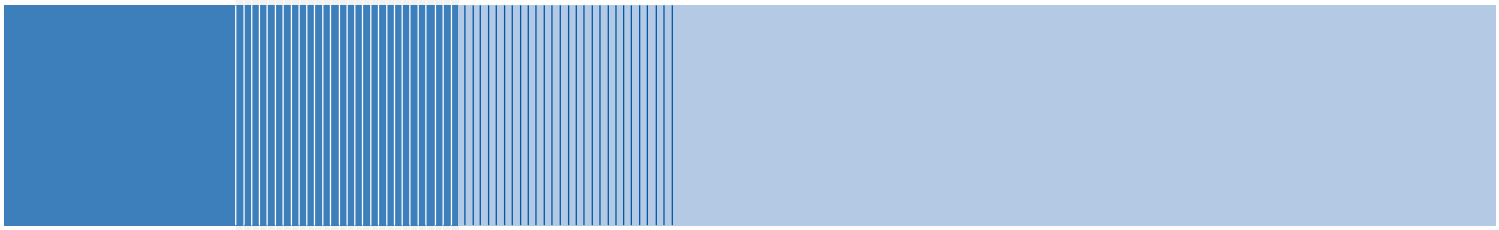
10 October 2011

Assessment of Alternative Queuing Requirements

A Report for APA Group



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1 Introduction

This report has been prepared by Ann Whitfield, Associate Director at NERA Economic Consulting (NERA) at the request of the APA Group, the owner of the Roma-Brisbane Pipeline (RBP).

APA has asked me to provide independent advice addressing the following question:

> 'What forms of queuing requirements, for existing capacity and developable capacity, are most likely to lead to economically efficient outcomes in the context of the RBP: a first-come-first-served approach or an approach based on a publicly notified auction?'

In considering this question, I have been asked by APA to have regard to:

- the Law and the Rules in relation to the economic regulation of gas networks, including:
  - Rule 103 in the Rules;
  - the National Gas Objective in the Law;
  - other relevant provisions in the Rules and the Law including those relating to capacity trading arrangements, extensions and expansions policy and access disputes;
- relevant provisions in the proposed access arrangement for the RBP for the next access arrangement period, including in relation to the proposed capacity trading arrangements and extensions and expansions policy;
- the general approach to regulating gas pipelines set out in the Rules and the Law, which accommodates bilateral contractual arrangements between service providers and users for negotiated services at negotiated tariffs, as well as for the provision of Reference Services at Reference Tariffs;
- the predominance of bilateral contacts in the specific case of the RBP, and the fact that the majority of contracts for existing capacity are at tariffs other than the Reference Tariff;
- the fact that existing capacity on the RBP is currently fully contracted and the limited number of capacity trades that take place in practice on the RBP;
- that under the current queuing requirements, if the first prospective user requests the Reference Service and is willing to pay the Reference Tariff, then APTPPL is required to offer them the capacity at the Reference Tariff;
- the fact that APTPPL considers that it is possible to further develop capacity on the RBP by undertaking further 'looping' (which is the construction of duplicate, parallel sections of pipeline), and that the sizing of such development is subject to a minimum volume threshold, but can be varied such that there may effectively be no maximum threshold; and
- such information that, in your opinion, should be taken into account to address the questions outlined above.

1.1 Structure of this Report

The remainder of this report is structured as follows:

- Section 2 provides background in relation to the relevant provisions of the NGR and the NGL;
- Section 3 provides background on the circumstances of the RBP, the current queuing requirements and the proposed provisions in the revised access arrangement in relation to capacity trading and the extensions and expansions policy;
- Section 4 sets out the criteria that appear relevant to me in assessing alternative queuing requirements;
- Section 5 then considers the first-come-first-served approach versus an auction approach for the queuing requirements on the RBP, and assesses these alternatives against the criteria in Section 4; and
- Section 6 provides conclusions in relation to the question asked.

Appendix A sets out the Terms of Reference provided for this report.

1.2 Statement of Credentials

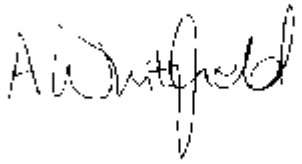
This report has been prepared by Ann Whitfield and peer reviewed by Katherine Lowe.

Ann Whitfield is an Associate Director with NERA Economic Consulting. Ann has eighteen years experience working as an economist for both private consultancies and government. Ann's particular areas of experience include utility regulation and market design, in both gas, electricity and water. Ann has advised across a range of regulatory issues in both Western Australia and the National Electricity Market in the eastern states, with particular focus on the arrangements for capital investment, price control mechanisms and efficiency incentive arrangements. Ann has worked for a range of Australian clients, including both regulators and utility businesses, and has also managed a number of large international projects. Ann's full CV is included as Appendix B to this report.

Katherine Lowe is a Senior Consultant with NERA Economic Consulting. Katherine has eight years experience as an economist working within the areas of energy, infrastructure regulation, securities litigation, competition, consumer protection, personal injury related liabilities and commercial macroeconomics. Katherine has particular experience in relation to the application of regulatory economics to gas pipelines, and has provided advice as part of the assessment of proposed Access Arrangements and as part of arbitration proceedings in relation to gas supply agreements. Prior to joining NERA, Katherine was employed as an economist within the Compliance, Regulatory and Merger Divisions of the Australian Competition and Consumer Commission ('ACCC').

In preparing this report, I have made all the inquiries we believe are desirable and appropriate and no matters of significance that I regard as relevant have, to my knowledge, been withheld from this report. I have been provided with a copy of the Federal Court Guidelines on Expert Witnesses in Proceedings in the Federal Court of Australia, dated 1 August 2011. I have

reviewed those guidelines and this report has been prepared consistently with the form of expert evidence required by those guidelines.



Ann Whitfield

10th October 2011

2 Legislative Requirements

The section sets out the specific provisions in the National Gas Rules (NGR) in relation to queuing requirements for transmission pipelines.

It also sets out the National Gas Objective, and highlights the specific aspects of the NGO which are likely to be most relevant in relation to queuing requirements. The Rules require that provisions in an Access Arrangement must be consistent with the NGO.

2.1 National Gas Rule Provisions

The NGR requires that any access arrangement for a transmission pipeline must contain queuing requirements.[1]

Rule 103 contains the following relevant provisions in relation to queuing requirements:

> (3) Queuing requirements must establish a process or mechanism (or both) for establishing an order of priority between prospective users of spare or developable capacity (or both) in which all prospective users (whether associates or, or unrelated to, the service provider) are treated on a fair and equal basis.
>
> (4) Queuing requirements might (for example) provide that the order of priority is to be determined:
>
> > (a) on a first-come-first served basis; or
> >
> > (b) on the basis of a publicly notified auction in which all prospective users of the relevant spare capacity or developable capacity are able to participate.
>
> (5) Queuing requirements must be sufficiently detailed to enable prospective users:
>
> > (a) to understand the basis on which an order of priority between them has been, or will be, determined; and
> >
> > (b) if an order of priority has been determined – to determine the prospective user's position in the queue.

2.2 National Gas Objective

The National Gas Objective is defined in the National Gas Law as:

> 'The objective of this Law is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.'

Rule 100(a) requires that the provisions of an access arrangement must be consistent with the national gas objective. This replaces the previous explicit requirement in the Gas Code[2] for a queuing policy to 'generate, to the extent reasonably possible, economically efficient outcomes.'

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1 NGR Part 10 Division 2 103(1)(a). Queuing requirements must also be included in an access arrangement for a distribution pipeline where the AER notified the service provider that the access arrangement must contain queuing requirements.

2 Gas Code, Section 3.12(c).

Queuing requirements have the potential to affect:

- the efficiency of the use of natural gas services (in relation to existing capacity);
- the efficiency of investment in natural gas services (in relation to developable capacity);
- the long term interests of consumers of natural gas in relation to the price charged for the service (for both existing and developable capacity); and
- the long term interests of consumers of natural gas in relation to the reliability and security of supply of natural gas (for both existing and developable capacity).

As I discuss in section 3.3.1, the extent to which queuing requirements for existing capacity will affect the above outcomes will also depend on the presence and effectiveness of arrangements for trading contracted capacity in the pipeline.

3 Roma to Brisbane Pipeline

This section provides relevant background in relation to the RBP, including in particular the current queuing requirements. It also summarises other relevant provisions in the current and proposed access arrangement, which have the potential to affect the efficiency of the outcomes of the queuing requirements.

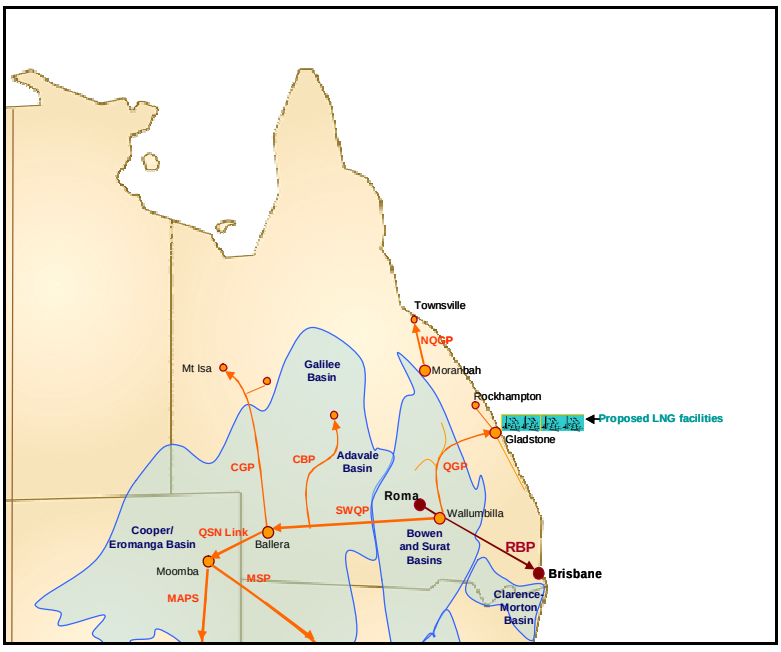
3.1 Roma to Brisbane Pipeline

Opened in 1969, the RBP is Australia's oldest natural gas pipeline. The RBP is a transmission pipeline of 438 km in length and supplies major customers including Incitec Pivot, CS Energy's Swanbank E Power Station, BP's Bulwer Island Refinery and energy retailers AGL and Origin Energy.[3] Its capacity has been expanded a number of times and the capacity of the pipeline is now more than five times its original size. The original pipeline is fully looped (duplicated) with the exception of the Brisbane metro section (running from Ellengrove to Murarrie). Total RBP capacity is currently 80 PJ/year.

The location of the RBP within Queensland, and its proximity to other gas pipelines, is shown in Figure 3.1.

The RBP is a covered pipeline and as a result is required to submit an access arrangement under the National Gas Rules, for approval by the AER.

Figure 3.1
Location of Roma to Brisbane Pipeline



Existing capacity on the RBP is currently fully contracted, and there is a queue in relation to this capacity.

[3] 2011 Gas Market Review Queensland, p. 45.

3.2 Current Queuing Requirements on RBP

Under the current access arrangement for the RBP, where there is insufficient capacity to satisfy a request from a user for capacity (either in full or in part), a queue is formed.[4]

The current access arrangement makes provision for two separate queues for capacity on the RBP: one for existing capacity and one for developable capacity. The AER required the provision for two separate queues as a condition of approving the current RBP Access Arrangement.[5] Currently there are queues in existence for both existing capacity and developable capacity.

In relation to both queues, prospective users must demonstrate to APTPPL (on request) that they will have access to a supply of gas at the time at which is it anticipated that the user will be offered access to the service. Where the Prospective user does not do so, its request will lapse.[6]

3.2.1 Existing capacity

The provisions in relation to the queue for existing capacity are set out in sections 6.3 and 6.4 of the access arrangement, and are reproduced below:

> **6.3 Forming the Existing Capacity Queue**
>
> (a) An Existing Capacity Queue will include all relevant Requests which can be satisfied from the capacity of the pipeline as configured as at 31 January 2006. For the avoidance of doubt, such capacity includes capacity which at the time of the Request is contracted.
>
> (b) A Request for a Reference Service will have priority over a request for a similar Service at a tariff less than the Reference Tariff. Otherwise, the priority of a Request depends upon its priority date.
>
> (c) Where APTPPL determines that two or more Requests relate to the same tranche of capacity for the same Delivery Point, then those Requests will have the priority date of the earliest Request.
>
> (d) At the time a Request is placed in the Queue, APTPPL will advise the Prospective User of:
>
> (i) its position on the Queue;
>
> (ii) the aggregate capacity sought under Requests which are ahead on the Queue;
>
> (iii) its estimate of when capacity may become available; and
>
> (iv) whether investigations are required to determine whether capacity is or can be made available ("Investigations").

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4 Current RBP Access Arrangement, section 6.1.

5 ACCC, Final Approval – Roma to Brisbane Pipeline – revised access arrangement, 28 March 2007, p. 13.

6 Current RBP Access Arrangement, section 6.2(h).

Where APTPPL advises a Prospective User that Investigations are required to determine if capacity is available, section 6.6 will apply.

6.4 Procedure when Capacity can be made available for Services provided by the Existing Capacity

(a) When capacity can be made available which meets the requirements of any Request in the Existing Capacity Queue:

(i) that capacity will be progressively offered to each Prospective User in the Existing Capacity Queue in order of priority (notwithstanding that such capacity is not sufficient to meet the needs of that Prospective User); and

(ii) a Prospective User will have 30 Days after an offer is made to enter into a Transportation Agreement (conditional if necessary on APTPPL entering into Transportation Agreements with other Prospective Users), failing which the Request will lapse or lose priority to Prospective Users entering into such a Transportation Agreement (upon that Transportation Agreement becoming unconditional). APTPPL may agree to extend the period of 30 Days.

(b) Where a Prospective User is offered part of the capacity in a Request:

(i) but declines it because the Prospective User wants all the capacity requested or nothing; or

(ii) accepts the capacity offered but the Prospective User wants to remain in the Queue for the remainder of the requested capacity the Prospective User will not lose priority in respect of any capacity requested but not taken provided that it notifies APTPPL that it wishes to remain in the Queue(s).

3.2.2 Developable capacity

The access arrangement provisions for developable capacity are set out in sections 6.5 to 6.7 of the current access arrangement. Key aspects of those provisions are reproduced below:

6.5 Forming the Developable Capacity Queue

(a) A Developable Capacity Queue will include all relevant Requests which cannot be satisfied without further capital development of the pipeline.

(b) If an expansion or extension has been Covered and a Reference Tariff established for that new capacity of the Pipeline, a Request for a Reference Service will have priority over a request for a similar Service at a tariff less than the Reference Tariff. Otherwise, the priority of a Request depends upon its priority date.

(c) Where APTPPL determines that two or more Requests relate to the same tranche of capacity for the same Delivery Point, then those Requests will have the priority date of the earliest Request.

(d) At the time a Request is placed in the Queue, APTPPL will advise the Prospective User of:

(i) its position on the Queue;

(ii) the aggregate capacity sought under Requests which are ahead on the Queue;

(iii) its estimate of when capacity may become available; and

(iv) whether investigations are required to determine whether capacity is or can be made available ("Investigations")

(v) In the event that Investigations are required APTPPL will, upon request, provide the Prospective User with a general indication of the range of tariffs which may be applicable in relation to any capacity expansion or extension (Indication). An Indication will be provided for the sole purpose of assisting Prospective Users to consider whether they share the costs of an Investigation, will be confidential and will not be binding on either party.

(vi) APTPPL will not be liable to the Prospective User for any cost, loss, expense or other matter arising from the provision of an Indication, or from the Prospective User's use of or reliance on an Indication, including where any tariff subsequently offered to the Prospective User or any other person is greater or less than the Indication.

(e) When the position of a Request changes relative to other Requests which are ahead in the Queue (such as where a Request ceases to be on the Queue) or where the timing of availability of a new tranche of Developable Capacity changes, APTPPL will provide revised information to the Prospective User.

(f) APTPPL will not provide information to a Prospective User where providing that information would involve the release or disclosure of confidential information about another User or Prospective User

6.6 Investigations to Determine if Capacity is Available

[..]

(c) Where a Prospective User declines to meet the cost of Investigations, that Prospective User's Request will have lower priority than Requests where the Prospective Users have agreed to bear the costs of the Investigation, and will maintain relative priority with other Requests where the Prospective Users have not agreed to bear the costs of the Investigation.

[..]

6.7 Procedure when Capacity can be made Available only with Investment in Developable Capacity

(a) Where Investigations identify that investment is required to make Capacity available:

(i) APTPPL will advise each of the Prospective Users on the Developable Capacity Queue of its plans to make Capacity available, and the terms and conditions on which the Capacity will be available;

(ii) prior to the development of Capacity, the Capacity will be progressively offered to each Prospective User in the Developable Capacity Queue in order of priority (notwithstanding that such Capacity is not sufficient to meet the needs of that Prospective User);

(iii) a Prospective User will have 30 Days after an offer is made to enter into a Transportation Agreement (conditional if necessary on APTPPL entering into Transportation Agreements with other Prospective Users), failing which the Request will lapse or lose priority to those entering into such a Transportation Agreement (upon that Transportation Agreement becoming unconditional). APTPPL may at its discretion to extend the period of 30 Days on one or more occasions.

(b) Where a Prospective User is offered part of the capacity in a Request:

(i) but declines it because the Prospective User wants all the capacity requested or nothing; or

(ii) accepts the capacity offered but the Prospective User wants to remain in the Queue for the remainder of the requested capacity;

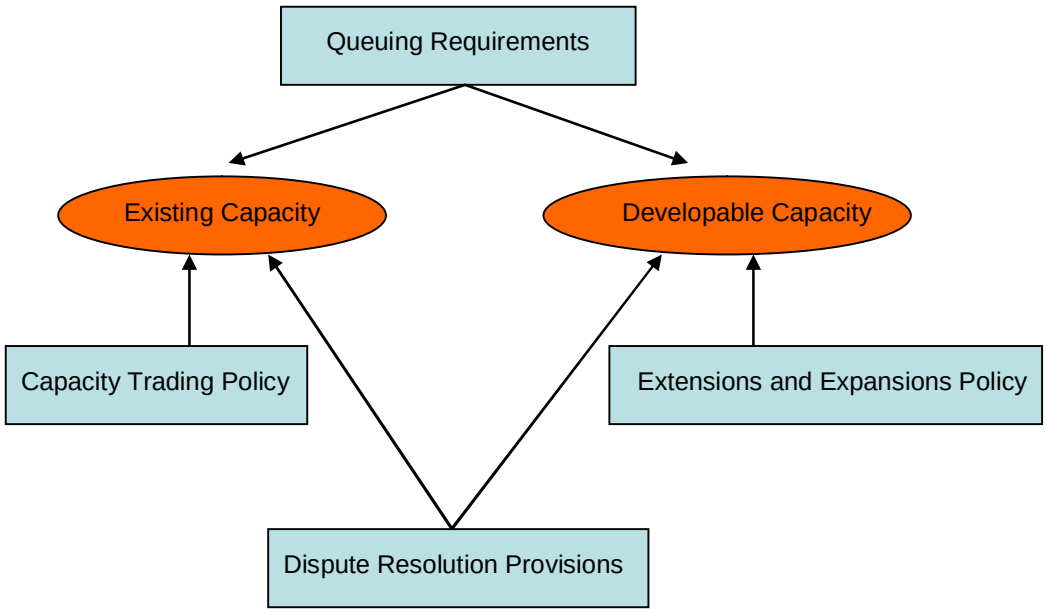
the Prospective User will not lose priority in respect of any capacity requested but not taken provided that it notifies APTPPL that it wishes to remain in the Queue(s).

3.3 Other Relevant Provisions in Access Arrangement and NGR/NGL

In the following section I discuss the objectives of queuing requirements, in relation to how they may further the NGO. However I note that the ultimate effectiveness of queuing requirements, and their relevance in terms of affecting final outcomes, also depends on their interaction with other provisions applying to the pipeline.

Figure 3.2 highlights the interaction between the queuing requirements for existing and developable capacity and other access arrangement provisions, as well as the dispute resolution provisions.

Figure 3.2
Interaction Between Queuing Requirements and other Access Arrangement Provisions



The arrangements in place for users to trade existing contracted capacity will fundamentally affect how important the allocation of existing capacity via the queuing requirements is in determining the ultimate allocation of that capacity between users.

For developable capacity, the expansions policy included in the access arrangement will determine whether that capacity is covered by the queuing requirements and, if it is covered, whether the service offered using the incremental capacity is the Reference Service (to which the Reference Tariff applies), or is a negotiated service (to which a bilaterally negotiated tariff applies).

Finally, the arbitration provisions in the NGL apply to both Reference Services provided using existing capacity and to both the size of any expansion and the contracts for services which use the expanded capacity.

The remainder of this section discusses these other relevant provisions in more detail, as they apply to the RBP.

3.3.1 Capacity Trading

The effectiveness of particular queuing requirements as they relate to existing capacity will be affected by the extent to which existing users can trade their capacity. Where there is active trading of existing capacity then the efficient allocation of existing capacity will not depend solely on the queuing requirements.

Rule 105(1) requires an access arrangement to incorporate capacity trading requirements. Rule 105(2) requires that such trading requirements must allow a user (without the service provider's consent) to transfer, by way of subcontract, all or any of the user's contracted capacity to another party.

In the case of the RBP I note that section 5 of the current approved access arrangement for the RBP contains provisions which allow a user to transfer or assign all or part of its contracted capacity, with the prior written consent of APTPPL, which may only be withheld on reasonable commercial or technical grounds. The Access Arrangement allows a user to request a change in delivery and receipt points, subject to the pipeline owner's consent.

I understand that similar provisions to allow for the trading of capacity are proposed for the new access arrangement. However, the new provisions allow existing users to assign (*without* APTPPL's consent) by way of subcontract, all or part of its contracted capacity to another person. I note that some users have previously commented that the current requirement to obtain the consent of APTPPL has restricted the effectiveness of the trading arrangements.[7]

I understand from APA that currently only a limited number of capacity trades take place in practice. The amended trading provisions in the new access arrangement may increase the effectiveness of the trading arrangements. I understand from APA that it is unclear how the introduction of the Short Term Trading Market (STTM) in Brisbane at the end of 2011 will affect the extent of trading of contracted capacity between users.

3.3.2 Extensions and Expansions Policy

Under the current access arrangement, any expansion of the capacity of the RBP above its existing capacity will form part of the covered pipeline and will therefore be subject to the provisions of the access arrangement, unless APTPPL and the regulator agree that the

[7] ACCC, *Final Decision - Roma to Brisbane Pipeline*, December 2006, p. 202.

expansion should not be covered[8] Similar provisions are proposed for the new access arrangement.[9]

Under the current approved access arrangement, where an expansion is covered, access to services provided using that capacity will be offered as a Negotiated Service at a negotiated tariff.[10] Under the proposed new access arrangement for the RBP, where an expansion is covered by the access arrangement APTPPL will elect whether access to incremental services provided using that capacity will be offered as part of the Reference Service at the Reference Tariff, or as a Negotiated Service at a negotiated tariff.[11]

A Negotiated Service is a pipeline service provided on terms and conditions different to those of a Reference Service. Specifically the proposed access arrangement for RBP provides that if a Prospective User's requirements and circumstances vary from the conditions of the Firm Service (including where the Prospective User seeks access to capacity other than the Existing Capacity) the Prospective User may seek to negotiate different terms and conditions, including tariff, as a Negotiated Service.[12]

3.3.3 Dispute Resolution Provisions

The National Gas Law (NGL) and the NGR make provision for both Reference Services and Negotiated Services to be provided by covered pipelines.

Chapter 6 of the NGL sets out provisions for access disputes, which include disputes in relation to both Reference Services and Negotiated Services. Under NGL 189, any access determination (ie, a decision made in response to an access dispute) must give effect to the applicable access arrangement applying to the pipeline services provided.

Under NGL 191(1), the dispute resolution body may make an access determination which may require a service provider to install or construct a new facility to expand the capacity of the access dispute pipeline, and to require prospective users who are party to the dispute to contribute some or all of the capital required.

The ability for users to seek an access determination in relation to the expansion of capacity is relevant in determining the role of the queuing requirements for developable capacity in ensuring that the expansion of pipeline capacity is likely to be optimally sized.

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8 Current RBP access arrangement, section 7.2(a)

9 Proposed Access Arrangement for the RBP, 7.2(a).

10 Current RBP access arrangement, section 7.2(b)

11 Proposed Access Arrangement for the RBP, 7.2(b).

12 Proposed Access Arrangement for the RBP, section 2.3.

4 Criteria for Assessing Alternative Queuing Requirements

Before assessing alternative queuing requirements, it is helpful to consider the objectives of such requirements. Alternatives can then be assessed on the basis of how well they are likely to meet these objectives.

Rule 103(3) requires that queuing requirements must 'establish an order of priority between prospective users of spare or developable capacity.' Below I consider the objective of such an 'order of priority' separately for existing and developable capacity.

I conclude that the specific objectives for queuing requirements are likely to differ depending on:

- whether there is active capacity trading, which provides an effective means of re-allocating capacity following its initial allocation by the pipeline; and
- whether the capacity is existing capacity or developable capacity (which requires additional capital investment).

As a consequence, a single set of queuing requirements may not be appropriate in all circumstances.

4.1 Existing Capacity

Existing capacity is the amount of pipeline capacity currently in existence, currently defined as the capacity of the pipeline as configured at 01 January 2006: 203 TJ/day. The amount of existing capacity is finite at any point in time (but may be added to in future by investment in *developable capacity*).

Where the demand for existing capacity exceeds the supply of that capacity, there is a need to allocate the existing capacity amongst users. The 'order of priority' between users is therefore used to allocate existing capacity, in circumstances where demand for that capacity exceeds supply.

Such an allocation of existing capacity should be in a manner which best meets the NGO, the most relevant aspects of which in this context are:

- to achieve the most efficient use of existing capacity; and
- in a way which is in the long term interests of consumers of natural gas with respect to price, reliability and security of supply.

Some or even all of the existing capacity in a pipeline will be under contract with users at any one time. However, even if there is no uncontracted existing capacity now, uncontracted existing capacity may become available in the future. Current contracts may not be automatically rolled-over on expiry. As a consequence, existing capacity will become available to other users in the future, once existing contracts expire. In addition, current users may curtail demand or exit the market, with the result that some or all of their contracted capacity may also become available.

Where demand exceeds the availability of existing capacity, the capacity can be considered 'scarce'. The degree of scarcity of existing capacity depends on (amongst other things):

- the level of demand compared with (finite) capacity;
- the feasibility of developing additional capacity, and time taken to do so;[13] and
- whether the new capacity is higher cost than the existing capacity, which means it is less attractive to prospective users. This is likely to be the case where the expansion of capacity involves looping rather than compression.

I understand from APA that existing capacity on the RBP is scarce, with the pipeline currently being fully contracted, and substantial uncontracted capacity not expected to become available for a few years. In addition, the cost of existing capacity under the Reference Tariff is likely to be significantly lower than the cost of developing new capacity in the RBP, which will require further looping of the pipeline.

Where capacity is scarce, the most efficient use of that capacity consistent with the NGO will be achieved when it is allocated to those who value it the most. Such an allocation is efficient as it ensures that the capacity is allocated to its most productive use.

However, I note that this does not necessarily equate to an objective of the queuing requirements for existing capacity being to achieve this allocation. This is because the allocation of existing capacity occurs through a combination of both:

- the queuing requirements applying to the pipeline, which determine which user is given priority in obtaining uncontracted existing capacity when it first becomes available; and
- any subsequent trading of that capacity between users, which determine the ultimate allocation of that capacity, and the price paid for the capacity by the ultimate holder.

The ability to trade capacity after its initial allocation allows users to access capacity which is contracted to other users. Where another user values the capacity more than the existing holder of that capacity does, it will be willing to pay the holder more than the value to the holder of that asset. Where capacity is scarce, other users may be willing to pay more than the Reference Tariff for that capacity. The price paid for the capacity becomes the mechanism via which the capacity it allocated to the user who values it most. The allocation of a scarce resource on the basis of price is a fundamental concept of efficient market outcomes.

The presence of an effective secondary trading mechanism for capacity means that the initial allocation of that capacity by the pipeline (ie, as a result of the queuing requirements) becomes less important from the perspective of ensuring that scarce capacity is allocated to those users who value it most. Where the queuing requirements don't achieve this 'first best' allocation initially, subsequent trading of the capacity by users would be expected to achieve the most efficient allocation.

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[13] This will in turn be affected by the presence of economies of scale in relation to the investment, which may require co-ordination of more than one user in order to make the costs of expansion economic. This is a common feature of pipeline investments.

However, where there is not an active capacity trading market, the role of the queuing requirements in achieving an initial allocation of scarce capacity which reflects efficient outcomes becomes more important.

As discussed in section 3.3, the current and proposed access arrangements for the RBP do allow for the trading of capacity. However I understand that the trading market is not currently highly active,[14] and does not currently appear to be an effective substitute for the initial allocation of capacity by APA under the queuing requirements. APA has advised me that it is not clear whether this situation is expected to change going forward, as the trading arrangements change and with the introduction of the STTM in Brisbane.

In the specific circumstances of the RBP, where there is not currently a high degree of trading of capacity subsequent to its initial allocation, a key objective of the queuing requirements for existing capacity is therefore that it seeks to allocate capacity in the way that best meets the NGO. This implies that the capacity should be allocated to those who value it most (in order to achieve the most efficient use of existing capacity) and in a way which is in the long term interests of consumers of natural gas in relation to the price charged for the service.

4.2 Developable Capacity

Developable capacity is new capacity which may be added to the existing pipeline capacity as a result of investment.

The NGO makes reference to:

- the efficiency of investment in natural gas services; and
- the long term interests of consumers of natural gas in relation to the price charged for the service, reliability and security of supply.

A 'queue' of users for developable capacity arises because new capacity is developed in increments, which are typically greater than the capacity required by a single user. There are also significant economies of scale associated with gas pipelines, which may result in expansions only being at a price attractive to users once they are above a certain size. The presence of economies of scale also means that larger expansions which are sized to meet all the requirements of all interested users are more likely to be in the long term interests of consumers in terms of the price of gas services than a series of smaller expansions designed to meet the needs of individual users as they arise.

A key role of a 'queue' in the context of developable capacity is to 'signal interest.' Having a 'queue' to indicate interest in developable capacity:

- assists the pipeline owner in determining when there is sufficient interest to warrant undertaking investigations of expansion options (which is also in users' interests, in ensuring timely investment); and

[14] See the Terms of Reference provided by APA.

- assists prospective users in determining the extent of others that are interested, and hence to form a view on whether new capacity is likely to be developed and whether economies of scale could be achieved.

I note that the recent Gas Market Review undertaken by the Queensland government commented that:

> 'Information on capacity and expansion projects under development is not widely disseminated to the market [..]. More and better communication about available pipeline capacity and planned capacity expansions would help market participants understand and plan for pipeline capacity requirements.'[15]

As noted earlier, Rule 103 specifies that queuing requirements must establish 'an order of priority' between prospective users of developable capacity. Such an 'order of priority' may simply distinguish between prospective users who are willing to enter into a contract for the developable capacity, and other users whose interest is more speculative. Allocation of scarce capacity only becomes a relevant factor for developable capacity if the demand for developable capacity is greater than the feasible efficient expansion size. In this circumstance users have an interest in gaining priority over others in the allocation of new capacity, in the same way as discussed above for existing capacity.

I understand that for the RBP once a minimum additional capacity threshold (to justify expansion) has been reached, then it is likely that the developable capacity can feasibly be sized to meet all the demand for that developable capacity. The need to establish an 'order of priority' between users who are all willing to enter into a contract for that capacity may not therefore arise. However there is still a need for a process to prioritise between real and speculative interest in obtaining developable capacity.

For developable capacity, the objectives of queuing requirements are most appropriately characterised as being aimed at ensuring that expansions of capacity are undertaken in a timely manner and are optimally sized, so as to realise economies of scale, which is in the long term interests of consumers in relation to the price charged.

Because developable capacity relates to investment of new capacity in the pipeline, there is no secondary trading mechanism that can achieve the objectives identified above, if these objectives fail to be met by the queuing requirements.

[15] Department of Employment, Economic Development and Innovation, *2011 Gas Market Review - Queensland*, p. 16.

5 Alternative Approaches to Queuing Requirements

I have been asked to evaluate which of the two broad alternative approaches for queuing requirements is most likely to lead to economically efficient outcomes in the context of the Roma to Brisbane pipeline:

1. A 'first-come-first-served' basis; or
2. A publicly notified auction.

These options reflect the two examples of 'queuing requirements' provided in Rule 103(4). I note that the Rule does not limit the queuing requirements to being only either one of the other of these approaches, in circumstances where an alternative approach would be more appropriate. I also note that there are a number of potential variants which could be adopted in implementing either of these two approaches. In particular Rule 103(4)(b) refers to 'a publicly notified auction', without specifying the particular form of auction or the variables which should be included in such an auction. Below I provide a short sketch of a possible implementation approach under each option which I consider to be in compliance with the NGR, and which is intended to contrast the key features of the two approaches. I also highlight potential variants under each option, and discuss how these variants may impact the economic efficiency of the outcomes.

5.1 First-come-first-served

Under a first-come-first-served approach, a register is maintained which records prospective users' requests for either existing or developable capacity in the order in which those requests are received, and then allocates the capacity to them sequentially, as it becomes available. The current arrangements on the RBP (discussed in section 3.2) reflect this general first-come-first-served approach.

Below I discuss the application of the first-come-first-served approach to existing capacity and to developable capacity, and assess how well this approach is likely to result in economically efficient outcomes in the context of the RBP.

5.1.1 Existing capacity

Under a first-come-first served approach:

- A register is maintained which records prospective users' requests for existing capacity in the order in which those requests are received, subject only to requests for capacity at below the Reference Tariff being given a lower priority to requests at the Reference Tariff;[16]
- When spare capacity arises, it is offered to the first potential user in the queue. This user then has a set period (eg, 30 business days) to enter into a contract;

[16] This reflects provisions in the current queuing requirements for existing capacity on the RBP.

- Where the user wishes to take the Reference Service, the tariff at which the capacity is offered will reflect the Reference Tariff. Where a Negotiated Service is sought, a bilaterally agreed, negotiated tariff would apply;

- Where the prospective user has not entered into an agreement by the end of the allowed period, the capacity is offered to the next person in the queue, and so on until the available uncontracted capacity is exhausted.

As discussed in section 4.1, demand for existing capacity on the RBP currently exceeds supply. The cost of existing capacity is also substantially less than the expected cost of developable capacity (which will require looping of the pipeline), which means that users have a strong preference for gaining access to existing capacity.

Where there is an effective secondary trading market for capacity, an initial allocation on a first-come-first-served basis by the pipeline will not determine the ultimate allocation of capacity, which may be traded between users subsequent to this initial allocation. In these circumstances it would be expected that the first user in the queue would request all of the uncontracted capacity as soon as it is available, as it would be able to trade the capacity with other users (including those lower down the queue) who may value the capacity more.

However I understand that APTPPL's experience has not been that the first user in the queue for existing capacity in the RBP has been willing to take all available capacity as soon as it is available (and to subsequently trade that capacity). Rather, users tend to align their queue requirements to the lead time for particular projects or expected needs. This has consequences for the efficiency of the outcomes under a first-come-first-served approach.

Firstly, where there are users who are close to the front of the queue who do not genuinely want the capacity, then a first-come-first-served approach has the potential to become time consuming, as the set period needs to be allowed sequentially for each user to who capacity is offered.[17] This problem is exacerbated if the queue is costless to join, as this increases the incentives for prospective users to join the queue, however speculative their requirement for capacity. Options for addressing this issue would be to require prospective users to lodge some form of bond in order to be eligible to join the queue;[18] to impose supplementary requirements for users to demonstrate that they have a genuine interest in the capacity in order to retain a place in the queue (eg, that they expect to have a supply of gas);[19] or to require users to lodge an executable contract in order to join the queue, which is then initiated as soon as capacity is offered to them.[20]

More fundamentally, in the absence of an effective allocation of capacity via the secondary trading market, a first-come-first-served approach of this nature has the potential to result in

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[17] However I note that prospective users who are offered the capacity may turn down the offer in a period shorter than the maximum allowed.

[18] Such a charge could be refunded to the user later as a credit against its transportation service, once it enters into a capacity agreement.

[19] This is a feature of the current RBP queuing requirements.

[20] I understand from APA that this latter feature is a feature of the queuing requirements applying to the Goldfields Gas Pipeline.

inefficient outcomes, where prospective users higher in the queue want to take capacity later and/or for a shorter period than those earlier in the queue, or where users with lower priority in the queue request a negotiated service at a negotiated tariff higher than the Reference Tariff. Box 5.1 provides examples of requests which, if treated on a first-come-first-served basis may lead to inefficient outcomes.

Box 5.1
Examples of Inefficient Capacity Allocation Under a First-Come-First-Served Approach

Example 1:

Request 1 is for 5TJ of existing capacity, between 2019-2024 and has been lodged ahead of Request 2 which is for 15TJ of existing between 2019-2029. Both Requests are for the Reference Service at the Reference Tariff.

Under a first-come-first-served approach, if 15TJ of existing capacity becomes available, Request 1 gets priority. If User 1 is willing to enter into a contract for Request 1, this means that there is then insufficient existing capacity to meet Request 2 in full. If User 2 is not willing to accept only 10TJ, then Request 2 will not be met.

This outcome represents an inefficient use of pipeline services. There will be uncontracted capacity, if there is no other user who wants to take the available 10TJ of capacity from 2019. There may also be uncontracted capacity once the contract associated with Request 1 expires in 2024, if no other user requests that capacity after that time. Moreover, the project associated with User 2 may not go ahead, since they have been unable to contract for a gas supply. The value of the project associated with User 2 may be greater than that associated with User 1.

Example 2:

Request 1 is for service between 2022-2025 and Request 2 is for service between 2019-2029. Request 1 is for the Reference Service at the Reference Tariff whilst Request 2 is for a Negotiated Service at a negotiated tariff which is above the Reference Tariff.

Existing capacity becomes available in 2019. Where Request 1 has been received first, User 1 will be offered the available capacity first. Where User 1 accepts that capacity, then Request 2 may not be able to be met.

This outcome represents an inefficient use of pipeline services, as it may leave uncontracted capacity idle for the period 2019-2022. It may also mean that the project associated with User 2 may not go ahead, since they have been unable to contract for a gas supply. The value of the project associated with User 2 may be greater than that associated with User 1, given User 2's willingness to contract for a longer period and for a higher value service.

I note that the likelihood of the issues identified in Box 5.1 arising and leading to inefficient outcomes may be low in practice, given that demand for existing capacity on the RBP is likely to remain high in future. The risk of such outcomes could also be mitigated to some degree by requiring contracts to be of a minimum duration. In this regard I understand that the Reference Service is defined in RBP's proposed Access Agreement as being for a five

year period.[21] Nevertheless, the examples do indicate the potential for inefficient outcomes under a first-come-first-served approach to allocating existing capacity.

In the absence of a level of capacity trading which enables an efficient re-allocation of existing capacity once it has been allocated under the queuing requirements, a key objective of the queuing requirements for existing capacity is that it results in outcomes under which users that value the spare capacity the most are the ones who obtain that capacity. A first-come-first-served approach may not achieve this objective.

5.1.2 Developable capacity

A first-come-first-served approach for developable capacity could involve the following:

- Prospective users' requests for developable capacity are recorded in a register, in the order in which they are received;
- Once there are sufficient indications of interest (or following a specific request), the pipeline will undertake an expansion study;
- Following completion of the expansion study, where the pipeline decides that it is feasible to make additional capacity available, that capacity (including terms and conditions) is offered to users sequentially on the basis of their position in the queue;
- Users have a set period (eg, 30 business days) to enter into a contract, following which the capacity is offered to the next prospective user in the queue. The tariff at which the contract is offered may be the Reference Tariff (where the incremental capacity is included as part of the Reference Service) or at a negotiated tariff (where the incremental capacity is treated as providing a negotiated service). In the latter case, the user would have potential recourse to arbitration is it disputed the negotiated tariff offered.

I note that the above approach under which a tariff may be agreed for the expanded capacity which differs from the Reference Tariff is consistent with the current bilateral approach to contracting allowed under the NGR, and the Rules relating to extensions and expansions, which do not require the services provided by the extension or expansion to be provided as a Reference Service at the Reference Tariff.

As discussed in section 4.2, the key objective for the queuing requirements in relation to developable capacity is ensuring that the investment is optimally sized, and is undertaken in a timely fashion.

The economies of scale associated with investment in gas pipelines means that the per unit cost of the developable capacity will depend strongly on the overall size of the expansion, with larger expansions likely to result in a lower (and therefore more attractive) per unit price for users.

Under the first-come-first-served approach, the pipeline is still able to make an efficient decision on the optimal size of the expansion, as this approach does not preclude it from

[21] Proposed RBP Access Arrangement, section 2.2.5.

discussing expansion requirements simultaneously with all of the parties in the queue, prior to determining the appropriate expansion size. Moreover, as discussed in section 3.3.3, under the NGL there are provisions for users to dispute the size of capacity expansion proposed by the pipeline. This provision helps in guarding against sub-optimal outcomes.

Although developable capacity would be offered to users sequentially under a first-come-first-served approach, the actual contract offered (including the tariff) can be made conditional on other parties (ie, those further down the queue) also entering into a contract.[22]

However the process of determining the optimal expansion size, and agreeing contractual terms may be more time-consuming under a first-come-first-served approach, and may therefore result in less timely investment. This is particularly the case if the queue is a long one, as this increases the number of parties the pipeline needs to hold discussions with in order to identify the optimal capacity expansion size.

As in the case of existing capacity, if the queue is costless to join this increases the incentives for prospective users to join the queue, however speculative their requirement for capacity, and is therefore likely to result in a longer queue. One option for addressing this is to impose some form of cost on prospective users in order to remain in the queue, such as a requirement to fund any expansion study undertaken by the pipeline in order to remain in the queue. Since the costs of such studies are relatively significant, the willingness of a user to fund the study is a strong indicator of its interest in the developable capacity. I note that the ability of users to fund an expansion study, and to improve their position in the queue as a result, compared to users who do not agree to fund the study, is a feature of the current queuing policy for developable capacity for the RBP.

5.2 A Publicly Notified Auction

The second approach to queuing requirements I have been asked to consider is a 'publicly notified auction.' This general approach to queuing requirements is explicitly allowed under Rule 103(4)(b), although no further details are set out in the Rule as to the potential forms of auction.

Under this second model, capacity would be allocated periodically on the basis of an auction, which would be advertised beforehand. Below I discuss the potential application of this approach to existing capacity and to developable capacity.

5.2.1 Existing capacity

Whenever there is expected to be available, uncontracted capacity in the pipeline, then under this approach the pipeline owner would issue a public notice that it is holding an auction for this capacity and seeking bids from interested users. Participation in the process would be open to any prospective user, provided that they can satisfy the terms set out in the bidding documents. The auction would be held in advance of the capacity becoming available.

[22] This is a feature of the current RBP queuing requirements under section 6.6.

One option is for an auction to proceed on the basis of identifying the bid with the highest net present value.

Such an auction would:

- Require the prospective user to specify: the quantity of capacity required, the commencement date and the end date
- Bids could be for the Reference Service at the Reference Tariff, or for a Negotiated Service for which the user would propose a negotiated tariff;
- Bidders would also be required to comply with other requirements, such as meeting prudential requirements;
- Bids would be irrevocable, and submitted in the form of an executable contract;
- Bids would be ranked on an NPV basis (with requests with a higher NPV ranked ahead of requests with a lower NPV); and
- The available existing capacity would then be allocated to prospective users in turn, based on their NPV ranking, until all of the capacity is allocated.

A queuing requirement of this form represents a mechanism (ie, auction) which will determine the priority between competing request for existing capacity at the time at which the auction is conducted, rather than a pre-determined list. There would be no need to also maintain a register of interested parties for existing capacity under this approach.

The model outlined above is one in which bids could be at the Reference Tariff or, where users are seeking a service other than the Reference Service, at a negotiated tariff. This is consistent with the regulatory approach under the NGL and NGR which makes provision for Negotiated Services to be provided by covered pipelines. I understand from APA that there is currently a prevalence of bilateral contracts for Negotiated Services on the RBP. Importantly, under this approach the price paid for the capacity would be determined as a result of the bids submitted in the auction process, and would not be determined by APA.

Under this approach, bids would be ranked on an NPV basis, with differences in the proposed tariff, contract duration or commencement date included in the bid affecting the NPV calculation. This approach would overcome some of the potential problems with a first-come-first-served approach for existing capacity. In the case of the examples set out in Box 5.1, the NPV of the second request would be greater in both cases, and so the capacity would be allocated to the second party first.

An auction undertaken on the basis of the model above would be expected to result in more efficient allocation of existing capacity than a first-come-first-served approach (on the assumption of a limited effectiveness of capacity trading).

5.2.2 Developable capacity

A variant of the public auction approach discussed above for existing capacity could also be applied to developable capacity, in order to facilitate the co-ordination of capacity expansion across a number of users, and 'prioritise' those users who are prepared to enter into a contract at a given time for the developable capacity.

Specifically, the pipeline could undertake a publicly notified process in which parties who are interested in obtaining developable capacity submit bids to indicate their firm interest in a proposed capacity expansion. Such a process is used in other markets in relation to capacity expansion, and is sometimes termed an 'open season'.

Such a process could operate as follows:

- Where a pipeline considers that there is likely to be sufficient interest in developable capacity (or where there is a request) it could issue a public notice that it is undertaking investigations for this expansion;
- Following completion of the study, where a pipeline considers that there is likely to be sufficient interest in the developable capacity options identified (or where there is a request) the pipeline owner would issue a further public notice that it is holding an open season for this capacity and seek bids from interested users;
- The pipeline advertises the open-season period, and indicates the potential tariffs that are likely to apply:
  - Where the pipeline has elected for the expansion to form part of the Reference Service, the tariff will be the Reference Tariff (or, where the user requests a negotiated service, a negotiated tariff); [23]
  - Where the pipeline has elected for the expansion to form part of a negotiated service, the tariff will be a negotiated tariff;
  - The indicative tariff may be presented as a range, linked to the overall final contracted capacity for the expansion;
- A capacity contract would be available as part of the invitation, setting out the terms and conditions which would apply to the new capacity, but with the tariff section blank. The contract could contain minimum term provisions;
- Participation in the open season process would be open to any prospective user, provided that they can satisfy the terms set out in the bidding documents (which may include such factors as meeting minimum prudential requirements, demonstrating that they expect to have access to a supply of gas, etc);

[23] As discussed in section 3.2.1, under the extensions and expansions policy included in the access arrangement proposed for the RBP, APTPPL will elect whether access to incremental services provided using an expansion of capacity will be offered as part of the Reference Service at the Reference Tariff, or as a Negotiated Service at a negotiated tariff. Proposed Access Arrangement for the RBP, 7.2(b).

- Responses to the open-season would be in the form of an executable contract, including a proposed negotiated tariff (where relevant). Responses would therefore include the period for which the capacity is sought, the quantity sought and any variations on the terms and conditions;
- The pipeline would then confirm the contracts for the developable capacity from those parties who have submitted bids;
- If the total capacity the bidders agree to accept is more than the total feasible expansion size, capacity will be allocated between prospective users on the basis of the NPV of their bids; and
- If the total capacity the bidders agree to accept is less than that assumed by the pipeline in setting the minimum viable tariff, then the pipeline can enter into bilateral negotiations with those prospective users who have submitted bids, with the aim of agreeing contracts for a smaller sized expansion.

The above form of queuing requirement is a mechanism (ie, a form of auction) which will determine how users can gain access to developable capacity, rather than a pre-determined list.

An open season approach appears likely to result in more timely and effective means of co-ordinating capacity expansions than a first-come-first-served approach, by virtue of imposing time-bounded periods for bids to be received and specifically providing for concurrent negotiations between parties. As a result it is likely to facilitate more timely decisions on optimally-sized expansions.

I noted earlier that the role of a queuing policy in allocating scarce resources is likely to be less relevant for developable capacity, where the capacity can potentially be sized to meet whatever committed contracts for the use of that capacity can be agreed (above a minimum size threshold). However, it is possible that in some circumstances there may be a maximum expansion size, which does require the capacity to be rationed between different prospective users. In this case the auction process set out above could also involve an NPV prioritisation between the different bidders for the developable capacity. The tariff assumed in this auction would either be the Reference Tariff (where the expansion capacity was included as part of the Reference Service and this is the service sought by users) or a negotiated tariff (where the expansion capacity is included as part of a negotiated service, or where the user is seeking a service which differs from the Reference Tariff).

Although the open season approach represents a mechanism for determining priority between users in relation to developable capacity, given the 'signalling' role of queuing requirements for developable capacity (both for the pipeline and for other users) there is likely to be value in still maintaining a register of interested parties (with no priority established between them) under this approach, in order to promote timely investment. In particular, a register which identifies the total amount of developable capacity sought by other users:

- is likely to provide value to users, as it enables them to better assess whether it is likely new capacity will be developed, given their own and others' interest; and

- provides a signal to the pipeline as to when there may be sufficient interest to justify investigating capacity expansion.

A queuing policy for developable capacity may therefore incorporate both an auction mechanism and an 'expression of interest' register. However no priority to developable capacity would be determined by a user's inclusion in such a register.

I note that if there is no cost to being included in the register, then the value of this information may be limited (since not everyone registered will be serious). A better signal would be provided where the register indicates the capacity sought by users who have been willing to co-fund an expansion study.

Where a register is kept, participation in the open season process should still be open to any users, and not restricted to those who are on the register (or to users who have funded an investigation study). This is to ensure that the expansion is optimally sized to meet all future demand identified at that time, and to ensure that the queuing requirements treat all prospective users on a fair and equal basis.

6 Conclusions

I have been asked to provide independent advice addressing the question of which form of queuing requirement is most likely to lead to economically efficient outcomes in the context of the Roma to Brisbane pipeline: a first-come-first-served approach or an approach based on a publicly notified auction.

I concluded in section 4 that the specific objectives of the queuing requirements for a pipeline are likely to differ depending on:

- whether there is active capacity trading between holders of contracted existing capacity, which provides an effective means of re-allocating capacity following its initial allocation by the pipeline; and
- whether the capacity is existing capacity or developable capacity.

In the case of the RBP I understand the relevant circumstances to be:

- that capacity on the existing pipeline is scarce, and it likely to remain preferred by users even once additional capacity is developed, due to its lower cost;
- that capacity is not actively traded, resulting in users requesting existing capacity from the pipeline for quantities which may be less than the total available and/or for commencement dates which are after the date at which capacity first becomes available; and
- that there is unlikely to be scarcity associated with developable capacity, as additional capacity can be sized to meet all firm requests for that capacity, subject to a minimum threshold to justify expansion.

In these circumstances, the queuing requirements for existing capacity on the RBP should have the objective of allocating the capacity to the users who value it most, in order to ensure the most efficient use of natural gas services. This outcome is more likely to be achieved under an approach which involves an auction of capacity to the bid (or bids) with the highest NPV than under a first-come-first-served approach.

For developable capacity, the queuing requirements for the RBP should have the objective of ensuring that expansions of capacity are undertaken in a timely manner and are optimally sized, so as to realise economies of scale which will in turn affect the long run price paid by consumers. An 'open-season' type approach which provides a set time-frame within which prospective users must register their committed interest in new capacity, and which provides for concurrent negotiations with users (each conditional on the outcome of others) is likely to represent a more effective and timely approach to meeting those objectives, compared with a first-come-first-served approach.

Appendix A. Terms of Reference

Background

APT Petroleum Pipelines Ltd (**APTPPL**) owns the Roma to Brisbane Pipeline (**RBP**) which transports natural gas from the gas hub near Roma to the markets of Brisbane and the regional centres along the pipeline route. The mainline was constructed in 1969, is 438km long and runs from Roma (Wallumbilla) to Brisbane. The Peat lateral was constructed in 2001, is 121km long and runs from the Peat and Scotia gas fields to Arubial.

Pursuant to the National Gas Rules (**Rules**), APTPPL is required to submit an access arrangement revision proposal to the Australian Energy Regulator (**AER**) by 12 October 2011. The access arrangement revision proposal must, amongst other things, set out the amendments to the access arrangement that the service provider proposes for the following access arrangement period.

The reference service provided by the RBP is a non-interruptible service for the receipt, transportation and delivery of gas through any length of the pipeline in the direction from Wallumbilla or Peat to Brisbane.

Pursuant to Rule 103 of the Rules, the access arrangement applying to the RBP (as a transmission pipeline) must contain queuing requirements. Rule 103(3) provides that queuing requirements must establish a process or mechanism (or both) in which all prospective users are treated on a fair and equal basis.

Subrule (4) is also relevant to queuing requirements, and provides two examples of the form that queuing arrangements may take:

> Queuing requirements might (for example) provide that the order of priority is to be determined:
>
> (a) on a first-come-first-served basis; or
>
> (b) on the basis of a publicly notified auction in which all prospective users of the relevant spare capacity or developable capacity are able to participate.

Pursuant to section 28 of the National Gas Law (**Law**), in making a decision on whether to approve an access arrangement proposal, the AER must have regard to the National Gas Objective (in section 23 of the National Gas Law), which is:

> "…to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas."

The AER must also take into account the revenue and pricing principles in section 24 of the Law when exercising a discretion in approving or making those parts of an access arrangement relating to a reference tariff. The AER may take into account the revenue and pricing principles when performing or exercising any other AER economic regulatory function or power (which is defined to include an applicable access arrangement decision), if the AER considers it appropriate to do so. The revenue and pricing principles in section 24 of the Law include the following:

> "(6) Regard should be had to the economic costs and risks of the potential for under and over investment by a service provider in a pipeline with which the service provider provides pipeline services."

The queuing requirements that currently apply to the RBP are set out in section 6 of the access arrangement. In broad terms the queuing requirements provide that the order of priority is determined on a first-come-first served basis.

APTPPL is seeking advice on the type of queuing requirements that will most likely lead to economically efficient outcomes in the context of the RBP. The approach taken to the queuing requirements will be required to comply with the relevant provisions of the Rules and Law, including the Rules and Law set out above.

Scope of Work

You are briefed to provide an expert opinion report for use by APTPPL in its access arrangement revision proposal addressing the following question:

> 'What forms of queuing requirements, for existing capacity and developable capacity, are most likely to lead to economically efficient outcomes in the context of the RBP: a first-come-first served approach or an approach based on a publicly notified auction?'

Information to be relied on

In providing your report, you are expected to draw upon the following information:

1. the Law and the Rules in relation to the economic regulation of gas networks, including:
2. Rule 103 in the Rules;
3. the National Gas Objective in the Law;
4. other relevant provisions in the Rules and the Law including those relating to capacity trading arrangements, extensions and expansions policy and access disputes;
5. relevant provisions in the proposed access arrangement for the RBP for the next access arrangement period, including in relation to the proposed capacity trading arrangements and extensions and expansions policy;
6. the general approach to regulating gas pipelines set out in the Rules and the Law, which accommodates bilateral contractual arrangements between service providers and users for negotiated services at negotiated tariffs, as well as for the provision of Reference Services at Reference Tariffs;
7. the predominance of bilateral contacts in the specific case of the RBP, and the fact that the majority of contracts for existing capacity are at tariffs other than the Reference Tariff;
8. the fact that existing capacity on the RBP is currently fully contracted and the limited number of capacity trades that take place in practice on the RBP;

9. that under the current queuing requirements, if the first prospective user requests the Reference Service and is willing to pay the Reference Tariff, then APTPPL is required to offer them the capacity at the Reference Tariff;
10. the fact that APTPPL considers that it is possible to further develop capacity on the RBP by undertaking further 'looping' (which is the construction of duplicate, parallel sections of pipeline), and that the sizing of such development is subject to a minimum volume threshold, but can be varied such that there may effectively be no maximum threshold; and
11. such information that, in your opinion, should be taken into account to address the questions outlined above.

Guidelines in preparing your report

The Guidelines for Expert Witness in the Federal Court of Australia are attached to this letter. Although this brief is not in the context of litigation, APTPPL is seeking a rigorously prepared independent view for use in the context of regulatory decision making and you are requested to follow the Guidelines to the extent reasonably possible in this context.

In particular, within your report you are requested to:

a. identify your relevant area of expertise and provide a curriculum vitae setting out the details of that expertise (to be attached to your report);
b. clearly set out the scope of matters which you have been asked to address (please attach this terms of reference letter to your report);
c. only address matters that are within your expertise;
d. where you have used factual or data inputs please identify those inputs and the sources;
e. if you make assumptions, please identify them as such and confirm that they are in your opinion reasonable assumptions to make;
f. if you undertake empirical work, please identify and explain the methods used by you in a manner that is accessible to a person not expert in your field;
g. confirm that you have made all the inquiries that you believe are desirable and appropriate and that no matters of significance that you regard as relevant have, to your knowledge, been withheld from your report; and
h. please do not provide legal advocacy or argument and please do not use an argumentative tone.

All key source materials referenced by you in your report should be provided with your report.

Confidentiality

Please ensure that any confidential information provided to you by APTPPL for the purposes of drafting your report is kept confidential, and that any confidential information is not disclosed to any person without the consent of APTPPL.

Your report, and potentially all key source material, will be provided to the AER as part of APTPPL's revised proposal. All non-confidential material will be published by the AER on its website, including your report. As such, should your report contain any information which is confidential, this material must be clearly identified by you as confidential at the time your report is finalised.

Timing

APTPPL requires a final report no later than 10 October 2011, and a draft report no later than 26 September 2011. Please let us know if you anticipate that you may not be able to meet these deadlines.

Appendix B. Curricula Vitae

Ann Whitfield

Associate Director

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Overview

Ann has nineteen years experience working as an economist for both private consultancies and government. Ann's particular areas of expertise include utility regulation and broader issues of energy market development. Ann has advised both regulators and utilities across a wide range of regulatory issues, and was involved with the initial development of the National Electricity Rules covering the regulation of both electricity transmission and distribution networks. She also has particular depth of experience in relation to the arrangements for network augmentation (including the AER's RIT-T and its predecessor, the regulatory test) and has advised a number of businesses on the practical application of these tests.

Ann's energy market development experience includes the development of Network Code arrangements for competitive gas markets, and a wide-ranging review of the operation of the Singapore Electricity Market. In Australia she has been involved in assignments for the Ministerial Council on Energy in relation to the roll-out of smart meters, Feed-in Tariff schemes and Retailer of Last Resort arrangements.

Ann joined NERA's London office in 1996, and worked largely on energy sector projects, both in the UK and in Eastern Europe. Ann relocated to NERA in Sydney from September 1998. Ann has worked for a range of Australian clients, including the Ministerial Council on Energy, the Australian Energy Market Commission, jurisdictional regulators and a range of utility businesses. She has also directed a number of large-scale projects in the wider South-East Asian region, including in both Singapore and Hong Kong.

Qualifications

1991-1992 **LONDON SCHOOL OF ECONOMICS**
M.Sc., Economics.

1987-1990 **OXFORD UNIVERSITY (JESUS COLLEGE)**

B.A.(Hons.), Philosophy, Politics and Economics (First Class).

Prizes and Scholarships

1991	ESRC Scholarship, London School of Economics
1989	Open Scholarship, Jesus College
1988	Open Exhibition, Jesus College Bahram Dequani-Tafti Scholarship, Jesus College

Career Details

Sep 1998- current	**NERA ECONOMIC CONSULTING** Associate Director, Sydney, Australia
March 1998- Sep 1998	**DELOITTE CONSULTING** Senior Consultant, Perth, Australia
Feb 1996-Feb 1998	**NERA ECONOMIC CONSULTING** Consultant, London, UK
Feb 1995-Feb 1996	**LMC INTERNATIONAL** Consultant, London, UK
Sept 1992-Oct 1994	**RESERVE BANK OF FIJI** Principal Research Officer, Suva, Fiji
August 1990-March 1991	**CENTRE FOR BUSINESS STRATEGY, LONDON BUSINESS SCHOOL** Research Officer, London, UK

Project Experience

Regulatory Analysis

2011 **Energy Networks Association, Australia**
Advice on AER Rule Change Proposal (Chapter 6 and 6A)

Ann is currently advising the ENA (the body representing electricity and gas distribution and transmission network owners in Australia) in relation to the AER's Rule Change Proposal, covering various aspects of the current regulatory arrangements.

2011 **Grid Australia, Australia**
Cost Pass-through

Ann assisted Grid Australia (the body representing the electricity transmission network owners in Australia) with the development of a

Rule Change Proposal in relation to the cost pass-through arrangements in the National Electricity Rules.

2011 **Western Power, Western Australia**
Deferral of Revenue

Ann provided an expert report for Western Power (together with Brendan Quach) addressing the question of the appropriate recovery period for revenue deferred in a previous access arrangement period.

2011 **AusGrid, NSW**
Regulatory Framework for Public Lighting

Ann provided a short analysis of the desirable features of a regulatory regime for public lighting, and suggested alternatives to the current arrangements which may better reflect these features.

2010 **Grid Australia, Australia**
Scale Efficient Network Extensions

Ann advised Grid Australia throughout the AEMC's Rule Change Process for Scale Efficient Network Extensions.

2009 – 2010 **Australian Energy Market Commission (AEMC), Australia**
Cost Recovery Arrangements for Smart Metering

Ann advised the AEMC during its review of the appropriateness of the Chapter 6 cost recovery arrangements in the context of a Ministerial Determination relating to smart meters.

2009 – 2010 **Ministry of Trade and Industry (MTI), Singapore**
Appeal of the Vesting Relief Scheme

Ann provided advice to MTI in the context of an appeal by some of the Singapore generating companies of a decision taken by the regulator.

2010 **ActewAGL, ACT**
Long-Run Marginal Cost (LRMC) Study

Ann led an analysis to estimate ActewAGL's LRMC, stand alone cost and avoidable cost of supplying electricity distribution services, for the purpose of compliance with the pricing principles in the National Electricity Rules. The study was submitted to the AER.

2009 **EnergyAustralia, NSW**
Appeal of AER Determination on Public Lighting

NERA assisted EnergyAustralia in relation to its appeal of the AER's determination in relation to public lighting. As part of this advice, NERA provided a report which set out the economic principles underlying the roll-forward approach to asset valuation, and applied these principles in rolling-forward the value previously assigned by IPART to EnergyAustralia's public lighting assets.

2009 **Ministerial Council of Energy (MCE), Australia**
Harmonisation of Feed-in Tariff Schemes

Ann advised MCE in relation to giving effect to the COAG national principles for Feed-in Tariff (FiT) schemes and the specific tasks that COAG has allocated to the MCE in relation to these schemes. This assignment (which was undertaken jointly with law firm Allens Arthur Robinson) included consideration of what constitutes 'fair value' for small customers with renewable generation, as well as areas in which it may be possible to achieve greater harmonisation amongst jurisdictions in relation to their 'premium' FiT schemes.

2009 **Western Power, Western Australia**
Revenue Deferral

Ann provided an expert report for Western Power addressing issues arising in relation to the ERA's Draft Decision to require Western Power to defer some of its revenue requirement from the second access arrangement period. The report was submitted to the ERA.

2009 **Western Power, Western Australia**
Application of the New Facilities Investment Test

Ann undertook an assignment for Western Power in relation to the application of the New Facilities Investment Test under the Access Code, and its link with customer contributions (together with Wedgewood White). The assignment includes developing a theoretical framework to assess the merits of the current arrangements and recommend potential changes, and the provision of practical advice in relation to the way in which Western Power applies the provisions.

2008 – 2009 **Grid Australia, Australia**
AEMC Climate Change Review

Ann advised Grid Australia throughout to the AEMC's review of Energy Market Frameworks in Light of Climate Change Policies.

2008- 2009 **ActewAGL, ACT**
Electricity and Gas Distribution Price Reviews

Ann provided advice to ActewAGL in relation to its electricity distribution price review and gas access arrangement review. For the electricity review Ann provided advice in relation to the appropriate negotiation framework and cost pass-through arrangements, as well as undertaking a 'reviewer' role for ActewAGL's submission more generally.

2007-09 **Grid Australia, Australia**
Review of National Transmission Planning Arrangements

Ann worked for Grid Australia throughout the AEMC's review of the National Transmission Planning Arrangements and the Reliability Panel's review of National Reliability Standards. In this role Ann

drafted submissions for Grid Australia. Ann subsequently advised in relation to the AEMC's Rule proposal implementing the new RIT-T.

2008-09 **EnergyAustralia, NSW**
Distribution Price Review

Ann provided advice to EnergyAustralia during its electricity distribution price review and subsequent appeal process. Ann drafted a report (together with Greg Houston) on the economic interpretation of clauses 6.5.6 and 6.5.7 of the National Electricity Rules, in relation to the assessment of a regulated business' expenditure forecasts. Ann subsequently provided a separate report critiquing the AER and Wilson Cook's assessment of the prudence and efficiency of step changes in opex, which was also submitted to the AER.

2008 **Origin Energy, Australia**
Impact of the Renewable Energy Target on Network Investment
Ann drafted a report for Origin Energy that focused on the implications for transmission investment of the expanded Renewable Energy Target scheme. The report canvassed both changes to the regulatory frameworks for transmission investment that may be required and provided an indicative quantification of the potential extent of investment needed.

2006 **Ministerial Council on Energy (MCE) Standing Committee of Officials, Australia**
Development of Chapter 6 Rules – Distribution Networks

Ann was involved with preparing a report for the Network Policy Working Group of the MCE in relation to the initial Rules which should apply for the determination of revenue and prices for electricity distribution businesses. The report answered specific questions focused on the scope of regulation and treatment of excluded services, cost pass-through, service standard incentive mechanisms and criteria for reviewing expenditure forecasts.

2005-2006 **Australian Energy Market Commission (AEMC), Australia**
Development of Chapter 6A Rules – Transmission Networks

Ann advised the AEMC on its Chapter 6A review of the Electricity Rules relating to transmission revenue determination and pricing. Ann was regularly involved in providing briefings to the Commission and assisted with the drafting of the public papers released as part of the review process and the development of the Rules Proposal and Draft Rules.

2005 **Ministerial Council of Energy (MCE) Standing Committee of Officials, Australia**
National Framework for Distribution Regulation

Ann had a lead role in the preparation for the MCE of a proposal for a national framework for energy distribution and retail regulation (prepared by NERA and Gilbert+Tobin). This assignment involved reviewing the existing regulatory obligations applying to retail and distribution businesses across all states and territories in Australia and proposing a substantial simplification and harmonisation of those obligations, based on 'best practice' principles.

2004-2005 **ETSA Utilities, South Australia**
Escalation Rates

Ann drafted two reports for ETSA Utilities relating to the escalation rates applied by ESCOSA to ETSA Utilities' labour and non-labour costs in ESCOSA's Draft Decision. Both reports were submitted to ESCOSA.

2004-2005 **Essential Services Commission (ESC), Victoria**
Electricity Distribution Price Review 2006-2010

Ann advised the ESC in Victoria in relation to the electricity distribution price review for 2006-2010. Ann's role focused on advice in relation to the review of capital and operating expenditure, as well as general strategic and editorial advice in relation to the ESC's various publications issued as part of the review process.

2003-2004 **ActewAGL, ACT**
Electricity Distribution and Water Regulatory Reviews

Ann provided regulatory and strategic advice to ActewAGL as part of the 2004-2009 pricing reviews for its electricity distribution and water and wastewater businesses. Ann also provided 'hands-on' support in managing the preparation of the regulatory submissions.

2003-2004 **TransGrid, NSW**
Transmission Regulatory Review

Ann was part of the NERA team advising TransGrid in relation to its 2005-2010 regulatory review. Ann's input focused on asset valuation issues, cost pass-through proposals and the appropriate use of the regulatory test in assessing the prudency of past investment.

Ann also provided assistance to TransGrid in reviewing and responding to the ACCC's Discussion Paper on the Draft Regulatory Principles for electricity transmission businesses, particularly in relation to asset valuation and incentive mechanisms.

2003 **EnergyAustralia, NSW**
Cost Pass-Through Mechanism

Ann prepared a report for EnergyAustralia which examined the rationale for incorporating a cost pass-through mechanism in the regulatory arrangements applying to the NSW distribution businesses. The report considered the criteria which cost changes would need to meet in order to be eligible for inclusion in such a mechanism and also provided a draft arrangement which could be applied to EnergyAustralia.

2002-03 **Essential Services Commission of South Australia (ESCOSA)**
Efficiency Carryover Mechanism

Ann advised ESCOSA in relation to the mechanisms which could be put in place to carryover the efficiency gains made by ETSA Utilities (the South Australian electricity distribution business) from the current regulatory period into the next regulatory period. The advice included providing input into the Discussion Paper released by ESCOSA and commenting on the submissions received.

2002 **SPI PowerNet, Victoria**
Efficiency Carryover Mechanism

Ann authored a report for SPI PowerNet (submitted to the ACCC) which set out an appropriate efficiency carryover arrangement to apply to SPI PowerNet's electricity transmission business

2002 **Essential Services Commission (ESC), Victoria**
Review of Gas Access Arrangements 2002-2007

Ann advised the ESC as part of its review of the Gas Access Arrangements to apply to the three Victorian gas distributors for the period 2002-2007. Specific areas of advice included the form of price control which should be incorporated into the distributors' Access Arrangements and the mechanism for the carry-over of efficiency gains from one access arrangement period to the next.

2001 **Essential Services Commission (ESC), Victoria**
Review of Standing Offer Tariffs For Electricity Retailers

Ann advised on options for the review of electricity retailers' 'standing offer' tariffs, in the context of the introduction of full retail competition. She assisted in drafting an Issues Paper for the ESC which set out options for assessing the key components of retail tariffs, including energy costs and the retail margin. Ann provided advice to the ESC in its subsequent assessment of retailers' standing offer tariff proposals.

1998-2000 **Essential Services Commission (ESC), Victoria**
Electricity Distribution Price Review 2001-2005

Ann provided assistance to the Victorian regulator in relation to the 2001-2005 electricity distribution price review. She worked with ESC staff to analyse the incentives under both the existing form of price control and alternative forms, and to formulate detailed proposals for the tariff basket price control to apply to the distribution businesses from 2001, and drafted two consultation papers on these issues. Ann also provided advice on related issues such as the pass-through of transmission charges, the treatment of excluded services, the calculation of the X factors, and the role of the regulator in relation to tariff structures.

As part of the distribution review, Ann also advised on the appropriate mechanism for the carry-over of efficiency gains between regulatory periods and on incentive payments for the achievement of service targets.

2000 **Australian Competition and Consumer Commission, Australia**
Regulation of Competing Gas Pipelines

Ann drafted a report on the implications of five alternative regulatory approaches for the regulation of the tariffs charged by an incumbent gas pipeline following the entry of a new, potentially competing pipeline. The report considered the implications of each option in relation to the incentives pipeline service providers and pipeline users would face, in a situation in which there is excess pipeline capacity. The ACCC released the report together with its Draft Decision on the Access Arrangement submitted by East Australian Pipeline Limited for the Moomba to Sydney Pipeline system.

1999 **Australian Competition and Consumer Commission, Australia**
Treatment of Taxation in Estimating the Cost of Capital

Provided advice on the approach taken by regulators overseas in relation to the treatment of taxation in estimating the WACC. This included commentary and analysis of nominal versus real approaches to the WACC (and associated frameworks for revenue determination); pre-tax versus post-tax WACC formulations; and the use of short versus long-term estimates of the effective tax rate.

1998 **Great Southern Networks, NSW**
Gas access arrangements

Advised Great Southern Networks (GSN) on their response to IPART's draft and then final decision on GSN's proposed gas access arrangements for Wagga Wagga. This work involved strategic advice, the drafting of GSN's responding submission to IPART, and providing expert evidence on cost of capital issues at IPART's public hearing.

Application of Regulatory Test for Network Augmentation

2010-11 **Grid Australia**
RIT-T Working Group

Ann participates in the RIT-T Working Group set up by Grid Australia in order to clarify and discuss approaches to the RIT-T analysis. In this role she has facilitated discussions between network planners from each of the businesses and led the preparation of a draft RIT-T Cost Benefit Handbook to guide Grid Australia members.

2010-11 **ElectraNet, South Australia**
Assistance with RIT-T Implementation Process

Ann provided assistance to ElectraNet with its internal RIT-T implementation process. In this capacity Ann has conducted several training workshops for relevant ElectraNet staff in relation to the cost-benefit analysis required under the RIT-T, the documentation that needs to be produced, and approaches to the initial quantification of potential market benefits.

2010 **ETSA Utilities, South Australia**
Application of the Regulatory Test to the Fleurieu Peninsula

Ann provided advice to ETSA Utilities in relation to the application of the regulatory test to a proposed distribution network augmentation in the Fleurieu Peninsula. The advice covered the appropriate test to be adopted and guidance on the calculation of the cost and benefit categories, including for potential non-network alternatives.

2010 **TransGrid, NSW**
Development of RIT-T Process Guideline and RIT-T Cost Benefit Analysis Guideline

Ann led the development for TransGrid of a detailed process guideline for applying the RIT-T as well as a guideline and spreadsheet templates relating to the RIT-T cost benefit analysis. This included guidance on the calculation of market benefits, as well as on the mechanics of the evaluation itself (eg, use of terminal values, appropriate discount rates). Ann also led a workshop for relevant TransGrid staff.

2010 **Grid Australia, Australia**
Advice in relation to the AER's Development of the RIT-T

Ann advised Grid Australia in relation to the AER's development of the Regulatory Test for Transmission (RIT-T) and associated Application Guidelines, including in relation to the calculation of option value in the context of an electricity network investment.

2007 **Electricity Network Owners Forum (ETNOF), Australia**
Submission to the AER in relation to the Regulatory Test version 3

Ann assisted ETNOF in drafting its submission to the AER in response to Version 3 of the regulatory test.

2006 **TransGrid, NSW**
Application of the Regulatory Test to the 500kV Upgrade

Project Director in applying the regulatory test to TransGrid's proposed 500kV upgrade. The application of the regulatory test considered alternative generation scenarios and non-network alternatives to the proposed network augmentation.

2003 **TransGrid, NSW**
Submission to the ACCC's Review of the Regulatory Test

Advised TransGrid in response to the ACCC's Discussion Paper on the review of the regulatory test. Ann prepared a report which commented both on the ACCC's proposal to amend the regulatory test to improve clarity and to ensure consistency with the provisions in the National Electricity Code, and also on the ACCC's proposed options for incorporating 'competition benefits' in the regulatory test.

2003 **Clayton Utz, TransGrid, NSW**
Murraylink's Application for Regulated Status

Ann advised TransGrid and Clayton Utz in responding to Murraylink's Application to the ACCC for regulated status, and, in particular, Murraylink's use of the regulatory test to derive a regulatory asset value. Ann drafted a report which was submitted to the ACCC as part of the latter's consultation process. Ann also advised TransGrid in responding to the ACCC's Preliminary View on Murraylink's Application, and drafted a further report commenting on aspects of the ACCC's approach.

2002 **Clayton Utz, TransGrid, NSW**
National Electricity Tribunal Hearing of Appeal against NEMMCO's Determination in relation to the SNI Interconnector

Project manager for the preparation of expert economic testimony in relation to the appeal of NEMMCO's Determination that SNI passed the regulatory test. Ann's role included assistance with the preparation of testimony, liaising with the modelling firm carrying out the re-application of the regulatory test, providing background briefings in relation to the regulatory test and NEMMCO's determination and all aspects of managing NERA's role in the litigation process.

2001-03 **TransGrid, NSW**
Application of the Regulatory Test to Network Augmentation in the Western Area

Project director for undertaking an application of the regulatory test on behalf TransGrid, for intra-regional network augmentation planned for the Western Area of NSW. The application highlighted issues in applying the regulatory test in a situation where an agreed reliability standard is not currently met.

2000-01 **TransGrid, NSW**
Methodological Issues Arising from the Application of the Regulatory Test for Network Augmentation

Provided a commentary in relation to a number of methodological issues arising in the application of the regulatory test for network augmentation, including the extent to which demand side management measures should be included within the options considered for network planning.

2000 **TransGrid, NSW**
Application of the Regulatory Test to the SNI Interconnector

Provided a summary of the methodology implied under the regulatory test for network augmentation, in the context of TransGrid's proposal for an interconnector between NSW and South Australia (SNI). This summary included a critique of the draft methodology proposed by the Inter-Regional Planning Committee.

1999-2000 **TransGrid and EnergyAustralia, NSW**
Final Cost Effectiveness Study of Supply Augmentation

Joint Project Manager of the team conducting the final cost effectiveness analysis of alternative options for augmenting supply to Sydney CBD area. The final analysis reflected significant changes in both the required regulatory test and the options considered. Also provided detailed advice to TransGrid on early drafts of the regulatory test released by the ACCC.

1998-99 **TransGrid and EnergyAustralia, NSW**
Initial Cost Effectiveness Study of Supply Augmentation

Development of a methodology consistent with the National Electricity Code for evaluating alternatives for intra-regional network augmentation. Ann was joint Project Manager of a small team conducting an initial cost effectiveness analysis of alternative options for augmenting supply to the Sydney CBD area, including identification and evaluation of generation and demand management options. The report was published in January 1999 as part of the public consultation process. Ann presented the report to a public forum.

Institutional and Regulatory Reform

2008 **Ministerial Council on Energy (MCE), Australia**
Development of a National Framework for Retailer of Last Resort

Ann led NERA's involvement in an assignment for the MCE to develop a national framework for the Retailer of Last Resort (RoLR). This project was conducted together with Allens Arthur Robinson. NERA set out the principles that should underpin the RoLR scheme and provided a base set of arrangements consistent with those principles. The project involved extensive consultation with stakeholders, both via bilateral meetings as well as a public forum and a written submission process.

2006 **Essential Services Commission (ESC), Victoria**
Role of Licences

Ann prepared a report for the ESC on the role of licences for energy distribution and retail businesses in Victoria. The report considered the typical role of licences within a legal and regulatory framework and evaluated the effectiveness of the current regime.

2001-02 **Independent Pricing and Regulatory Tribunal (IPART), NSW**
Review of Energy Licensing Regime

Ann was project manager for a review of the electricity and gas licensing regime in NSW. The review fell into three parts: (i) to provide advice on the most effective model for the NSW electricity and gas licensing regimes, given the current institutional arrangements; (ii) to develop a compliance monitoring and reporting framework which IPART can implement; and (iii) to assess the need for minimum performance standards for licensed electricity and gas businesses. Ann had lead responsibility for all aspects of the review, including consultation with and presentations to government ministries and licensees.

1999 **Government of Vanuatu, World Bank**
Utility Sector Regulation

Part of a small World Bank team organising and facilitating a workshop on introducing utility sector regulation in Vanuatu. The workshop participants included government officials and representatives from the private sector utility concessionaries. The outcome of the workshop was an agreed policy statement for each of the utility sectors, which was submitted to the Council of Ministers.

Market Development and Market Design

2011 **Confidential Government Client**
Review of Future Generation Development Paths

Ann was project manager for a major review of alternative options for generation development paths for a confidential government client. The review considered how well each alternative would meet key government objectives, and the policy measures that may be necessary to facilitate the most desirable generation paths.

2008 **Ministry of Trade and Industry (MTI), Singapore**
Review of Aspects of the Singapore Electricity Market

Ann was project director for a wide-ranging review of the Singapore electricity market. The project involved six workstreams, focused on both quantitative analysis of market outcomes and the development of robust regulatory strategies to address specific issues identified by MTI. Ann co-ordinated a NERA team involving staff from Sydney, London and New York and lead all discussions and presentations with the client, at senior government level.

2000-2005 **Energy Market Authority, Singapore**
Restructuring of the Singapore Gas Market

Ann was part of an international, multi-disciplinary team undertaking the design of a competitive natural gas market in Singapore. Ann was involved in the design of the new market framework, and had lead responsibility in developing the Network Code, which sets out the detailed rules governing the interaction of parties in the new gas market. In this role Ann was involved in presentations of the new market arrangements to industry players and in consultation and negotiations on the final Network Code. Ann also liased with the IT consultants in translating the Network Code provisions into the IT systems which will be used to support the new market.

As part of this project, Ann was also involved in designing recommendations governing the future operation of the gas retail market in Singapore.

2003 **Commission for Energy Regulation, Ireland**
Development of new Market Rules for the Irish Gas Market

Ann acted in an expert reviewer role for changes proposed to the Network Code for Ireland, to facilitate the move from a point-to-point to entry-exit capacity regime.

1999 **Electricity Businesses, New Zealand**
Reform of Arrangements for Ancillary Services

Preparation of a report for an industry group in New Zealand comprising electricity lines businesses, generators and retailers, on pragmatic measures to improve the efficiency of the provision of ancillary services in the electricity market in New Zealand. The report was publicly released.

1999 **Water Reform Unit, Department of Treasury and Finance, Victoria**
Tradeable Water Entitlements

Part of a team involved in designing a system of tradeable water entitlements for metropolitan Melbourne. Prepared step-by-step examples of how the proposed dispatch and settlement system would operate, under arrangements which encompassed financial transmission rights. Developed a detailed specification of a simple model to illustrate how all of the aspects of the proposed arrangements would operate in practice.

Competition Policy

2005 **Hong Kong Government**
Competition Analysis of Hong Kong Autofuel Market

Ann led NERA's involvement in a multi-disciplinary team advising the Hong Kong government on the competitiveness of the Hong Kong retail autofuel market. Ann's role included both on-the-ground interviews as well as analysis and presentations to the government Steering Committee. This was the first competition policy investigation undertaken in Hong Kong.

2002 **Singapore Power International (SPI)**
Impact of Acquisition of a Victorian Distributor on Competition

Advised SPI on the competition policy implications of its proposed acquisition of a Victorian electricity distribution/retail business, given its existing ownership of the Victorian electricity transmission business, SPI PowerNet. The advice included the preparation of a paper submitted to the ACCC as part of the application for Section 50 clearance, which examined the impact of the acquisition on the transmission, distribution, retail and generation markets, and attendance at meetings with the ACCC.

2000 **Baker & MacKenzie, Victoria**
Impact of Consolidation on Competition

Provided a first principles analysis of the extent to which the acquisition of Powercor (a Victorian electricity distribution/retail business) by an entity with interests in the national electricity market

may lead to a 'substantial lessening of competition' in a relevant energy market. This analysis was submitted to the ACCC and the Office of the Regulator-General by Baker & MacKenzie, who are acting for Powercor as part of the latter's sale process.

Cost Benefit Analysis & Forecasting

2008 **Ministry of Trade and Industry (MTI), Singapore**
Cost Benefit Analysis of Deregulation

Ann was project director for a cost benefit analysis of the deregulation of the electricity market in Singapore. The cost benefit analysis involved consultations with stakeholders in Singapore, preparation of detailed Requests for Information and the use of a dispatch model of the Singapore electricity market.

2007 – 2008 **Ministerial Council on Energy (MCE), Australia**
Cost Benefit Study of a National Smart Meter Rollout

Ann was part of the consulting team conducting a cost benefit analysis of a rollout of smart meters and direct load control. Ann's prime responsibility was the drafting of the overview reports that brought together the costs and benefits identified by the different consulting workstreams, and the development of the recommendations resulting from that analysis. Ann was also involved in estimating the customer benefits associated with smart meters.

1998-2000 **TransGrid/Energy Australia, NSW**
Cost Effectiveness Study for Network Augmentation

Ann conducted both an initial and a final cost effectiveness study of options for addressing future electricity transmission constraints in the Sydney CBD and Inner Suburbs. Analysis involves the identification of alternative options (network, generation and demand side options) and undertaking cost-benefit analysis to arrive at a preferred recommendation.

1997-1998 **CGC, France**
Estimation of electricity system marginal costs

Provided advice to an independent power producer in France on generation, transmission and distribution costs and tariff methodology of Electricité de France (EdF). Estimated the short-run and long-run system marginal costs of the French electricity network using a generation dispatch model developed by NERA.

1995 **LMC International, UK**
Forecasting Demand, Modelling Costs of Production

Forecasts of the future global demand for sweeteners, by country. Cost of production study for oilseeds and vegetable oils in key producing countries.

1995 **Chicago Board of Trade, US**
Futures Contracts

Assessment of demand for oilseed and grain futures contracts in Europe, for a leading US futures exchange. Involved interviews with producers, traders and end-users in several European countries.

Acquisitions and Privatisation

2005 **Investment Bank (Confidential)**
Risk Analysis

Project director for a review of the risks associated with the purchase of a generator in Queensland, on behalf of the investment bank acting for a potential acquirer. The report considered pricing risks, institutional risk and input cost risk.

2002 **Singapore Power International (SPI)**
Regulatory Due Diligence

Carried out regulatory due diligence for SPI in relation to its bid to acquire a Victorian electricity distribution/retail business. The advice included the preparation of a report covering detailed aspects of the regulatory framework and ad-hoc advice in relation to how aspects of the framework should be represented in the financial modelling.

1998 **US Utility, Queensland**
Asset sale, Due Diligence

Part of the due diligence team acting on behalf of a large US utility in the purchase of a gas pipeline in Queensland, Australia. Provided advice on the regulatory implications of the purchase and analysed the business's transportation and gas sale contracts as part of the financial modelling and due diligence procedures.

1996-7 **European Bank for Reconstruction and Development (EBRD)**
Government of Armenia, Armenia, Privatisation

Conducted an assessment of the possibility of attracting private investment in a thermal generating plant in Armenia. Identification of the risks which would be perceived by potential private investors and outlining the steps which could be taken to mitigate those risks. The main deliverables of the project were a "pre-prospectus" document to

be shown to potential private investors, a timetable outlining the process to privatisation, and a financial model of the project. A follow up study provided a more detailed "Roadmap", setting out the necessary milestones to be met for privatisation to be achieved.

1997 **Government of Kazakstan, Kazakstan**
Privatisation, Concession Contracts

Worked with a legal team during the negotiating process for the concession contract for the operation of the Kazak electricity transmission network. Advised on the economic implications of alternative forms of concession contract.

1996 **Nuclear Electric Ltd, UK**
Privatisation, Electricity Trading Arrangements, Pool Prices

Advice to Nuclear Electric on issues surrounding their privatisation, including the potential impact of developments in the Pool's trading arrangements and interconnector access on the newly privatised nuclear generating company. Modelled the impact of different trading arrangements on future England and Wales Pool prices.

1992 **Centre for Business Strategy, London Business School, UK**
Transport Market Deregulation, Contestability

Analysis of the impact of the deregulation of the UK express coaching market on competition and pricing, and the importance of incumbent advantage. Identified the implications for successful business strategy.

Intellectual Property

2006 **Crown Solicitor's Office (CSO), NSW**
Payments for Digital Copyright

Ann was part of a team advising CSO on the likely range of reasonable licence payments for government use of digital copyright materials, and the approach that should be taken in valuing digital copyright. The advice was in the context of negotiations between government and the Copyright Licensing Agency, and took account of rates payable in equivalent agreements (including for print media) and in previous decisions of the relevant Copyright Tribunals, both in Australia and overseas.

2003 **Phillips Fox, Attorney General's Department, Australia**
Digital Agenda Act Review

Ann advised Phillips Fox as part of the review conducted on behalf of the Attorney-General's Department of the impact of the Copyright Amendment (Digital Agenda) Act 2000. Specifically, Ann provided initial analysis of publicly available data in relation to music sales and

cinema attendance and provided responses to the economic issues raised by interested parties as part of the review process.

Economic Development

1997 **Department for International Development (DfID), UK**
Enterprise Restructuring, Evaluation, Economic Development

Preparation of guidance notes for the international development department of the UK government on assessing the impact of enterprise restructuring projects in developing and transition economies. Joint project with London Business School.

1992-1994 **Reserve Bank of Fiji, Fiji**
Exchange Rates, International Trade

Head of the External Section of the Research department with responsibility for four junior members of staff. Main areas of work: exchange rate policy; foreign reserves projections; analysis of balance of payments developments; and monitoring external debt. Secretariat to the Macroeconomic Committee, the primary policy advisory body to Government.

Publicly Available NERA Reports

May 2011 **A Practical Application of Real Options Under the Regulatory Investment Test for Transmission**
A paper prepared for Grid Australia

February 2009 **Critique of the AER and Wilson Cook Assessments of the Prudence and Efficiency of Step Changes in Opex**
A Report for EnergyAustralia

September 2008 **Retailer of Last Resort – Review of Current Jurisdictional Arrangements and Development of a National Policy Framework**
A Report for the MCE Retail Policy Working Group

May 2008 **Economic Interpretation of clauses 6.5.6 and 6.5.7 of the National Electricity Rules**
A Report for EnergyAustralia

October 2007 **Cost Benefit Analysis of Smart Metering and Direct Load Control: Phase 1 Overview Report**
Report prepared for the Ministerial Council on Energy

October 2006 **500kV Upgrade: Final Regulatory Test Analysis**
Report prepared for TransGrid.

January 2006	**Study of the Auto-fuel Retail Market** Report prepared for the Hong Kong Economic Development and Labour Bureau (with Gilbert+Tobin and Arculli & Associates).
May 2005	**Public Consultation on a National Framework for Energy Distribution and Retail Regulation** Report prepared for the Ministerial Council on Energy (with Gilbert+Tobin).
July 2003	**Comments on the ACCC's Preliminary View in Relation to Murraylink's Application for Regulated Status** Report for TransGrid, submitted to the ACCC.
May 2003	**Augmentation of Supply to the Western Area: Preliminary Cost Effective Analysis** Report for TransGrid.
March 2003	**Comments on the ACCC's Discussion Paper: Review of the Regulatory Test** Report for TransGrid, submitted to the ACCC.
March 2003	**Incorporating A Pass-Through Mechanism for Unexpected Cost Changes** Report for EnergyAustralia, submitted to IPART.
January 2003	**Comments on Murraylink's application for Conversion to Regulated Status.** Report for TransGrid, submitted to the ACCC.
October 2002	**Efficiency Carryover Design** Report for SPI PowerNet, submitted to the ACCC.
March 2002	**Most Effective Regulatory Model** Recommendations to IPART on the most effective model for the NSW electricity and gas licensing regimes.
March 2002	**Compliance Monitoring and Reporting Framework** Developed for IPART.
March 2002	**Minimum Service Standards** Report for IPART.
February 2000	**Supply to Sydney CBD and Inner Suburbs: Final Cost Effectiveness Analysis** Final Report for TransGrid and EnergyAustralia.

November 1999	**Ancillary Services in New Zealand: Recommendations for Change** Report prepared for the CEO Forum
April 1999	**Taxation and the Cost of Capital: A Review of Overseas Experience** Final Report for the Australian Competition and Consumer Commission.

Speeches, Presentations and Testimony

2008	**MCE Public Workshop on Retailer of Last Resort Arrangements** Presentation, Sydney, 9 July 2008.
2008	**MCE Public workshop on Cost Benefit Analysis of National Smart Meter Roll-out** Demand Response Benefits Presentation, Sydney, 28 March 2008.
2002	**IPART Public Workshop** **Review of Electricity and Gas Licensing Regimes in NSW** Presentation, Sydney, 19 March 2002.
1999	**World Bank Workshop on Regulation and Competition** **Draft Policy Statement: Power Sector** Presentation, Vanuatu, 2 November 1999.
1999	**TransGrid public hearing** **Supply to the CBD and Inner Suburbs: Initial Cost Effectiveness Study** Presentation, Sydney, 5 February 1999.
1998	**Expert Witness on behalf of Great Southern Networks in the access determination by IPART** Sydney, 12 November 1998.

Publications

2008	**The Future of Smart Metering in Australia** Co-Author with Adrian Kemp, Metering International, 2008
1995	**"Express Coaching: Deregulation, Incumbent Advantage and the Competitive Process" in The Regulatory Challenge** Co-Author with Thompson, ed. Bishop, Kay and Mayer, Oxford University Press 1995.

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