maximum daily demand has been based on historical values without forecast growth, in line with the characteristics of load at those sites.

Maximum demand at the Katherine and Alice Springs has been derived based on maximum daily quantities advised by PWC, growing at the same average rate as has been observed historically. This approach has been adopted because generating capacity served is either unknown (Alice Springs) or because NT Gas considers that the expected utilisation of the generating capacity does not provide a reasonable basis on which to estimate maximum demand for the access arrangement period.

For Weddell, where there is limited historical information on maximum demand, NT Gas has averaged the last two years of the period (where Weddell was at full generating capacity) and applied this value as a maximum value for 2010–11. Similarly for Channel Island, NT Gas has calculated maximum demand based on the average of the five highest maximum values observed in the past, and has applied this value as the maximum value in 2010–11. Maximum demand at both delivery points is then forecast to grow at the same rate as has been observed for these points over the current access arrangement period (3 per cent per year). However maximum demand at Channel Island has been capped at 60TJ/day in 2015–16, reflecting NT Gas's assessment of the gas demand to service PWC's maximum electricity transfer capacity off Channel Island, which is not expected to change during the access arrangement period.

Commentary: ACIL Tasman considers that, in the circumstances, the methodology and assumptions used by NT Gas to develop the demand forecasts is sound, and no other viable approach would be likely to yield better or more reliable results.

4.2 Demand forecasts

NT Gas provides detailed discussion of drivers of average, peak and minimum demand at each system delivery point (NT Gas, 2010b, pp. 49-56).

The following summarises the key drivers identified:

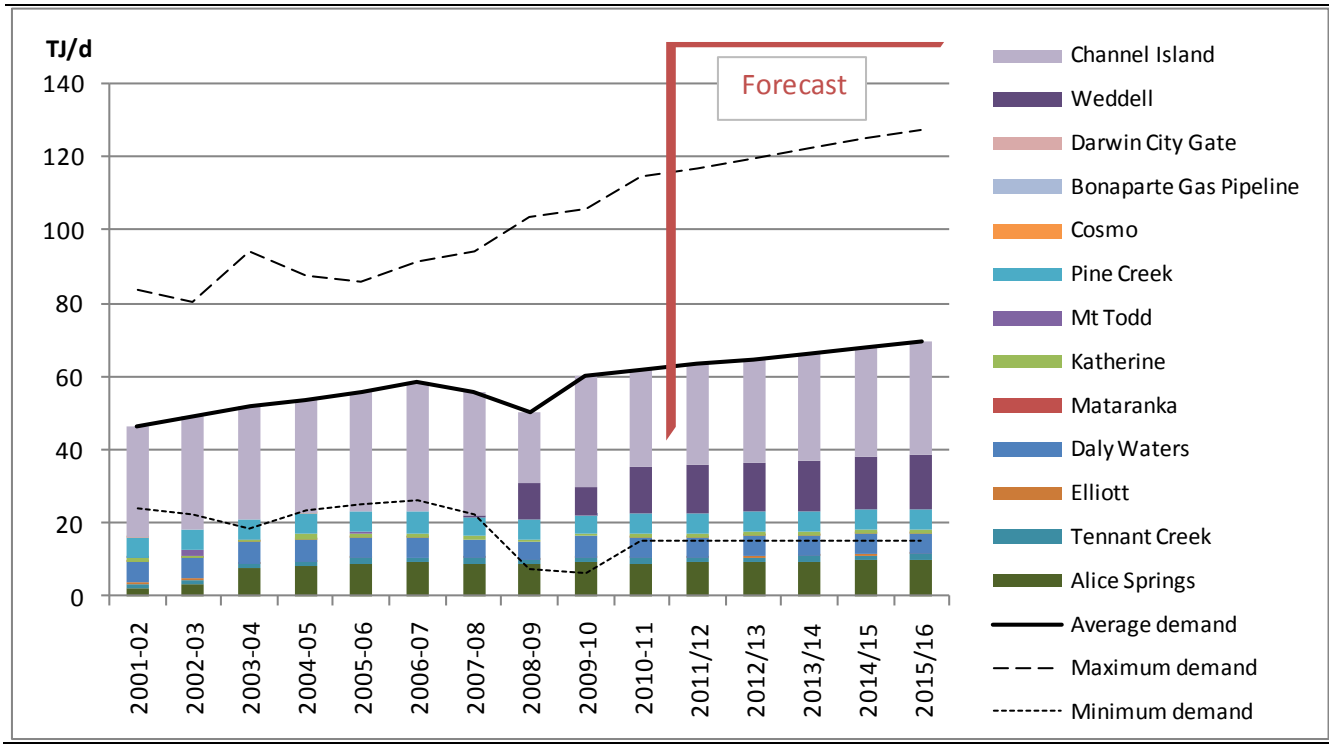
- **Alice Springs** — historical growth trend, boosted by increasing penetration of reverse cycle air conditioners, but offset to some extent by more efficient generator units installed by PWC. Overall 2% pa growth in demand and peak requirements.
- **Tennant Creek** — similar demand drivers to Alice Springs. Overall 1.7% pa growth in demand and peak requirements based on historical trends.
- **Elliott** — very small load. Stable demand based on current generation capacity continuing to operate at full capacity.
- **Daly Waters** — stable demand based on historic flat average demand for Macarthur River Mine, and stable mine production outlook.
- **Mataranka** — stable demand in line with 2010–11 levels, higher than in recent years where gas supply was constrained and substitute fuel used. Availability of Blacktip gas has removed gas supply constraints and allows full demand of the main industrial customer to be met with gas.
- **Pine Creek** — steady base load delivered by a third party generator under contract to PWC. Gas demand therefore does not change significantly over the period.
- **Katherine** — peaking electricity load. Demand growth at 1% pa in line with historical growth.
- **Weddell** — delivery point commissioned in 2007. The forecast reflects increased utilisation of these more efficient units and the displacement of gas load from Channel Island. Forecast growth of 3% pa reflecting the trend in total gas demand growth for the Darwin/Katherine transmission system over the current access arrangement period.
- **Channel Island** — dominant load for with 43 per cent of 2010/11 volumes for the pipeline. Some shift of gas demand at this delivery point to more efficient generation units at Weddell. However PWC is currently expanding Channel Island generation capacity with efficient modern units, so forecast growth of 3% pa reflecting the trend in total gas demand growth for the Darwin/Katherine transmission system over the current access arrangement period, capped at 60 TJ/d reflecting electricity transmission constraints.

  - Overall **Darwin/Katherine transmission system** gas demand (Pine Creek, Katherine, Weddell, Channel Island) forecast to grow by 2.6% pa. This is a slight decrease from the growth rate in the earlier access arrangement period of 3.2 %pa, reflecting increased efficiency of newer generating units installed at Channel Island, Katherine and Weddell.
- **Mt Todd** — Mt Todd mine closed 2006–07; no gas deliveries since that time and no deliveries forecast.
- **Cosmo – Howley** — lateral decommissioned 2008, no deliveries forecast.
- **Ban Ban Springs —** delivery point for Bonaparte Pipeline commissioning gas in 2000–09 and 2009–10 but now a supply point, no deliveries forecast.
- **Darwin City Gate** — supplies to commercial and light industrial users; low demand not material to overall forecast (0.4 per cent of 2010–11 demand total) forecast to remain steady.

Commentary: ACIL Tasman considers that the bottom-up consideration of gas demand at a delivery point level used by NT Gas to develop its demand forecasts is sound. Appropriate consideration has been given to demand drivers, and to factors that may cause future demand growth rates at particular delivery points to differ from historical trends.

The resultant demand forecasts (expressed in terajoules per day) are summarised in Figure 4 and Table 6.

Figure 4 **Forecast and historical daily gas demand by delivery point (TJ/d)**



Source: ACIL Tasman compilation of data presented in AGP AA RIN pro formas.xls

Note: Values for 2010–11 are forecast estimates.

Table 4 **Forecast and historical daily gas demand by delivery point (TJ/d)**

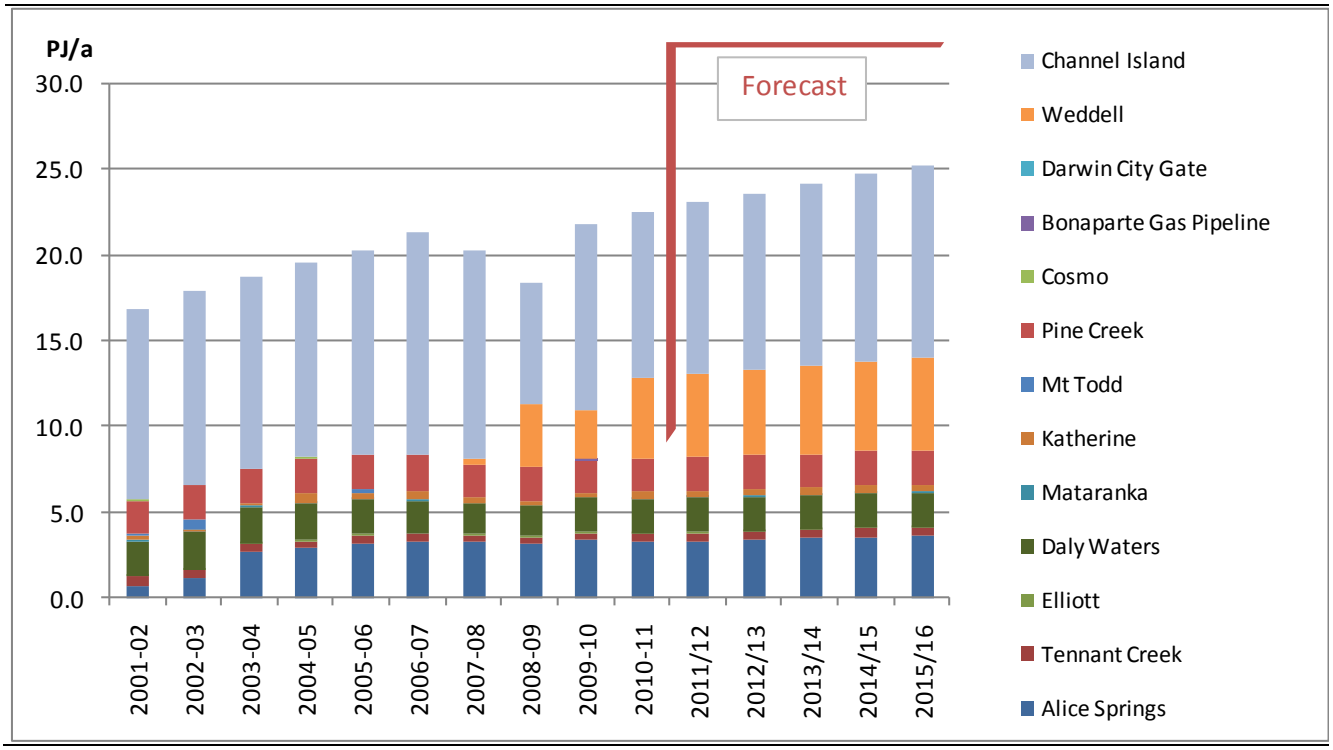
	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011/12	2012/13	2013/14	2014/15	2015/16
Average demand	46.4	49.2	51.6	53.8	55.8	58.5	55.7	50.4	59.9	61.9	63.3	64.8	66.2	67.9	69.4
Maximum demand	83.4	80.5	94.2	87.6	85.8	91.2	94.2	103.4	105.8	114.4	116.9	119.5	122.1	124.9	127.4
Minimum demand	23.9	22.4	18.2	23.5	24.9	26	22.2	7.6	6.4	15	15	15	15	15	15
Alice Springs	2	3.2	7.6	8	8.9	9.2	9	8.7	9.3	9	9.2	9.4	9.6	9.8	10
Tennant Creek	1.5	1.4	1.1	1.2	1.3	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4
Elliott	0.1	0.1	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Daly Waters	5.6	5.9	5.9	6	5.5	5.3	5	5	5.7	5.5	5.5	5.5	5.5	5.5	5.5
Mataranka	0.1	0.1	0.1	0.1	0.1	0.1	0	0	-	0.1	0.1	0.1	0.1	0.1	0.1
Katherine	0.9	0.4	0.5	1.6	0.9	1.4	1	0.6	0.6	1.1	1.1	1.1	1.1	1.2	1.2
Mt Todd	0.2	1.6	-	-		0.7	-	-	-	-	-	-	-	-	-	-	
Pine Creek	5.3	5.4	5.4	5.5	5.4	5.7	5.1	5.5	5.2	5.4	5.4	5.4	5.4	5.4	5.4
Cosmo	0.1	0	0	0.1	-	-	-	-	-	-	-	-	-	-	-	-	
Bonaparte Gas Pipeline	-	-	-	-	-	-	-		0	0.2	-	-	-	-	-	-	
Darwin City Gate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weddell	-	-	-	-	-	-		0.8	9.9	7.7	12.8	13.2	13.6	14	14.4	14.8
Channel Island	30.6	31.1	30.9	31.2	32.9	35.6	33.5	19.4	29.9	26.6	27.4	28.3	29.1	30	30.9

Data source: ACIL Tasman compilation of data presented in AGP AA RIN pro formas.xls

Note: Values for 2010–11 are forecast estimates.

The corresponding annual demand forecasts are summarised in Figure 5 and Table 6.

Figure 5 **Forecast and historical annual gas demand by delivery point (PJ/a)**



Source: ACIL Tasman compilation of data presented in AGP AA RIN pro formas.xls

Note: Values for 2010–11 are forecast estimates.

Table 5 **Forecast and historical annual gas demand by delivery point (PJ/a)**

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011/12	2012/13	2013/14	2014/15	2015/16
Alice Springs	0.7	1.2	2.8	2.9	3.2	3.4	3.3	3.2	3.4	3.3	3.4	3.4	3.5	3.6	3.7
Tennant Creek	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5
Elliott	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Daly Waters	2.0	2.2	2.2	2.2	2.0	1.9	1.8	1.8	2.1	2.0	2.0	2.0	2.0	2.0	2.0
Mataranka	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Katherine	0.3	0.1	0.2	0.6	0.3	0.5	0.4	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4
Mt Todd	0.1	0.6	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pine Creek	1.9	2.0	2.0	2.0	2.0	2.1	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0
Cosmo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bonaparte Gas Pipeline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Darwin City Gate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weddell	0.0	0.0	0.0	0.0	0.0	0.0	0.3	3.6	2.8	4.7	4.8	5.0	5.1	5.3	5.4
Channel Island	11.2	11.4	11.3	11.4	12.0	13.0	12.2	7.1	10.9	9.7	10.0	10.3	10.6	11.0	11.3
TOTAL	16.9	18.0	18.8	19.6	20.4	21.4	20.3	18.4	21.9	22.6	23.1	23.7	24.2	24.8	25.3

Data source: ACIL Tasman compilation of data presented in AGP AA RIN pro formas.xls

Note: Values for 2010–11 are forecast estimates.

Total gas demand for the AGP is forecast to grow at compound average growth rate (CAGR) of 2.3 per cent per year over the next access arrangement period. This compares to an historical CAGR from 2001–02 to 2010–11 of 3.3 per cent per year.

The lower forecast growth rate compared to the earlier access arrangement is attributed by NT Gas to the factors driving demand at each delivery point as well as some more general drivers that impact gas use in NT, including:

- improved efficiency of recently installed PWC electricity generating units
- drivers for PWC to improve efficiency in the utilisation of its installed generation units, largely by prioritising the use of the most efficient generating units (which can be seen by the move away from Channel Island demand towards Weddell
- slowing population growth throughout NT, as well as an easing in economic growth. NT Gas cites reputable independent forecasts in which these trends have been identified[3]

ACIL Tasman notes that the Northern Territory government is currently forecasting average economic growth of 3.5% over the three years from 2010–11 (Northern Territory Government, 2010, p. 19) which compares with average historical GSP growth of 3.7% over the decade from 2000–01 (Australian Bureau of Statistics, 2010). The Northern Territory government also notes that:

> "The Territory has a relatively small, open economy which is heavily influenced by international trade and large, typically resource-based projects. As a result, economic growth in the Territory tends to be volatile from year to year." (Northern Territory Government, 2010, p. 13)

[3] Northern Territory Government 2009, Northern Territory Population Projections, July 2009; Access Economics 2010, Economic Brief, September Quarter 2010.

Commentary: ACIL Tasman agrees that the factors identified by NT Gas are likely to lead to future gas demand growth rates being lower than historical rates of demand growth. Compared to growth rates in other jurisdictions, the future gas demand growth rate of 2.3 per cent is relatively strong. Given that the future growth rate has not been directly estimated but arises implicitly from the detailed examination of gas demand drivers at a delivery point level, we consider the implied demand growth rates over the next access arrangement period are reasonable.

4.3 Forecast system use gas

System use gas is gas used to operate the pipeline (heaters, instrumentation, compression).

System use gas in 2010/11 is expected to be less than 0.1% of total gas delivered and has not been included by NT Gas in the forecast volumes. Because of the very small volumes of system use gas on the AGP, exclusion of system use gas volumes from the forecast will not materially alter the volume forecasts. In any case, because system use gas costs are recovered directly from pipeline users under their gas transportation contracts as a percentage of total gas delivered, inclusion of system use gas in the total system demand for purposes of setting tariffs would not be appropriate.

4.4 Forecast customer numbers

NT Gas does not forecast any new customers for AGP during the forthcoming access arrangement period. It expects PWC to remain the sole customer for the pipeline.

In support of this position, NT Gas contends that:

- Users other than PWC have in the past only contracted over short periods of time, reflecting the following circumstances—
  - Historically limited availability of firm contracting arrangements
  - Historically limited availability of gas and capacity to support longer term arrangements
  - The nature of the users, which are generally shorter term mining operations.

Despite gas availability improving with the connection of the Bonaparte Gas Pipeline, NT Gas expects this trend to continue, as the other drivers for shorter term contracts remain largely in place. Importantly, similar to the last period, the full capacity of the pipeline is again expected to be fully contracted to PWC for the term of the access arrangement, thus limiting the ability of NT Gas to offer firm haulage contracts to third party shippers.

NT Gas has advised that, despite currently marketing transportation services on the pipeline, at this stage there are no users other than PWC in prospect. While acknowledging that at some stage over the access arrangement period additional users may contract to use the pipeline (as they did in the previous period) NT Gas argues that it has no basis for assuming that there will be any additional users on the pipeline at any given delivery point.

Commentary: ACIL Tasman accepts that there is currently no reasonable basis on which to include customers other than PWC in the demand forecast for the next access arrangement period. Taking into consideration historical patterns of customer numbers and demand as well as PWC's current contractual entitlements to firm capacity in the pipeline, if any new customers do emerge they will be reliant on non-firm (as-available) capacity and are likely to be small and transient. Hence they are not likely to materially increase revenue to NT Gas within the next access arrangement period.

4.5 Forecast capacity utilisation

NT Gas has calculated forecast capacity on the same basis as historic capacity (see section 3.3.3). No increase in the current nominal capacity of 104 TJ/d (post connection to Bonaparte Gas Pipeline) has been assumed. Utilisation of the pipeline has been forecast using an estimate of the non-coincident maximum demand for all delivery points divided by the forecast capacity of the pipeline. NT Gas has derived its estimates of the non-coincident demand from recent flow data extrapolated for the forecast years with an annual growth rate matching forecast volume growth.

Table 6 **Forecast pipeline capacity utilisation**

	2011-12	2012-13	2013-14	2014-15	2015-16
Pipeline capacity (TJ/d)	104	104	104	104	104
Utilisation of pipeline capacity %	79	80	82	84	86

Data source: NT Gas access arrangement submission, Table 5.7

Commentary: ACIL Tasman considers that the method employed by NT Gas to estimate future capacity utilisation is appropriate and could be expected to yield a reasonable forecast of capacity utilisation.

5 Conclusions

ACIL Tasman has conducted a desk top review of the demand forecasts prepared by NT Gas for the next access arrangement period for the AGP. This review has included consideration of:

- the historical data on gas demand by location
- the demand trends revealed by the historical data

- the attention given to various demand drivers that may cause future demand for gas transmission pipeline services on the AGP to differ from historical trends
- the methodologies used by NT Gas to generate the forecasts
- the reasonableness of the resulting forecasts.

We conclude that, in preparing the demand forecasts, NT Gas has adopted sound methodologies and assumptions that are sound, and that no other viable approach would be likely to yield better or more reliable results.

The bottom-up consideration of gas demand at a delivery point level used by NT Gas to develop its demand forecasts is sound. Appropriate consideration has been given to demand drivers, and to factors that may cause future demand growth rates at particular delivery points to differ from historical trends.

NT Gas has identified a number of factors that are likely to lead to future gas demand growth rates being lower than historical rates of demand growth. Nevertheless, the future gas demand growth rate of 2.3 per cent is relatively strong compared to other jurisdictions. Given that the future growth rate has not been directly estimated but arises implicitly from the detailed examination of gas demand drivers at a delivery point level, we consider the implied demand growth rates over the next access arrangement period to be reasonable.

A noteworthy feature of the forecasts is that NT Gas has not assumed the introduction of any new customers during the next access arrangement period. ACIL Tasman accepts that there is currently no reasonable basis on which to include customers other than PWC in the demand forecast for the next access arrangement period. Taking into consideration historical patterns of customer numbers and demand as well as PWC's current contractual entitlements to firm capacity in the pipeline, we consider that if any new customers do emerge they will be reliant on non-firm (as-available) capacity and are likely to be small and transient. Hence they are not likely to materially increase revenue to NT Gas within the next access arrangement period.

Finally, ACIL Tasman considers that the method employed by NT Gas to estimate future capacity utilisation is appropriate and could be expected to yield a reasonable forecast of capacity utilisation.

On this basis, the demand forecasts for the AGP presented by NT Gas could be considered to be reasonable.

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