Service Quality Incentive Mechanism for QR Network

Report to QR Network

February 2010

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Executive Summary

In the Queensland Competition Authority's (QCA's) Draft Decision in relation to QR Network, it has determined that QR Network must implement a revised incentive regime within six months of the commencement of the new undertaking period. QR Network has requested Synergies Economic Consulting to review the principles underpinning the design of such a regime, and how it might be applied to QR Network, while having regard to its existing incentives and obligations.

Issues with the current regime

Since QR Network moved to a revenue cap form of regulation in 2006, it is apparent that the debate has evolved to a point where sight has potentially been lost of the objectives of a service quality incentive regime and why it might be applied. Also, no explicit consideration has been given as to how QR Network can influence performance and how this is currently addressed under the existing regulatory regime. Further, no consideration has been given to the natural incentives that arise as a consequence of QR Network's vertical integration.

The development of an effective incentive mechanism for below-rail services is inherently difficult. Due to the complexities of a coal supply chain and the interdependencies between participants in that chain it can be difficult to attribute specific responsibility for performance (or non-performance).

Further, one of the key deficiencies with the current mechanism is that the potential adjustment for breach or negligence is a quasi legal remedy rather than a pure regulatory response. This approach is open to legal interpretation and vulnerable to costly disputation. The QCA's proposal to apply this test at an origin to destination level risks further supplanting the remedy available under the access agreement, and provides an incentive for users to transfer the costs associated with pursuing such a claim under the contract to the QCA, where a potentially different (and not yet clearly defined) process will be applied.

Service quality regimes in theory and practice

The objective of service quality incentive schemes is to ensure monopoly service providers do not exercise market power through reducing service quality to increase profits. Maintenance of efficient service quality levels can be achieved through various non-financial or financial mechanisms, such as public reporting, the establishment and

enforcement of service quality standards and/or through service incentive mechanisms applied under price or revenue regulation.

In theory, the optimal level of service quality is where the marginal cost of the quality improvement equals the marginal benefits derived by consumers. One of the reasons that service quality incentive regimes are introduced is where there is a significant:

- information asymmetry between the infrastructure owner and users; and/or
- imbalance in negotiating power between the owner and consumers.

This is particularly evident in regulated industries with a large and diverse customer base, such as electricity.

The success of any incentive scheme is a function of a number of factors, namely:

- identification of service attributes that users value most highly;
- the ability to clearly articulate the desired level of performance;
- meaningful and measureable indicators of performance;
- the strength of the financial incentive provided by the scheme for performance improvement; and
- performance is under the control of the regulated business to a significant extent.

A poorly designed regime risks not only being ineffective in providing incentives to improve performance, but can also have unintended consequences, including the imposition of unnecessary costs. The key issues in relation to designing and implementing service quality incentive regimes are:

- obtaining quality performance data (for example, attributing responsibilities for delays remains one of the more complex and resource-intensive aspects of Network Rail's regime in the UK);
- defining the optimal level of service quality; and
- specifying outcomes that the business actually has control over.

Application to QR Network

An incentive regime should be developed with regard to the existing regulatory and commercial incentives/obligations. This has been recognised as a specific requirement when implementing these regimes in electricity, for example. QR Network's current incentives/obligations include:

- *A strong incentive to optimise throughput by virtue of QR Network's vertical integration*. If QR Network does not contribute towards improvements in supply chain performance or find ways to increase throughput (including expanding the network where required, provided this can be justified on commercial and economic grounds), it will only harm the business as a whole. The power of this incentive cannot be understated as it comes back to its fundamental commercial business drivers.

- *A range of obligations under the access undertaking in the key areas that influence supply chain performance.* This includes provisions governing investment, maintenance expenditure, capacity allocation and management, as well as existing requirements to publicly report on a range of key performance indicators.

- *Participation in a number of supply chain forums that are examining ways to optimise performance across the supply chain*. This includes, but is not limited to, the development of the Long Term Solution in the Dalrymple Bay Coal Chain.

In relation to the last point, the QCA notes that these initiatives are underway however because "it has not yet had the benefit of understanding the outcome", QR Network will be required to develop a solution via a separate process. This is not seen as an adequate reason to set up a separate process and indeed, could compromise what the existing forums are trying to achieve.

Our key conclusions in relation to an incentive regime for QR Network are as follows:

1. Service quality incentive regimes tend to target industries where there is a significant imbalance in information and negotiating power (for example, industries where there is a large number of small residential customers). QR Network's user base comprises a relatively small number of large, sophisticated organisations with individual and collective negotiating power.

2. Due to the nature of QR Network's customer base and the coal supply chain in which it operates, service quality is best dealt with in the contracts. This will be further enhanced when more users seek to contract directly for access and hence achieve greater control over the level of service received from both above- and below-rail.

3. Whole-of-supply chain forums can provide a more appropriate vehicle for addressing accountability for performance across the entire supply chain. It would be premature to require QR Network to develop a separate mechanism before the outcome of this process is known.

4. QR Network's existing commercial and regulatory obligations should be acknowledged. Similarly, the strength of the commercial incentives arising by virtue of QR Network's vertical integration should also be considered.

5. To the extent that a breach or negligence test is applied to the revenue cap adjustment, this should be linked as close as possible to the basis on which QR Network's revenue, and Reference Tariffs, are developed. This should be assessed at a system level. It is important to ensure that parties are not incentivised to transfer the costs of pursuing claims under their contracts onto the QCA, and that the costs of administering this regime do not outweigh the benefits. Any concerns regarding the materiality threshold previously applied (when it was based on a single access agreement), can be addressed in the threshold applied at the system level.

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1 Introduction

In finalising the approval of QR Network's 2006 access undertaking, one of the matters that was unresolved was QR Network's exposure to volume risk. In response to this, QR Network proposed moving from a hybrid price cap to a revenue cap.

The Queensland Competition Authority (QCA) accepted QR Network's proposal however it noted that despite the operational incentives inherent in the associated commercial and contractual frameworks, a service quality incentive scheme should accompany QR Network's transition to a revenue cap. This was in recognition of the integral role of QR Network's activities in the coal supply chain and that QR Network has responsibility for maintaining the network and managing expansions to system capacity.

The appropriate form of a service quality regime has been contentious. One of the key reasons for this is the inherent difficulties in designing an appropriate regime in a coal supply chain, which is characterised by complex interfaces between a number of different participants, all of whom can impact supply chain performance. The interdependencies between these participants mean that it can be difficult to clearly delineate responsibilities *ex post* for performance improvements or failures. However, increasing accountability for each participant's contribution to performance could assist in optimising throughput in the long-run.

In its Draft Decision in relation to QR Network's 2009 Draft Access Undertaking (DAU), the QCA requires QR Network to come up with an alternative incentive regime within six months. If this does not occur, or the regime is rejected by the QCA, the QCA will impose its own regime.

In our view, the debate has evolved to a point where it has potentially lost sight of the objectives of a service quality incentive regime and why it might be applied. Further, no explicit consideration has been given as to how QR Network can influence performance and how this is currently addressed under the existing regulatory regime. Consideration has also not been given to the natural incentives that arise due to QR Network's vertical integration.

QR Network has requested Synergies Economic Consulting to review the principles underpinning the design of such a regime, and how it might be applied to QR Network, also having regard to any existing incentives or obligations it has. This report is set out as follows:

- section 2 provides a brief overview of the development of the existing regime;

- section 3 examines the objectives behind service quality incentive regimes and the key principles underpinning their design. It also examines their application elsewhere in electricity and rail;
- section 4 considers existing incentives and obligations in place for QR Network; and
- section 5 summarises the implications of these considerations for a service quality regime for QR Network.

2 Background

This section sets out a brief overview of the history of the incentive regime that is currently in place and the key limitations that have already been identified with that regime.

2.1 Current regime

QR Network's initial proposal (February 2007) for transitioning to a revenue cap proposed an incentive mechanism that was modelled on the one incorporated in DBCT Management's Access Undertaking for the Dalrymple Bay Coal Terminal, which provided scope to claim additional revenue of up to two per cent if QR Network could demonstrate that it had contributed towards an improvement in supply chain efficiency. In discussions with QR Network as part of the development of its proposal, industry indicated that the mechanism should also provide for a 'downside' adjustment for QR Cause. QR Network argued that its Standard Access Agreement (SAA) already provided remedies in the event of breach or negligence.

In its May 2007 proposal, QR Network accepted the principle that it should not be able to recover revenue via the revenue cap where it had wilfully denied access to the below-rail network. However, it had a number of concerns with the QCA's proposed drafting on this issue, including how the QCA would assess any claims of breach or negligence. It proposed a set of drafting principles, including a requirement to link any proposed revenue adjustment for breach of negligence to any claims agreed or resolved under an access agreement. In the Final Decision, the QCA was not prepared to endorse those principles.

The key features of the mechanism that was finally approved by the QCA were as follows.

1. It provides for an adjustment to QR Network's System Allowable Revenue in the event that QR Network fails to provide access due to its own negligence or its own breach of the access agreement (while avoiding the potential for double counting). This is subject to a materiality test of ten per cent of train services in an access agreement in a month, consistent with the arrangements included in the Standard Access Agreement (SAA) for claims for the non-provision of access.
2. Where QR Network's Total Actual Revenue exceeds System Allowable Revenue in a year, QR Network is entitled to apply to retain some of this difference if it can demonstrate that the additional revenue was either wholly or partly a consequence

of a supply chain initiative implemented by QR Network. This must be approved by the QCA and the amount that can be claimed is limited to two per cent of System Allowable Revenue.

3. It allows for the QCA to assess whether any adjustment to System Allowable Revenue is required as part of its assessment of proposed variations to reference tariffs as part of the annual 'unders and overs' revenue cap adjustments:
   - this assessment would be conducted irrespective of whether the parties exercised their rights under the access agreement;
   - any adjustment would be 'reasonably determined' by the QCA;
   - all stakeholders would have the opportunity to lodge their claims with the QCA.

2.2 Limitations of current regime

Synergies considers that one of the key deficiencies with the current mechanism is that the potential adjustment for breach or negligence is a quasi legal remedy rather than a pure regulatory response. By default this approach is open to legal interpretation and vulnerable to costly disputation. Furthermore, by allowing stakeholders to lodge a claim with the QCA rather than via the access agreement only, it provides scope for users to seek an alternative, less costly form of compensation. However, under this approach QR Network is exposed to both legislative and/or regulatory risks for the same event based on potentially different assessment criteria.

The development of an effective incentive mechanism is inherently difficult given the complexities of a coal supply chain and the interdependencies between participants in that chain, which means that attributing specific responsibility for performance (or non-performance) can be difficult. QR Network stated:[1]

> …there has been no public acknowledgement by the QCA of the complexities in attributing responsibilities for the non-provision of access where a Claim is not made. In addition, it is not clear from the Final Decision or the Proposed Schedule F Amendment how the QCA would 'reasonably determine' whether breach or negligence has occurred in these instances.

While QR Network highlighted these difficulties in its submissions, this issue was not clearly acknowledged by the QCA.

[1] QR Network (2007), QR Access Undertaking (2005, Submission to the Queensland Competition Authority: Revised Proposed Schedule F Amendment, June, p.15

In its June 2007 submission QR Network set out its residual concerns with the proposed incentive mechanism. One concern was that by allowing stakeholders to lodge a claim with the QCA, it allows a mine and/or third party access holder to seek a deduction where the materiality tests have been satisfied, but the access holder has not made a claim under the access agreement. It noted that failure to make a claim may be due to one or more of the following:[2]

- a third party access holder is unable to make a claim against QR Network for breach or negligence, for example due to the breach or negligence relating to Major Periodic Maintenance;
- an access holder agrees with QR Network a resolution which is outside the claims process (e.g. for an alternative remedy or for specific performance);
- QR National agrees with QR Network that a claim will not be made; or
- the materiality threshold does not align with the access agreement.

This additional path for compensation places additional pressures on QR Network as compared to claims under an access agreement, as any stakeholder may lodge a claim with the QCA. Further, there are minimal administration costs associated with a user lodging a claim with the QCA compared to lodging a claim under clause 15.3 of the SAA, in other words, these costs are transferred to the QCA.

Issues in relation to developing and applying such a regime to QR Network are considered further in section 5.

2.3 Proposed amendments to current regime

As part of stakeholder consultation on its UT3 proposal, industry had indicated to QR Network that it did not see that the current mechanism provides an effective performance incentive, although it was also noted that no alternatives were proffered by industry.[3] QR Network reiterated that the following principles remain relevant:[4]

- QR Network should not continue to bear a material degree of volume risk;
- That QR Network should have some incentive to maximise throughput, and that it should be penalised for actions which restrict throughput;

[2] QR Network (2007), p.15.

[3] QR Network (2008a), Volume 1 Attachment D, 2009 Access Undertaking – Principles Paper: Form of Regulation (Revenue Cap), August.

[4] QR Network (2008a), p.2.

- That any incentive framework should be clear, symmetric, readily understood, relatively simple to implement and proportionate to the contractual and non-contractual remedies already available for poor performance by QR Network;
- That any mechanism minimises the probability of parties 'gaming' the framework by making spurious claims.

QR Network had considered a number of alternatives (which it is understood were discussed with industry) but none of them were seen to demonstrate significant advantages over the existing mechanism. Following discussions with the Queensland Resources Council (QRC), it was acknowledged that QR Network needs to have some exposure to performance risk, but that the existing framework had too much uncertainty, noting that it largely relied on the QCA arbitrating on any performance issues or improvements.

QR Network therefore proposed to remove the plus or minus two per cent incentive. It stated that the continued exclusion of AT_1 from the revenue cap would result in QR Network retaining adequate exposure to volume risk.

QR Network's revised proposal was discussed with the QCA following the release of an initial Issues Paper. The QCA indicated that is was not considered appropriate to remove the incentive mechanism altogether. QR Network therefore proposed further amendments to:

- lower the materiality threshold to apply to ten per cent of train services in a year in an individual system (given it was recognised that at the current time, most services are covered under a single access agreement); and
- place the onus on non-QR Network parties to demonstrate that it is not entitled to claim the two per cent increment.

In its Draft Decision on the QR 2009 DAU, the QCA acknowledged there were some limitations with the current incentive mechanism. Despite these limitations, the QCA believed there was scope for an incentive mechanism linked to the improvement of the whole of the coal chain to be developed. It noted the role of coordination initiatives such as the Long Term Solution (LTS) being progressed in the Dalrymple Bay coal supply chain, although it indicated that it "has not yet had the benefit of understanding the outcomes of these processes."[5]

[5] Queensland Competition Authority (2009), Draft Decision: QR Network 2009 Draft Access Undertaking, December, p.174.

While it did not specifically comment on QR Network's proposal to change the threshold to a system level (or why that was not considered sufficient), the QCA has proposed that the downside incentive arrangement should apply when there is a breach or negligent act that affects more than ten per cent of train services in an origin-destination pair over a year.

It also rejected QR Network's proposal to remove the two per cent increment. While noting that initiatives such as the Dalrymple Bay LTS were underway, it still requires that QR Network develops an alternative mechanism in consultation with industry within six months of the commencement of the next undertaking period. If QR Network is unable to do this, the QCA will develop its own mechanism.

The following section will consider the characteristics of service incentive regimes more generally, before considering how one can or should be applied to QR Network.

3 Service Quality Incentive Schemes

3.1 Rationale for Service Quality Incentive Schemes

The objective of service quality incentive schemes is to ensure monopoly service providers do not exercise market power through reducing service quality to increase profits. Economic regulation therefore needs to consider service quality along with prices for the regulatory period. Failure to consider service quality may result in regulated prices being 'gamed' through the regulated entity reducing service quality levels, which is economically equivalent to increased prices.

Maintenance of efficient service quality levels can be achieved through various non-financial or financial mechanisms, such as public reporting, the establishment and enforcement of service quality standards and/or through service incentive mechanisms applied under price or revenue regulation.

In theory, the optimal level of service quality is where the marginal cost of the quality improvement equals the marginal benefits derived by consumers.[6] One of the reasons that service quality incentive regimes are introduced is where there is a significant:

- information asymmetry between the infrastructure owner and users; and/or
- imbalance in negotiating power between the owner and consumers.

This is particularly evident in regulated industries with a retail customer base, such as electricity. In rail, the equivalent area is passenger services. Regulatory intervention can address this information asymmetry by establishing performance standards on behalf of a large and diverse customer base, as well as monitoring the extent to which these standards are achieved.

Excessive service quality may occur where the form of economic regulation rewards inefficient over-investment, which may occur under rate of return regulation. Alternatively, poor service quality may occur if incentives are aimed at reducing expenditure, such as under CPI-X incentive-based price or revenue caps designed to extract greater efficiencies.

[6] V.Ajodhia & R. Hakvoort (2004), in "Economic Regulation of Quality in Electricity Distribution Networks", in Utilities Policy, Vol.13, pp.211-221.

3.2 Design features

The objective of service quality incentive schemes is to ensure an efficient level of service quality is provided to users of the regulated monopoly service, taking into account the price of the service and users' preferences. In a competitive market consumers seek products that met their desired levels of service and willingness to pay for quality and firms' willingness to supply these goods on the consumer's preferred terms. Market forces therefore create strong incentives for firms to provide appropriate quality levels to customers. These forces are generally weaker for regulated services. Regulation therefore can play an important role in ensuring the monopoly provider's customers receive appropriate levels of service quality.

If it is deemed that service quality incentives are required for a service provider, one or more of the following regulatory mechanisms could be used:[7]

- public reporting of service quality;
- enforcement of service standards by the regulator;
- price control adjustments in response to service performance;
- guaranteed payments; and
- legal compensation.

Each of these regulatory mechanisms is discussed below.

3.2.1 Public reporting of service quality

This approach encourages service providers to maintain and improve service quality by exposing them to critical assessment by informed customers, media and other stakeholders.

It also facilitates informed negotiations between customers and service providers on local or generalised service quality improvements. This approach carries high transaction costs when the mechanisms are initially developed to collect and report against benchmark categories of service quality.

Once established this approach has low transaction costs and provides customers and interested parties with quantitative data on network performance. This form of incentive can also assist performance, as the access provider is subject to reputational and commercial risk through the reporting of poor performance.

[7] Utility Regulators Forum (1999), Quality of Service Monitoring: Discussion Paper, October pp.5-6.

As will be set out below, QR Network is already required to publicly report on a number of indicators under Part 9 of the undertaking.

3.2.2 Enforcement of service standards by the regulator

Enforcement of service quality standards by the regulator can be achieved through the application of statutory penalties. This option carries high transaction costs and is allocatively inefficient, in that penalties do not reflect the lost consumer value. Also, the statutory penalties are generally not paid to the effected consumers proportional to their economic loss. However, this approach can be effective as a *last resort* as access providers will generally seek to avoid the consequences of non-compliance.

To provide a meaningful basis to the establishment of service quality standards, historical data on service quality performance is required, which could be gathered through reporting service quality to the regulator.

3.2.3 Price control adjustments in response to service performance

The usual form of this incentive is that prices are reduced when service performance falls below benchmark levels. Similarly, prices may rise when service performance exceeds benchmark service levels. The size of the adjustment is generally proportional to the difference between actual and benchmark service quality levels, but may be capped at particular levels.

If the same price adjustments are provided to all consumers this approach suffers from allocative inefficiency. This is due to the adjustment failing to reflect the different levels of service actually received by individual customers or the value placed on service by individual customers. Under this scenario the service provider has a distorted incentive, that is to increase service quality at least cost compared to undertaking those projects which will maximise net consumer benefits. A tradeoff therefore exists between allocative efficiency and transaction costs.

3.2.4 Guaranteed service level (GSL) payments

The service provider may be required to make GSL payments to customers who receive service below defined benchmark levels of service.

The key value in this incentive is its symbolic value to customers and the service provider. Transaction costs are generally low (assuming payment is made directly by the service provider rather than through a third party). However, in terms of allocative efficiency consumers receive a fixed payment rather than compensation equivalent to the financial impact or the value the customer has attributed to the reduced level of

service. This approach has been applied to all Distribution Network Service Providers (DNSPs) operating in the National Electricity Market (NEM). These GSL schemes tend to be targeted at small retail customers rather than larger customers.

3.2.5 Legal compensation

Users may seek compensation through the courts or complaint handling bodies for sub-standard levels of service which cause loss or damage. This form of incentive is allocatively efficient but carries high transaction costs which limit its application. Moreover, it relates to contractual arrangements rather than the broader regulatory revenue/price determination.

This approach is currently available to QR Network's users via clause 15.3 of the SAA.

3.3 Incentive regimes in practice

3.3.1 Key success factors

In Synergies' view, of all regulated infrastructure services in Australia, electricity network regulation (distribution and transmission) is most advanced in the application of service incentive schemes with associated financial rewards/penalties. One of the key reasons that this has been seen as important in this industry is because of the information asymmetries present and the significant imbalance in negotiating power between electricity network owners and users (which include a large number of small residential customers). Furthermore, given the essential nature of electricity, ensuring certain service standards are maintained has been a priority for regulators (and government[8]).

The success of any incentive scheme is a function of a number of factors, namely:

- identification of service attributes that users value most highly;
- the ability to clearly articulate the desired level of performance;
- meaningful and measureable indicators of performance;
- strength of financial incentives provided by the scheme for performance improvement; and

[8] For example, reference is made to the Electricity Distribution and Service Delivery review that was commissioned by the Queensland Government. This review, which was completed in 2004, resulted in the implementation of minimum service standards and mandatory Guaranteed Service Levels.

- performance is under the control of the regulated business to a significant extent.

Each of these elements is discussed further below having regard to their application to below-rail services.

Identification of service attributes that are most highly valued by users

The service attributes that should be subject to performance assessment are those that users value most highly, as it would be an inefficient use of resources to encourage a service provider to increase the frequency and/or type of services that do not reflect user preferences. Over time it is expected that user preferences will change (including their willingness to pay for service quality), based on factors such as world demand for coal. Furthermore different classes of user will have different preferences. It is difficult to tailor a scheme to reflect differences in these preferences where that scheme is applied across the entire network.

QR Network has already sought to engage with users on their preferences in relation to service quality (at an aggregate level) as part of the development of its maintenance cost forecasts (see next section).

Ability to clearly articulate required performance levels

Once the service attributes have been identified, there is a need to determine the performance level that the service provider is required to achieve in order to earn a reward (or face a penalty if the performance level is not achieved). At its simplest, this is the user having access to below-rail services at the times they wish to transport coal to port. However there are many other attributes that need to be considered, such as the reliability of the service (that is, the number and duration of service interruptions). These types of attributes are not measurable in a scheme that is applied at an aggregate level (that is, system or network).

It is understood that QR Network has already sought to engage with users on this issue with respect to maintenance, which is one of the key activities undertaken by QR Network that can influence supply chain performance (this is considered further below). The trade-off between service quality and maintenance costs was explored in some detail in QR Network's submission accompanying its 2009 DAU.[9]

In setting out the process it followed to develop its maintenance cost allowance, QR Network noted that it had released two papers to industry, which invited users to

[9] QR Network (2008b), Volume 2, Attachment G: QR Network's Access Undertaking (2009): Maintenance Costs, August.

provide input into the development of the service standard specification, and the scope of the maintenance task. QR Network noted that it received very limited feedback on these documents. This is a somewhat surprising outcome, as we would have expected that these users are not only motivated to provide input into this process (given they are ultimately bearing the costs), but are also of a size and sophistication to enable them to articulate their service quality expectations.

Measurable indicators of performance

When seeking to determine user preferences and willingness to pay for improved performance, the nominated service attributes should be meaningful and measurable. As outlined above, there are a number of measures that QR Network is already required to report against under Part 9 of the undertaking. This includes:

- information on reliability, which is based on the exit times of healthy and unhealthy services;
- information on transit times, based on estimated delays according to the cause of that delay; and
- information on availability, based on the number of cancellations.

T main practical difficulty is the ability to attribute responsibility for performance between below-rail, above-rail and other causes. This is particularly important in this context given the measures for which a below-rail network owner is to be held accountable must be within its control (as discussed below). Further, different users may have different tolerances or preferences in relation to performance levels.

Strength of financial incentive

If a financial incentive for performance improvements is to be applied, it needs to be of a sufficient magnitude to motivate the network owner to invest in service quality improvements. Implementing improvements will result in costs being incurred. Further, there will be additional costs involved in making a claim under the incentive regime, or in QR Network's case, demonstrating to the QCA that the initiative has directly resulted in an improvement in supply chain performance. As outlined above, given the complexities of the coal supply chain this can be difficult to demonstrate.

QR National is also motivated to act in the best interests of the QR Group by virtue of QR Network's vertical integration. If QR Network does not contribute towards improvements in supply chain performance or find ways to increase throughput (including expanding the network where required), it will only harm the business as a whole. The power of this incentive cannot be understated as it comes back to its

fundamental commercial business drivers and is not present in a vertically separated business. This is discussed further in section 4.1 below.

Performance must be within the control of the regulated business

They should also be under the control of the regulated business to a significant extent and be relatively independent of each other.

Regulators should consider the practicalities of establishing, implementing, monitoring and reviewing a service quality incentive scheme. Given the degree of uncertainty involved in isolating responsibility within the supply chain for variances in performance and the strength of user preferences for different service quality attributes, a cautious approach is required.

This may involve initially concentrating on the factors of performance that are quantifiable, verifiable and within the control of the regulated business (to a significant extent). It may also involve an assessment of the market, such as the level of experience of users and access seekers. By considering each of these factors, it will assist in determining:

- the suitability of an incentive mechanism for the service provided;
- the ability to accurately attribute performance success and failure;
- the type of regulatory mechanisms that could be used (e.g. comparative reporting, legal compensation and/or price control adjustments); and
- identifying those attributes where quality information is available, that is verifiable.

This is one of the key areas of difficulty in establishing an incentive regime for QR Network. As outlined previously, in such a closely integrated supply chain it can be extremely difficult to delineate responsibilities for performance. While the way in which QR Network can influence performance can be identified (as will be discussed in section 4), accurately attributing responsibility *ex post* for performance improvements or failures is a more difficult task.

Experience elsewhere

Electricity

The electricity industry is a primary example of where service quality regimes have been implemented in an Australian context. One of the key reasons for this, as set out

above, is the information asymmetries present and the significant imbalance in negotiating power between electricity network owners and users.

Clause 6A.7.4 of the National Electricity Rules (the Rules) prescribes that the AER must implement a service target performance incentive scheme for the transmission network. This has some specific objectives, being to:

- improve system reliability at the times when this reliability is most highly valued by users; and
- improve the reliability of those elements of the system that have most influence over spot prices.

The scheme is to have direct consequences for the revenue earned by Transmission Network Service Providers (TNSPs), however the maximum revenue increment or decrement is limited to between one per cent and five year cent of maximum allowable revenue.

The ACCC released guidelines for the regulation of electricity transmission in 2004 and as part of this considered the issues that should be taken into account in designing a service quality incentive regime. Some of the key points made here are listed in the box below.

Box 1 ACCC: Key considerations in designing a service quality incentive regime

1. The power of the incentive is directly linked to revenue at risk.
2. The incentive may or may not be symmetric (that is, it may be appropriate for a regulator to penalise for under-performance whilst not rewarding for over-performance).
3. The power of the incentive to improve service quality will have a direct correlation with the incentive to set low performance targets:
4. There is the potential for a 'ratchet' effect in designing these frameworks. In other words, if the regulated entity achieves a high target today, the bar is set even higher tomorrow, which therefore serves as a disincentive to achieve the high target. In the ACCC's view, higher performance targets today should be able to be followed by lower performance targets in the future, if appropriate.
5. As indicated above, high powered incentives are not always better. Not only can this increase the incentive to set low performance targets, it can increase the incentive for the regulated entity to reduce expenditure, as long as the regulator is uncertain about the influences on the firm's costs. Further, imposing a high powered incentive for one objective may encourage the firm to sacrifice another in order to achieve the target.
6. There are a number of incentives in the regulatory framework and these are inextricably linked. They include:
    - efficiency incentives as part of the building blocks approach (via the 'CPI minus X' pricing principle);
    - incentives to reduce operating expenditure;

- incentives to reduce capital expenditure; and
- service quality incentives.

7. It is important to ensure that these incentives are appropriately balanced, for example, incentives to reduce expenditures should not compromise service quality.

Source: ACCC (2004), Decision: Statement of Principles for the Regulation of Electricity Transmission Revenues: Background Paper.

In August 2007 the AER released details of its service target performance incentive scheme. Despite some pressure from stakeholders, it limited the maximum revenue increment or decrement to 1%, although this would be considered as part of the review of the extent to which the scheme is achieving its desired objectives. The initial scheme focused on network availability and reliability.[10] The TNSP's responsibility excludes force majeure events, or anything outside of the TNSP's control.

The need for a cautious and pragmatic approach when developing a service quality incentive scheme has been widely acknowledged by electricity regulators. This is evidenced by most jurisdictional electricity regulators investigating the merits of such a scheme and that various approaches have been taken across the jurisdictions in recognition of jurisdictional factors and the availability of reliable data. For example, prior to the Australian Energy Regulator (AER) assuming responsibility for economic regulation of electricity distribution networks:

- only three regulatory service quality incentive schemes had been implemented - Victoria, South Australia and Tasmania;
- New South Wales (NSW) decided to implement a paper trial of a service quality incentive scheme and delay the implementation of monetary incentives in recognition of:
  - the risk of perverse incentives (that is, distributors may focus on the 'quick wins');
  - the difficulties associated with annual performance variability;
  - the difficulties in adjusting for data accuracy improvements; and
- Queensland decided not to adopt a service quality incentive scheme due to the findings of the Electricity Distribution and Service Delivery review and that the Queensland Government had implemented minimum service standards and

[10] The scheme has recently been updated to include incentives based on the market impact of transmission congestion. Under the *market impact incentive*, which is designed to provide incentives for TNSPs to minimise the market impact of their outages, a TNSP will receive a financial incentive which falls within a range of 0 and 2 per cent of the TNSPsof maximum allowable revenue.

mandatory Guaranteed Service Levels relating to customer service as a licence condition.

Under Clause 6.6.2 of the Rules the AER was required to develop and implement a service target performance incentive scheme for electricity distribution. The Rules require that in developing such a scheme, the AER takes into account:

(i) the need to ensure that benefits to consumers likely to result from the scheme are sufficient to warrant any reward or penalty under the scheme for Distribution Network Service Providers; and

(ii) any regulatory obligation or requirement to which the Distribution Network Service Provider is subject; and

(iii) the past performance of the distribution network; and

(iv) any other incentives available to the Distribution Network Service Provider under the Rules or a relevant distribution determination; and

(v) the need to ensure that the incentives are sufficient to offset any financial incentives the service provider may have to reduce costs at the expense of service levels; and

(vi) the willingness of the customer or end user to pay for improved performance in the delivery of services; and

(vii) the possible effects of the scheme on incentives for the implementation of non-network alternatives.

The Rules therefore explicitly require that consideration is given to other aspects of the regulatory regime, including both obligations and incentives. It also requires consideration of the costs and benefits of the scheme and the willingness of customers to pay for service quality improvements.

The original scheme for DNSPs was finalised in 2008 (and has subsequently been updated). The scheme has four components, being: reliability of supply, quality of supply, customer service and guaranteed service levels. The maximum revenue increment or decrement is 5% of revenue each year (excluding the guaranteed service level component). However, a DNSP may propose a different increment or decrement provided it satisfies the objectives of the scheme.

Network Rail

Network Rail owns and operates Britain's below-rail network. It is also two-way, that is, both the below-rail network owner and operators are governed by the regime. The objectives of its performance regime are quite different to QR Network's, particularly given a focus on service quality for passenger transport.

A performance regime was introduced for Network Rail's predecessor, RailTrack, in 1996. The objective of the regime was to provide incentives to RailTrack to deliver improvements in service quality. The rewards and penalties under the regime were significant, for example, the societal rate, which covered all passenger services, was reset to £3.5 million per percentage point in 2001. The scope of the regime applies to passenger and freight services.

The regime was initially seen to be reasonably successful. However, following the Hatfield accident in 2000 (which resulted in four fatalities), an unprecedented number of speed restrictions were put in place, significantly increasing delays attributable to RailTrack. Following the increase in rates to apply from April 2001, RailTrack estimated that its total payments would be between £1 and 2 billion over its five year control period. RailTrack was subsequently placed into administration in October 2001 due to mounting debts associated with its compensation payments, project cost overruns and maintenance cost increases.

Network Rail assumed responsibility for ownership of the network in October 2002. It also assumed responsibility for what was expected to be very high compensation payments. The benchmarks and payment rates were subsequently revised by the Office of Rail Regulation (ORR).

A key feature to note regarding this regime is that it holds both Network Rail and operators accountable for performance. One of its key priorities is the lateness and cancellation of services, having regard to passenger priority. It provides for compensation of affected operators of passenger or freight services for the estimated costs and revenue loss resulting from lateness or cancellations attributed to Network Rail or other operators. It also provides incentives to Network Rail and operators to improve operational performance through operational decision-making and investment appraisal.

A volume incentive has also been included in the regime, to provide Network Rail with an incentive to accommodate expected growth in demand. This incentive is effectively one way, that is, Network Rail will be provided with additional revenue for accommodating demand in excess of forecast. Any failure to meet demand is seen to be addressed in other parts of the regulatory framework, including enforcement of its

licence conditions. For example, delivery of certain capacity-related schemes is a condition of the license.

As part of the most recent periodic review of Network Rail's outputs and funding, the performance regime was also reviewed.[11] The regime applying to passenger services largely remained unchanged, with the exception of updates to benchmarks and payment rates. More significant changes were made to the regime applying to freight, including the application of standardised benchmarks and payment rates for all operators, normalised for traffic growth.

Delay attribution is still seen as one of the most complex aspects of the regime. The Office of Rail Regulation indicated that between 300 and 500 people are employed across Network Rail and the operators for delay attribution. A 125 page Delay Attribution Guide has been prepared, which is overseen by a Delay Attribution Board. This would seem to indicate that the management of this regime is extremely costly (noting the delay attribution is just one aspect of that regime). It is therefore reasonable to question whether at this point in time, the benefits of this regime outweigh the costs.

3.4 Limitations of incentive mechanisms

Service quality incentive schemes can be an effective way of remedying the perverse outcomes of economic regulation[12] and/or increasing service standards more generally. However careful consideration should be given to the appropriateness of such mechanisms, including the type of enforcement mechanisms adopted.

Although incentive schemes can deliver significant efficiency benefits, this only applies when the incentive mechanisms (including enforcement mechanisms) are appropriately scoped to meet market factors and user/consumer needs. Failure to do so may result in an inefficient mechanism which duplicates regulatory or commercial frameworks and/or encourages an inefficient allocation of resources. Therefore an assessment of commercial and regulatory factors should be conducted prior to adopting a service quality incentive mechanism and this should be reviewed on an ongoing basis.

The key issues to consider based on regulatory precedent and success factors (section 3.3) are summarised below.

[11] Office of Rail Regulation (2008), Periodic Review of Outputs and Funding for 2009-14

[12] One of the aims of CPI-X regulation is to provide incentives for monopoly businesses to become more cost efficient over the regulatory period. However, such a framework can have perverse incentives in that it might encourage a business to reduce costs at the expense of service standards.

3.4.1 Quality performance data

The availability of quality performance data is essential for setting baseline performance, establishing regular reporting regimes and determining whether performance has improved over the regulatory period. In the electricity sector, a number of regulators have chosen to delay the implementation of incentive mechanisms that include financial incentives/penalties until a significant amount of information is available. In these instances a 'paper trial' approach has been adopted. Similarly, the service quality regime now in place for Network Rail was also originally subject to twelve months of 'shadow running' before it was formally implemented.

In electricity, in some jurisdictions where financial incentives were in place there have been issues around the quality of the reliability data reported by electricity DNSPs, such as significant levels of statistical noise. For example, the Office of the Tasmanian Energy Regulator (OTTER) decided to move away from the current scheme due to[13]:

- a lack of consistent historical data available especially for SAIDI[14] on which to establish a benchmark;
- difficulty in establishing the impact of past reliability improvement programs, leading to uncertainty about actual current performance levels;
- difficulty in forecasting the impact of future reliability improvement programs;
- the risk of incorrectly matching performance targets to capital expenditure forecasts; and
- volatility in recorded network performance due to variability of weather conditions.

3.4.2 Optimal level of service quality

Users normally prefer better quality of service to inferior quality service and are prepared to pay a premium for better service. However, the premium they are willing to pay will depend on individual preferences and the improvement in quality involved. In industries such as electricity distribution that provide services to a large number of users with disparate consumption requirements, mechanisms such as minimum standards can act as an effective safety net.

[13] OTTER (2007), 2007 Electricity Pricing Investigation: Final Report, September, pp. 227.

[14] System Average Interruption Duration Index.

For some industries, due to the small number of users and their commercial experience, commercial arrangements can be a more effective way to achieve agreed service standards compared to performance based incentive mechanisms, as it allows the user to specify the type of service/s required to optimise its production processes. This is also the case in the electricity sector where large users can enter into negotiated contracts for network services.

As set out above, given the size and sophistication of QR Network's customer base, we would consider that at minimum, its users should be able to provide input into the specification of service standards to apply to the network. Ultimately, with (at least some) users seeking to take increased control over their access to supply chain capacity, they may also seek to negotiate their own service standards. This would be seen as a more effective mechanism than regulator-imposed standards.

3.4.3 Control over outcomes

To implement a service quality incentive scheme, objective, quantifiable and verifiable performance indicators are required. According to Kaufmann and Lowry, service quality indicators should satisfy four criteria, one which is "utilities should be able to affect the measured quality"[15]. That is the indicator must be under the control of the service provider to a significant extent and the service provider is able to affect its performance.

For industries such as electricity it is possible to attribute improvements or reductions in service quality to an individual service provider due to the technical nature of the service provided and the way users connect and are supplied energy via the network. However, the ability to easily measure and directly affect performance does not hold for all service providers within supply chains.

For example, a below rail service provider's ability to provide a guaranteed level of train paths is directly impacted by the actions of third parties using the network. Unlike electricity, users of the below rail network actually physically use the network. The standard and specification of a user's rollingstock or the speed in which it was travelling can directly impact the below- rail network owner's performance. As outlined above, due to the high level of interdependency of the railing task and connectivity with adjoining supply chains, it is very difficult to assign liability for improvements or reductions in performance.

[15] L. Kaufmann, and M. Lowry, (1999), Price Cap Regulation of Power Distribution, Report prepared for Edison Electric Institute by Pacific Economics Group, Madison.

The complexity of implementing incentive regimes for railways was noted in a paper by Gibson, which analysed the regime in place for RailTrack:

> A key part of the performance problem on the railways is the complexity of the underlying causes of delay and the poorly understood relationship between the actions of the infrastructure owner (for example, in terms of maintenance and renewal work), the outputs in terms of reduced asset failures and management and rectification of incidents when they occur, and the final level of reliability delivered to passengers. There is also a very large exogenous element to the initial causes of many delays…and a large variance in performance over time. This makes managing and controlling performance difficult and means that in practice, the infrastructure owner has only limited control over the outcome in terms of delay experienced by final passengers particularly in the short term and indicates that medium term incentive regimes should be preferred to annual targets.[16]

This is clearly demonstrated by the resources dedicated to delay attribution in Network Rail's regime, as set out above.

[16] S.Gibson (2005), "Incentivising Operational Performance on the UK Rail Infrastructure Since 1996", in Utilities Policy, Vol.13, p.228.

4 Application to QR Network

In considering the application and design of an incentive regime for QR Network, it is necessary to revisit the fundamental principles underpinning such a regime, which were set out above. It is also necessary to put this in context of QR Network's ownership structure and its regulatory regime.

4.1 Incentives for vertically integrated businesses

The fundamental driver for QR Network's business decisions is to maximise value to its shareholders, subject to its obligations under the undertaking. If QR Network did not undertake reasonable initiatives to further enhance and improve the performance of the below-rail network (subject to being adequately compensated for the efficient costs and risks of doing so), it would not be adding value to the QR business as a whole.

What the QCA has not explicitly considered is the natural incentives that arise by virtue of QR Network's vertical integration. If QR Network does not contribute towards improvements in supply chain performance or find ways to increase throughput (including expanding the network where required), it will only harm the business as a whole. The power of this incentive cannot be understated as it comes back to its fundamental commercial business drivers.

The Office of Rail Regulation has indicated that the vertical separation of what was RailTrack was a key reason for the imposition of a service quality regime:

> With vertical separation in 1994, it was important to ensure that the infrastructure manager was still focused on performance…[17]

There is also empirical evidence to support a relationship between service quality and ownership structure. For example, Benz et al (2000) examined the relationship between institutional arrangements and the incentives to invest in quality-enhancing improvements. They found that these incentives are smaller under vertical separation than integration.[18] Economides also found that a lack of vertical integration leads to a reduction in quality.[19]

[17] Office of Rail Regulation (2008), GB Performance Regime, p.2.

[18] M. Benz, S. Buehler & A. Schmutzler (2000), Quality Provision in Deregulated Industries: The Railtrack Problem, working paper, http://ideas.repec.org/p/soz/wpaper/0002.html.

[19] N. Economides (1999), "Quality Choice and Vertical Integration", in International Journal of Industrial Organisation, Vol. 17, pp.903-914.

We understand that the below-rail coal network will remain part of a vertically integrated business under the proposed privatisation. While we are not aware of the specific reasons underpinning the State Government's decision, we would expect that a key consideration was the benefits that arise under vertical integration. These benefits include the alignment of incentives in relation to investment and optimising supply chain performance, which would be more difficult to replicate under a vertically separated structure.

4.2 QR Network's role in influencing supply chain performance

As noted above, both the ACCC and AER have recognised that any service quality incentive regime needs to be considered within the context of the overall regulatory regime, including existing obligations and incentives under that regime.

There are two issues underpinning the design of the incentive regime under the revenue cap. The first is volume risk. Under a revenue cap, volume risk is transferred to users. If a regulated entity is to either be fully or partially exposed to this risk, it should be governed by a price cap form of regulation. A key concern for users under a revenue cap is the extent to which the regulated buiness is, or needs to be, incentivised to increase throughput to accommodate future growth in demand.

The second dimension is performance risk. This relates to the extent to which QR Network should be exposed to the consequences of its own poor or non-performance via the revenue cap. This risk exists under either form of regulation however under a price cap it has an immediate revenue impact, given QR Network's revenue will be reduced in the event of under-performance.

In determining the extent to which an incentive regime is needed, consideration must be given to the ways that QR Network can contribute to the performance of the supply chain. The main ways are:

- undertaking sufficient and timely investment in network capacity;
- undertaking adequate maintenance to maximise network availability (while recognising the impact that maintenance possessions have on availability); and
- maximising efficient utilisation of network capacity.

QR Network must also publicly report on a number of key performance indicators on a regular basis.

QR Network's existing access regime can be observed to be the most prescriptive and detailed heavy haul access regime in Australia (which has largely evolved from QR Network's vertical integration). A review of QR Network's existing regulatory framework, as well as changes proposed for UT3, demonstrates that there is already a range of measures in place to ensure that QR Network satisfies its obligations under the undertaking and contributes towards the growth and development of the coal supply chain. These measures are examined below.

4.2.1 Provisions governing investment

QR Network's investment planning and decision-making is based on a comprehensive Master Planning process, which involves key supply chain stakeholders and is ultimately submitted to the QCA for approval. The QCA must still approve all capital expenditure, noting that processes have now been included in the undertaking to facilitate this.

If QR Network fails to invest in necessary network infrastructure, in the first instance, as outlined above, it will only detract value from the integrated business given it will stifle any growth opportunities for the affiliated above-rail operator (presuming that such investment would have been justifiable on commercial and economic grounds). We also note that there is a provision under the *Queensland Competition Authority Act 1997* (section 119(5)), that enables the QCA to require QR Network to extend the network for an access seeker (provided QR Network is not required to meet the costs of that extension) in the context of an access dispute arbitration.

Under-investment in one regulatory period can also impact on the capital expenditure allowance that is approved for the next regulatory period. For example, in the UT2 Final Decision, one of the reasons cited by the QCA for not approving QR Network's proposed expenditure was because of the relatively low level of expenditure that actually occurred during the first undertaking period.[20]

4.2.2 Provisions governing maintenance expenditure

QR Network's maintenance expenditure must also be approved by the QCA. The review undertaken by the QCA is detailed and includes independent analysis by its own consultant. This involves consideration of both the scope and cost of works.

We note that QR Network's UT3 proposal in relation to its maintenance cost allowance was extremely comprehensive and that the QCA noted that:

[20] Queensland Competition Authority (2005), Decision: QR's 2005 Draft Access Undertaking, December.

> The Authority is encouraged by the underlying maintenance program proposed by QR Network as part of its submission on the 2009 DAU.[21]

QR Network's submission included details regarding the proposed scope of works for each of its key maintenance activities. As outlined above, it had also released discussion papers prior to the preparation of its submission, inviting comments from stakeholders on the proposed scope of works. The trade-off between service quality and cost was one of the key issues canvassed as part of this submission.

Again, if QR Network fails to adequately maintain the network to the point where throughput is reduced, this will be to the clear detriment of the QR group. Also, a failure to adequately maintain the network could ultimately degrade the value of the asset. QR Network would also be in breach of its access agreement. Clause 6.2(a) provides that:

> QR Network must carry out Maintenance Work on the Nominated Network such that, subject to any agreed criteria and the Network Management Principles:
>
> (i) the Infrastructure is consistent with the Rollingstock Interface Standards; and
>
> (ii) the Operator can operate Train Services in accordance with its Scheduled Times.

A regulated business, subject to a revenue cap, may be seen as having an incentive to underspend on maintenance relative to the approved allowance. However it would need to be confident that these benefits could be retained for a reasonable period. It would also have to consider the potential risks that this would pose, including consequences for failing to maintain the network to an appropriate standard (which in QR Network's case, would be considered from the perspective of the group as a whole), and the risk of a lower operating expenditure allowance being applied in the subsequent regulatory period.

QR Network is required to annually report on its actual maintenance program relative to forecast. Hence, the nature and source of any underspend would be scrutinised by the QCA. Therefore it would be unlikely that the potential financial 'benefits' from an underspend (if any) would be seen as sufficiently persistent to outweigh the potential risks and costs.

We also note that the QCA proposes to impose an X factor against both QR Network's operating and maintenance costs. If appropriately specified, the objective of this is to

[21] Queensland Competition Authority (2009), p.57.

provide incentives to improve efficiency. This is not designed to target improvements in service quality, and indeed, if inappropriately specified could compromise that objective because it may result in QR Network failing to recover its reasonable costs of maintaining the network.

4.2.3 Provisions governing capacity allocation and management

Part 7 of QR Network's undertaking deals with capacity allocation and management. This includes provisions governing:

- how capacity is allocated, including how multiple requests for mutually exclusive access rights will be dealt with;
- the resumption, relinquishment and transfer of capacity, which can assist in ensuring capacity utilisation is optimised; and
- notification regarding future capacity that may be available.

Schedule G also contains a detailed set of Network Management Principles, which govern scheduling and the management of conflicting requirements.

Again, these provisions are very detailed and are designed to achieve two things. First, they ensure that QR Network cannot unduly advantage its above-rail affiliate in allocating and scheduling capacity. Second, they provide a clear framework by which QR Network seeks to optimise access to below-rail capacity on a daily basis.

We understand that initiatives such as the Long Term Solution, which is currently being developed in Dalrymple Bay, will put in place a comprehensive framework for optimising supply chain performance in the short- and long-run. This is considered particularly important given the interdependencies between supply chain participants and the need to ensure that there is appropriate alignment between these participants in order to optimise supply chain performance. We understand that QR Network is an active participant in this forum, as well as other forums that have been established in other supply chains. The implications of this will be considered further below.

4.2.4 Reporting

Part 9 of QR Network's undertaking includes a range of measures that must be reported on a quarterly and annual basis. For example, the information that must be provided in the quarterly report includes:

- statistics on healthy and unhealthy services;

- below-rail transit times and delays (attributed to above-rail, below-rail, or other);
- data on network availability; and
- speed restrictions in place over the relevant period.

QR Network is also required to report its actual maintenance costs relative to forecast.

This information must be publicly reported. As outlined in section 3.2.1, public reporting can provide an importance performance incentive on a business given the commercial and reputational impacts that could result.

The amount of information provided - including the information furnished in regulatory proposals and QR Network's Master Plan – also reduces the information asymmetry that exists between QR Network and users. The QCA also has access to this information, as well as other commercially sensitive information that is necessary to enable it to fulfil its obligations as regulator.

Further, the establishment of supply chain forums, such as the Dalrymple Bay Coal Chain and the Capricornia Coal Chain Management Group, is providing all participants with access to additional information regarding performance. One of the key purposes of these forums is to identify and analyse short-term performance issues, including attributing responsibilities for performance failures. This is understood to have already yielded important benefits to date.

The implications of the above considerations for QR Network's service quality regime will be examined below.

5 Implications for QR Network

5.1 Incentivising performance

Service quality regimes are considered particularly important where there is a significant gap between the service provider and users in terms of information and negotiating power.

This is a key reason why they have been applied in electricity and passenger rail services. In contrast, QR Network's customer base is comprised of a relatively small number of large, sophisticated customers that exert both individual and collective bargaining power.

The existing incentive regime applied to QR Network's below rail coal services has not yet evolved to a point where users have sought to clearly articulate their desired level of performance, or the service attributes that they value most highly. It is also expected that these preferences will vary through time, as user preferences change, as well as their willingness to pay. We would expect that users will seek to become more involved in this in the future, particularly as they seek to obtain more control over their access to supply chain capacity (under the proposed alternate access agreements).

The other key complexity here is developing realistic and meaningful performance measures that reflect the intent of the regime. These measures in turn need to relate to factors that are under the control of the regulated business.

As set out previously, this is inherently difficult in rail, and this has been highlighted in the Network Rail case. While this regime has been in operation for nearly 15 years, delay attribution (being only one aspect of performance assessment) remains problematic. Given the amount of resources that are now dedicated to this task, this shows that there is a significant risk that the cost of developing and administering such a scheme could far outweigh the benefits, at least in QR Network's case.

Given the size and sophistication of customers, and the likelihood that individual preferences may vary, it is considered that a more appropriate way of dealing with service quality is via contracts. Regulatory intervention would only be considered necessary in the circumstances set out above, that is, where users were not in a position to articulate and/or negotiate their desired service levels.

In the meantime, as set out above, there are a raft of existing obligations in QR Network's regulatory framework relating to each of the key areas in which it can

influence supply chain performance. The QCA also has a considerable degree of scrutiny over its investment program, its maintenance program and the way it manages capacity. A range of measures are already publicly reported on a regular basis.

A fundamental concern expressed by stakeholders has been the impact of a revenue cap on QR Network's investment incentives. In our view, a service quality incentive regime will not address this incentive. As a vertically integrated business, QR Network is naturally incentivised to do what is necessary to increase throughput. This includes investing in the network, provided it is commercial to do so. QR Network cannot be forced to invest if it is seen to compromise its legitimate business interests.

To the extent that performance incentives need to be addressed, the best way that any collective solution could be achieved is via supply chain coordination initiatives such as the Long Term Solution being pursued in Dalrymple Bay. This is an issue for all supply chain participants. Not only is an industry-driven forum considered the most appropriate vehicle to negotiate enhanced arrangements in relation to accountability, it does this within the context of the whole supply chain. This enables more effective consideration of the way in which all participants influence performance (such as attributing responsibilities for delays), including how this might be able to be monitored by the Central Coordinator who will have access to this information.

The QCA acknowledges the existence of such initiatives but effectively states that because "it has not yet had the benefit of understanding the outcome", QR Network will be required to develop a solution via a separate process. This is not seen as an adequate reason to set up a separate process. Further, to the extent that it is required to be completed in a shorter time frame, QR Network's separate process may be seen to undermine what the Long Term Solution – which is driven by all industry participants, not just QR Network – might be able to achieve. A premature solution imposed by the QCA could result in an even worse outcome.

In our view, these industry-driven forums provide the most appropriate vehicle for addressing this issue, noting that any changes to the undertaking will ultimately need to be approved by the QCA. We would expect that they will also provide a forum for considering other issues that may need to be considered within the aligned contractual framework, such as the ability to negotiate flexibility on an individual basis for differences in service quality.

5.2 Breach or negligence

The other key issue that stakeholders have sought to address via the regime is breach or negligence. We agree with the principle that QR Network should not be entitled to recover revenue via the revenue cap adjustment that it should not have earned due to its own breach or negligence.

One of the key difficulties with this in practice is that as previously set out, breach or negligence is a contractual mechanism, not a regulatory mechanism. To the extent that a breach or negligence test is to be applied when assessing any revenue cap adjustment, it should not interfere with the breach or negligence provisions under the access agreement, or be seen to replace that contractual remedy. In our view, the QCA's proposal to assess breach or negligence at an origin-to-destination path level could be seen to do just that.

As outlined above, the process that would be applied under a legal review is quite different from the approach that the QCA may apply, noting that it remains unclear as to how the QCA will assess this. More importantly, it provides parties with a greater incentive to pursue a claim under the revenue cap rather than the access agreement. This not only subjects the claim to a different process, but it also transfers costs that would other be incurred onto the QCA. This could not be considered efficient. There is nothing to prevent parties from pursuing spurious claims and if they are not incurring the costs the incentives are even greater to do this.

This in turn could materially increase the costs of administering this provision under the regime. As outlined previously, one of the key principles that should underpin the design of any regime is that the marginal costs should not exceed any benefits that may be derived.

We consider that QR Network's proposal to assess breach or negligence on a system-wide level is more appropriate. First, it is consistent with the way in which the Reference Tariffs are determined and any revenue cap 'over and under' adjustments are assessed. Second, it reduces the incentives on parties to seek to transfer the costs of pursuing individual breach or negligence claims onto the QCA. It does result in a higher materiality threshold than an origin-destination level, although this is considered appropriate given the potential for the costs to outweigh the benefits, as well as the incentive problems outlined above. To the extent that the former threshold (which was based on an access agreement) was seen as too high, that could be addressed via the materiality threshold set at the system level.

5.3 Conclusion

In conclusion, our key observations are:

1. Service quality incentive regimes tend to target industries where there is a significant imbalance in information and negotiating power (for example, industries where there is a large number of small residential customers). QR Network's user base comprises a relatively small number of large, sophisticated organisations with individual and collective negotiating power.

2. Given the nature of QR Network's customer base and the nature of the coal supply chain in which it operates, service quality is best dealt with in the contracts. This will be further enhanced when more users seek to contract directly for access and hence achieve greater control over the level of service received from both above- and below-rail.

3. In the meantime, whole-of-supply chain forums provide a more appropriate vehicle for addressing accountability for performance across the entire supply chain. It is considered premature to require QR Network to develop a separate mechanism before the outcome of this process is known.

4. QR Network's existing obligations under its regulatory regime in relation to the key areas where it is able to influence performance cannot be ignored. Similarly, the strength of the commercial incentives arising by virtue of QR Network's vertical integration should also be considered.

5. To the extent that a breach or negligence test should be applied to the revenue cap adjustment, this should be linked as close as possible to the basis on which QR Network's revenue, and Reference Tariffs, are developed. This is a system level. It is also important to ensure that parties are not incentivised to transfer the costs of pursuing claims under their contracts onto the QCA, and that the costs of administering this regime do not outweigh the benefits. Any concerns regarding the materiality threshold previously applied (when it was based on a single access agreement), can be addressed in the threshold applied at the system level.

Forecasts of Key Components of Queensland Rail Network's Maintenance Cost Index

Job No: I5277/AH

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SUMMARY

Consumer Price Inflation

Economic growth in Queensland has outpaced the national average over recent years due to the state enjoying the benefits of the recent minerals investment boom. This, in turn, has resulted in Queensland (as proxied by Brisbane Consumer Price Index inflation) having stronger demand inflationary pressures to the national average.

Fuel Prices

Historically, automotive fuel prices tend to track changes in benchmark oil prices (adjusted for exchange rate differentials) and adjusted for changes in refining and transport margins. Our fuel price model therefore is predominantly driven by variations in world oil prices.

Over the next 12 months, the oil price is expected to decline to an average US$64/barrel for 2009/10. The large holdings of stocks and production capacity exceeding demand (OPEC spare capacity has spiked from early 2009) will place downward pressure on prices. With global demand picking up over 2010 to 2012 — led by China — the market is expected to tighten again, pushing up prices. Given our outlook for only a moderate appreciation of the A$ against the US$ through the next few years, our forecast assumes that A$ oil prices will rise again through the 2010/11 to 2013/14 period.

Given our oil price assumptions and the removal of the Queensland government's 8.25c fuel subsidy, we expect that year average fuel prices for Brisbane will weaken over 2009/10 before experiencing moderate increases over 2010/11 and 2011/12. Stronger growth in fuel prices is expected by 2012/13 as global demand strengthens and margins increase.

We note that historically there has been little divergence in fuel prices between different regions of Queensland. However, this is a reflection of transport costs, which are higher in areas such as Gladstone and Emerald. In addition, we believe fuel costs in Brisbane will be marginally lower than in other regions of Queensland due to higher levels of competition between retail suppliers in Brisbane.

Maintenance Consumables

At present, road and bridge construction is the sole input to the ABS non-building construction index published quarterly by the Australian Bureau of Statistics (ABS) in its Producer Price Index (PPI) release (Cat. No. 6427.0). BIS Shrapnel is forecasting growth in annual average non-building construction costs, as captured by the road and bridge construction index, to be much weaker over the next two years as slowing (or declining) construction activity coupled with lower commodity prices continues to filter through.

We expect cost growth to re-accelerate by 2012/13 and 2013/14 as global economic conditions continue to improve (pushing up prices for oil and steel) with another upswing in domestic construction activity driving up prices for domestically-sourced labour, materials and equipment.

The ABS basic metals products PPI and fabricated metal products PPI is an output index and it essentially reflects prices of raw materials and labour used in the production process as well as the manufacturers' profit margins. The final index is calculated as a weighted index of these components. We have been able to approximate reasonably closely the historical percentage changes in basic metal products and fabricated metal products PPIs by applying the individual price elasticities to the respective input component index (constructed in-house). An outlook for

these indices, therefore, is based on our future price expectations of key components of the overall index as well as the estimated price elasticities.

Transport Equipment and Parts PPI is also an output index and reflects the price received by producers or manufacturers of transport equipment and parts. As a result, movements in this index are influenced by technological change, efficiency gains, government policy (such as import tariffs) and competition which affect the manufacturers' profit margins. To forecast the growth in this price series over the next four years, we make use of our Consumer Price Index inflation for price of motor vehicles and for motor vehicle parts and accessories.

Wages

Wage pressures in Australia are forecast to ease through 2009 and 2010 as employment stalls and then falls. Construction sector wages growth is strongly influenced by the cycle of growth in total construction sector activity (total includes residential building and non-residential construction). In light of the expected downturn in overall construction activity in the short term, Australian construction wages are forecast to ease over the two years to 2010/11. We believe construction sector wages will regain momentum from 2011/12 when total construction sector activity is expected to start tracking upward once again.

While the demand of the mining industry for labour is currently contracting as shown by widespread job cuts, it is noted that those exiting mining employment tend to be less experienced and lower skilled individuals who tend typically command lower wages. This is acting to skew the wage distribution in the mining sector higher. Nonetheless, in the following year, wage growth is forecast to slow. A further 6.1 per cent growth in AWOTE mining wages is expected for 2009/10. Over the 2010–2013 period, AWOTE mining wage growth is forecast to persist above 5%, a level well above inflation, and above the forecast economy wide rate of wage growth.

Queensland wages growth is expected to weaken in line with falling economic activity. We expect growth in the state's LPI to slow to 3.2 per cent in 2010/11, a full percentage point lower than the growth rate for 2008/09. Beyond 2010/11, wages are forecast to be on an upward curve reflecting a stronger state economy to be underpinned by strong business investment (see Table on next page).

Table: Forecasts of Key Components of QR Network's Maintenance Cost Index

						Forecasts			
	Jun-05	Jun-06	Jun-07	Jun-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13
Consumer Price Index - Brisbane	150.0	156.2	160.2	168.4	171.8	n.f.	n.f.	n.f.	n.f.
Fuel Prices									
AAA Pricing Unleaded Petrol (cents per litre)									
Emerald	98.7	121.7	122.2	134.7	126.3	127.2	130.8	134.8	144.8
Gladstone	97.4	119.0	120.7	133.2	126.1	126.2	129.8	133.9	143.9
Mackay	95.9	118.8	119.4	131.3	122.5	125.1	128.6	131.9	141.2
AIP TGP for Brisbane (cents per litre)									
Unleaded Petrol	98.5	119.1	118.9	131.2	122.0	116.4	120.4	124.9	134.6
Diesel	106.0	126.0	121.7	140.9	131.2	119.5	121.6	132.9	141.9
Maintenance Consumables									
Non-Building Construction Cost Index	125.8	133.2	139.9	147.5	157.0	159.3	163.4	168.0	175.3
Basic Metal Product Price Index	129.4	152.9	189.8	176.8	169.9	145.0	146.0	153.0	178.0
Transport Equipment and Parts Price Index	126.1	126.3	129.2	128.0	129.5	132.0	131.1	131.6	133.7
Fabric Metal Product Price Index	133.6	140.6	145.3	149.8	170.9	155.0	151.0	156.0	170.0
Labour									
Labour Price Index (LPI)									
Queensland - All Industries	103.9	108.4	113.2	118.0	122.9	127.0	131.0	135.7	141.0
Mining - Australia	104.1	109.2	115.9	122.5	129.3	134.0	138.5	143.9	150.4
Construction - Australia	105.0	110.1	115.2	120.6	126.0	130.4	134.8	139.9	146.3
Average Weekly Eranings (AWOTE): $									
Queensland - All Industries	911.4	949.8	990.1	1,043.8	1,119.7	1,176.0	1,226.2	1,277.0	1,348.0
Mining - Australia	1,515.4	1,595.9	1,708.7	1,852.8	1,997.6	2,119.4	2,224.5	2,341.2	2,483.4
Construction - Australia	948.2	967.0	1,015.2	1,114.0	1,200.8	1,254.5	1,305.0	1,363.6	1,437.6
Annual Nominal Growth Rates									
	Through-the-year annual percent change (June-on-June)								
Consumer Price Index - Brisbane	2.5	4.1	2.6	5.1	2.0	n.f.	n.f.	n.f.	n.f.
	Year ended (end of June) annual percent change								
Fuel Prices									
AAA Pricing Unleaded Petrol (cents per litre)									
Emerald	11.4	23.2	0.4	10.3	-6.3	0.7	2.9	3.0	7.5
Gladstone	14.2	22.1	1.4	10.4	-5.4	0.1	2.9	3.1	7.5
Mackay	10.8	23.9	0.5	10.0	-6.8	2.1	2.8	2.5	7.1
AIP TGP for Brisbane (cents per litre)									
Unleaded Petrol	n.a.	21.0	-0.2	10.3	-7.0	-4.6	3.5	3.7	7.8
Diesel	n.a.	18.9	-3.4	15.7	-6.9	-8.9	1.8	9.3	6.8
Maintenance Consumables									
Non-Building Construction Cost Index	4.2	5.9	5.0	5.5	6.4	1.5	2.6	2.9	4.3
Basic Metal Product Price Index	21.3	18.2	24.1	-6.8	-3.9	-14.7	0.7	4.8	16.3
Transport Equipment and Parts Price Index	-0.8	0.2	2.3	-1.0	1.2	2.0	-0.7	0.4	1.6
Fabric Metal Product Price Index	6.6	5.2	3.3	3.1	14.1	-9.3	-2.6	3.3	9.0
Labour									
Labour Price Index (LPI)									
Queensland - All Industries	3.9	4.4	4.4	4.2	4.2	3.3	3.2	3.6	4.0
Mining - Australia	4.0	5.0	6.1	5.7	5.6	3.7	3.3	3.9	4.5
Construction - Australia	5.0	4.8	4.7	4.7	4.5	3.5	3.4	3.8	4.6
Average Weekly Earnings (AWOTE): $									
Queensland - All Industries	5.0	4.2	4.3	5.4	7.3	5.0	4.3	4.2	5.6
Mining - Australia	2.9	5.3	7.1	8.4	7.8	6.1	5.0	5.3	6.0
Construction - Australia	6.3	2.0	5.0	9.7	7.8	4.5	4.0	4.5	5.4

n.f.: not forecast

Source: BIS Shrapnel, ABS

INTRODUCTION

This report has been prepared to assist Queensland Rail Network in re-calculating the company's likely cost of maintenance activities over the 2009/10 to 2012/13 regulatory control period. The report deals with the following;

- Section 1 provides an overview of Australia and Brisbane Consumer Price Index Inflation;
- Section 2 has BIS Shrapnel's fuel price forecasts for Brisbane as well as for Emerald, Gladstone and Mackay;
- Section 3 provides a discussion of the national non-building construction cost index. Forecasts of basic metal products, transport equipment & parts and fabricated metal products price indices are also included in this section.
- Section 4 provides wage forecasts for Australia and Queensland. This section also has an outlook for wages growth in the total construction and mining sector.

For the purpose of this report, we draw on our latest national inflation and wage forecasts from the BIS Shrapnel report *Long Term Forecasts: 2009 to 2024*. More recent forecasts of key economic indicators were sourced from BIS Shrapnel's *Economic Outlook* Bulletin for September 2009. These forecasts will also be presented at the company's September 2009 business forecasting conferences. In addition, we sourced data from BIS Shrapnel's forthcoming *Mining in Australia 2009-2024* report as well as the Australian Bureau of Statistics (ABS).

BIS Shrapnel is an independent economic forecasting and industry research company. We regularly produce industry research and forecasting reports on the building, construction and resources sectors. We undertake both commissioned reports for market participants and regular multi-client reports. All efforts have been made to ensure that the information contained in this report is accurate and appropriate at the time of writing.

1. AUSTRALIA AND BRISBANE CONSUMER PRICE INDEX INFLATION

1.1 Trends in Australia CPI Inflation

World recession eases capacity constraints and demand inflationary pressures

Australia's high inflation environment through 2007 and most of 2008 was predominantly due to the imbalance between the economy's supply potential (i.e. capacity constraints) and strong demand, the latter fuelled by sharp increases in the terms of trade boosting incomes and spending. Demand inflationary pressures was the main problem, rather than wage-cost drivers, with wages relatively contained despite low unemployment and tight labour markets. The strong demand conditions saw retailers and other businesses lift profit margins. Other factors also contributed, including marked increases in global food and commodity prices, rising rents and escalating oil prices. Annual headline inflation stayed above 3 per cent over the four quarters to September 2008, outside the Reserve Bank's target zone of 2-3 per cent. Moreover, underlying inflation, which is a measure of ongoing/trend inflation, reached 4.7 per cent through the year to September 2008, the highest level in 16 years.

The international financial crisis which began in late 2008, and resulting world recession, however, has produced a sharp reversal in the terms of trade and has undermined the economy's strong run of business investment — a key driver of activity in recent years. Moreover, as the prospects of a more severe global economic downturn (and weaker domestic growth) emerged late last year, consumer confidence declined due to mounting fears over job security. With a significant weakening in the economy and consumer spending, the strong demand inflationary pressures of early 2008 began to moderate over the second half of 2008.

Australia's Consumer Price Index (CPI) inflation fell 0.3 per cent in the December 2008 quarter, the weakest result since the September 1997 quarter. This brought the annual headline price inflation to 3.7 per cent from 5.0 per cent in the year to September 2008. This was followed by a 0.1 per cent increase in price inflation in the March 2009 quarter which took the headline price inflation to 2.5 per cent in the year to March 2009.

Headline inflation knocked down by lower oil prices and financial costs, but core inflation is only on a slow downward drift

The low CPI inflation outcome in the March 2009 quarter was predominantly due to an 8.0 per cent decline in cost of financial services, an 8.1 per cent decrease in automotive fuel prices and a 4.5 per cent fall in holiday travel and accommodation costs (largely due to airfare discounting), with the latter two declines largely due to lower oil prices. These price falls detracted -0.6 per cent, -0.3 per cent and -0.2 per cent, respectively off the overall annual headline CPI outcome.

Cost of financial services now falling . . .

The deposit and loan facilities component (part of the financial services sub-group) of the CPI effectively measures the margin between deposit and loan products used by households as well as the explicit fees and charges on these products. This component accounts for around 4 per cent of the CPI. It increased markedly over the four quarters to September 2008 and has had a significant effect on CPI inflation over the past 18 months. The fastest pace of growth was recorded in the June 2008 quarter when the quarterly increase of 9.5 per cent saw the annual rate jump to 16.2 per cent. This increase was recorded at the height of the global credit turmoil which significantly raised the cost of funds for financial institutions and in turn households.

Table 1.1: Australia: CPI by Category

CPI - Groups and selected subgroups	% of Jun' 09 CPI	Quarterly Percent Change				Annual Percent Change			
		Sept '08	Dec '08	Mar'09	Jun '09	Jun '06	Jun '07	Jun '08	Jun '09
Food	16.8	1.4	2.0	2.2	-0.9	8.3	2.2	3.9	4.8
- fresh fruit & vegetables	2.5	2.8	5.4	4.8	-7.2	37.6	-6.7	-7.7	5.3
- milk, cheece and dairy products	1.3	1.4	1.3	0.4	-1.3	4.0	4.3	12.1	1.7
- bread & cereal products	1.9	3.1	1.2	1.2	-0.8	5.3	5.1	7.7	4.7
- meat & seafoods	2.5	0.6	2.2	3.1	-0.3	2.2	1.3	4.2	5.8
- meals out & takeaway food	4.8	1.3	1.2	1.5	0.9	3.5	3.6	5.6	5.0
Tobacco and Alcohol	7.0	1.4	1.4	1.0	0.9	3.6	3.0	4.8	4.7
Clothing and Footwear	3.5	-0.7	0.4	-0.5	2.1	-1.7	0.7	1.1	1.3
Housing	20.7	2.6	0.7	0.9	0.8	3.5	3.6	6.0	5.2
- utilities charges	3.6	6.6	0.5	2.7	-0.2	4.0	3.9	8.3	9.7
- house purchases	7.9	1.3	0.2	-0.5	0.8	3.6	2.7	5.0	1.8
- rents	5.7	2.1	1.8	1.7	1.4	3.0	5.2	7.7	7.2
Household Furn, Supplies & Serv	8.8	-0.9	0.3	0.8	2.2	1.4	2.1	-0.6	2.4
- Furniture and Furnishings	2.8	-0.6	0.5	0.2	3.5	-0.3	2.2	-0.3	3.5
- Hhold Appl, utensils and tools	1.5	-0.7	-0.6	0.0	2.4	-0.8	-0.8	0.4	1.2
- Hhold supplies	2.8	0.4	0.4	1.4	1.6	1.7	1.2	1.4	3.9
- Child care	0.3	-22.9	1.4	3.0	1.0	12.4	12.8	-28.7	-18.7
Transportation	12.5	1.0	-6.9	-1.5	1.6	7.7	0.2	6.9	-5.9
- motor vehicles	4.3	-0.7	-2.4	1.3	0.9	-0.9	1.4	-1.3	-0.9
- automotive fuel	3.7	2.0	-18.2	-8.1	3.6	24.6	-4.2	18.4	-20.6
- urban transport costs	0.8	1.2	0.5	3.3	0.0	3.3	3.7	4.9	5.1
Recreation	10.8	1.3	0.5	-1.1	-0.1	1.5	1.0	1.7	0.7
- audiovisual & computing equip,serv	1.2	-0.3	-2.8	4.7	0.0	-0.3	-1.9	1.3	1.4
- sports participation & other rec. serv	1.9	1.9	0.6	0.8	0.6	-3.5	-0.2	-0.1	5.5
- domestic holiday travel and accomm	2.2	2.4	1.7	-5.1	1.0	6.9	2.4	2.1	-0.3
- overseas holiday travel and accomm	1.8	4.9	1.6	-4.0	-3.4	2.6	2.9	7.1	-1.1
Communication	3.0	0.2	0.4	0.4	0.3	-0.9	1.5	0.0	1.2
Health	4.9	-0.2	-1.2	4.4	2.3	4.6	4.1	4.8	5.2
Education	2.9	-0.5	0.0	5.4	0.1	5.8	4.3	4.2	5.1
Financial & insurance services	9.0	1.7	-0.3	-6.3	-1.7	2.2	1.5	9.9	-6.6
All Groups (Headline CPI)	**100.0**	**1.2**	**-0.3**	**0.1**	**0.5**	**4.0**	**2.1**	**4.5**	**1.5**

Source: ABS data

The difference between the deposit and loan rates now appears to be narrowing, with a decline of 1.9 per cent in the December quarter of 2008 and an unprecedented 14.1 per cent decline in the March 2009 quarter. These price falls together have more than unwound the large increases in the price of deposit and loan facilities over 2008. The substantial easing in monetary policy by the RBA since September 2008 (the RBA has cut interest rates a cumulative 425 basis points over seven months to April 2009) and subsequent pass through of cuts in official interest rates by the commercial banks has led to significant falls in lending rates, in particular mortgage rates. But with competition for interest-bearing retail deposits remaining strong, deposit rates have not fallen by as much. This, in turn, has most likely led to the compression of interest-rate margins.

We have a problem with the inclusion of the 'deposit and loan facilities' sub-group within the CPI. It re-introduces a component into 'consumer' prices which reflects more the cost of investment-related goods (i.e. household dwelling investment and investment in savings), rather than the price of household consumer spending. The deposit and loan facilities sub-group, which was introduced into the CPI when it was re-based in June 2005, accounts for just under half of the financial and insurances services group, and (usually) around 4.4 per cent of the total CPI. We believe it should be removed from the CPI. Previously, the Mortgage Interest Charge (MIC) component was removed from the CPI in the September quarter 1998, as it too had disproportionately large and distorting effected on the CPI.

. . . lower oil and airfare prices also weighed on the March CPI

Automotive fuel prices fell 8.1 per cent in the quarter due to sharp declines in world oil prices. The price of oil in the March 2009 quarter averaged US$44/bbl compared to US$59/bbl in the December quarter and US$119/bbl in September quarter. With US$/A$ exchange rate remaining steady at around $0.67 over the March quarter (i.e. same as the December quarter average), the decline in oil prices saw local oil prices fall 25 per cent from A$87/bbl in the December quarter to A$66/bbl in the March 2009 quarter.

Meanwhile, a heavy bout of airfare discounting was largely responsible for domestic holiday travel and accommodation prices falling 5.1 per cent in the quarter. Moreover, lower international airfares resulting from strong competition and lower fuel prices, outweighed the upward pressure in overseas holiday prices coming from a weaker Australian dollar and drove a 4.0 per cent fall in overseas holiday travel and accommodation costs in the first quarter.

Underlying Inflation, while easing, remains elevated

Despite the current weak demand conditions, underlying inflation remains high. The RBA's measure of underlying inflation declined at a much slower rate — from a peak of 4.7 per cent in the September quarter 2008 to 4.2 per cent in March quarter. This suggests that much of the current inflationary pressures are proving to be resilient and consequently underlying inflation (although easing in light of weaker demand conditions) is expected to be on a slow downward drift to the RBA's target band.

High underlying inflation also suggests that some retailers did not undertake the usual seasonal discounting (especially on clothing and household goods items) over the March quarter and took advantage of the boost to demand stemming from the Federal government's stimulus payments to households to consolidate their profit margins. Retailers' profit margins over recent months have come under pressure from higher import prices as a result of a relatively lower Australian dollar.

Indeed, tradeables inflation excluding fuel, fruit and vegetables i.e. baseline tradeables inflation, increased a strong 1.2 per cent in the quarter to be 2.8 per cent higher than March 2008. This was driven by increases in the prices of dairy products, cereals, spirits, tobacco, some household and recreational goods, which suggests some pass through of import price pressures (due to the currency depreciation in the second half of 2008) in the March quarter.

Headline annual price inflation to rise in 2010 but remain within the RBA's target band

The consumer price inflation through-the-year to June 2009 fell to 1.5 per cent. However, despite weak demand conditions, underlying inflation rose 0.8 per cent in the June quarter to be 3.9 per cent higher in the year to June 2009. The low annual headline CPI inflation in June 2009 was largely due to steep falls in the price of automotive fuel prices and costs of financial services which together subtracted 1.8 percentage points from the annual headline rate.

While global oil prices have recovered from their February lows, it is still substantially lower than the peak reached in September quarter 2008. The effects of the large falls in petrol prices and deposit and loan facilities from their peaks in the September quarter 2008 should drop out of the calculations of the annual rate by early 2010. Once the influence of the large 'one-off' price falls is removed, we expect a lift in the annual headline inflation to June 2010. BIS Shrapnel believes a weaker A$ will offset some of the benefit of global disinflationary forces and constraints in the housing sector will keep rental inflation high. This together with moderate food price inflation will put upward pressure on headline inflation in the year to June 2010.

1.2 Brisbane Consumer Price Inflation

Inflation generally is a function of economic activity. Economic growth in Queensland has outpaced the national average over recent years due to the state enjoying the benefits of the recent minerals investment boom. This, in turn, has resulted in Queensland (as proxied by Brisbane CPI inflation) having stronger demand inflationary pressures to the national average (see Table 1.2). In addition, there have been significant differences in housing inflation in particular rents and house purchase costs.

Dwelling construction has now fallen to a level in Queensland where not enough is being built to satisfy underlying demand for dwellings. This has resulted in a significant deficiency of residential stock, which, in turn, is leading to strong increases in rents in the state.

Recent growth in house purchase costs in Brisbane has also been stronger than national average (see Table 1.2). This can partly be attributed to strong volume of mining related engineering construction in the state which resulted in significant competition for skilled trade. This in, turn, pushed construction wages higher and contributed to faster rises in house construction and consequently house purchase costs in the state.

Table 1.2: Australia v Brisbane CPI – Groups and Selected subgroups

CPI - Groups and selected subgroups	Australia (Annual Percent Change)					Brisbane (Annual Percent Change)				
	Jun '08	Sept '08	Dec'08	Mar '09	Jun '09	Jun '08	Sept '08	Dec '08	Mar '09	Jun '09
Food	3.9	3.4	5.6	5.7	4.8	3.7	2.6	6.0	6.2	4.6
- fresh fruit & vegetables	-7.7	-12.8	2.1	5.6	5.3	-13.6	-18.5	4.2	8.8	10.2
- dairy & related products	12.1	11.3	7.9	6.0	1.7	10.0	9.5	8.4	5.6	1.2
- meat & seafoods	4.2	4.4	5.2	5.9	5.8	4.2	4.1	4.8	5.3	5.2
- meals out & takeaway food	5.6	5.9	5.8	5.6	5.0	7.6	6.7	6.4	5.4	3.6
Tobacco and Alcohol	4.8	5.8	5.8	5.7	4.7	4.0	6.4	7.0	7.1	6.2
Clothing	1.1	0.0	0.2	2.1	1.3	3.5	0.6	-0.6	2.1	0.7
Housing	6.0	6.8	6.5	5.5	5.2	8.0	8.3	7.6	6.4	5.6
- utilities charges	8.3	10.8	10.8	9.7	9.7	11.2	7.7	7.7	7.7	7.7
- house purchases	5.0	5.4	4.3	2.0	1.8	7.5	8.7	6.6	4.0	2.9
- rents	7.7	8.2	8.4	8.1	7.2	9.3	9.8	10.1	9.3	8.1
Household Furn, Supplies & Serv	-0.6	0.9	0.4	1.9	2.4	0.0	1.9	0.9	3.1	3.9
- Furniture and Furnishings	-0.3	0.4	-0.4	2.8	3.5	1.6	1.9	1.5	5.8	7.8
- Hhold Appl, utensils and tools	0.4	-0.5	-1.0	0.3	1.2	0.7	0.1	-0.8	1.2	4.7
- Hhold supplies	1.4	2.2	2.3	3.1	3.9	2.0	3.4	1.6	3.6	4.2
- Child care	-28.7	-17.5	-17.3	-18.3	-18.7	-26.2	-14.7	-15.2	-16.3	-16.9
Transportation	6.9	8.7	-1.2	-4.6	-5.9	7.8	10.1	0.4	-3.3	-5.8
- motor vehicles	-1.3	-1.9	-3.5	-1.9	-0.9	0.5	0.4	-1.8	-1.3	-1.8
- automotive fuel	18.4	25.4	-4.4	-16.7	-20.6	18.8	26.8	-3.9	-15.6	-21.3
- urban transport costs	4.9	4.4	3.3	5.3	5.1	6.1	6.0	6.0	6.5	6.5
Recreation	1.7	1.6	1.3	0.5	0.7	2.3	2.4	1.3	0.7	0.5
- audiovisual & computing equip,serv	1.3	1.3	-3.7	1.0	1.4	4.1	1.2	-4.6	1.0	0.5
- sports participation & other rec. serv	6.4	5.4	5.4	4.8	3.9	5.3	6.3	6.0	4.1	4.2
- domestic holiday travel and accomm	2.1	2.6	0.6	-3.2	-0.3	2.7	3.2	0.8	-2.4	-1.1
- overseas holiday travel and accomm	7.1	7.8	8.4	3.4	-1.1	8.3	10.8	7.8	3.3	-2.5
Communication	0.0	0.2	0.5	1.0	1.2	0.1	0.3	0.7	1.1	1.3
Health	4.8	5.1	4.9	5.3	5.2	4.9	5.2	5.3	5.6	4.8
Education	4.2	4.7	4.8	5.0	5.1	4.8	5.2	5.2	6.3	6.3
Financial & insurance services	9.9	9.5	7.0	-1.4	-6.6	8.9	8.2	6.4	-1.1	-4.3
All Groups CPI	4.5	5.0	3.7	2.5	1.5	5.1	5.6	4.3	3.1	2.0

Source: ABS

2. FORECASTS OF FUEL PRICES IN BRISBANE AND SELECTED REGIONS IN QUEENSLAND

Historically, automotive fuel prices tend to track changes in benchmark oil prices (adjusted for exchange rate differentials) and adjusted for changes in refining and transport margins. Our fuel price model therefore is predominantly driven by variations in world oil prices. Forecast of petrol prices in Brisbane and selected Queensland regions are provided in Table 2.1 and 2.2 respectively.

We note that historically there has been little divergence in fuel prices between different regions of Queensland. Prices across regions historically operate off different levels. However, this is a reflection of transport costs, which are higher in areas such as Gladstone and Emerald. In addition, we believe fuel costs in Brisbane will be marginally lower than in other regions of Queensland due to higher levels of competition between retail suppliers in Brisbane.

As mentioned earlier, our outlook for fuel prices is primarily driven by our forecast of world oil prices. We provide a discussion of likely future path of world oil prices as a means of explaining the rationale for the Queensland petrol prices.

2.1 Oil and Fuel Price Outlook

The benchmark oil price, West Texas Intermediate (WTI), has fluctuated wildly during the past 18 months, following the dramatic changes in the world economic outlook. A flourishing world economy saw the WTI price break through the US$100/barrel barrier in February 2008 and shoot up to a cyclical peak of US$145/barrel in July 2008 as supply struggled to keep pace with demand growth. However, the sharp contraction in global output in the second half of 2008 led to the oil price tumbling to a low of US$33/barrel by December 2008.

The slide in the oil price and the large fluctuations in prices have stabilised through 2009, with the WTI recovering through the middle of 2009 to trade within the US$60-70/barrel price band. The recent price recovery has been due to a mixture of factors. On the supply side, OPEC production has been scaled back to support prices as OECD stocks rose to record levels. Meanwhile, a depreciating US Dollar and optimism about a global economic recovery in the second half of 2009 or early 2010 has increased investment demand from financial markets.

Over the next 12 months, the oil price is expected to decline to an average US$64/barrel for 2009/10. The large holdings of stocks and production capacity exceeding demand (OPEC spare capacity has spiked from early 2009) will place downward pressure on prices.

However, price volatility will remain for some time due to the large role sentiment plays. With tentative signs of economic recovery underway, it will take time before economic fundamentals establish themselves and it is likely the WTI will have significant swings in price — although not to the same extent as 2008.

The price of oil is expected to return to levels above US$70/barrel from 2010/11 and remain above this level over the medium term. An accelerating global economy will support increased oil consumption while increased production through cuts to OPEC spare capacity will be partially offset by declining production at mature fields. These price levels should encourage further investment by non-OPEC producers, although the production growth is likely to be sourced from higher unit cost ventures such as deep water and oil sands projects.

With global demand picking up over 2010 to 2012 — led by China — the market is expected to tighten again, pushing up prices. Given our outlook for only a moderate appreciation of the A$ against the US$ through the next few years, our forecast assumes that A$ oil prices will rise again through the 2010/11 to 2013/14 period.

Given our oil price assumptions described above and the removal of the Queensland government's 8.25c fuel subsidy, we expect that year average fuel prices will weaken over 2009/10 before experiencing moderate increases over 2010/11 and 2011/12. Note that with the elimination of the fuel subsidy, Queensland petrol prices have effectively risen back to the national average with localised competition forcing nearly all of the subsidy to be passed on to consumers. Stronger growth in fuel prices is expected by 2012/13 as global demand strengthens and margins increase.

Table 2.1: Average Annual Fuel Price - Brisbane
AIP Terminal Gate Prices, Australian cents Per Litre (pump price)

Year Ended June	Unleaded	%	Diesel	%
2005	98.5	n.a.	106.0	n.a.
2006	119.1	21.0	126.0	18.9
2007	118.9	-0.2	121.7	-3.4
2008	131.2	10.3	140.9	15.7
2009	122.0	-7.0	131.2	-6.9
Forecast				
2010	116.4	-4.6	119.5	-8.9
2011	120.4	3.5	121.6	1.8
2012	124.9	3.7	132.9	9.3
2013	134.6	7.8	141.9	6.8

Table 2.2: Average Annual Fuel Price – Australia, Brisbane and Selected Queensland Regions
AAA Retail Data, Australian cents Per Litre (pump price)

Year Ended June	Brisbane	% ch	Emerald	% ch	Gladstone	% ch	Mackay	%ch	Australia ([1])	% ch
2002	77.7		83.6		81.1		80.5		84.6	
2003	81.9	5.4	87.5	4.6	85.3	5.2	85.6	6.3	89.8	6.1
2004	84.2	2.8	88.6	1.3	85.3	0.0	86.5	1.1	91.4	1.8
2005	94.6	12.4	98.7	11.4	97.4	14.2	95.9	10.8	101.8	11.4
2006	115.3	22.0	121.7	23.2	119.0	22.1	118.8	23.9	122.2	20.0
2007	116.7	1.2	122.2	0.4	120.7	1.4	119.4	0.5	122.7	0.4
2008	128.7	10.3	134.7	10.3	133.2	10.4	131.3	10.0	135.5	10.4
2009	122.2	-5.1	126.3	-6.3	126.1	-5.4	122.5	-6.8	128.4	-5.2
Forecast										
2010	122.6	0.3	127.2	0.7	126.2	0.1	125.1	2.1	122.7	-4.4
2011	125.9	2.7	130.8	2.9	129.8	2.9	128.6	2.8	125.8	2.6
2012	129.8	3.1	134.8	3.0	133.9	3.1	131.9	2.5	129.1	2.6
2013	140.1	8.0	144.8	7.5	143.9	7.5	141.2	7.1	139.0	7.7

([1]) weighted average of 8 capital cities

Source: AAA, BIS Shrapnel

3. MAINTENANCE CONSUMABLES FORECASTS

3.1 Non-Building Construction Cost Index Forecasts

At present, road and bridge construction is the sole input to the ABS non-building construction index published quarterly by the Australian Bureau of Statistics (ABS) in its Producer Price Index release (Cat. No. 6427.0). Thus, the non-building construction index does not include a measurement for price increases in other classes of non-building construction such as railways, telecommunications and electricity infrastructure. Accordingly, in the text below we refer to 'non-building construction costs' as 'road and bridge construction costs'.

The key ABS index on road and bridge construction is an output index — its aim is to measure changes in the prices of output (or work put in place) from an industry sector: in this case road and bridge construction. As such, this index also includes contractor margins, as well as, implicitly, materials, labour and plant. The key components of the road and bridge construction index are the following outputs: preliminaries, drainage, earthworks, pavement, furniture, and bridge construction.

Growth in construction costs generally tends to be linked to the amount of construction activity going on at any time. We believe that there is a positive correlation between construction activity and construction costs because high (and rising) levels of demand (i.e. construction activity) not only places pressure on the existing supply of inputs, boosting input prices, but also allows construction companies to raise their prices (and possibly margins). Where capacity constraints exist, rising construction activity can lead to strong increases in input prices as investment in new capacity is itself costly and takes time to come on stream.

Costs for road and bridge construction are not only linked to broader cost trends in the building and construction industry, but also to changes in commodity prices which are determined in global markets (e.g. steel and oil). That is, road and bridge construction costs may vary independent of domestic construction activity. In formulating our outlook for Australian construction costs, we therefore consider our outlook for both domestic construction activity (which is a key driver of demand and prices for locally-sourced materials and labour) as well as expected price movements for inputs determined in global markets.

Outlook

BIS Shrapnel is forecasting growth in annual average non-building construction costs, as captured by the road and bridge construction index, to be much weaker over the next two years as slowing (or declining) construction activity coupled with lower commodity prices continues to filter through.

After reaching record levels in both nominal and real terms in September 2008 (from the very low levels of early 2000s), commodity prices slumped in late 2008. Initially the fall in commodity prices was due to a shock to confidence that resulted from the start of the global financial crisis. However, once the prospects of a more severe global economic downturn emerged towards the end of last year—precipitated by the bankruptcy of Lehman Brothers in mid-September 2008—and with the Chinese economy struggling to decouple from the US, commodity prices fell further. Commodity prices, on average, continued to fall in the first half of 2009. In total, BIS Shrapnel's non-rural commodity price index declined by more than 40 percent over the nine month period from September 2008.

Overall, we are forecasting the national road and bridge construction index to grow just 1.5 per cent on average through 2009/10, down from 6.4 per cent in 2008/09. This would be the

weakest growth in the index since 1998/99. Queensland will be one of the stronger performing states (+2.4 per cent), along with South Australia (2.9 per cent). Weaker growth is expected in the new South Wales and Victoria. The differences at the state level reflect differences in selected construction activity (i.e. demand), although in the case of Queensland, the relative strength in the index reflects the removal of the 8.35c petrol subsidy which came into effect on July 1, 2009. This is expected to keep cost growth higher than otherwise, given our expectation that selected construction activity (i.e. affecting demand for roads inputs) in the state will decline significantly through 2009/10.

Further out, BIS Shrapnel expects cost growth, as captured by the road and bridge construction index will remain relatively muted in 2010/11 as selected construction activity remains weak (and lower than recent peaks) and the impacts of lower oil prices, steel prices and, ultimately, contractor margins filter through.

We expect cost growth to re-accelerate by 2012/13 and 2013/14 as global economic conditions continue to improve (pushing up prices for oil and steel) with another upswing in domestic construction activity driving up prices for domestically-sourced labour, materials and equipment.

Overall, the road and bridge index is expected to grow at an annual average rate of 2.8 per cent per annum over the five years to 2012/13, with the strongest growth expected to occur in South Australia (+3.7 per cent per annum), New South Wales (+3.5 per cent) and Queensland (+3.1 per cent). Our Australia level forecasts are presented in Table 3.1.

Table 3.1: Non-Building Construction Cost Forecasts - Australia

Year Ended June	Non-Building Construction Cost Index		Consumer Price Index : Australia	
	Index	A%CH	Index	A%CH
1999	100.0	1.3	121.8	1.3
2000	103.7	3.7	124.7	2.4
2001	107.9	4.0	132.2	6.0
2002	109.7	1.7	136.0	2.9
2003	116.0	5.8	140.2	3.1
2004	120.8	4.1	143.5	2.4
2005	125.8	4.2	147.0	2.4
2006	133.2	5.9	151.7	3.2
2007	139.9	5.0	156.1	2.9
2008	147.5	5.5	161.4	3.4
2009	157.0	6.4	166.4	3.1
Forecast				
2010	159.3	1.5	169.9	2.1
2011	163.4	2.6	174.1	2.4
2012	168.0	2.9	178.4	2.5
2013	175.3	4.3	184.3	3.3
Compound Annual Growth Rate				
1999 - 2004		3.8		3.3
2004 - 2009		5.4		3.0
Forecast				
2009 - 2013		2.8		2.6

Source: BIS Shrapnel, ABS

3.2 Articles Produced by Manufacturing Industries

Structure of the Forecasting Model

The ABS basic metals products and fabricated metal products PPI is an output index. In reflects changes in prices received by producers exclusive of any taxes, transport costs and trade margins. That is, the pricing point is ex-factory. As a result, it essentially reflects prices of raw materials and labour used in the production process as well as the manufacturers' profit margins. The final index is calculated as a weighted index of these components.

To ascertain the price elasticity of the raw material components (such as steel, aluminium, copper, and zinc) and labour costs, we specified a regression model for each of the price indices with the key input components as the explanatory variables. The price elasticities derived from the estimation of the statistical model are also presented in Table 3.1.

By applying each price elasticity to the respective input component index (constructed in-house), we have been able to approximate reasonably closely the historical percentage changes in basic metal products and fabricated metal products PPIs (see Charts 3.1 and 3.2). An outlook for these indices, therefore, is based on our future price expectations of key components of the overall index as well as the estimated price elasticities. The price forecasts of key base metals are discussed next. BIS Shrapnel's outlook for wages growth is provided in section 4.

Table 3.2: Key Input Components of Basic and Fabricated Metal Products and their Price Elasticities

Chart 3.1: Basic Metal Products Producer Price Index

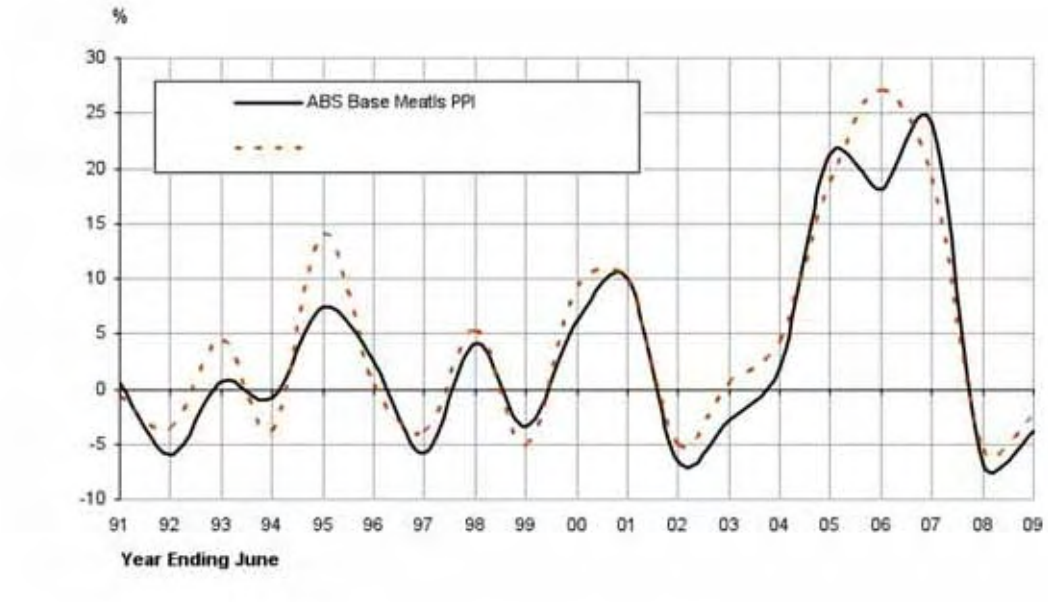
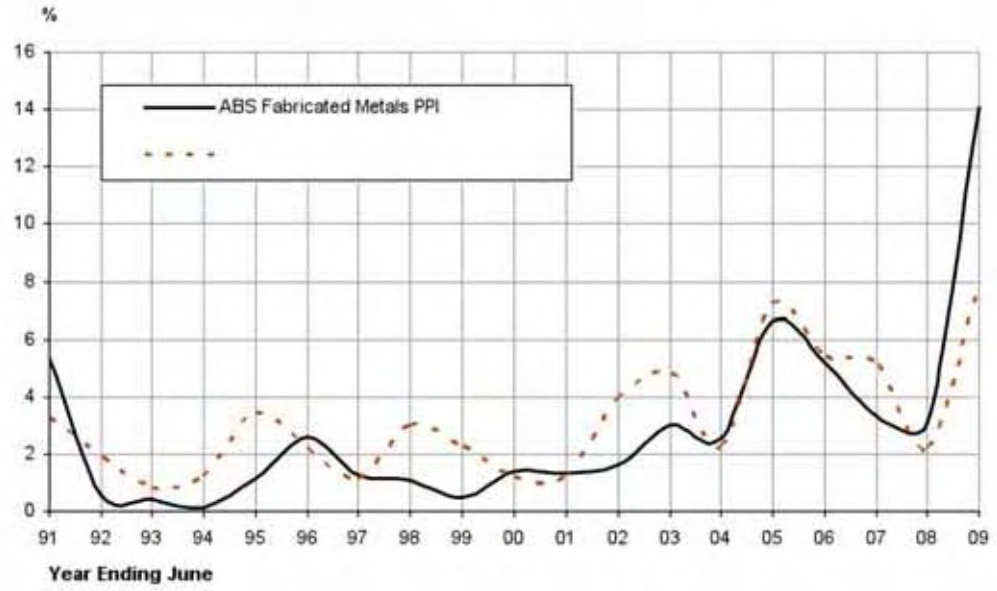


Chart 3.2: Fabricated Metal Products Producer Price Index



3.2.1 Steel Prices

Forecasts are based on our outlook for raw materials input prices (mainly iron ore and coking coal), exchange rates and the outlook for construction activity, the three key factors influencing steel prices.

Iron Ore

The rapid industrialisation of Asia, particularly China and India, has been the key driver of steel consumption growth in recent years. Due to the high steel intensity of infrastructure construction, demand for steel and its major inputs soared. In contrast the supply response was slow, with producers hindered to some degree by capacity constraints caused by a lack of skilled labour and equipment shortages. The negative demand shock brought on by the global recession has helped realign commodity markets to a certain extent with the excess demand quickly turning into excess supply. Producers have responded by shutting down high cost operations while the low cost producers have temporarily scaled back production.

The cuts to global iron ore production have prevented a steep fall in iron ore prices, with the big Australian miners settling with average price cuts of 37 per cent for the 2009-10 contracts with Japanese and Korean steel mills. These cuts mostly reverse the large gains received in the 2008-09 Japanese Fiscal Year (JFY) settlements, keeping the contracted price of iron ore well above long term price levels.

Steel production and consumption has dropped sharply during 2009. Targeted infrastructure stimulus packages across China, India and the OECD will absorb some of the slack caused by the current slump in industrial activity, however steel consumption is not expected to return to pre-global recession levels until 2011. China is the crucial link, currently consuming roughly one third of total world steel production and will rise with the implementation of the large US$ 586 billion stimulus program. A further boost to steel consumption will be a tentative recovery in world economic activity which will begin to take shape from 2010 and take industrial production back to pre-global recession levels by early 2011.

The weakness of global industrial production and steel demand will continue to place dampening pressure on iron ore contract prices. After the collapse in steel demand, prices slumped, however, re-stocking at weaker spot prices has led to prices rebounding and quite possibly overshooting on the way back up. Steady additions to global iron production capacity by low cost producers (investments undertaken at the price peak) will help bring the currently elevated spot prices back into line with the fundamentals and will see contract settlements for the 2010-11 JFY drop by a further 20 per cent. A stronger global economy from 2011 will stimulate further demand for steel inputs and reverse the slide in prices, although the price gains from the 2011-12 JFY settlements are likely to be small.

Coking Coal

Coking coal contract prices increased to a record US$303 in the 2008/09 JFY from US$98 the previous year. Over the five years to 2008/09, coking coal contract prices increased at a compound rate of 45 per cent per annum, as demand for exports outpaced supply growth. Japan and India have been the key economies driving this demand, underpinned by rapid expansions to steel production.

China is the world's largest producer of coking coal and plays a major role in influencing prices, despite only a small percentage of Australian coking coal exports being destined for that country. China's key role in influencing world prices is that country's ability to restrict its coking coal exports to world markets.

The pace of demand growth from India and Japan (combined with the fall in global export supply, as China withdrew hard coking coal from global markets for its own internal demand) led to unprecedented demand for Australian coking coal. However, the lack of investment by government in export infrastructure also created transport bottlenecks on inland coal transport corridors and capacity constraints at ports.

The consequence of the reduced global industrial demand has been lower benchmark contract coking coal prices. Contract prices for coking coal decreased by 58 per cent for JFY 2009/10 to US$128. Despite the fall, the result is the second highest on record and reflects the underlying strength of demand for steel in emerging economy.

The outlook for global industrial production informs our view on the outlook for coking coal prices. World industrial production is expected to fall by 7.6 per cent over 2009 as demand for steel weakened dramatically. The outlook for coking coal prices will stay weak a steel producers look to minimise input costs as they grapple with a sharp fall in global steel consumption over 2008/09. Steel consumption in China will offer some respite through the year as consumption growth in that country improves on the back of the fiscal stimulus package.

Driving short-term economic growth in China will be spending programs aimed at mitigating the effect of declining exports. Over two years, the government plans to invest US$586 billion in the real economy to build roads and critical infrastructure. The projects will draw in large amounts of raw materials, including steel, supporting demand for coking coal. However, despite this big program of works, we believe contract prices will decline over JFY 2010/11 as sluggish industrial demand outside of China is outpaced by additions to supply capacity. A price recovery is expected in JFY 2012/13 once global growth returns to long term trend levels.

3.2.2 Copper

Industrial growth in China and India has been the main driver of copper demand over this decade. Shutdowns of substantial amounts of copper capacity between 2001 and 2003, coupled with strengthening demand, helped drive price to high levels from 2004 though 2008.

Prices skyrocketed from late 2005, driven by surging demand and a slow and inadequate supply response, most prominently in Chile, where rapid growth in electricity prices and labour supply problems have contributed to supply constraints and elevated copper prices of the past few years.

The copper price on the London Metals Exchange peaked in July 2008 at a price of $US8837/t before the onset of the global financial crisis punctured the price cycle at its peak. As prices fell through the last two quarters of 2008, exports volumes also dropped back.

Copper demand has improved over the first half of 2009. We believe prices will not breach the recent low set in December 2008 as the economic situation across the world stabilises. The resumption of imports by china continues to surprise on the upside. In August 2009, the copper price on the London metals exchange had increased by over 100 per cent from its December low. However, we believe the price has overshot on the way up and could drop back over coming months.

Copper consumption has fallen sharply over 2009. China's infrastructure stimulus package and state-backed strategic stock building will fill some of the void though the year, however world growth is not expected to return until 2010.

We expect copper consumption will strengthen to above pre recession levels in 2010 as stimulus investments in China and the OECD continue, and as private sector demand regains momentum. The US is investing over US$41 billion on energy infrastructure renewal with similar stimulus measure planned across the OECD, all of which will be copper intensive. Government spending will keep demand at sufficiently high levels to maintain price support until later in 2009/10, as industrial output improves.

We suspect that current copper exports by China are creating excess supply in that country, as stockpiles have increased to very high levels through the first half of this year (from a historical perspective). Stocks of refined copper are now at the highest level since 2002. We expect weaker growth Chinese imports of copper over the coming quarters, which will place downward pressure on prices through the second half of 2009. Therefore, we expect the copper price to pull back from its current level (the price of copper on the LME was US$6,500/t at the end of August 2009).

The outlook for prices out to 2011/12 is relatively flat. The recovery in copper consumption will be matched by the recommencement of idled and new production capacity. During this period stocks are expected to decline. As the global industrial production moves up a gear early next decade, conditions in the copper market are expected to tighten significantly from 2012/13, taking prices back towards the boom levels of 2008.

The strength in demand from China is a key risk to our price outlook. The degree to which imports to China fall will determine the price response, as current investor sentiment is tied closely to the Chinese outlook. However, it is our balanced view that copper use in stimulus spending will keep a floor on demand.

Over the medium term, we believe there is limited upside risk to the copper price. We expect industrial demand from the OECD to remain tepid. Meanwhile, supply delivered by production

at recently completed mines—as well as the return to production of idled capacity—will quickly absorb increases in demand.

3.2.3 Zinc

Zinc prices peaked at over US$4,000/t in late 2006, after weak growth in production over 2003 to 2005 saw stocks fall dramatically — below 3 weeks. Strong growth in production over 2007 and 2008 then saw prices tumble back below US$2,200/t, but stocks still remained at critical levels. As further production continued to come on stream prices fell further. Zinc producer were then dealt a second blow with the demand shock caused by the GFC resulting in inventory levels climbing sharply — above five weeks consumption in 2009.This resulted in the price of zinc falling below US$1110/t in December 2009 and average the year at US$1405/t, some 45 per cent lower than the previous year.

Over the forecast period, increased production will continue to come on-stream. As a result we expect growth in the price of zinc to be negative at first before embarking on a sustainable recovery as demand recovers, ending our forecast period just short of US$3000/t — US$2960/t. Overall the price of zinc is set to increase a collective 110 per cent over our five year forecast period — the second highest on record.

Through 2009/10 we expect the zinc price to fall modestly — by US$10/t — as weak demand and excess capacity plague the industry. As demand returns with a recovery in industrial production levels and inventory levels begin to fall we expect the zinc price to again rise, modestly at first, but building speed thereafter. By 2012 we expect zinc prices to have reached US$1900/t or a collective rise of over 35 per cent since the forecast trough in 2010.

Meanwhile, the US housing and automotive sectors are expect to recover in this period and overall global industrial production to accelerate over 2011-14, zinc demand growth is set to strengthen. By 2014 we anticipate these drivers will see inventory levels to continue falling over most of our forecast period. Conversely we expect the price of zinc to rise by a collect 55 per cent in the three years to 2014, reaching an average price of US$2960/t through the year.

The weights of the respective raw material input component were applied to our base metal index price forecasts to estimate the growth in basic metal and fabricated metal product prices over the 2009/10 to 2012/13 period. The expected growth in the two price series are presented in Table 3.3.

Table 3.3: Forecasts of Selected Articles Produced by the Manufacturing Industries

Year Ended June	Basic Metal Products	Transport Equipment and Parts	Fabricated Metal Products
Annual Average Values			
1997	98.2	115.5	111.8
1998	102.2	116.6	113.1
1999	98.7	117.8	113.6
2000	104.8	119.6	115.2
2001	115.4	124.1	116.7
2002	107.9	128.5	118.6
2003	104.8	129.4	122.2
2004	106.7	127.0	125.3
2005	129.4	126.1	133.6
2006	152.9	126.3	140.6
2007	189.8	129.2	145.3
2008	176.8	128.0	149.8
2009	169.9	129.5	170.9
Forecasts			
Jun-2010	145.0	132.0	155.0
Jun-2011	146.0	131.1	151.0
Jun-2012	153.0	131.6	156.0
Jun-2013	178.0	133.7	170.0
Annual Average Percentage Change			
1998	-5.7	1.0	1.1
1999	-3.4	1.0	0.5
2000	6.2	1.5	1.4
2001	10.1	3.7	1.3
2002	-6.5	3.5	1.6
2003	-2.9	0.7	3.0
2004	1.8	-1.8	2.6
2005	21.3	-0.8	6.6
2006	18.2	0.2	5.2
2007	24.1	2.3	3.3
2008	-6.8	-1.0	3.1
2009	-3.9	1.2	14.1
Annual Average Growth Forecast			
2010	-14.7	2.0	-9.3
2011	0.7	-0.7	-2.6
2012	4.8	0.4	3.3
2013	16.3	1.6	9.0

Source: PPI = Producer Price Index (6427.0),
CPI = Consumer Price Index (6401.0), BIS Shrapnel

3.3 Transport Equipment and Parts Price Forecasts

The ABS transport equipment and parts PPI is also an output index. That is, it measures the rate of change in the prices of products as they leave the producer. As a result, movements in this index are influenced by technological change, efficiency gains, government policy (such as import tariffs) and competition which affect the manufacturers' profit margins.

Over recent years, growth in this index has been fairly muted and this can primarily be explained by greater competition in the market brought about reduction of import tariffs on motor vehicles early in this decade (see chart 3.2). To forecast the growth in this price series

over the next four years, we make use of our CPI inflation for price of motor vehicles and for motor vehicle parts and accessories. We believe the (output) producer price indices reflect upstream cost pressures and increases in PPI are eventually reflected in an up-shift in consumer price inflation particularly during strong conditions. Our forecasts are tabulated in Table 3.3. We expect prices to strengthen marginally in 2009/10 due mainly to a lower dollar. Beyond this financial year, we believe prices will be fairly stable — much like the recent history.

Chart 3.2: Transport Equipment and Parts Producer Price Index

4. WAGES OUTLOOK – AUSTRALIA AND QUEENSLAND

The key determinants of nominal wages growth are consumer price inflation, productivity and the relative tightness of the labour market (i.e. the demand for labour compared to the supply of labour). In this section we provide wage forecasts for Australia as well as the construction and mining sectors. In addition, we provide an outlook for Queensland wages growth. First though, we define the different wage measures and provide a description of BIS Shrapnel's model of wage determination.

4.1 A Note on Different Wage Measures

Several different measures of wages growth are referred to in this report, each differing slightly both in terms of their construction and appropriateness for measuring different aspects of labour costs. The following provides a brief summary of the main measures, what they are used for and why.

The main wage measures are:

Average Weekly Ordinary Time Earnings (AWOTE) — earnings gained from working the standard number of hours per week. It includes agreed base rates of pay, over-award payments, penalty rates and other allowances, commissions and retainers; bonuses and incentive payments (including profit share schemes), leave pay and salary payments made to directors. AWOTE excludes overtime payments, termination payments and other payments not related to the reference period. The AWOTE measures used in this report refer to full-time adult AWOTE, and are sourced from the Australian Bureau of Statistics (ABS) catalogue number 6302.0, with BIS Shrapnel forecasts.

The Labour Price Index (LPI) — a CPI-style measure of changes in wage and salary costs based on a weighted combination of a surveyed 'basket' of jobs. The LPI used in this report excludes bonuses. The LPI also excludes the effect of changes in the quality or quantity of work performed and most importantly, the compositional effects of shifts within the labour market, such as shifts between sectors and within firms. The LPI figures quoted in this report are sourced from ABS catalogue number 6345.0, with BIS Shrapnel forecasts.

Each measure provides a slightly different gauge of labour costs. However, the main distinction between average earnings measures and the labour price index relate to the influence of compositional shifts in employment. The compositional effects include changes in the distribution of occupations within the same industry and across industries, and the distribution of employment between industries. For example, a large fall in the number of lower paid employees, or in employment in an industry with lower average wages, will increase average weekly earnings (all else being equal). While this is a true reflection of the average cost of labour to businesses, it is not necessarily the best measure of ongoing wage inflation (i.e. trends in wage-setting behaviour in the labour market). Another compositional problem with using the 'all persons' AWOTE is variations in the proportion of male and female employees (particularly as average female AWOTE is lower than average male AWOTE). However, in practice, the data shows only minor differences in the AWOTE growth rates between male and females (or males and all persons) — between -0.2 and +0.2 per cent — since the 1980s or basically since the equal pay legislation was enacted through the 1970s.

The labour price index was specifically designed to get around these compositional problems. It uses a weighted average of wage inflation across a range of closely specified jobs. As it measures the collective variations in wage *rates* made to the current occupants of the *same* set of

specified jobs, the LPI reflects pure price changes, and does not measure variations in quality or quantity of work performed. However, like the CPI (Consumer Price Index), the weights are fixed in a base year, so that the further away from that base and the more the composition of the labour market changes over time, the more 'out of date' the measure becomes.

Importantly, the LPI does not reflect changes in the skill levels of employees within industries or for the overall workforce, and will therefore understate (or overstate) wage inflation if the overall skill levels increase (or decrease). The labour price index is also likely to understate true wage inflationary pressures as it does not capture situations where promotions are given in order to achieve a higher salary for a given individual, often to retain them in a tight labour market. Average weekly earnings would be boosted by employers promoting employees (with an associated wage increase), but promoting employees to a higher occupation category would not necessarily show up in the labour price index. However, the employer's total wages bill (and unit labour costs) would be higher.

For this reason, BIS Shrapnel prefers using AWOTE as the measure that best reflects the increase in wage cost changes (or unit labour costs, net of productivity increases) for business and the public sector across the economy. On the other hand, labour price index can be used as a measure of *underlying* wage inflation in the economy.

4.2 Wage Setting Methods

BIS Shrapnel's model of wage determination is based on the analysis of past and future (expected) wage movements in three discrete segments of the workforce, based on the three main methods of setting pay and working conditions (see Tables 3.1 and 3.2):

- Those dependent on awards rely on pay increases given in the annual National Wage case by the Fair Pay Commission (formerly by the Australian Industrial Relations Commission). Most of the wage increases in the National wage case over the past decade have been given as flat, fixed amount (i.e. dollar value) increases, rather than as a proportional increase. At the all industries level, 16.5% of all employees (data excludes those in agriculture, forestry and fishing) have their pay rises determined by this method.
- Collective agreements negotiated under enterprise bargaining account for 39.8% of all employees.
- The remaining 43.7% of all industries employees have their pay set by individual arrangements, such as individual contracts or other salary arrangements (including incentive-based schemes).

Wage movements by segment are shown in table 3.2. The proportions (by pay setting method) used in the All Industries calculations for 2008 onwards are based on the August 2008 ABS Survey of Employees, Earnings and Hours. However, the individual industry wage models used in this report are based on the May 2006 survey, because there was a change in the industry classification used in each survey – from the 1993 ANZSIC (Australian and New Zealand Standard Industrial Classification) to the revamped 2006 ANZSIC. But the industry specific wages data (and output or gross value added data) is still using the old 1993 ANZSIC. For consistency in our wage modelling (and because wastewater services has been added to electricity, gas and water), we have used the 2006 proportions.

Note in table 3.2, wage increases under 'individual arrangements' are calculated by deduction. Data from DEWR (Department of Employment and Workforce Relations) are used for wage increases under collective agreements. Award increases are calculated by applying the flat $

increase provided in each annual National pay decision to the relevant AWOTE $ value to give the percentage increase.

For example, the $17 per week increase granted in mid-2005 was equal to a 1.7 per cent contribution to the all industries AWOTE in 2005/06. Using the proportions of the workforce under each pay setting method (and with total AWOTE measured at 4.7 per cent) then the individual arrangements is calculated (as a residual) at 6.7 per cent in 2005/06. The same methodology was used to calculate individual arrangements using the labour price index.

The limitation of this methodology is that because individual arrangements are calculated as a residual, all of the compositional effects in terms of AWOTE (i.e. from more or less lower-paid workers being employed in the relevant year) plus all (or most) of the bonuses and incentives from those under award or collective agreements end up in the individual arrangements residual, which distorts the pay increases in this segment. However, the methodology works well for the LPI, particularly at the all industries level, although some compositional problems occur at the sectoral level, particularly for sectors with a relatively small employment base (such as electricity, gas and water).

This predominantly decentralised system of wage determination has evolved over the past 15 years (from a much more centralised system in the 1970s and 1980s), particularly since the Federal Industrial Relations and Workplace Relations Act in 1996. Over time, the operation of the new Act also produced a lengthening in the average duration of wage contracts — enterprise agreements now run for an average of over two years, although many include 'escalation' clauses that provide higher wages if inflation runs higher than expected. The longer duration of wage contracts means wage pressures are now slower to respond to changing economic conditions. However, businesses now have more flexibility when it comes to meeting changes in demand, and are more readily able to change the number of hours worked rather than employment levels or wages in response to a slowdown in activity. This has occurred over 2008/09.

Nevertheless, the shift to a decentralised system of wage determination has not altered the fundamental supply and demand drivers of wages. The new system has reduced the threat of a 'union-driven' rise in wages growth but it does not preclude a 'market-driven' rise, i.e. one driven by strong demand and supply shortages. Indeed, a more market-oriented system may make wages more prone to strong rises, especially when skilled labour is in short supply.

A market-driven acceleration in wages would be driven primarily by the section of the workforce who are on individual contracts or other salary arrangements, particularly as this segment has higher proportions of more highly skilled workers. Conversely, wages growth in this segment will be quicker to react to a dramatic weakening in the labour market because of the more flexible, less institutionalised, wage setting faced by businesses.

In terms of the key influences on the different wage determination mechanisms of each discrete segment:

- increases in the Federal Minimum Wage (on which a range of mostly lower paid awards are also based) granted by the Fair Pay Commission (and by the AIRC previously) each year are usually set in relation to recent increases in the CPI and with regard to the Commission's view of both current and short-term future economic conditions. For instance, the $21.66 increase granted by the Commission in its decision in mid-2008 (effective October 2008) amounted to a 4.1 per cent increase for those on the Federal Minimum Wage of $522/week. This reflected the marked acceleration in the CPI in the first half of 2008 (to 4.2 per cent in the March quarter and to 4.5 per cent in the June

quarter). It also reflected the strong economic conditions apparent around mid-2008 (the unemployment rate was just over 4 per cent. Conversely, the Fair Pay Commission gave no increase in its July 2009 decision, citing as its reasons, the deterioration of economic conditions and the spurious link between minimum wage increases and higher unemployment.

- increases in collective agreements under enterprise bargaining are influenced by a combination of recent CPI increases, inflationary expectations, the recent profitability of relevant enterprises, current business conditions and the short-term economic outlook, and by the industrial relations 'strength' of relevant unions. Because the average duration of agreements now runs for two-to-three years, BIS Shrapnel bases its near-term forecasts on the strength of recent agreements, which have been 'formalised' over recent quarters. Thereafter, collective agreements are based on BIS Shrapnel's macroeconomic forecasts.
- increases in individual agreements are primarily influenced by the strength of the labour market (especially the demand-supply balance of skilled labour), inflationary expectations, the recent profitability of relevant enterprises, current business conditions and the short-term economic outlook.

BIS Shrapnel's model of wage determination therefore takes into account of the present complexity of the wage determination process, both at the national (all industries) level and at the industry sector level.

4.3 Wage Forecasts - Australia

Wage pressures to ease through 2009 and 2010 as employment stalls, and then falls

Wages growth picked up through 2007/08, but remained surprisingly contained given the tight labour market conditions and the shortage of skilled workers. Wage inflation, as measured by the 'All Industries' LPI (labour price index), rose 4.2 per cent through the year, up from 4.0 per cent in 2006/07. Growth measured by All Industries AWOTE (average weekly ordinary time earnings) jumped to 5.0 per cent, up from 3.7 per cent in 2006/07.

In the December quarter 2008, the LPI rose 4.3 per cent, while the AWOTE increase was 5.5 per cent (December quarter 2008 compared to December quarter 2007). The December quarter result was boosted by the latest Fair Pay Commission ruling which took effect in October 2008. The $22 weekly increase in the minimum wage represented a 4.1 per cent pay increase for workers on the federal minimum wage. This was double the previous year's result. However, most workers on awards do not receive the minimum wage and the actual wage rise for affected workers was considerably less than 4.1 per cent.

The LPI eased in the March quarter (which is the latest actual data available) to 4.2 per cent, although AWOTE increased from 5.5 per cent through the year to December to 5.7 per cent in the year to March 2009.

As a result of the slowdown in domestic demand through 2008/09, profits have come under significant pressure and employment growth slowed sharply. However, the easing in labour markets will be slow to affect wages because of the staggered nature of wage setting decisions. Tight labour conditions and the high CPI through most of 2008 (the headline rate peaked at 5.0 per cent in the September quarter, 2008) also pushed up wage demands and agreements through 2008 and most of these agreements will run from one to three years.

Meanwhile, employment is forecast to decline over calendar 2009, with only very weak (or negligible) growth expected over 2010. The unemployment rate is forecast to climb toward 7 per cent by late 2009, and peak around 8 per cent by mid to late 2010. Because contracts are fixed for a set period, a year in the case of awards and some individual arrangements and multiple years for collective agreements, it will take time for the decline in employment growth and weakening inflationary environment to be reflected in wages growth.

Nevertheless, wages growth is forecast to ease from a forecast 4.1 per cent for the LPI in 2008/09 to 3.1 per cent in 2009/10 and 3.0 per cent in 2010/11, led by the sharp slowing in wages growth in the individual arrangements segment. AWOTE wages growth is expected to be slower to ease initially, slowing from an estimated 5.4 per cent in 2008/09 to 4.5 per cent in 2009/10, with compositional effects holding up average wages. We expect the largest proportion of job losses to occur among the lower skilled (and lower paid) sections of the workforce, which will 'artificially' boost the level of average wages.

Medium to longer term outlook – wages growth contained but pressures persist

Low interest rates, a housing construction recovery, and government stimulus packages, followed by stronger household consumer spending and a turnaround in business investment will drive a recovery in employment growth, which will gather pace over 2010/11 and particularly 2011/12. This is projected to push the unemployment rate down back under 6 per cent again by the second half of 2012, and toward 5 per cent by mid 2013. With the labour market again showing signs of tightness and skilled labour shortages re-emerging, we expect wage pressures to be re-ignited, with both AWOTE and the LPI rising to around 5 per cent and 4 per cent respectively during 2012/13 (see Table 3.3).

Wages growth is expected to remain at these relatively high levels over 2013/14 and 2014/15, despite the RBA and government acting to constrain economic growth and inflationary pressures. Indeed, by the middle of next decade, both skilled and general labour shortages will begin to emerge due to demographic factors, i.e. retirements.

Australia will continue to experience sustained labour shortages in the decade to 2024 (and beyond), and these shortages will become more significant as the workforce ages. As Australia's 'baby boomers' generation move into the 65+ age group, the growth of the 15-64 year old component of Australia's working age population (the overwhelming majority of Australia's workforce) will begin to slow.

With more people retiring, the supply of labour will increase at a slower rate through the coming decade. This will lead not only to skilled labour shortages, but total labour shortages. Meanwhile, the demand for labour will continue to rise — particularly in periods of strong investment and economic growth. These sustained labour shortages will result in a long term upward bias in wage inflationary pressures.

4.4 Construction Wages Outlook - Australia

The ABS does not publish industry AWOTE by private and public sector. We also note that private sector construction wages, as measured by the LPI, tracks very closely the total construction sector wages growth. We therefore provide total construction sector wage forecasts as a proxy for private sector (construction) wages growth.

Construction sector wages growth is strongly influenced by the cycle of growth in total construction sector activity (total includes residential building and non-residential construction). Wages growth basically reflects the growth in the demand for labour and the 'spare' supply (latent capacity) among the construction-related skill types.

In the past six years we have seen strength in all the major categories of construction except private residential construction. The global financial crisis and subsequent world recession, however, has stopped Australia's recent construction boom in its tracks. Project deferrals or cancellations (as a result of a shortage of finance and weak demand) will impact severely on private engineering construction and non-dwelling building. Construction activity therefore will turn down over the next two years with the contraction to be most severe in 2009/10. Nonetheless, strong recovery is forecast from 2011/12.

We expect the next upturn in dwellings building to commence in 2010/11. The large deficiency of dwelling stock (estimated to have reached 130,600 dwellings by June 2009) and rising pent-up demand means that Australia is set for a boom in housing construction to cater for underlying demand and wipe out the undersupply. Dwellings investment is expected to recover strongly over the three years to 2012/13.

In addition, the predicted downturn total construction in particular engineering construction is not expected to be protracted as the recent cycle has been more of a catch-up following many years of underinvestment rather than speculative boom. Consequently stronger growth in non-residential construction is expected to re-emerge from 2011/12. The initial recovery will be led by private engineering construction and will be boosted by an upsurge in non-dwelling building from 2012/13.

In light of the expected downturn in overall construction activity in the short term, Australian construction wages are forecast to ease (although with a one year lag) over the two years to 2010/11. We believe construction sector wages will regain momentum from 2011/12 when total construction sector activity is expected to start tracking upward once again (see Table 4.1).

Table 4.1: Wages Growth by Workforce Segment
Australia – Construction

	Year Average Percent Change								
						Forecast			
Year Ended June	2005	2006	2007	2008	2009	2010	2011	2012	2013
Proportion of Workforce by Pay setting Method									
Awards Only	13.6%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%
Collective Agreements	25.9%	27.7%	27.7%	27.7%	27.7%	27.7%	27.7%	27.7%	27.7%
Individual Arrangements	60.5%	60.3%	60.3%	60.3%	60.3%	60.3%	60.3%	60.3%	60.3%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
AWOTE									
Awards Only	2.1	1.8	2.1	1.5	1.7	0.5	1.2	1.2	1.4
Collective Agreements	4.4	4.9	4.8	4.4	4.9	4.6	4.3	4.4	4.8
Individual Arrangements (a)	8.1	0.7	5.6	13.8	10.4	5.2	4.5	5.2	6.5
AWOTE (Persons)(b)	**6.3**	**2.0**	**5.0**	**9.7**	**7.8**	**4.5**	**4.0**	**4.5**	**5.4**
Labour Price Index									
Awards Only	2.1	1.8	2.1	1.5	1.7	0.5	1.2	1.2	1.4
Collective Agreements	4.4	4.9	4.8	4.4	4.9	4.6	4.3	4.4	4.8
Individual Arrangements (a)	5.9	5.4	5.1	5.4	4.9	3.6	3.4	4.0	5.1
Labour Price Index (Ord. Time)	**5.0**	**4.8**	**4.7**	**4.7**	**4.5**	**3.5**	**3.4**	**3.8**	**4.6**
Compositional Effects + Bonuses,etc	1.3	-2.9	0.3	5.1	3.3	1.0	0.7	0.7	0.8
AWOTE ($)	948.2	967.0	1,015.2	1,114.0	1,200.8	1,254.5	1,305.0	1,363.6	1,437.6
Labour Price Index	105.0	110.1	115.2	120.6	126.0	130.4	134.8	139.9	146.3

Source: BIS Shrapnel, ABS, DEWR

(a) Calculated as a residual - affected by compositional effects and the payments of bonuses, incentive payments, et
(b) Full-time Adult Persons, excluding overtime

4.5 Wage Forecasts for the Mining Sector – Australia

With only around 1% of wages in the mining sector estimated to be determined through awards, — and the correspondingly high proportion of workers on enterprise agreements and individual contracts — wage growth in the mining sector has outpaced that of the broader economy, reflecting the tight labour market conditions in this sector.

Wage growth in the Australian mining sector has strengthened over recent years. In 2004/05, AWOTE wage growth was 3%. This increased to 5.3% in 2005/06, 7.1% in 2006/07 and 8.4% in 2007/08. Wage growth over these years accompanied strong employment growth, and represented the scramble of mining companies and contractors to increase productive capacity.

However, growth in mining output over the 2008/09 year was weak due to a collapse in world industrial production, the key driver of global demand for most minerals and metals. The sharp contraction in metals demand and consequently production led to an easing of labour constraints. This in turn contributed to slightly weaker wages growth in the mining sector for the last financial year (see Table 4.2).

While the demand of the mining industry for labour is currently contracting as shown by widespread job cuts, it is noted that those exiting mining employment tend to be less experienced and lower skilled individuals who tend typically command lower wages. This is acting to skew the wage distribution in the mining sector higher. Nonetheless, in the following year, wage growth is forecast to slow. A further 6.1 per cent growth in AWOTE mining wages is expected for 2009/10. Over the 2010–2013 period, AWOTE mining wage growth is forecast to persist above 5%, a level well above inflation, and above the forecast economy wide rate of wage growth.

OECD industrial production, a key driver of metals demand and in turn mining output, is expected to rebound over 2010 and 2013. Initially the growth will be led by Japan with Europe and the US strengthening from 2011. In addition, Chinese industrial production growth is forecast to regain momentum i.e. record double digit growth from 2010. Overall, world industrial production is predicted to expand by 5.3 per cent and 5.2 per cent in 2010 and 2011 respectively before accelerating to 7.2 per cent in 2013. A synchronised upturn in the China, India, US and OECD countries is expected to drive the growth in world industrial production predicted for the later period of the forecast horizon.

Mining sector wages growth is expected to regain momentum from 2011/12 as the world recovery and demand for metals gains traction. Tight labour markets is likely to emerge once again pushing wages growth higher. The LPI is expected to rise to 4.5 per cent by the end 2012/13 with AWOTE strengthening to 6 per cent.

Table 4.2: Wages Growth by Workforce Segment
Australia – Mining Sector

	Year Average Percent Change								
						Forecast			
Year Ended June	2005	2006	2007	2008	2009	2010	2011	2012	2013
Proportion of Workforce by Pay setting Method									
Awards Only	2.2%	2.4%	1.8%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
Collective Agreements	34.3%	29.8%	30.4%	30.9%	30.9%	30.9%	30.9%	30.9%	30.9%
Individual Arrangements	63.6%	67.8%	67.9%	67.9%	67.9%	67.9%	67.9%	67.9%	67.9%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
AWOTE									
Awards Only	1.3	1.1	1.3	0.9	1.0	0.3	0.7	0.7	0.8
Collective Agreements	3.6	3.7	3.9	4.2	4.0	3.9	3.7	3.8	4.0
Individual Arrangements (a) (c)	2.6	6.2	8.6	10.5	9.7	7.2	5.6	6.0	7.0
AWOTE (Persons)(b)	**2.9**	**5.3**	**7.1**	**8.4**	**7.8**	**6.1**	**5.0**	**5.3**	**6.0**
Labour Price Index									
Awards Only	1.3	1.1	1.3	0.9	1.0	0.3	0.7	0.7	0.8
Collective Agreements	3.6	3.7	3.9	4.2	4.0	3.9	3.7	3.8	4.0
Individual Arrangements (a) (c)	4.4	5.7	7.2	6.5	6.4	3.6	3.2	4.0	4.8
Labour Price Index (Ord. Time)	**4.0**	**5.0**	**6.1**	**5.7**	**5.6**	**3.7**	**3.3**	**3.9**	**4.5**
Compositional Effects + Bonuses,etc	-1.1	0.3	1.0	2.7	2.3	2.4	1.6	1.4	1.5
AWOTE ($)	1,515.4	1,595.9	1,708.7	1,852.8	1,997.6	2,119.4	2,224.5	2,341.2	2,483.4
Labour Price Index	104.1	109.2	115.9	122.5	129.3	134.0	138.5	143.9	150.4

Source: BIS Shrapnel, ABS, DEWR

(a) Calculated as a residual - affected by compositional effects and the payments of bonuses, incentive payments, etc.
(b) Full-time Adult Persons, excluding overtime.
(c) Because of relative small workforce (and therefore small sample size) in Mining, Indiv Agreements picks up all the standard errors of LPI and AWOTE estimates by ABS.

4.6 Wages Outlook for Queensland

Wage growth in Queensland has outperformed the national average over recent years. In 2007/08 and 2008/09, average weekly ordinary time earnings grew 5.4 per cent and 7.3 per cent respectively, a rate of growth well above the national average (5–5.5% p.a.). Wage growth over these years accompanied strong employment growth, and reflected the strong demand for labour from the booming mining sector.

In fact, Queensland has been buoyed by exceptionally strong investment spending since 2003. The investment boom was underpinned by the surge in resources-related capital expenditure and by the acceleration in population growth, both of which led to large increases in infrastructure and non-residential building construction. Against the background of tight capacity, this in turn contributed to robust wages growth in the state.

The investment boom and surge in consumer spending are over. Residential building remains weak, choked by the sharp decline in household wealth, weak consumer confidence and the desire to reduce debt. Meanwhile, non-dwelling building and engineering construction remain buoyant, underpinned by projects that had been approved or commenced before the debt crisis started to bite.

State Final Demand) — which is the addition of spending on consumption and investment by the private and public sectors — fell by 1.5% in the year to March 2009 with still strong non-dwelling building (+11%) offset by weak private consumption expenditure (0.9%) and a sharp fall in dwellings building (-19%). State employment growth has fallen from the heady days of the boom but remains positive (1.1% through the year to May).

This is the calm before the storm. The next stage will see the impact of the minerals investment downturn. Falls in commodity prices, weakening demand for exports from key trading partners and financial constraints mean that work done on construction for minerals investment projects will fall by over 50% over the next two years.

However, the Queensland economy is relatively diversified and that will soften the impact of the minerals investment downturn. Despite weaker economic growth and public sector finances, the Queensland government is determined to maintain a strong capital works program notwithstanding a growing budget deficit and downgrading by credit rating agencies.

Queensland wages growth is expected to weaken in line with falling economic activity. We expect growth in the state's LPI to slow to 3.2 per cent in 2010/11, a full percentage point lower than the growth rate for 2008/09. Beyond 2010/11, wages are forecast to be on an upward curve reflecting a stronger state economy to be underpinned by strong business investment.

Table 4.3: Wages Growth by Workforce Segment
Queensland – All Industries

	Year Average Percent Change								
						Forecast			
Year Ended June	2005	2006	2007	2008	2009	2010	2011	2012	2013
Proportion of Workforce by Pay setting Method									
Awards Only	22.5%	22.0%	20.5%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%
Collective Agreements	41.5%	41.6%	41.5%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%
Individual Arrangements	36.0%	36.4%	38.1%	39.7%	39.7%	39.7%	39.7%	39.7%	39.7%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
AWOTE									
Awards Only	2.2	1.9	2.2	1.5	1.8	0.5	1.3	1.3	1.5
Collective Agreements	3.8	4.2	4.2	4.2	4.2	3.8	3.6	3.9	4.1
Individual Arrangements (a)	8.1	5.6	5.4	8.6	13.1	8.5	6.4	5.8	9.0
AWOTE (Persons)(b)	**5.0**	**4.2**	**4.3**	**5.4**	**7.3**	**5.0**	**4.3**	**4.2**	**5.6**
Labour Price Index									
Awards Only	2.2	1.9	2.2	1.5	1.8	0.5	1.3	1.3	1.5
Collective Agreements	3.8	4.2	4.2	4.2	4.2	3.8	3.6	3.9	4.1
Individual Arrangements (a)	5.0	6.0	5.9	5.5	5.3	4.1	3.7	4.3	5.0
Labour Price Index (Ord. Time)	**3.9**	**4.4**	**4.4**	**4.2**	**4.2**	**3.3**	**3.2**	**3.6**	**4.0**
Compositional Effects + Bonuses,etc	1.1	-0.1	-0.1	1.2	3.1	1.7	1.1	0.6	1.6
AWOTE ($)	911.4	949.8	990.1	1,043.8	1,119.7	1,176.0	1,226.2	1,277.0	1,348.0
Labour Price Index	103.9	108.4	113.2	118.0	122.9	127.0	131.0	135.7	141.0

Source: BIS Shrapnel, ABS, DEWR

(a) Calculated as a residual - affected by compositional effects and the payments of bonuses, incentive payments, etc.
(b) Full-time Adult Persons, excluding overtime.

Estimating the risk free rate and debt risk premium

A report for QR

Dr. Tom Hird

February 2010

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Executive Summary

1. CEG has been asked by QR to provide a review of the Queensland Competition Authorities (QCA) Draft Decision in so far as it relates to the term of the risk free rate and the estimation of the debt risk premium. This report has been prepared by Dr Tom Hird, a Director of CEG based in its Melbourne office.

Maturity profile of debt

2. There are two key conclusions in relation to the maturity assumption for debt issues.

3. The first key conclusion is that the conceptual discussion in the Draft Decision fails to consider the interrelationship between the maturity structure of the debt issued by a company and the cost of equity. As first described by the Nobel Prize winning finance academics, Modigliani and Miller (1958),[1] changes in the debt maturity profile will alter the cost of equity in an offsetting fashion.

4. In summary, the Draft Decision proceeds on the basis that, by assuming QR issues five year instead of ten year bonds, the estimated cost of debt for QR will be reduced because interest costs on five year bonds are lower than interest costs of 10 year bonds. This, in itself, is not necessarily an error. The error is in the failure to then analyse what this implies about the cost of equity. The Draft Decision implicitly assumes that halving the maturity profile of QR's assumed debt has no impact on QR's cost of equity.

5. By contrast, Modigliani and Miller (1958) demonstrated that the level of risk in a firm is like the amount of air in a balloon. If one squeezes risk out of one area (eg, debt) then the risk simply moves to another (ie, equity). Issuing short-term debt may lower the cost of debt but it does so precisely because it lowers the amount of risk that debt providers have to bear. The corollary of this, however, is that the equity providers have to bear higher risk (ie, the risk that was previously passed onto debt providers is now retained in the business for equity holders).

6. Assuming efficient financial markets and zero transaction costs (as are generally assumed in the derivation of the CAPM model used by the QCA) Modigliani and Miller demonstrated that the net effect on the weighted average cost of capital will be zero – with the higher cost of equity offsetting the lower cost of debt. Modigliani and Miller effectively described the "law of the conservation of risk" that has its corollary the physical sciences in the "law of conservation of energy".

[1] Modigliani, F.; Miller, M. (1958). "The Cost of Capital, Corporation Finance and the Theory of Investment". *American Economic Review* **48** (3): 261–297.

7. A further conclusion that flowed from Modigliani and Miller was that, if financial markets are perfectly efficient with zero transaction costs, then no debt raising strategy will dominate any other debt raising strategy. All strategies, from issuing very short-term debt to issuing very long term debt, will result in the same weighted average cost of capital (WACC). Consequently, in such a world we would expect to see great variety in debt maturity profiles for businesses.

8. By contrast, if we observe that, in the real world, there is a dominant debt raising strategy, such as issuing long term debt, then Modigliani and Miller demonstrated that this must be because transaction costs are positive (financial markets are less than perfect). If we observe a dominant strategy of issuing long-term debt then this must be because there are advantages to issuing long term debt, such as lessening exposure to refinance risk and potential insolvency and bankruptcy transaction costs.

9. These advantages must *more than fully* offset the advantages of gaining a lower interest rate by issuing short-term debt. That is, if issuing long-term debt is a dominant strategy for particular kinds of businesses then it must be the case that issuing short-term debt not only does not reduce the WACC but actually raises the WACC (ie, is less efficient than issuing long-term debt). That is, it must be that the cost of equity increases by more than the cost of debt reduces when short-term debt is issued – otherwise long term debt issuance would not be the dominant observed debt issuance strategy.

10. This brings us to the second key conclusion of on the cost of debt. Namely, that average maturity at issuance for long lived infrastructure businesses is 10 years or greater (see Section 2.4 "What do firms actually do"). This includes the businesses the Draft Decision has used to benchmark QR's cost of capital (including Australian energy businesses regulated in the same manner as QR).

11. The fact that we observe a dominant long term debt maturity strategy demonstrates that issuing 5 year debt is inefficient (raises the cost of equity by at least as much, and generally more, than it lowers the cost of debt). This must be true as otherwise we would observe firms lowering their cost of debt and WACC by issuing short-term debt. The fact we don't observe value maximising firms doing this is compelling evidence that such a strategy is inefficient.

12. In summary, the Draft Decision has three related but separate critical errors of finance theory and internal inconsistency. The Draft Decision is inconsistent with finance theory in that it:

    i. implicitly assumes that achieving a lower cost of debt through shorter maturity debt issuance will have no offsetting impact on the cost of equity;

    ii. fails to recognise that the dominant observed behaviour of infrastructure businesses in issuing 10+ year average maturity debt demonstrates that issuing

10 year debt is efficient. That is, not only will issuing short term debt not lower the WACC it will, properly estimated, raise the WACC;

- assumes that QR issues 5 year debt despite inconsistently estimating the cost of equity based on benchmarking against firms that issue 10+ year debt (eg, regulated Australian energy businesses).

13. Implicitly, the Draft Decision assumes that a "free lunch" exists in capital financing – that equity owners can lower their cost of debt without raising their cost of equity. This is inconsistent with the conclusions of the finance literature and inconsistent with the actual behaviour of firms with long lived assets.

AER precedent

14. The Draft Decision acknowledges that the AER recently considered this issue and determined to continue assuming a ten year maturity for debt profiles. The Draft Decision determines that the AER reasoning is not persuasive because, even though firms *do* issue 10 year debt, they *could* issue 5 year debt.

15. For the reasons described above we consider that this is wrong – namely the fact that the dominant strategy of infrastructure businesses is to issue long-term debt demonstrates that issuing short-term debt is likely inefficient. However, even if 5 and 10 year debt issues were equally efficient strategies, the Draft Decision is in error for not increasing the cost of equity to reflect the higher risk retained in businesses that issue short term debt (ie, for assuming lower interest rates on short term debt are a 'free lunch').

16. More importantly, we consider that the Draft Decision mischaracterises the AER reasoning in that the Draft Decision fails to acknowledge:

- The AER explicitly accepted the relevance and importance the Modigliani and Miller (1958) conclusions and the need for consistency between the assumed term of debt issues and the cost of equity. The AER clearly stated that it would not assume a 5 year debt issuance if it could be demonstrated that firms issues 10 year debt as this would be inconsistent with the accepted findings of Modigliani and Miller; and
- The AER explicitly considered the reasons why businesses did not issue 5 year debt and determined that this was to prudently limit exposure to refinancing risk. That is, the AER explicitly considered and rejected the reasonableness of assuming the issuance of five year debt was efficient.

Maturity profile for the risk free rate

17. The Draft Decision proceeds on the basis that it can estimate the cost of equity using a five year risk free rate, in conjunction with an estimate of the market risk premium (MRP) derived assuming a 10 year risk free rate. The effect of this is to effectively use two different definitions of the risk free rate in the CAPM formula (adding a lower five year risk free rate and subtracting a higher 10 year risk free rate). This introduces a clear bias in the estimated cost of equity.

18. This is an error and the Australian Competition Tribunal has previously determined this logic to be in error in its GasNet determination.[2]

> *"In truth and reality, the use of different values for a risk free rate in the working out of a Rate of Return by the CAPM formula is neither true to the formula nor a conventional use of the CAPM. … The CAPM is not a model, which is intended to operate in this way. The timescales are dictated by the relevant underlying facts in each case and for present purposes those include the life of the assets and the term of the investment.*

19. There are other important problems with the Draft Decision financial logic including:

- the fact that we observe a horizon of at least 10 years for debt financing is evidence, consistent with the ACT finding above, that investors in long-term infrastructure assets have long horizons;
- the rationale put forward in the Draft Decision for wanting to estimate the cost of equity using a 5 year risk free rate simply does not apply in the specific context of QR's determination – where the cost of equity is not being estimated at the beginning of the regulatory period;
- consistency would require the QCA to estimate a forward looking MRP over 5 years which would be much higher than the 6% estimate adopted in the Draft Decision.

Estimate of the cost of debt

20. The Draft Decision does not explicitly state how it has estimated the debt premium that gives rise to an estimated cost of debt. It noted that while the fair value yields estimated by Bloomberg and CBASpectrum diverged over the GFC, they have recently reconverged to the extent that the differences are no longer as large as they were.

[2] Australian Competition Tribunal, Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6

21. We consider that applying a methodology to select the service that provides the best fair yield estimate remains important insofar as the differences between Bloomberg and CBASpectrum are significant. The AER has devised such a methodology and has applied it in recent regulatory decisions with different results, depending upon the averaging period used and as the methodology has developed.

22. Applied to the Draft Decision averaging period, we find that the AER's methodology is inconclusive, but that with additional information would conclude that the Bloomberg fair value curve is the best fit to observed yields for 10-year BBB+ debt. This is associated with a debt premium of 4.40%.

23. For five-year debt, the AER's test would pick either the CBASpectrum fair yield curve or a simple average of the Bloomberg and CBASpectrum yield curves – the test does not produce a unanimous result. Rather, it gives rise to a relatively narrow range of debt premia for five year BBB+ debt of 3.64% to 3.67%.

1. Introduction

24. This report has the following structure:

- Section 2 considers the appropriate assumption regarding the assumed maturity profile for issue of debt (eg, 5 vs 10 years). This section concludes that the assumed maturity of debt issues should be at least 10 years;
- Section 3 examines the appropriate assumption regarding the assumed maturity profile for the risk free rate in determining the cost of equity. This section concludes that an assumed maturity of 10 years continues to be appropriate; and
- Section 4 examines the best estimate of the cost of issuing 10 year debt and concludes that Bloomberg fair value estimates are currently the most accurate.

2. Maturity of debt issues

2.1. QCA Decision

25. The QCA Draft Decision determines that the cost of debt should be estimated based on the assumption that QR issues debt with a five year maturity. The rationale for this is to align the maturity of the assumed debt profile with the length of the regulatory period.[3] The Draft Decision suggests that if businesses actually issue 5 year debt they will have effectively hedged their exposure to interest rate movements.[4]

> *Using borrowings which have a term that closely matches the regulatory term will avoid this mismatch, and potential risk, provided that the costs of refinancing debt are adequately met.*

26. The effect of this aspect of the QCA Draft Decision is that the cost of debt is dramatically reduced. Indeed, this is a primary motivation for the decision to alter the assumed maturity of debt.[5]

> *While in the past the Authority has recognised the appropriateness of seeking to benchmark the risk free rate on the basis of a bond with a term that is equivalent to the term of the undertaking, it has not chosen to do so. However, on this occasion the difference between setting the risk free rate and the debt margin on the basis of 10 year and 5-year bonds is material.* ***In these circumstances, the Authority does not consider that it is reasonable to set aside the in principle arguments in support of setting the risk-free rate and the debt margin with reference to a 5-year bond.*** [Emphasis added]

2.2. Higher cost of equity offsets lower cost of short term debt

27. We discuss below why the QCA rationale for adopting a 5 year maturity for debt issues is flawed. However, even if the rationale was compelling the Draft Decision would still be in error because the Draft Decision fails to recognise that if a 5 year debt issuance assumption reduces the cost of debt it will, according the fundamental principles of modern finance theory, increase the cost of equity by an offsetting amount.

28. As first described by the Nobel Prize winning finance academics, Modigliani and Miller (1958),[6] changes in the debt maturity profile (or any other aspect of a firm's debt

[3] QCA Draft Decision, p. 12

[4] Ibid.

[5] Ibid.

[6] Modigliani, F.; Miller, M. (1958). "The Cost of Capital, Corporation Finance and the Theory of Investment". *American Economic Review* **48** (3): 261–297.

strategy) that lead to lower interest costs will alter the cost of equity in an offsetting fashion.

29. Modigliani and Miller (1958) demonstrated that the level of risk in a firm is like the amount of air in a balloon. If one squeezes risk out of one area (eg, debt) then the risk simply moves to another (ie, equity). Issuing short-term debt may lower the cost of debt but it does so precisely because it lowers the amount of risk that debt providers have to bear. However, the corollary is that the equity providers have to bear higher risk (ie, the risk that is no longer passed onto debt providers is retained in the business for equity holders).

30. Miller, 33 years after his seminal paper with Modigliani has used a similar analogy. Miller (1991) states:[7]

> *Think of the firm as a gigantic tub of whole milk. The farmer can sell the whole milk as it is. Or he can separate out the cream, and sell it at a considerably higher price than the whole milk would bring. (Selling cream is the analog of a firm selling debt securities, which pay a contractual return.) But, of course, what the farmer would have left would be skim milk, with low butter-fat content, and that would sell for much less than whole milk. (Skim milk corresponds to the levered equity.) The Modigliani-Miller proposition says that if there were no cost of separation (and, of course, no government dairy support program), the cream plus the skim milk would bring the same price as the whole milk.*

31. In this quote Miller notes that issuing low risk debt securities is analogous to a farmer separating out cream from whole milk. The firm gets a good price (low interest rate) for its debt but the corollary is that the equity it is left with is less desirable (requires a higher return to attract investors). This is similar to a farmer starting with whole milk and separating out the cream (for which the farmer gets a high price) but the milk the farmer is left with is skim milk and worth less per unit.

32. Another relevant analogy that is commonly used to describe the Modigliani and Miller conclusions is that they effectively described the "law of the conservation of risk" that has its corollary the physical sciences in the "law of conservation of energy"[8]. What Modigliani and Miller (1958) demonstrated was that there is a fixed amount of risk

[7] Miller (1991) *Financial Innovations and Market Volatility*, p. 269

[8] In fact, as early as 1938 (twenty years before Modigliani and Miller's 1958 proof) the same point had been effectively made (although not technically proved) by John Burr Williams who wrote: "If the investment value of an enterprise as a whole is by definition the present worth of all its future distributions to security holders, whether on interest or dividend account, then this value in no wise depends on what the company's capitalization is…. . Bonds could be retired with stock issues, or two classes of junior securities could be combined into one, without changing the investment value of the company as a whole. **Such constancy of investment value is analogous to the indestructibility of matter or energy: it leads us to speak of the Law of the Conservation of Investment Value, just as physicists speak of the Law of the Conservation of Matter, or the Law of the Conservation of Energy**" Williams (1938) *Theory of Investment Value.* Emphasis added.

inherent in any activity. This can be packaged into different parcels (eg, different types of debt and different types of equity) and sold separately but the total risk is not reduced by this action. The more low risk (desirable) debt packages are sold the higher risk (less desirable) will be the residual (equity).

33. In the context of short-term debt rather than long term debt, short-term debt generally has a lower interest rate than long term debt because it is lower risk. An investor who buys a short-term bond does not expose herself to interest rate risk (the risk of locking in for an extended period an out of date interest rate) nor does she expose herself to the long term risks associated with that company. An investor in 5 year bonds only runs the risk of default for 5 years at which point they are free to re-determine what compensation for that risk is required should they wish to re-invest. An investor in a 10 year bond must wait twice as long for the same rights.[9]

34. However, precisely because short-term debt is lower risk for lenders it is higher risk for borrowers. A firm with short-term debt has less certainty about the level of long-term cash-flows as interest costs are reset more regularly. Moreover, a firm cannot be guaranteed that funds will always be available when it has to refinance its debt (as any firm attempting to refinance debt during the recent financial crisis can attest). This means that issuing short term debt, which requires a greater proportion of debt to be refinanced more regularly, increases the refinancing risks that a firm faces.

35. It follows that while issuing short term debt can be expected to reduce the interest rate paid on that debt it must also be expected to increase the rate of return required by equity investors. The fact that these are two sides of the same coin has been established in the finance literature since Modigliani and Miller (1958). The Draft Decision has taken one side of this coin (lower interest rates) without allowing for the other side (higher cost of equity).

36. If short term debt has a lower interest rate than long term debt then this must be because commensurately less risk is being transferred to debt investors. Thus, any advantage for lower interest rates on debt is offset by higher required returns on equity – with the effect that the WACC remained unchanged.

2.2.1. AER precedent on Modigliani and Miller conclusions

37. This literature was put to the AER by CEG in the context of its 2009 consideration of the electricity distribution and transmission cost of capital review and, specifically, after the AER had signalled in its Draft Decision that it would adopt a 5 year term for the risk free rate and the cost of debt.

[9] The fact that higher interest rates on long term debt reflects higher risk of long term debt is well accepted in the finance literature. For example, see Fama (1984) "Term Premiums in Bond Returns," *Journal of Financial Economics*, December 1984.

38. The AER accepted that this logic was correct and that current debt financing practices of regulated businesses (eg, the issuance of 5 vs 10 year debt) would affect the riskiness of equity. The AER went on to state that its intention was not to assume a five year debt issuance maturity if it could be shown that businesses actually issued 10 year debt. The AER would only assume a 5 year debt issuance if it was actually the case that businesses issued (on average) 5 year debt. The AER therefore concluded that its approach would not be in violation of the conclusions of Modigliani and Miller.

39. We consider that the AER position was correct in this assessment. Moreover, we note that the AER determined that, contrary to its initial information relied on in the Draft Decision, the regulated businesses on average issued 10 year debt (not 5 year debt). The AER therefore continued to assume 10 year maturity for debt issues in its WACC modelling. We summarise the evidence on actual debt issues in section 2.4 below but agree with the conclusions of the AER and note that, if anything, a longer term than 10 years is justified.

40. The below quote from the AER Final Decision provides a summary of its considerations on the Modigliani and Miller conclusions.

> *The JIA's consultant CEG argues that a focus on the cost of debt in setting the term of the risk-free rate is inappropriate as it violates a fundamental principle of asset pricing theory – that the value of an asset is determined independently of the way in which it is funded. CEG states that:*
>
> > *…one gains the impression that the AER believes that it is efficient to issue short term debt (which has lower interest rates) provided that the transaction costs of issuing short term debt are not higher by an offsetting amount.*
> >
> > *We do not agree with this. The principle of conservation of risk suggests that any lower interest rates available from issuing short term debt will be fully offset by a higher cost of equity – this is known as the Modigliani-Miller theorem.*
>
> *In the AER's view, CEG correctly observes that the impact of current debt financing practices on interest rate risk should already be reflected in empirical equity beta estimates. However, as the AER's objective is to provide fair compensation for the current financing practices of a benchmark efficient firm, this final decision is not expected or intended to change debt raising practices such that the risk to equity-holders would increase as a result. On this basis the AER does not consider that its focus on the cost of debt to inform the*

appropriate term of the risk-free rate will in any way violate the Modigliani-Miller theorem.[10]

41. In our view the QCA Draft Decision fails to properly describe and come to terms with the logic of the AER decision. We describe this in more detail in Section 2.5 below.

2.3. WACC increases with short term debt in the presence of transaction costs

42. The discussion in the previous section describes the conclusions of finance theory on the basis of the assumption of perfectly efficient finance markets (zero transaction costs). However, in the presence of transaction costs, such as bankruptcy costs, issuing short term debt is likely to actually increase the WACC. That is, the increase in the cost of equity will more than fully offset any lower interest rates on short term debt.

43. An important conclusion that flows from Modigliani and Miller (1958) is that, if financial markets are perfectly efficient with zero transaction costs, then no debt raising strategy will dominate any other debt raising strategy. All strategies, from issuing very short-term debt to issuing very long term debt, will result in the same WACC. Consequently, in such a world we would expect to see a proliferation of, and great variety in, debt maturity profiles for businesses.

44. If we observe, in the real world, that there is a dominant debt raising strategy, such as issuing long term debt, then this must be because financial markets are not perfect (transaction costs are not zero). There must be advantages to issuing long term debt, such as lessening exposure to insolvency and bankruptcy transaction costs, which more than fully offset the advantages of gaining a lower interest rate by issuing short-term debt.

45. The most notable transaction costs relevant to financing strategies are the costs of tax and the potential costs of insolvency/bankruptcy.

46. A firm that issues 5 year debt is, on average, refinancing 20% of its debt every year. This means that the firm is heavily reliant on liquid markets for its debt each year. If the market for its debt is illiquid in any given year it may be unable to find sufficient lenders willing to refinance the debt it has due (either at all or at a reasonable interest rate). This increases the risk of technical insolvency even if its assets are greater than its liabilities. In order to repay the debt at maturity, the borrower that cannot refinance may be forced into a fire sale of assets at a low price further destroying firm value. This may lead to bankruptcy even when the borrower would have positive net worth in the absence of a forced 'fire sale' of assets – with bankruptcy potentially resulting a destruction in the value of the firm's assets.

[10] AER, May 2009, Final Decision, *Electricity transmission and distribution network service providers. Review of the weighted average cost of capital (WACC) parameters* Page 149

47. A firm need not become insolvent or bankrupt in order to incur these costs. Financial distress of any kind imposes costs on a firm. Writing thirty years after his 1958 paper with Modigliani, Miller wrote on this subject:[11]

> *A run of very bad years might actually find a highly-levered firm unable (or, as the option theorists might prefer, unwilling) to meet its debt service requirements, precipitating thereby any of the several processes of recontracting that go under the general name of bankruptcy. These renegotiations can be costly indeed to the debtor's estate, particularly when many separate classes of creditors are involved.*
>
> *The terminal events of bankruptcy are not the only hazards in a high debt strategy. Because the interests of the creditors and the stockholders in the way the assets are managed need not always be congruent, the creditors may seek the additional protection of restrictive covenants in their loan agreement. These covenants may not only be costly to monitor but may foreclose, if only by the time delay in renegotiating the original terms, the implementation of valuable initiatives that might have been seized by a firm less constrained. Nor should the transaction and flotation costs of outside equity financing be neglected, particularly in the face of information asymmetries. Prudence alone might thus have seemed to dictate the maintenance of a substantial untapped reserve of quick borrowing power,* ***especially in an era when those managing U.S. corporations (and the financial institutions buying their debt securities) still had personal memories of the debt refinancing problems in the 1930s****.* [Emphasis added]

48. While this quotation is framed in terms of the level of debt it could equally be framed in terms of the type of debt. Issuing short term debt similarly raises the level of refinancing risk a firm faces (eg, five year debt must be refinanced twice as often as 10 year debt).

49. Notably, since Miller wrote this quote we have experienced what has been described as the worst financial crisis since the great depression of the 1930s. At this time, one does not need a long-term memory to understand the risks associated with relying heavily on the rolling over of short-term debt. Even in Australia, where the crisis was relatively less severe, corporate bond markets 'seized up' with liquidity evaporating. In appendix A we provide quotations from the OECD, RBA and Deloitte (advising the AER) that describe how both corporate bond and even bank debt markets 'dried up' in 2008/2009. Any firm with a short term debt strategy would have been much more severely affected by such events than a firm with a long-term debt strategy.

[11] Miller, *Journal of Economic Perspectives*— Volume 2, Number 4—Fall 1988—Pages 99-120 The Modigliani-Miller Propositions After Thirty Years Miller, p. 113.

50. The above discussion provides a conceptual explanation for why one would expect firms financing long term assets to issue long term debt rather than short term debt. In the presence of imperfections in financial markets, doing so can be expected to reduce their cost of equity by more than it increases their cost of debt (with the overall WACC falling).

51. However, up to this point the discussion is purely conceptual. What matters is what firms actually do. That is, do firms with long lived assets issue short term or long term debt? If the dominant strategy is to issue long term debt then this is strong evidence that issuing long-term debt is efficient. That is, if value maximising firms issue long-term debt despite short-term debt having lower interest rates then it must be that issuing short term debt actually raises the riskiness of equity by more than any benefit from lower interest rates.

2.4. What do firms actually do

52. An important conclusion of this report is that that long-lived infrastructure businesses, including regulated businesses, near universally issue debt with a maturity of 10 years or greater.

53. This includes the firms that the QCA uses to benchmark QR's cost of equity (namely regulated Australian energy businesses and Canadian railways). This is relevant not only because the fact that these firms issue long term debt confirms the previous evidence that this is efficient business conduct. It is also relevant because, with the cost of equity for QR having been determined by reference to the cost of equity of these firms, then it is inconsistent for the Draft Decision to assume QR adopts a debt strategy that makes QR's equity more risky than these firms.

2.4.1. Australian Energy Businesses.

54. Based on a Deloitte report to the AER CEG has previously estimated that the average term to maturity of *outstanding* debt (as opposed to maturity at issuance) issued by private regulated energy businesses was around 6 years.[12] Deloitte derived the underlying data from financial statements of the businesses. Table 2 from that report is reproduced below:

[12] CEG, *Term of the risk free rate under the NER*, January 2009.

Table 1: Estimate of the weighted average remaining time to maturity

Time to maturity	Total debt* ($m)	Percentage of total debt	CEG point estimate (years)	Weighted average
Less than 1 year	2,651	13%	0.5	
1 to 5 years	8,868	44%	3	
More than 5 years	8,812	43%	11	
Sum	**20,331**	**100%**		**6 years**

Source: Deloitte and CEG analysis

55. However this needs to be doubled to provide an estimate of the average time to maturity of debt at the time of issuance – noting that, on average, outstanding debt will tend to be half way through its life.

56. CEG were also provided with the following data from the Joint Industry Associations (JIA) that corroborates this conclusion. We are informed that these figures have been reconciled to the 2007 statutory accounts.

Table 2: JIA estimate of the average time to maturity

Distribution Business	Ownership	Amount	Average Term to maturity	Average term at issuance
CitiPower & Powercor	Private	2,532.0	5.65	10.40
ETSA utilities	Private	2,353.5	7.11	10.81
SPAusnet	Private	3,662.8	4.47	7.27
Envestra	Private	1,960.9	10.91	14.39
Average	**20,331**	**100%**	**6.55**	**10.14**

Source: JIA

57. The AER inspected these audited accounts and concluded:[13]

> *Taking into account this new information, the AER has verified that the weighted average maturity of debt portfolios at the time of issuance for these businesses is 10.14 years as presented above in table 6.1. That is, the further information confirms that these businesses refinance on average every 10 years.*

[13] AER, May 2009, Final Decision, *Electricity transmission and distribution network service providers. Review of the weighted average cost of capital (WACC) parameters*, p. 159

2.4.2. Regulated utilities internationally

58. We have also examined a large database of all outstanding bonds listed on Bloomberg and classified as being issued by a "utility" (being gas electricity or water transport company). Many if not most of these firms will be regulated in a similar fashion to Australian regulated business – including with regular price resets every five or so years. The results of this analysis are reported in the below table.

Table 3: Debt issues by utilities internationally

	Amount (bn)	Unweighted average term to maturity at issuance	Weighted average term to maturity at issuance
Utility by sector			
Water	na	18	na
Gas transmission	na	10	na
Gas Distribution	na	12	na
Electricity integrated	na	12	na
Electricity transmission only	na	12	na
Electricity distribution only	na	13	na
All	na	12	na
Utility by currency of issue			
US dollar	476.7	15	14
Euro	161.4	10	9
Canadian dollar	36.4	19	22
Australian dollar	6.4	10	11
British pound	51.5	29	24
Japanese yen	11,467.9	10	11

Source: Bloomberg and CEG analysis

59. Based on the figures in this table, all utility sectors tended to issue debt with a maturity of 10 years or higher. The lowest was gas transmission which had an unweighted average maturity of 10 years. The highest was for water which had an unweighted average maturity of 18 years.

60. It was not possible to easily calculate a weighted average for sector specific categories because the bonds are issued in a range of currencies (48 currencies in total).[14]

[14] In order to calculate a meaningful weighted average maturity it would be necessary to convert each of the outstanding amounts for each bond into a common currency. It is not obvious what exchange rate (eg, nominal or purchasing power parity) should be used in this context and what date should be used (eg, current or time of issue).

61. However, Bloomberg also allows one to classify bonds issued by utilities by the currency in which they have been issued. In that case it is possible to calculate a meaningful weighted average and these are reported in the table. The weighted average maturity of bonds issued in US dollars is 14 years. The lowest weighted average maturity is 9 years for bonds issued in Euros. The highest weighted average maturity is 29 years for bonds issued in British pounds.

62. It should be noted that this does not mean that European companies tend to issue 9 year bonds and British companies tend to issue 29 year bonds. Rather, it is more likely that European companies tend to issue their long term debt in British pounds (eg, because the demand for long term corporate debt is highest in Britain).

63. This data strongly confirms the Australian data that regulated utilities, with long lived assets, have a strong preference for issuing long term debt.

2.4.3. Rail businesses

64. The below table provides the same analysis for debt issued by rail businesses. Unfortunately, there are few stand alone 'below track' rail operators so these numbers are dominated by integrated 'below track' and 'above track' businesses. Also, given that the Draft Decision determined Canadian rail operators to be a relevant comparator to QR we have separately reported Canadian National Railways and Canadian Pacific Railways.

Table 4: Debt issues by rail businesses internationally

	Amount (bn)	Unweighted average term to maturity at issuance	Weighted average term to maturity at issuance
All rail businesses	na	12	na
Utility by currency of issue			
US dollar	63.8	18	17
Euro	51.3	15	14
Canadian dollar	2.0	16	18
Australian dollar	2.0	15	14
British pound	6.2	27	26
Japanese yen	5,470.4	12	13
Canadian rail businesses			
Canadian National	5.0*	20	19*
Canadian Pacific	4.2*	19	18*

*Source: Bloomberg and CEG analysis. *Both Canadian National and Canadian Pacific issue debt primarily in US dollars but with some debt issued in Canadian dollars. For the purpose of this calculation we have used an exchange rate of one US dollar buys one Canadian dollar. At the time of writing a Canadian dollar buys 93 US cents.*

65. It is clear from this table that the average maturity of debt issued by rail companies and listed on Bloomberg is well in excess of 5 years. For Canadian rail businesses the average is also well in excess of 10 years.

2.5. The Draft Decision does not properly grapple with AER precedent

66. The rationale for moving to a 5 year term in the QCA Draft Decision is essentially the same logic expressed in the AER's 2008 SoRI Draft Decision where it also proposed adopting a 5 year assumption. Subsequent to receiving submissions the AER did not implement this in its Final Decision.

67. In relation to the AER precedent the QCA Draft Decision states:

> *This approach was initially supported by the AER in its review of the WACC parameters for electricity transmission and distribution. However, in its may 2009 final decision the AER moved away from its draft decision on the basis that, inter alia, the regulated businesses do not appear to be able to hedge the debt premium component of the cost of debt.*

68. The QCA Draft Decision goes on to argue that it does not consider the AER's decision was made on a compelling basis because:

> *The Authority considers the need to hedge the debt premium component stems from a strategy of using borrowing which have an average term in excess of the regulatory period… Using borrowings which have a term that closely matches the regulatory term will avoid this mismatch and potential risk…*

69. Put simply, the Draft Decision states that that if a regulated businesses simply issued 5 year debt then the problems identified by the AER could be eliminated. The Draft Decision goes onto state that it believes that its provision of a 12.5bp debt raising cost is adequate to cover the costs of refinancing debt every five years and, therefore, the AER's reasons for not implementing a maturity assumption of 5 years are not persuasive.

70. For the reasons described in previous sections the QCA Draft Decision is wrong – one cannot assume that issuing shorter maturity debt will lower the WACC just because it lowers the cost of debt. One must recognise that this will raise the cost of equity.

71. Importantly, we do not consider that the QCA Draft Decision accurately characterises the AER Final Decision. It fails to acknowledge that the AER explicitly rejected the 'solution' proposed by the QCA Draft Decision that businesses simply issue 5 year debt. That is, the AER explicitly noted that businesses needed to issue long-term debt in order to efficiently minimise refinancing risks.

> *"Taking into account this new information, the AER has verified that the weighted average maturity of debt portfolios at the time of issuance for these businesses is 10.14 years as presented above in table 6.1. That is, the further information confirms that these businesses refinance on average every 10 years."*[15]
>
> …
>
> *Moreover, the AER considers that for the average effective term at issuance to match the length of the regulatory period (i.e. five years) the term-to-maturity of the long term bonds on issue by the benchmark business would need to shorten significantly. Given the statements made by the Treasurers, the AER accepts that such a shortening of debt maturities may increase refinancing risk for the benchmark efficient energy network business.*[16]

72. With the above facts in mind, we consider that a more accurate description of the AER Final Decision is that the AER:

    a. accepted that firms tend to issue 10 year debt and that doing so lowers refinancing risk (borne by equity holders) relative to issuing 5 year debt;

    b. given firms actual (and efficient) debt management strategies it is not possible to hedge these positions into an equivalent 5 year debt exposure. Therefore, it was not appropriate for the AER to adopt this assumption.

73. The QCA Draft Decision description of the AER Final Decision has the potential to mislead because it leaves out the most important finding of the AER. The QCA Draft Decision proposes that firms issue five year debt. However, the Draft Decision fails to acknowledge that the AER had already rejected this "solution" because it did not reflect what businesses actually do and that if businesses did issue 5 year debt then this would impose too high a refinancing risk on those businesses.

74. We also note that the fact that the AER recognised the relevance of the Modigliani and Miller analysis to consideration of this issue, as described in section 2.2.1 above. However, this interrelationship between debt maturity and the cost of equity is not raised in the QCA Draft Decision.

[15] AER, May 2009, Final Decision, *Electricity transmission and distribution network service providers. Review of the weighted average cost of capital (WACC) parameters*, p. 159

[16] AER, May 2009, Final Decision, *Electricity transmission and distribution network service providers. Review of the weighted average cost of capital (WACC) parameters* Page 165

3. QCA rationale for a five year term

75. The QCA uses the same rationale to justify setting a five year term for the risk free rate as adopting five year term for the cost of debt. Namely, that the WACC for a business with regulated revenues reset every five years should be estimated using the interest rates available on five year debt instruments (risk free debt and corporate debt).

76. The justification for this is that because the WACC is adjusted every five years then investors will adopt a five year investment horizon – even if the life of the underlying business assets is much longer. It is therefore argued that:

- the return on equity must be based on the yield on 5 year government bonds (risk free rate) plus an equity premium; and
- the return on debt must be based on the yield on 5 year corporate bonds.

77. In the case of corporate debt we have already demonstrated why this logic is false. Regulated businesses simply do not borrow using five year debt. Regulated businesses have an incentive to borrow in the most efficient manner and they do so, on average, using 10 year or longer debt. To compensate based on the cost of 5 year debt would under-compensate businesses acting efficiently.

78. The actual behaviour of businesses demonstrates the flaw in the entirely theoretical logic of the Draft Decision – which is to assume that businesses and investors would actually prefer to sell/buy five year debt. This may be true in a theoretical model with no market imperfections (and no refinancing risk) but it is demonstrably not true in the real world.

79. We now turn to the cost of equity. The cost of equity is determined by the QCA using the capital asset pricing model (CAPM) formula developed in Sharpe (1964) which sets the required return on equity using the following formula:

$$RoE = r_f + \beta \times (market\ return - r_f)\ ;\ \text{where} \qquad (1)$$

$$RoE = required\ return\ on\ return\ on\ equity$$

$$(market\ return - r_f) = market\ risk\ premium\ (MRP)$$

$$r_f = risk\ free\ rate$$

$$\beta = asset\ specific\ equity\ beta$$

80. The Sharpe CAPM formula is based on a number of assumptions about investors and capital markets. In particular, the derivation of this formula relies on the assumption that investors invest once, hold that portfolio unchanged for a given period, and then consume their entire wealth at the end of that period. In the terminology of finance theory the Sharpe CAPM is a 'single period' model.

81. Sharpe (1964) himself states in relation to his assumptions:

> *"Needless to say, these are highly restrictive and undoubtedly unrealistic assumptions."*

82. The assumption of a 'single period' in the CAPM simplifies the mathematics and allows one to arrive at the above simple formula. However, a cost of this simplicity is that finance theory can tell us nothing about the appropriate term of the risk free rate to use in the CAPM formula. In the CAPM there is only one risk free rate because the simplifying assumptions of the model assume that there is only period. The real world is made of multiple consecutive periods and thus, multiple possible risk free rates – eg, from one month to 30 years.

83. There is no financial theory that can be used to conclude that the CAPM, when applied to regulated businesses with five yearly resets, must be implemented with a five year risk free rate. The correct term of the risk free rate to be used in the CAPM is an imponderable question because the model is incapable of even considering more than one possible risk free rate.

84. In this context by far the most important consideration for choosing the term of the risk free rate is to choose one that is internally consistent with the definition of the MRP $(market\ return - r_f)$. If the MRP has been estimated using a 10 year risk free rate then the risk free rate used in the CAPM equation (equation 1) must also be set using the same assumption. If a 10 year risk free rate is used in the estimation of the MRP but the MRP is added to a five year risk free rate then the equation actually implemented is:

85. $RoE = r_{f\ (five\ years)} + \beta \times (market\ return - r_{f\ (ten\ years)})$;

86. Obviously, if the five year risk free rate is materially lower than the ten year risk free rate then this inconsistent use of risk free rates will downward bias the estimated RoE relative to a consistent use of risk free rates (either consistent use of 5 or 10 year rates).

87. This is incorrect as a matter of finance theory and is also the basis of the Australian Competition Tribunal's finding in GasNet that the ACCC made an error in the use of a

5 year risk free rate in the CAPM formula when the MRP had been estimated using a 10 year risk free rate.[17]

> *"In truth and reality, the use of different values for a risk free rate in the working out of a Rate of Return by the CAPM formula is neither true to the formula nor a conventional use of the CAPM. … The CAPM is not a model, which is intended to operate in this way. The timescales are dictated by the relevant underlying facts in each case and for present purposes those include the life of the assets and the term of the investment.*

88. The Draft Decision acknowledges this inconsistency also exists in its decision but determines that it will nonetheless proceed with the adoption of a five year risk free rate on the grounds that the magnitude of the inconsistency is 'well within the standard error of the estimates' for the MRP.[18]

> *The Authority also took into consideration the potential inconsistency of estimating the mrp relative to the 10-year Commonwealth government bonds but using the 5-year Commonwealth government bond in other aspects of this draft WACC decision.*
>
> *In this regard, in terms of the historical averaging, available data indicate that the average difference between the five-year and 10-year Commonwealth government bonds is around 20 basis points (ie, 0.20%). Such a difference is well within the standard error of the estimates and the head rook the Authority provided between the proposes 6% allowance and the mean/mode estimates relying on a range of methodologies.*

89. We consider that this is an error.

90. Firstly, uncertainty in the value of parameters is not a basis for introducing a known bias into your methodology.

91. Secondly, arguing that the QCA has included 'headroom' (by which we assume the QCA implies some form of margin for error) in other aspects of its decision is not a reasonable basis for introducing a deliberate downward bias in this part. A margin for error ('headroom') that is subsequently used to justify a conscious underestimate is not, in reality, a margin for error. Moreover, the assertion that the QCA has built in a positive margin for error in the Draft Decision MRP is, in our view, unjustified. Unlike other regulators, such as the AER, the QCA has not increased the MRP to reflect the increased risk premiums in the wake of the global financial crisis. We have separately

[17] Australian Competition Tribunal, Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6

[18] Page 15.

estimated that the forward looking MRP in the wake of the global financial crisis is between 8.3% and upwards of 16.7%.[19] In this context the assertion that there is 'headroom' in the MRP estimate is, in our view, simply wrong.

92. Thirdly, the Draft Decision's rationale for using a 5 year risk free rate (and five year cost of debt) is predicated on the assumption that using an up-to-date 5 year risk free rate at the beginning of the 5 year regulatory period will best proxy investors required return at the beginning of the regulatory period. However, the same logic suggests that one must also use an up-to-date estimate of the MRP. No attempt has been made to do this. As described above, the MRP relative to the current five year risk free rate would be materially greater than 6% and this has been recognised by the AER which has increased its MRP estimate from 6.0% to 6.5%.

93. Fourthly, the current decision is taking place midway through QR's regulatory period and the WACC will be being applied in part retrospectively and in part prospectively. In this context, even if one accepted the arguments in favour of using a five year risk free rate in general, they simply would not be relevant to this decision.

94. Fifthly, no justification for the claimed 20 basis points historical average difference between 10 and 5 year bond. Not only is it unclear what data source and/or time period has been used to justify this claim it is also unclear what it refers to. For example, does it refer to the average daily yield to maturity on such bonds or the average annual total return on such bonds (ie, the sum of interest payments and capital gain over a one year holding period)? The latter is the relevant measure for how using a five year risk free rate would affect the calculated MRP. Further it is unclear whether this is an arithmetic or geometric average?

95. Finally, we also note that even if a business did issue five year debt, its interest costs would not be based on the interest costs prevailing at the beginning of the regulatory period but rather would reflect the interest costs prevailing over the period that it issued those bonds. We have already described why issuing 5-year debt is likely to be imprudent, but issuing five-year debt and issuing it all at the same time (such that it all must be refinanced at the same time) would expose a business to even more refinance risk.

96. For example, the AER was specifically advised by its consultant, Deloitte, that:

> *In the current market it would be difficult (if not impossible) to attempt to refinance billions of dollars of debt in a 5-40 day [sic].*[20]

[19] CEG, June 2009, The Market Risk Premium and Risk Free Rate Proxy Under the NER and in a Period of Financial Crisis. See table 3 on page 19.

[20] Page 9.

97. A 55% geared business (such as QR is assumed to be) that had to refinance all of its debt during 2008 and early 2009 would likely have ceased to exist should it have adopted this strategy. Yet, this is implicitly the strategy that the Draft Decision assumes would (could) be adopted by a business aligning its debt issuance with the beginning of the regulatory period.

4. Calculation of the debt premium

98. Bloomberg and CBASpectrum both provide estimates of fair value yields for Australian corporate bonds of various ratings and maturities. One or both of these estimates have been used by Australian regulators for a number of years as a proxy for cost of debt for regulated firms. Recently the AER has developed and applied a statistical test to best determine which is the better proxy for a BBB+ cost of debt at any given time.

99. In the remainder of this section:

- Section 4.1 describes the evolution of the AER test over the last four regulatory determinations;
- Section 4.2 applies the most recent version of the AER test to the QR decision period. However, the application of this test is inconclusive;
- Section 4.3 describes further information that can be used to augment the AER test to arrive at a more definitive conclusion; and
- Section 4.4 summarises our conclusions.

4.1. AER's testing procedure

100. Historically the fair value estimates provided by Bloomberg and CBASpectrum have been broadly consistent. However, their estimates began to diverge significantly from May 2008 following the onset of the GFC. During this period, the AER has made a number of decisions in which it has had to determine the cost of debt, including:

- the final decisions for the New South Wales distribution and transmission business and for Transend;[21]
- the final determination for Victorian AMI cost recovery;[22]
- the draft decision for ActewAGL gas distribution network;[23]
- the draft decisions for the Queensland distribution businesses and for ETSA Utilities;[24]

[21] These decisions were made simultaneously and made the same considerations of cost of debt issues. See for example: AER, *New South Wales distribution determination: 2009-10 to 2013-14*, April 2009

[22] AER, *Victorian advanced metering infrastructure review: 2009-11 AMI budget and charges application*, October 2009

[23] AER, *Access arrangement proposal for the ACT, Queanbeyan and Palerang gas distribution network: 1 July 2010 to 30 June 2015*, November 2009.

[24] See for example: AER, *South Australia draft distribution determination: 2010-11 to 2014-15*, November 2009

101. The AER devised a methodology to test which service provided the most accurate estimates and this test was first presented in the final decisions for the New South Wales electricity network businesses and Transend. That test proposed to compare the fair value estimates from both services to 'observed' yields on all fixed rate bonds rated BBB+ with Standard & Poor's that:[25]

- had more than two years to maturity; and
- reported yields from both Bloomberg and CBASpectrum over the relevant averaging period.

102. In addition to these selection criteria, two Lane Cove Tunnel bonds were excluded on the grounds that they were illiquid.

103. The AER measured over the averaging period the difference between the observed yields on each of the four remaining bonds and the interpolated fair yields at that maturity from Bloomberg, CBASpectrum and the simple average of the fair value estimates. Three measures of the difference were computed:

- the average difference between observed yield on each of the four bonds and each fair value on each day of the averaging period, averaged over the averaging period;

$$\text{Average of differences} = \frac{1}{T}\sum_{t=1}^{T}\left(\frac{1}{n}\sum_{i=1}^{n}\left(\text{Observed value}_{i,t} - \text{fair value}_{i,t}\right)\right)$$

- the average absolute difference between observed yield on each of the four bonds and each fair value on each day of the averaging period, averaged over the averaging period; and

$$\text{Average of absolute differences} = \frac{1}{T}\sum_{t=1}^{T}\left(\frac{1}{n}\sum_{i=1}^{n}\left|\text{Observed value}_{i,t} - \text{fair value}_{i,t}\right|\right)$$

- the average squared difference between observed yield on each of the four bonds and each fair value on each day of the averaging period, averaged over the averaging period.

[25] Reference

$$\text{Average of squared differences} = \frac{1}{T}\sum_{t=1}^{T}\left(\frac{1}{n}\sum_{i=1}^{n}\left(\text{Observed value}_{\text{i,t}} - \text{fair value}_{\text{i,t}}\right)^2\right)$$

104. The AER's test indicates that the Bloomberg fair value curve was closer under all three of these measures than the CBASpectrum fair value curve, or an average of the two, to both the Bloomberg and CBASpectrum observed yields. The AER concluded from this result that the Bloomberg fair value curve was the best fit and selected a Bloomberg fair value estimate as its 'benchmark' cost of debt.

105. Since applying its test in the New South Wales and Tasmanian final decisions, the AER has applied similar tests in decisions for Victorian AMI cost recovery and in respect of the Queensland electricity distribution businesses and ETSA Utilities. Over this time, the methodology used in the test has evolved, including:

- introducing a third source of observed yields, from UBS rate-sheets, to test the goodness of fit of the Bloomberg and CBASpectrum fair value curves;
- applying a further criterion, that the issuing company be Australian, in the selection of relevant bond issues;
- no further criteria relating to illiquidity were suggested or applied to other bonds once the Lane Cove Tunnel bonds were downgraded from BBB+;
- abandoning the use of three different measures of 'closeness of fit' and using only the average of squared errors (or 'weighted sum of squared errors');
- redefining the method of calculation for the weighted sum of squared errors so that each bond receives the same weight in the calculation, no matter how many observations it has over the averaging period (in effect, swapping the order of summation); and
- the AER introduced a statistical test (the Chow test) to identify bonds for which the market perceived credit rating had deviated from BBB+.

106. In its AMI determination, the AER found that the average of the Bloomberg and CBASpectrum fair value curves was the closest fit to the observed yield under every test. The AER therefore chose the simple average of the Bloomberg and CBASpectrum fair value estimates for 10-year BBB+ bonds as the benchmark cost of debt.

107. In its draft decisions for the Queensland electricity distribution businesses and ETSA Utilities, the AER found that CBASpectrum was the best estimate of the benchmark cost of debt and that this was true no matter which set of observed value it was tested against.

4.2. AER test applied to Queensland Rail

108. The test devised by the AER can relevantly be applied to selecting the data source that can best be used to estimate QR's cost of debt (or debt premium). That is, the test can be used to determine whether Bloomberg or CBASpectrum fair value curves are the best estimate of observed bond yields over the Draft Decision averaging period of 4 November 2009 to 1 December 2009.

109. Over this period, we have identified 16 fixed rate bonds with observed yields from either Bloomberg, CBASpectrum or UBS. We show details about these bonds in Table 5 below.

Table 5: Fixed rate bond information, 4 November 2009 to 1 December 2009

Issuer	ISIN	Maturity	Observed yields (%)*		
			Bloomberg	CBASpectrum	UBS
DB RREEF	AU300DREF019	4-Feb-10	6.313	5.065	6.380
SNOWY (W)	AU000SHL0018	25-Feb-10	6.747	7.153	6.839
CHALLTREAS	AU3CB0024644	23-Apr-10	-	-	11.909
GPT	AU300GPTC037	7-Nov-10	6.964	6.669	7.097
BKQLD	AU300BQ40434	2-Dec-10	6.338	6.177	6.513
DB RREEF	AU3CB0016673	8-Feb-11	7.616	7.513	7.853
ORIGINERGY	AU3CB0004117	6-Oct-11	7.725	-	8.029
TABCORP	AU300TPP0010	13-Oct-11	7.047	6.936	6.868
AMEX	AU3CB0010213	5-Dec-11	7.532	7.756	7.687
COLESMYER	AU300CML1014	25-Jul-12	7.121	7.078	7.018
SNOWYHYDRO	AU000SHL0034	25-Feb-13	9.144	10.778	9.176
GPT	AU300GPTM218	22-Aug-13	8.859	8.622	8.573
WESFARMERS	AU3CB0126860	11-Sep-14	7.887	7.838	7.815
SANTOS	AU300ST50076	23-Sep-15	9.023	9.244	9.082
BBIDBCTFIN	AU300BBIF018	9-Jun-16	-	17.006	11.568
AXA	AU0000AXJHB7	26-Oct-16	10.462	-	15.763

Source: Bloomberg, CBASpectrum, UBS
** Yields are averaged over 4 November 2009 to 1 December 2009 and are calculated on an annualised basis.*

110. Applying the most recent version of the AER criteria to this dataset:

- both DB RREEF bonds, SNOWY (W), CHALLTREAS, GPT, BKQLD, ORIGINERGY and TABCORP are excluded because they have less than two years to maturity;
- AMEX is excluded because its issuer is not an Australian company; and

- BBIDBCTFIN and AXA are excluded because they lack observed yields from Bloomberg and CBASpectrum respectively.

111. We believe that there is also some possibility that the application of the Chow test may eliminate the second GPT bond. Table 6 and Table 7 below show the results of the AER's test with and without the inclusion of GPT.

Table 6: Fair value and observed yield analysis using weighted sum of squared errors, 4 November 2009 to 1 December 2009, including GPT

		Observed yield source		
		Bloomberg	CBASpectrum	UBS
Fair value source	Bloomberg	0.591	1.736	0.598
	CBASpectrum	0.570	1.625	0.612
	Simple average of Bloomberg and CBASpectrum	0.572	1.672	0.588

Source: Bloomberg, CBASpectrum, UBS and CEG analysis

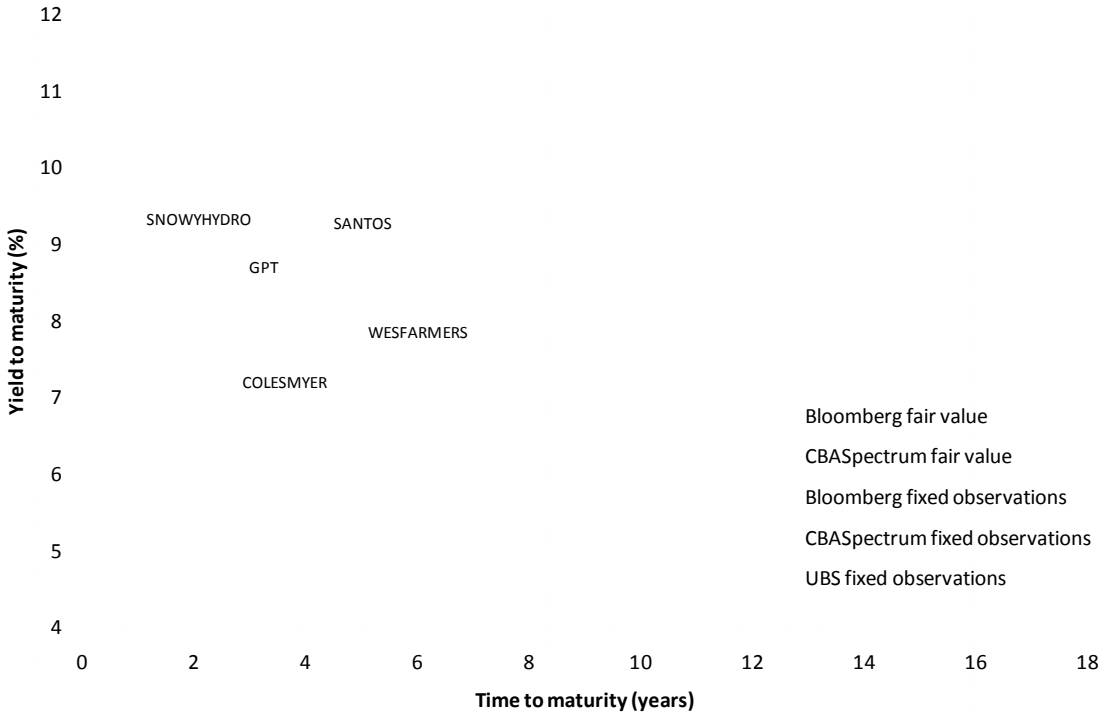
Table 7: Fair value and observed yield analysis using weighted sum of squared errors, 4 November 2009 to 1 December 2009, excluding GPT

		Observed yield source		
		Bloomberg	CBASpectrum	UBS
Fair value source	Bloomberg	0.637	2.141	0.729
	CBASpectrum	0.630	2.013	0.749
	Simple average of Bloomberg and CBASpectrum	0.626	2.070	0.721

Source: Bloomberg, CBASpectrum, UBS and CEG analysis

112. The data used in the AER's test is shown graphically in Figure 1 below.

Figure 1: Fair value curve and observed yields included in AER's test, 4 November 2009 to 1 December 2009



Source: Bloomberg, CBASpectrum, UBS, CEG analysis

113. In summary, the AER's test returns the following results:

- if GPT is included, then CBASpectrum fair value is the best fit for Bloomberg and CBASpectrum observed yields and the simple average of Bloomberg and CBASpectrum fair value is the best fit for UBS observed yields; and
- if GPT is excluded, then CBASpectrum fair value is the best fit for CBASpectrum observed yields and the simple average of Bloomberg and CBASpectrum fair value is the best fit for Bloomberg and UBS observed yields.

4.3. Further information is required to augment the AER's test

114. We consider that there are two reasons why the AER's test needs to be further developed to take into account the circumstances around the QR Draft Decision averaging period.

115. Firstly, the AER's test applied to the data over the averaging period did not produce a conclusive result. On every occasion that the AER has applied its test (or the variants of it) it has been unanimous in its conclusions.

116. Secondly, and more importantly, we note that over the Draft Decision averaging period, the shape of the Bloomberg and CBASpectrum fair value curves are unusual, in that they cross twice. Figure 1 above shows that over the Draft Decision averaging period, the Bloomberg fair value curve was higher than CBASpectrum's for tenors of less than about three years, lower up to about seven years and then higher again (when extended out using the shape of the Bloomberg AAA fair value curve) up to 15 years.

117. This has unforeseen implications for the use of the AER testing procedure. Although the AER's objective is to find the best estimate of the 10-year BBB+ cost of debt, the test does not specifically look at bonds around this maturity – because there are no bonds that fit the AER's criteria in this range. Rather, the AER's test is an overall test of the goodness of fit of the fair value curves to the observed yields for maturities above two years.

118. When the differences between the curves are consistent over all maturities this test is most useful. However, when the curves cross (ie, when one curve is sometimes higher and sometimes lower than the other) the test is potentially problematic if to the extent it fails to give most weight to the observations in the region of most relevance (eg, at 10 years maturity if we are interested in the best estimate of the cost of 10 year debt).

119. We note that the bonds that are included in the AER's test have maturities between two and seven years, and that the CBASpectrum fair value curve is higher than the Bloomberg fair value curve over most of this area. Consequently, the fact that the AER test determines CBASpectrum (or an average of CBASpectrum and Bloomberg) is a better fit than bloomberg is, in reality, a conclusion that the higher of the two fair value curves (in the region where data is available) is a better fit to the data.

120. However, the CBASpectrum fair value is lower than the Bloomberg fair value beyond six years. Given that the objective is to find the best estimate of the 10 year BBB+ cost of debt, then choosing the higher fair value curve where there is data (CBASpectrum) will consequently (and counter intuitively) return the lower value at 10 years.[26]

121. For both the above reasons, we consider that further information must be brought to bear to decide which of the Bloomberg and CBASpectrum fair value curves is the best fit to the observed yields at 10 years to maturity.

[26] We note, however, that this issue will not directly affect the use of the AER's test if the objective is to estimate a five-year benchmark yield.

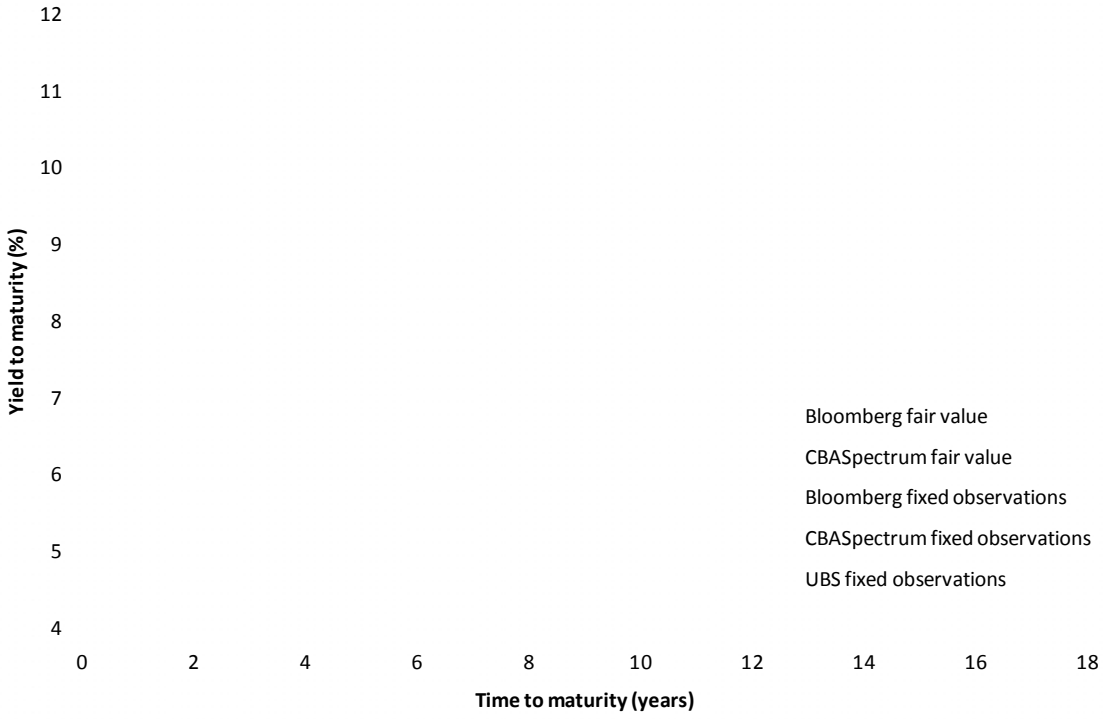
4.3.1. Other fixed rate bonds

122. All the yield information that we have collected for fixed rate bonds, including the information filtered out by the AER's critieria that three observations per bond must exist, is shown graphically in Figure 2 below.

123. Whilst Figure 2 shows that there is considerably more information that was not considered in Figure 1 above, most of this information is unhelpful in determining which of Bloomberg and CBASpectrum's fair value curve provides the best fit at a maturity of 10 years. Most of the additional data points are for bonds with a maturity of less than two years. The only bonds with a longer time to maturity than Santos (the longest fixed rate maturity bond with yield estimates from all of Bloomberg, CBASpectrum and UBS) are BBI and AXA. However, the yields on these bonds are high relative to those included in Figure 1. It would be inappropriate to conclude, with just the information in Figure 2 to hand, that these yields are representative of a benchmark yield on a ten year BBB+ bond.

124. We also note that the time to maturity, even for BBI and AXA, is still less than seven years, so these are in any case not providing values that are proximate to ten years to maturity.

Figure 2: Fair value curve and all observed yields on fixed rate bonds, 4 November 2009 to 1 December 2009



Source: Bloomberg, CBASpectrum, UBS, CEG analysis

4.3.2. Floating rate notes

125. Floating rate notes (or FRNs) are another class of bonds that can provide relevant information on the observed yields for fixed rate bonds.

126. An FRN is different from a fixed rate bond in that holding an FRN delivers a stream of payments that is variable in magnitude rather than fixed. To be specific, an FRN delivers the contemporaneous 90-day bank bill rate plus a margin over the life of the bonds, plus return of the principal at maturity.

127. Although the structure of payments is different, an FRN can simply be converted into a fixed rate bond by the holder selling a swap with the same maturity as the bond – ie, agreeing to make quarterly payments equal to the 90-day bank bill rate over the life of the bond in exchange for a fixed payment from the swap counterparty. After this transaction, the net position of the bond holder consists only of the fixed payments made quarterly plus return of the principal at maturity. This is an identical cash flow to a fixed rate bond. (See appendix B for a more detailed specific example of the

mechanics of estimating the equivalent fixed rate on the floating rate bond issued by Tabcorp in April 2009).

128. It therefore follows that, to avoid arbitrage, the prices on fixed and floating bonds must be consistent. We note that the empirical evidence is that the market prices FRNs on this basis. Figure 3 below shows the average yields calculated over the Draft Decision averaging period on the population of BBB+ bonds where the issuer issued both fixed and floating bonds with the same maturity, using UBS data. (Noting that UBS rate sheets report the equivalent fixed rate for FRNs).

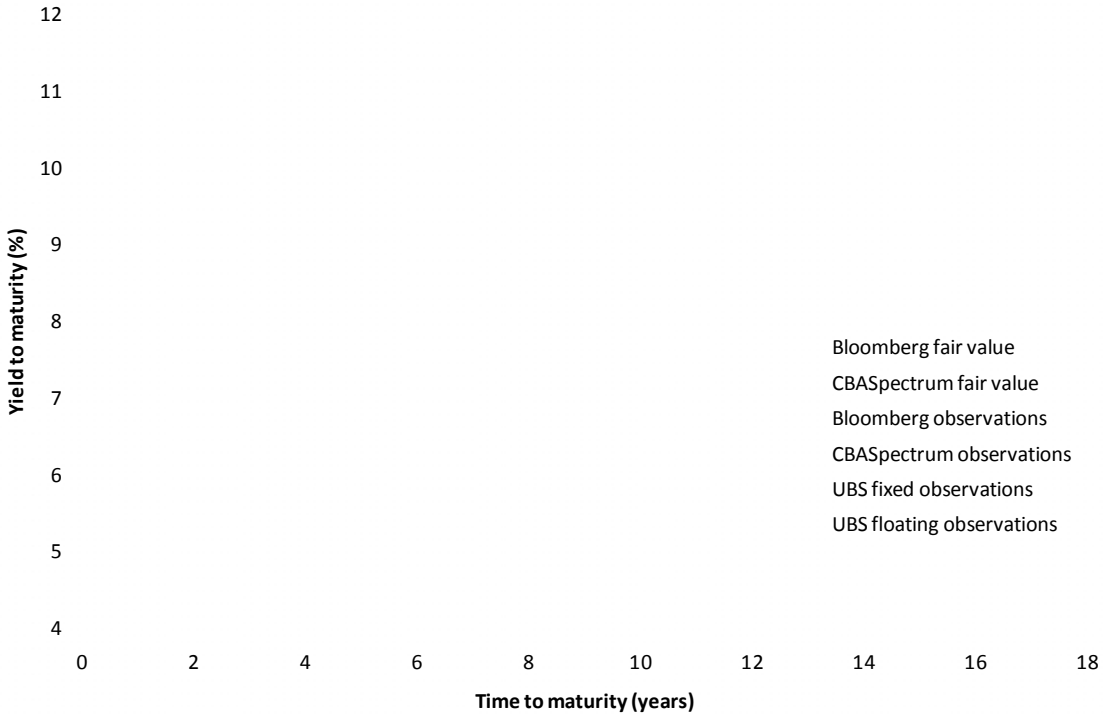
Figure 3: Yields on BBB+ fixed rate bonds and floating rate notes

Source: UBS

129. Figure 3 shows that, on average, the yields on the fixed and floating bonds are the same. The fact that the yields are not identical may reflect different points in the payment cycle, different analysts views (eg, a different UBS analyst covering the floating rate bond than the fixed rate bond) or simply different dates at which each was last updated. However, there is no reason to believe that any of these factors systematically bias equivalent fixed rate yields on floating rate bonds below the yields on their sister fixed coupon bonds. This is consistent with the above figure which shows in four out of the ten cases the fixed bond had a higher estimated yield than the floating rate bond.

130. There is a significantly bigger population of FRNs rated BBB+ than there are fixed rate bonds – almost twice as many.[27] The effect of considering these in the choice of the best fit fair yield curve is shown in Figure 4 below.

Figure 4: Fair value curve and all observed yields on fixed and floating rate bonds, 4 November 2009 to 1 December 2009



Source: Bloomberg, CBASpectrum, UBS, CEG analysis

131. Figure 4 shows that there is a considerable population of FRN's with maturities on or about ten years, issued by mainly Reliance and BBI. The yields on these are higher than for both the Bloomberg and CBASpectrum fair value curves. This suggests that the higher of these curves at 10 years should be chosen as the best fit to the data for long dated bonds.

4.4. Conclusion on best fit fair yield curve

132. Because the Bloomberg and CBASpectrum fair yield curves cross (not once, but twice), which was not anticipated in the development of the AER test, the most recent

[27] We have found observed yields on 31 FRNs from UBS, compared to 16 fixed rate bonds.

form of its test requires further information to adequately choose the best fit yield curve for 10 year yields on BBB+ bonds.

133. Little additional useful information that address this issue is contained in fixed rate bond data, but floating rate note yields from UBS indicate that the higher of the two fair yield curves, Bloomberg, is likely to be the best fit in this region. We therefore recommend that the QCA adopt the Bloomberg fair yield curve (extended out using the Bloomberg AAA fair yield curve) to estimate a ten-year cost of debt.

134. If the QCA must instead estimate a five-year cost of debt, then the answer as to which fair yield curve is the best fit is different, because of the region in which they cross. We believe that the AER's test is capable of answering this question without additional information since the bonds that it uses have maturities that are close to five years and the yield curves do not cross in this region. Application of the AER's test indicates that either CBASpectrum, or an average of Bloomberg and CBASpectrum will be appropriate.[28]

4.4.1. Calculation of debt premium

135. Table 8 below shows the calculation of the debt premium for both five year and ten year bonds.

Table 8: Calculation of the debt premium for five year and ten year bonds

	Five year	Ten year
CGS yield	5.287	5.562
Bloomberg fair yield	8.906	9.957
CBASpectrum fair yield	8.957	9.703
Average fair yield	8.931	9.830
Bloomberg premium	3.619	4.395
CBASpectrum premium	3.670	4.141
Average premium	3.644	4.268
Recommended premium	**3.644-3.670**	**4.395**

Source: Bloomberg, CBASpectrum, UBS, CEG analysis
Note: All yields expressed in annual terms

136. We note that the Draft Decision states that the estimated debt margin at 5 years is 3.43%.[29] It is unclear to us how this was estimated.

[28] The tests remain inconclusive as to which is the best.

[29] See page 23. 3.43 is 3.56% less 0.125% debt raising costs.

Appendix A. The financial crisis and refinance risk

137. This appendix provides a brief summary of reputable views on the impact of the global financial crisis on refinance risk.

138. Deloitte in a November 2008 report for the AER has stated:[30]

> *"**The market for non-financial institutions corporate bonds, similar to the assumed BBB+ grade used in the WACC model, effectively vanished from capital markets in the first half of 2008** against a total for $6.5 billion for the whole of 2007"*
>
> *"The small volume of corporate bond issues that has taken place in 2008 has been in the main restricted to large financial institutions, and credit spreads have increased significantly"*
>
> *"In the past, 5 and 10 year bonds were widely issued, but in the current market, the little volume that is being issued is primarily 3 year bank debt, with very little liquidity in 5 year facilities."*
>
> ***"In the current market it would be difficult (if not impossible) to attempt to refinance billions of dollars of debt in a 5-40 day*** [sic]*."* [Emphasis added.]

139. The Organisation for Economic Cooperation and Development (OECD) stated in the context of its November 2008 Economic Outlook No. 84:[31]

> *"This Economic Outlook represents a substantial downward revision from just a few months ago: many of the downside risks previously identified have materialised. The financial turmoil that erupted in the United States around mid-2007 has broadened to include non-bank financial institutions and rapidly spread to the rest of the world. **Following the collapse of Lehman Brothers in mid-September, a generalised loss of confidence between financial institutions triggered reactions akin to a 'blackout' in global financial markets.**"* [Emphasis added.]

140. The Reserve Bank of Australia (RBA) has stated:[32]

[30] Deloitte, p. 5

[31] OECD, Economic Outlook No. 84, Editorial, *Managing the global financial crisis and the economic downturn and summary of projections*, Klaus Schmidt-Hebbel, OECD Chief Economist, p. 3.

[32] RBA, *Statement on Monetary Policy*, 10 November 2008, p. 1

"World financial markets have come under severe stress in the period since the last Statement [in August 2008]. Strains in credit markets escalated in early September, and the period since then has been marked by further large declines in equity prices and exceptional volatility across a range of markets…"

"The renewed turmoil was sparked by the failure or near-failure of a number of financial institutions in the United States and Europe…"

"These events saw an intensification of the credit tightening that was already beginning to take hold in a number of countries. While this had previously been mainly apparent in increased funding costs, which were typically passed on to borrowers in the form of higher lending rates, the renewed turmoil saw this develop into a serious tightening in credit availability. ***As confidence in the financial sector deteriorated, banks became more uncertain about their ability to sustain their funding, and this in turn made it more difficult for them to lend to sound borrowers in the non-financial sector.****"* [Emphasis added.]

Appendix B. Specific example of the equivalent fixed rate on a FRN

141. Tabcorp announced the issue of a 5 year BBB+ rated bond on 24 March 2009. It will pay a floating interest rate which is reset every three months to be equal to the then prevailing 3 month bank rate plus a margin of 425bp.[33]

142. In order to estimate the full yield of the Tabcorp issue one must add the five year swap rate. The actual process that Tabcorp would follow (and may well have followed) to achieve an equivalent fixed rate would be to hedge its floating rate liability associated with the bond by entering into a contract with a third party to pay that third party a fixed yield over 5 years in exchange for the third party paying Tabcorp a floating liability based on the 3 month bank bill rate. This is termed a 'fixed for floating swap'. In effect, Tabcorp would promise to pay a fixed coupon to the third party over five years and the third party would promise to pay Tabcorp the bank bill rate over those five years.

143. By entering into this transaction Tabcorp would be able to use the bank bill payments from its swap agreement to pay the bank bill related costs on its floating rate bond. This would leave Tabcorp with a net liability equal the fixed component of its swap agreement plus the fixed margin above the bank bill rate on its floating rate bond. That is, the net position would be identical to having issued a fixed coupon bond.

144. Such transactions are commonplace in financial markets and it is quite possible that this is precisely what Tabcorp did. Of course, Tabcorp does not have to enter into a 5 year swap. It can leave itself exposed to variations in the bank bill rate over the five years. However, the market price of bearing this risk itself is given by the 5 year swap rate.

145. On the 24 March 2009 the 5 year swap rate was 4.34% on that day. The table below provides the relevant calculations to come to a five year estimate of the cost of debt.

[33] See http://www.asx.com.au/asxpdf/20090401/pdf/31gvxc5xsd8t2c.pdf.

Table 9: Cost of debt based on 432bp margin above the swap rate

Date	24 March 2009
Swap rate	4.34%
Tabcorp 5 year issue (swap rate plus 4.25%)	**8.59%**

*Source: Bloomberg and CEG analysis.

146. This table states that Tabcorp issued a 5 year equivalent fixed yield in excess of 8.59%.

147. We note that UBS, which reports comprehensively on FRN yields reports each day the equivalent fixed rate on these FRN's. That is, UBS reports both the fixed margin above the swap rate (eg, 4.25% in the case of Tabcorp) and also the prevailing fixed rate for swapping the floating component of the FRN over the remaining life of the FRN (which was 4.34% at the time the Tabcorp bond was issued).

Response to the QCA's Draft Decision

QR Network: Beta Assessment

February 2010
Synergies Economic Consulting Pty Ltd
www.synergies.com.au

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Synergies Economic Consulting (Synergies) has prepared this advice exclusively for the use of the party or parties specified in the report (the client) and for the purposes specified in the report. The report is supplied in good faith and reflects the knowledge, expertise and experience of the consultants involved. Synergies accepts no responsibility whatsoever for any loss suffered by any person taking action or refraining from taking action as a result of reliance on the report, other than the client.

In conducting the analysis in the report Synergies has used information available at the date of publication, noting that the intention of this work is to provide material relevant to the development of policy rather than definitive guidance as to the appropriate level of pricing to be specified for particular circumstance.

Contents

Overview

QR Network has requested Synergies Economic Consulting (Synergies) undertake a review of the Queensland Competition Authority's (QCA's) Draft Decision in relation to beta. This follows on from the report originally produced by Synergies in 2008 regarding the cost of equity to be applied to QR Network, which accompanied QR Network's draft 2009 Undertaking submission.

The position of the QCA with respect to the beta of QR Network relies upon its analysis, and that of its consultant, on four dimensions:

1. the choice of comparator companies
2. the degree and importance of demand correlation
3. treatment of stranded asset risk
4. the case for a further reduction in beta.

Following consideration of these dimensions, we will conclude that the QCA's previous position of 0.90 for QR Network's equity beta was at the low side of a reasonable range, but acceptable. We do not believe the reduction to 0.80 is supportable and certainly do not agree that there is any basis for an even further reduction as mooted by the QCA in the Draft Decision.

Following a brief overview of the QCA's decision, we address each of these four areas in this response.

QCA's response

The QCA rejected QR Network's proposed asset beta range of 0.5 to 0.6 (which assuming a gamma of zero and gearing of 55%, represents an equity beta range of 0.93 to 1.11). The QCA's decision was based on the analysis undertaken by its consultant, the Allen Consulting Group (ACG), who had previously reviewed QR Network's beta as part of the UT2 review.

ACG examined firms in the coal, transport, rail and Australian electricity network businesses, and concluded that "there was little direct supporting evidence for a precise value for QR Network's beta" although "the electricity transmission and distribution businesses' underlying drivers of covariance risk were closest to those of QR Network."[1] ACG argued that the equity beta estimate "should not be drawn from the upper end of a range that has been constructed from inappropriate comparators" and that "estimation of betas should ultimately rely on judgment that is informed by empirical analysis."[2] ACG concluded that there was no persuasive evidence to depart from its previous recommended equity beta range of 0.6 to 0.9 (assuming 55% gearing), with a preferred estimate of 0.8.

The QCA also referenced the Australian Energy Regulator's (AER's) decision to reduce the equity beta that has historically been applied to electricity networks from 1 to 0.8 (we note that this decision was not specifically considered by ACG). This was based on analysis conducted by Professor Olan Henry, who recommended an equity beta range of 0.35 to 0.62. The QCA concluded that QR Network's risk profile was probably below that of a regulated electricity network business, because electricity businesses have demand profiles that have a higher degree of covariance with the domestic economy.

The QCA then considers the measures that it is proposing to accept in relation to QR Network's asset stranding risk, including accelerated depreciation and the potential for capital underwriting of new projects. It concludes that these measures, combined with a strong outlook for coal demand and the highly competitive position of Queensland coal producers, result in minimal stranding risk for QR Network:

> Accordingly, the Authority does not believe that the previous uplift to the equity beta, from 0.8 to 0.9, can be justified.[3]

[1] Queensland Competition Authority (2009), Draft Decision: QR Network 2009 Draft Access Undertaking, December, p.18.

[2] Queensland Competition Authority (2009), p.18.

[3] Queensland Competition Authority (2009), p.20.

The QCA even considers that a further reduction in beta might be warranted (such as 0.7) and invites comments from stakeholders on this matter.

Comparator companies

QR Network's proposed asset beta range was 0.5 to 0.6. This was based on Synergies' analysis, which included a first principles assessment, a comparable companies analysis, and an examination of relevant regulatory precedent.[4] The comparable companies chosen for QR Network were from the railroad and coal mining industries. The publicly listed companies in these industries were reviewed individually for appropriateness. Synergies also included a Canadian export coal port previously identified as comparable by ACG.

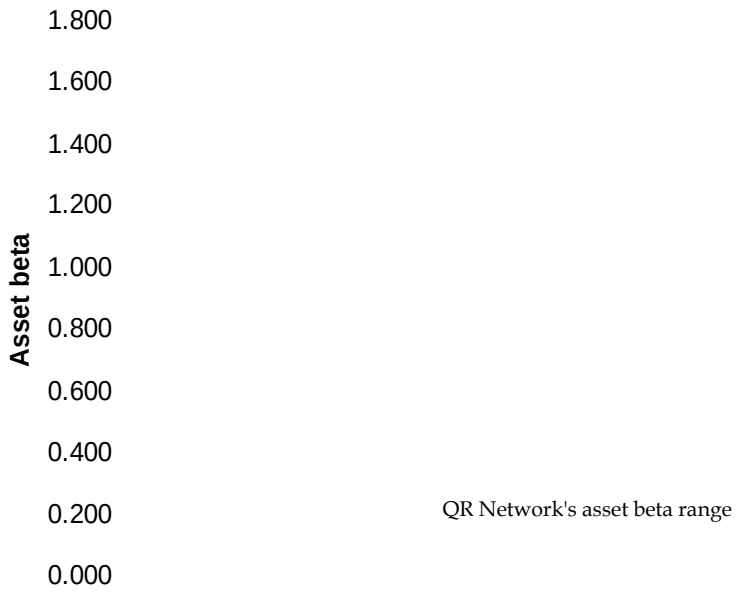
Both the Synergies report and QR Network's submission emphasised the difference in the risk profile between the comparable companies and QR Network's business and explicitly identified and analysed the sources of those differences.[5] The asset beta range that was recommended sits well below the estimates of the comparable companies. For example, the average (raw) asset beta of the US railroads was 0.83 and the average for the coal companies was 1.15.

The following chart shows the asset betas of the comparator sample, relative to QR Network's recommended range of 0.5 to 0.6.

[4] Synergies Economic Consulting (2008), Review of QR Network's Cost of Equity, August. In particular, see section 5.2.1.

[5] For example, refer Synergies Economic Consulting (2008), pp.73-75.

Figure 1 Scatterplot of asset betas of QR Network's comparator sample



Only one company's estimate is anywhere near QR Network's estimate, which was Canadian National. The asset betas of all of the other firms in the sample are above 0.8. We had also observed that there had been a material uplift in the betas of these companies since 2003,[6] although it is not possible to explain why this might have occurred.

In its submission, QR Network highlighted that:

> The upper bound remains well below the estimates produced for the comparator companies, which is considered to more than account for the differences in their systematic risk profile relative to QR Network.[7]

Both ACG and the QCA have misinterpreted QR Network's position. As part of its dismissal of the recommended range, ACG states:

> …we do not agree that an estimate should be drawn from the upper end of a range of beta estimates for inappropriate comparators.[8]

[6] Refer: Synergies Economic Consulting (2008), p.8.

[7] QR Network (2008), QR Network's Access Undertaking (2009), Volume 2 – Central Queensland Coal Region Reference Tariffs, September, p.78.

[8] The Allen Consulting Group (2009a), Final Report to the Queensland Competition Authority, June, p.28.

Of course no credible analyst would disagree with this statement if the contentions were true, but its relevance to the issues at hand depends upon ACG's assertion that the comparators used by Synergies are inappropriate. Synergies and QR Network are of the view that its comparators are more relevant for deriving an asset beta estimate for QR Network than the electricity transmission and distribution businesses used by ACG and then accepted by the QCA.

We note that in its earlier advice to the QCA,[9] the comparator companies chosen by ACG were a sea port and two infrastructure investment companies. Both the QCA and ACG state that "there is a lack of direct comparators for QR Network...".[10] We agree that there are no direct comparators. The choice of appropriate comparable companies is always problematic. There are no perfect matches. The task is to find the best set of companies reflecting the quality of comparability, weighed against the statistical advantage of having more companies in the analysis. This highlights the importance of a careful assessment of comparability using the first principles assessment.

Electricity network businesses as comparators

ACG maintains that electricity network businesses are the most appropriate comparators that can be used to estimate QR Network's asset beta:[11]

> We consider that the key characteristics of QR's below-rail regulated coal haulage business (i.e. take-or-pay contracts for a significant component of volume, demand that is relatively uncorrelated to the domestic market, and a revenue cap pricing framework) would indicate a level of systematic risk for this business that is unlikely to be empirically distinguished from energy transmission or distribution.

The key characteristic that QR Network has in common with a regulated energy transmission or distribution business is that both are governed by a revenue cap. What this does mean is that both businesses will have reasonably predictable revenues (relative to forecast) during the course of the regulatory period. The contention is that any business that is governed by a revenue cap form of regulation, irrespective of the industry it operates in, will exhibit similar characteristics.

Form of regulation is one of a number of factors that influence systematic risk. In any case, as outlined in our previous report, in more recent times there is very limited evidence of regulators making distinctions between businesses for form of regulation

[9] The Allen Consulting Group (2004), Queensland Rail – Coal: Analysis of Proxy Betas, November, p 4.

[10] Queensland Competition Authority (2009), p.19.

[11] The Allen Consulting Group (2009a).

when assessing beta (this is discussed any further below).[12] However, when assessing beta the horizon under CAPM is long-term – it is not limited to the horizon of the regulatory period. Hence, when assessing the systematic risk profile of the business this must be considered over a long-term, forward-looking horizon. It is over such a horizon that fundamental differences between QR Network and a regulated energy business can be observed, particularly when considering the long-run sensitivity of each business's revenue to changes in demand.

Of all of the factors considered in the first principles analysis, one of the key drivers of systematic risk is the nature of the product or service and the nature of the customer (that is, demand drivers). Other features, such as pricing structure, contract duration and form of regulation influence the extent to which those demand drivers will impact revenues. As outlined in our previous report, in the long-run the demand for QR Network's services will be directly linked to the demand for coal. In the short to medium-term, this exposure will be mitigated by mechanisms such as the revenue cap (for the duration of the regulatory period) and take-or-pay provisions (for the duration of the contracts, unless they are terminated early).

Our approach to referencing the US railroads in assessing QR Network's beta is not novel. For example, in its review of the WACC to apply to The Pilbara Infrastructure Railway (TPI) in 2009, the Economic Regulation Authority (ERA) stated:

> The eight sampled US and Canadian railways are commonly used by regulators as potential comparators for Australian freight railways.[13]

We also note that while this railway exclusively services a single iron ore mine, whose product is exported, the ERA makes no reference to "uncorrelated demand". We also observe that the ACCC relied on the same sample in its determination in relation to ARTC's interstate network. As will be noted below, in its most recent review IPART has not varied the beta to apply to ARTC's Hunter Valley Coal Network (which was partly in anticipation of the pending transfer of responsibilities to the ACCC), although in its original decision in 1999, reference was made to US railroads (along with Railtrack in the UK).[14] In its most recent review concluded in 2009, IPART noted the AER's recent decision for electricity networks and stated:[15]

[12] Synergies Economic Consulting (2008), pp.56-59.

[13] Economic Regulation Authority (2009), The Pilbara Infrastructure, Final Determination on the 2009 Weighted Average Cost of Capital for TPI's Railway Network, p.39.

[14] Independent Pricing and Regulatory Tribunal (1999), Aspects of the NSW Rail Access Regime, Final Report, April.

[15] Independent Pricing and Regulatory Tribunal (2009), New South Wales Rail Access Undertaking – Review of the Rate of Return and Remaining Mine Life from 1 July 2009, Rail Access – Final Report and Decision, August, p.39.

> IPART does not consider that this decision sets a precedent for this rail access decision as the evidence and analysis presented as part of that decision reflects a different industry and therefore different systematic risks.

We also note that IPART made no reference to "uncorrelated demand" in its analysis.

These regulators similarly observed differences between the relevant businesses and the comparators. However, in the absence of close comparators, listed railroads were considered an appropriate reference point.

The relevance of AER's equity beta analysis

The QCA accepted ACG's choice of electricity network businesses as comparators and its estimate of QR Network's equity beta based upon those comparators. It then referenced the AER's most recent conclusions in relation to beta as part of its *Statement of Regulatory Intent* for electricity transmission and distribution service providers. The QCA also relied on advice provided to the AER by Professor Henry in suggesting that an even lower equity beta could potentially be applied to QR Network (given that Professor Henry's range for equity beta for the electricity network businesses was between 0.35 and 0.62).

We do not accept that the electricity network businesses provide appropriate comparators. However, because of the QCA's reference to the AER's decision, it is important to discuss the reasonableness of the equity beta estimates that formed the basis of the AER's position.

The AER's equity beta analysis has been contentious within the energy industry. The QCA's consultant was among those that did not accept the analysis that formed the basis of the AER's position.

ACG references the previous analysis it had undertaken for the Essential Services Commission (ESC) (which applied a material reduction in the equity beta to be applied to gas distribution businesses from 1 to 0.7). ACG indicated that depending on the estimation method applied, an equity beta range of between 0.65 and 0.9 is appropriate for an electricity transmission and distribution business.[16] It also stated that comparing these results with the estimates it had produced for the ESC indicated a rising trend in beta estimates for the industry. A rising trend was similarly observed for US data.

[16] The Allen Consulting Group (2008), Beta for Regulated Electricity Transmission and Distribution, Report to Energy Networks Association, Grid Australia and APIA, September.

In an analysis of beta prepared for the Joint Industry Associations as part of the AER review, ACG highlighted significant problems with the data. In referring back to its analysis undertaken for the ESC, it suggested that the measurement period that was used in informing the ESC's decision was one of unusually low volatility and hence "depressed beta estimates for regulated electricity transmission and distribution businesses relative to other businesses."[17] It states:[18]

> Estimation of betas is subject to a high degree of imprecision, and the Australian data that are available for the estimation of the beta of a regulated electricity transmission or distribution business are depressingly poor. Upper bounds on confidence intervals for estimates of an equity beta value (at a gearing of 60 per cent debt to assets) from the set of portfolios of Australian businesses range from 0.9 to 1.2…
>
> Taking into account the limitations of the data set, the size and incompleteness of statistical error margins around the beta estimates, and evidence of a recent rising trend in beta estimates, we do not consider that current empirical evidence on beta values would provide convincing or persuasive evidence to conclude that the (60 percent geared) equity beta for a regulated electricity transmission or distribution business is different from 1.

ACG reiterated these views in a further report produced for the Joint Industry Associations in 2009 in response to the AER's draft decision.[19] ACG was critical of the AER's proposed equity beta range of 0.44 to 0.68, which was based on the advice of Professor Henry. ACG restated its previous conclusions:[20]

> The strength of the empirical evidence that is available cannot demonstrate that the true value may not lie materially above (or below) the range of the central estimates. We remain of the view expressed in our previous report that, if the full imprecision of the current beta estimates is taken into account, there is not persuasive evidence for concluding that the equity beta for a benchmark electricity transmission or distribution entity is different to the previously adopted value of 1.

SFG Consulting also examined the AER's sample and was similarly critical:[21]

[17] The Allen Consulting Group (2008), p.1.

[18] The Allen Consulting Group (2008), p.1.

[19] The Allen Consulting Group (2009b), Australian Energy Regulator's Draft Conclusions on the Weighted Average Cost of Capital Parameters: Commentary on the AER's Analysis of the Equity Beta, Report to Energy Networks Association, Grid Australia and Australian Pipeline Industry Association, January.

[20] The Allen Consulting Group (2009b), p.1.

[21] SFG Consulting (2009), The Reliability of Empirical Beta Estimates: Response to AER Proposed Revision of WACC Parameters, Draft Report Prepared for ENA, APIA and Grid Australia, 28 January, p.17.

> In summary, it is difficult to imagine any set of estimates faring worse on these "key objective criteria." In my view, this indicates that the data that is required to produce reliable estimates simply does not exist. The estimates that have been produced are neither plausible nor economically reasonable and should not be afforded material weight.

For the reasons outlined above, we do not accept that a beta estimated for electricity network businesses should be used to establish QR Network's beta. Those businesses are not appropriate comparable companies. Further, in this section we have shown the deficiencies in the analysis upon which the AER based its conclusions. The evidence that the QCA has relied upon is not sufficiently robust to justify a reduction in QR Network's beta.

As part of the AER review, the QCA's own consultant stated that it does not consider that the evidence presented to the AER was sufficiently persuasive to justify a value other than 1. ACG does not explain, and the QCA does not acknowledge, the clear conflict between this unequivocal position and its contemporaneous recommendation of an equity beta for the regulated electricity network industry between 0.65 and 0.9.

ACG was also critical of the estimates arrived at by Professor Henry, which the QCA is potentially relying upon in flagging a further potential reduction in QR Network's beta in the Draft Decision.

We concur with ACG's conclusions that an equity beta of 1 is an appropriate estimate to apply to an electricity transmission and distribution business. Adjusting this estimate for the 55% gearing applied to QR Network's business, this equates to an equity beta of 0.9, which is at the upper bound of ACG's recommended range. On the basis of this evidence alone, we do not see any support for a lower value for those businesses.

It is noted that the AER is bound by a specific requirement under the *National Electricity Rules* to only depart from a previously established parameter value if there is 'persuasive evidence' to do so. The question as to what might constitute 'persuasive evidence' has been subject to some debate. On this point, ACG noted:[22]

> We interpreted this as requiring the new evidence to demonstrate that the previously adopted values were incorrect, whereas the AER has decided that this is met if the new information justifies a different value for beta. However, we note that the majority of issues addressed in this report remain relevant irrespective of how the need for 'persuasive evidence' is interpreted.

[22] The Allen Consulting Group (2009b), p.1.

In other words, ACG would appear to be saying that its conclusions would largely hold even if the test was "if the new information justifies a different value for beta."

The QCA is not bound by the same persuasive evidence requirement. However, particularly given the asymmetric consequences of error (which we addressed in our previous report), we consider that the QCA should have robust and reliable evidence to support a proposed reduction in QR Network's beta. The evidence presented from the AER's review is not considered sufficiently robust and reliable. In its response to the AER review, while ACG interpreted a high threshold for the 'persuasive evidence' test, it stated that the majority of the issues they identified would still apply, even if a lower threshold applied, such as "if the new information justifies a different value for beta".[23]

To the extent that the QCA places reliance on the betas of electricity network businesses we consider that this introduces two significant risks of error for QR Network. The first is the risk that energy businesses are not an appropriate proxy for QR Network's business. The second is the risk of estimation error in the comparator sample. These risks are significant given the QCA is solely relying on this industry to set QR Network's beta. We do not consider that such reliance is appropriate.

Degree and Importance of Demand Correlation

ACG and the QCA make repeated references to QR Network's 'uncorrelated' demand and see this is as a key reason for applying a low beta. We agree that demand drivers are particularly important as they will determine QR Network's revenue. However, it is important to remain cognisant of the fact that beta is not directly determined by demand, nor even by revenue. Beta is a measure of the sensitivity of the returns on a firm's equity to movements in the domestic economy.

Demand drivers

As stated previously, the nature of the product or service and the nature of the customer (that is, demand) are of fundamental importance to the assessment of beta. Synergies undertook detailed analysis of this as part of our first principles discussion in our previous report. We will not repeat that discussion here.[24]

[23] The Allen Consulting Group (2009b), p.1.

[24] Synergies Economic Consulting (2008).

ACG highlights that QR Network's revenues are dependent on "the volume of railings estimated over a five year period"[25]. In making comparisons between QR Network's revenues and the coal price, ACG also observe that:

> The movement down in QR-Coal's revenue was caused by a shift from one regulatory period to another, and was therefore not correlated with market factors.[26]

As outlined above, the horizon of beta analysis should extend well beyond the horizon of the regulatory period. While a revenue cap form of regulation does provide some protection to a regulated business from the impact of market factors, this protection is only for the length of the regulatory period. This does not mean that there is *no* correlation with market factors. Further and more fundamentally, equity prices (and hence returns) will respond to changes in long term expectations.

The assumption that the demand for coal will remain strong in the long-term is clearly an extremely important one, particularly given the horizon of the beta assessment. As part of the development of its 2009 Coal Rail Infrastructure Master Plan (CRIMP), QR Network sought to obtain long-term demand forecasts. It is understood from QR Network that in initial discussions with a number of service providers who can provide such forecasts, it was evident that there were different views as to what the long-term outlook might be. QR Network ultimately used forecasts produced by Wood Mackenzie. These forecasts (dated May 2009) projected a compound annual average growth rate of 4% in worldwide demand for metallurgical coal and 2.5% for thermal coal, to 2025.[27]

The 2009 CRIMP also contains projections of Queensland's export coal demand over a ten year horizon (to 2020). This also shows strong demand for both metallurgical and thermal coal, although it is noted that there is a flattening in supply over the last few years of the forecasts, which "most likely reflects future uncertainty in mine production and demand."[28]

As we outlined in our previous report, there are alternative scenarios for both demand and supply over the longer term. Some of the key uncertainties here relate to environmental issues and technological change, which neither the QCA nor ACG have responded to.

[25] The Allen Consulting Group (2009a), p.29.

[26] The Allen Consulting Group (2009a), p.29.

[27] QR Network (2009), 2009 Coal Rail Infrastructure Master Plan, pp.6-7.

[28] QR Network (2009), pp.8-9.

The demand forecasts underpinning QR Network's revenue projections must reflect the 'most likely' outcome, noting that forecasting volumes over the relatively short horizon of the term of the regulatory period has proven reasonably contentious historically (we note that the QCA is proposing to approve an annual reset of these forecasts). However, when setting beta, a key issue from the perspective of an equity investor is risk and uncertainty. While the investors will be interested in the 'most likely' scenario they will also be concerned with the potential risks to that scenario. It is this uncertainty that will contribute to the variability of future returns.

The long-term uncertainty relates to the global demand for both thermal and metallurgical coal and the competitiveness of Australian producers in world markets. For example, in its submission in response to Garnaut Climate Change Review, Rio Tinto stated:

> The international seaborne coal market is transparent, driven by supply and demand with no material opportunity for product differentiation. Australian coal producers are price takers and will not be able to pass the cost of emissions on to customers, whilst our major competitors are not exposed to similar costs. Consequently an ETS could add significantly to production costs, which will reduce profits and returns to shareholders.[29]
>
> As additional production comes on line and coal prices fall, the higher cost of production for Australian coal exporters compared to competitors in developing countries will become a critical factor in international competitiveness. The coal industry is acutely aware of this fact and is working hard to avoid locking in production cost increases that will not be sustainable in the medium term, whilst striving to maintain market share. The cyclical nature of commodity markets and the eventual reduction in prices are factored into investment decisions by coal producers. This should equally be acknowledged in Government policy formulation.[30]

The Queensland Resources Council voiced similar concerns:

> Queensland, with its significant energy reserves, growing energy exports, and emissions intensive industries, is particularly exposed to the risk of any hastily conceived (or implemented) ETS. The international competitiveness of Queensland's EITE industries should not be eroded for the benefit of international competitors (existing and potential) who are not exposed to the cost of comparable carbon

[29] Rio Tinto Australia (2008), Rio Tinto Submission to the Garnaut Climate Change Review, p.32.

[30] Rio Tinto Australia (2008), p.34.

> constraints. Policies should avoid exporting emissions by diverting new and existing investment overseas; this includes the design elements of a national ETS.[31]

We do not dispute that the short- to medium-term outlook for global coal demand is positive. However, in this context (that is, when setting the cost of capital), it is imperative to have regard for the uncertainty underpinning that growth story, particularly in the long-term. The significant falls in volumes following the global financial crisis highlight the inherent vulnerability of the industry to price shocks or structural change that could either impact the global demand for coal or Australia's competitiveness in the world market.

As we stated earlier in this section, beta is a measure of the returns to equity of a company relative to the returns in the economy. The positive outlook for global coal demand will be reflected in security prices. Changes in prices and returns will result from changes in these expectations.

Costs

The key consideration from the costs side is operating leverage. In our previous report, we indicated that QR Network has high operating leverage, as with any rail infrastructure provider. Relative to our comparator sample, we indicated that QR Network's operating leverage is likely to be higher than a mining company and about the same as a railroad business.

We note that ACG has made a statement that:

> …QR has estimated its operating leverage incorrectly, the correct measure being the proportion of its ongoing fixed expenditure requirements to its total cash flow (both in present value terms).[32]

While QR Network did make a statement in its submission which noted that its variable maintenance costs were essentially fixed in the short-run, it still concluded that:

> The key driver of QR Network's systematic risk continues to be its high operating leverage, which would be similar to other below-rail access providers but different to the comparator businesses.[33]

[31] Queensland Resources Council (2008), Submission in Response to the Garnaut Climate Change Review's *Emissions Trading Scheme: Discussion Paper*, p.8.

[32] The Allen Consulting Group (2009a), p. x.

[33] QR Network (2008), p.76.

It appears that ACG has misinterpreted QR Network's statement. QR Network has not sought to argue for an uplift to its beta relative to other rail access providers based on differential operating leverage. It has argued that QR Network's operating leverage is higher than DBCT Management's (which has also been concurred with by the QCA) and is higher than its mining company comparators. These statements remain valid.

Again it is essential to understand that the returns to equity, and implications for measurement of beta, result from changes in the expectations with respect to costs. The very high operating leverage of QR Network serves to magnify the changes in costs and expectations of those costs.

Treatment of Stranded Asset (Asymmetric) Risk

Stranding risk within the context of the CAPM

The Capital Asset Pricing Model (CAPM), which is used to estimate the cost of equity capital, includes an assumption that returns are normally distributed. Returns that are not normally distributed at the firm level are assumed to be diversifiable, and as such, are not compensated with a return. However, asymmetric risks as are imposed upon regulated companies are not diversifiable. Further, as an econometric model, the CAPM can only be validly applied when the error terms are random and normally distributed around the characteristic line. In the case of asymmetric risks, returns are not normally distributed as they are truncated. Therefore, the beta estimate does not accurately reflect the asymmetric risk.

An important type of asymmetric risk for an infrastructure company such as QR Network is the risk of its assets becoming stranded.

To the extent that a regulated company faces asymmetric risks, there should be appropriate compensation in some element of the calculations leading to pricing. This has been discussed extensively in the various regulatory processes in Australia. The discussions have distilled to two issues:

- does the company face asymmetric risks that warrant compensation, and if so,
- how should that compensation be achieved.

QR Network has submitted that it faces asymmetric risk (in the form of stranded asset risk), but it has not received any compensation for the risk in its regulatory cost of capital:[34]

[34] QR Network (2008), p.7.

> Notwithstanding the approval framework in place for new capital expenditure, which is underpinned by QR Network's Coal Master Plan, QR Network remains exposed to the risk of optimisation in the long-term. In QR Network's view, the stranding risk associated with its investments it is undertaking in (sic) the current climate are significant. QR Network is not compensated for stranding risk via the rate of return (given stranding risk is asymmetric whereas the Weighted Average Cost of Capital (WACC) is based on a model that assumes that returns are normally distributed), and it has limited means to mitigate this risk.

We are not aware of any regulator that has explicitly taken a position that the WACC does and should provide compensation for asymmetric risks. For example, in its decision in relation to electricity distribution network businesses, the Independent Pricing and Regulatory Tribunal (IPART) stated:[35]

> The Tribunal particularly considered Country Energy's argument that the CAPM is based on a number of assumptions including that returns are normally distributed, and that in the presence of asymmetric risk, this assumption is violated because this type of risk represents a truncation of returns.
>
> The Tribunal has previously acknowledged that the CAPM is based on a number of assumptions that are unlikely to hold perfectly in the real world. It uses the model because it is generally recognised to be the best model currently available. However, it does not consider it theoretically correct to increase the equity beta within the CAPM based on the argument that the assumption of normally distributed returns is violated. It believes that if asymmetric risk represents a truncation of returns and consequently violates the CAPM assumption of normally distributed returns, a different model should be used. In the absence of a better model and sufficient evidence that asymmetric risk is the only risk that violates the assumption of normally distributed returns, the Tribunal considers it correct to account for these risks elsewhere in the building block model where necessary.

The most contentious issues in relation to asymmetric risk has not been whether such risks are already reflected in the WACC, but rather whether compensation should be provided, how it can be robustly quantified, and whether it should occur via a cashflow adjustment or an additional margin on the WACC. The Economic Regulation Authority (ERA) has taken the view that stranding risk is non-systematic and hence can only be compensated via the cashflows:[36]

[35] Independent Pricing and Regulatory Tribunal (2004), NSW Electricity Distribution Pricing, 2004/05 to 2008/09, Final Report, p.231.

[36] Economic Regulation Authority (2009), The Pilbara Infrastructure: Final Determination on the 2009 Weighted Average Cost of Capital for TPI's Railway Network, June, para.348.

> The Authority considered that stranding risk is more appropriately accounted for in cash flows rather than an ad hoc adjustment of the WACC. To be consistent with the Authority's policy of using WACC to only reflect systematic risk, stranding risk (non-systematic risk) will be assessed in the future determination of floor and ceiling costs for TPI's railway.

There is no evidence to suggest that regulators assume that asymmetric risks are already compensated via a CAPM-derived WACC. Further, even though the question of compensation for asymmetric risk has been contentious in some areas (including in relation to asset stranding risk), we could not find evidence of a regulator denying a claim for asymmetric risk because it was assumed this risk was already compensated in the WACC. The regulatory discussion with respect to asymmetric risks focuses on whether any appropriate compensation should be recognised as an increment to a conventionally estimated WACC or as an increment to estimated cash flows.

The QCA's prior assessment of QR Network's stranding risk

In its Final Decision in relation to UT2, the QCA concluded that:[37]

> Both QR and DBCT operate in the same coal chain and, while DBCT faces a higher asset stranding risk than QR, it is considerably offset by the approved regulatory arrangements.

While it did not address the issue of stranding risk in any detail in its 2004 report to the QCA, ACG concluded that:[38]

> …the indications are that the asset stranding issue does not appear to be a significant risk factor for at least the next two regulatory periods.

In its 2009 report, one of the reasons that ACG considered it appropriate to draw parallels between QR Network and regulated energy businesses was that energy transmission and distribution "are subject to a relatively low level of stranding risk compared with most industries".[39]

We agree that the stranding risk in electricity transmission and distribution is relatively low. We also note certain features of the regulatory regime that were highlighted by

[37] Queensland Competition Authority (2005), Decision: QR's 2005 Draft Access Undertaking, December, p.vi.

[38] The Allen Consulting Group (2004), Queensland Rail – Coal, Analysis of Proxy Betas, Report to Queensland Competition Authority, November, p.7.

[39] The Allen Consulting Group (2009a), p.2.

the AER that were seem to reduce industry's systematic risk.[40] Under the roll-forward of the Regulatory Asset Base (RAB), there is no re-optimisation or revaluation. Further:

> Under the ex-ante regime actual capex is rolled into the RAB, without any ex post prudency assessment.[41]

QR Network's capital expenditure is subject to ex post review, which examines the prudency of scope and cost (noting that a process has now been included in the Undertaking to provide more certainty in relation to how this will be assessed). It also remains exposed to the risk of optimisation in the long-term, albeit under a limited set of circumstances. One of these circumstances is a material reduction in demand. This is the key risk in relation to asset stranding.

In any case, we note that the only basis for considering this in an assessment of comparability is if stranding asset risk warranted compensation. However, even then ACG provides no support for its implicit assumption that stranded asset risk is relevant to the estimation of beta for QR Network.

In summary, neither the QCA nor ACG have previously proposed any recognition of stranded asset risk in the estimation of QR Network's beta or elsewhere in its WACC. As noted above, in 2005 the QCA considered that any stranding risk it does have (which was considered to be less than DBCT's) was already "considerably offset by the approved regulatory arrangements." This refers to the arrangements in place for UT2, not the proposed new measures for UT3.

We agree that some of the measures proposed by the QCA, such as accelerated depreciation and an increased ability to seek access conditions for major projects, have the potential to mitigate QR Network's exposure to stranding risk, although this will only be in relation to investments made from UT3 onwards (that is, they will not impact the existing Central Queensland Coal Region asset base, which is in the order of $3.3 billion). Although they do not reduce the probability of the assets being stranded, they have the potential to reduce the impact on the business in the event of a stranding.

However, the extent to which these measures will actually mitigate this risk on new investments remains unclear. We note that the QCA has determined that the maximum twenty year life will be a 'rolling' life, with the potential for further review. Further, the decision in relation to access conditions proposes to provide QR Network with an increased ability to seek those conditions. It does not mean they will be applied. For example, we understand from QR Network that no such conditions have been sought

[40] The Australian Energy Regulator (2009), p.249.

[41] The Australian Energy Regulator (2009), p.249.

on the significant capital expenditure program proposed for UT3 (noting that this excludes the Goonyella to Abbot Point expansion).

The QCA's proposed reduction of beta for stranded asset risk

The QCA's current position on stranded asset risk is clearly stated in its Draft Decision:[42]

> With respect to asset stranding risk, the Authority considers that the measures that it is preparing to accept in part of this draft decision, in particular accelerated depreciation for new capital expenditure and the greater ability to seek access conditions (e.g. capital underwriting for major projects, combined with strong coal demand (in particular in relation to metallurgical coal), and the highly competitive position of Queensland coal producers, means that QR Network's asset stranding risk if minimal.

As the QCA had previously assessed QR Network's asset stranding risk as low, this represents little change in its position. However, immediately following the above statement, the QCA says:[43]

> Accordingly, the Authority does not believe that the previous uplift to the equity beta, from 0.80 to 0.90, can be justified.

As outlined above, we agree that some of the measures approved by the QCA will potentially mitigate QR Network's exposure to stranding risk - but only in relation to new investments - thereby reducing the scope for an uplift in beta (which was only proposed in the absence of a more effective means of either compensating for asymmetric risk or reducing the impact of that risk). However, given QR Network's previously approved equity beta never reflected compensation for asymmetric stranding risk, the QCA cannot use this as a reason to r*educe* beta.

The QCA cannot propose to reduce the compensation in the WACC for something that was never previously compensated. Apart from saying that QR Network's stranding risk was seen as low, the QCA has never clearly stated that stranding risk was a material consideration in setting QR Network's beta in UT2.

The QCA's clearly stated justification for reducing its estimate of QR Network's equity beta from 0.9 to 0.8 therefore has no merit.

42 Queensland Competition Authority (2009), p. 19.

43 Queensland Competition Authority (2009), p. 20.

Case for Further Reduction in Beta

The QCA has expressed its view that a strong case can be made for a further reduction in QR Network's equity beta to 0.70, which would be within the range suggested by ACG. In support of this position, the QCA cites the introduction of annual updates of volume forecasts, indexing of maintenance costs annually with reference to a special purpose index of maintenance costs (MCI) (rather than the CPI), and changes in take-or-pay contracts.[44] Although the QCA did not impose the reduction in the Draft Decision, its suggestion warrants discussion.

The QCA has introduced annual updates to volume forecasts into the 2009 DAU. However, a revenue cap form of regulation was largely seen to transfer QR Network's exposure to volume risk to customers for the term of the regulatory period. Annual updates to volume forecasts will have no discernible impact on QR Network's long-term exposure to volume risk. In any case, the QCA has consistently sought to argue that QR Network's demand is largely 'uncorrelated'. It is therefore inconsistent to argue that this will reduce its systematic risk.

The QCA does not explain how the change from a CPI to a MCI could be shown to have a material impact on QR Network's systematic risk. The change in index only impacts maintenance costs, which have been shown to constitute a relatively small proportion of QR Network's total cost base (given its high operating leverage). We do not see any substance to the QCA's suggestion that the index change will have any appreciable impact on beta.

The QCA observes that the contracts with the 'weaker' pre-2006 undertaking take-or-pay provisions will be progressively replaced by the stronger post-2006 provisions. First, as we have previously highlighted, take-or-pay does mitigate the impact of changes on demand on revenues, however the degree of protection afforded is only as good as the strength of the counterparty to the contract. Further, it only exists for the duration of that contract.

It is also noted that under clause 7.4.3 of the 2008 Undertaking, access holders have the ability to relinquish all or part of their access rights under the access agreement. In the event that these rights are exercised, QR Network is entitled to levy a relinquishment fee. However, the amount that can actually be recovered by QR Network has been capped at 50% of the relinquishment fee amount.

Second, and more importantly, it is not apparent from reviewing the previous QCA decisions that the relative strength of the take-or-pay provisions had any impact on the

[44] Queensland Competition Authority (2009), p. 20.

outcome. In any case, the QCA's consultant, ACG, did not consider that take-or-pay had a material impact on QR Network's beta:

> QR-Coal's take-or-pay contracts make its EBIT less responsive to demand shifts. It was noted that the significance of this for systematic risk is dominated by the uncorrelated demand effect. That is, the systematic risk is already low, and will not be impacted greatly by contracts that span only a small proportion of the asset life.[45]

In the Final Decision, the QCA also noted:[46]

> ACG also argued that, even if the take-or-pay arrangements offer limited protection, QR's volume risk from 1986 to 2003 was positively skewed, and this variability has not been demonstrated to be systematic.

It also saw no difference between QR Network's systematic risk and DBCT Management's (which has always been subject to 100% take or pay), other than for operating leverage.

Hence, if the impact of take-or-pay was not considered to be a relevant consideration at the time when the protection provided was relatively weaker, it is not evident to us as to why and how it is now seen to be more relevant by the QCA. This is inconsistent and cannot be supported.

The QCA has mooted the possibility of a further reduction in beta for the factors discussed above. We have shown that these factors will have little or no relevance to QR Network's beta (or at least have been previously seen by the QCA as having little impact). We are strongly of the view that the QCA has not provided any basis for reducing QR Network's beta below the level previously approved in 2005.

We reiterate, if a material reduction in beta is proposed it needs to be for a material reduction in risk, and then only those risks that are reflected in the beta estimate.

[45] The Allen Consulting Group (2005), Queensland Rail – Coal, Response to Comments on QR-Coal Proxy Beta Analysis, Report to Queensland Competition Authority, December, p.3.

[46] Queensland Competition Authority (2005), Decision: QR's 2005 Draft Access Undertaking, December, p.20.

Updating Regulatory Precedent

The ACG report cites equity betas determined in previous regulatory decisions.[47] As a final contribution to the discussion about an appropriate beta for QR Network, we note three subsequent decisions that should also be included, being:

- the ACCC's 2008 decision to apply an asset beta of 0.65, or an equity beta of 1.29 (with 50% gearing) to ARTC's interstate network;
- the ERA's 2009 decision to apply an asset beta of 1, or an equity beta of 1.43 (with 30% gearing), for The Pilbara Infrastructure, which hauls iron ore; and
- IPART's 2009 decision to retain an equity beta range of between 0.7 and 1 for ARTC's Hunter Valley Coal Network (with a gearing range of 50% to 60%), noting that given the pending transfer of responsibilities to the ACCC, IPART did not look to implement any material change:[48]

> It has been derived using an approach which is consistent with the 2005 decision. Given the likelihood that ARTC will be regulated by the ACCC in the near future, IPART considers that there is merit in maintaining regulatory certainty at this point rather than adopting substantial change.[49]

There are differences between QR Network and each of these other businesses. For example, ARTC's interstate network is subject to intermodal competition and The Pilbara Infrastructure Railway is relatively unique as it is dominated by a single customer (although its fundamental demand drivers are still similar to QR Network's). However, if QR Network's beta is reduced it will be well below all existing regulatory precedent applying to rail, with the exception of the WA urban network (which, as we would expect, has a lower equity beta of 0.46). It will certainly be the lowest of any regulated heavy haul network.

47 The Allen Consulting Group (2009a), p.26.

48 Independent Pricing and Regulatory Tribunal (2009), p.5.

49 We also note that IPART determined a WACC above the mid-point of the range (consistent with historical practice), which implies a mid-point equity beta estimate of 0.89, which is very close to QR Network's previously determined equity beta of 0.9.

Conclusion

We have identified a number of significant concerns with the QCA's Draft Decision in relation to QR Network's equity beta. While we concur that there are issues in finding an appropriate proxy for QR Network's business, we consider that a comparator group that is based on the key drivers of QR Network's systematic risk, being the nature of the product or service and the nature of the customer, is far more relevant than a comparator group that solely comprises regulated energy businesses.

The differences between QR Network's businesses and rail and coal companies were clearly recognised in our report and in QR Network's submission. Our recommended asset beta range was therefore set well below the average beta estimates derived for our sample.

We also note that the QCA is proposing to place some reliance on the AER's 2009 WACC decision in relation to electricity distribution and transmission networks. We have identified a number of concerns with the AER's conclusions. These include concerns raised by the QCA's own consultant regarding the quality of the comparator data used to derive the beta estimates relied upon by the AER. Hence, this introduces two potential sources of regulatory error, being the risk that the comparators used by the QCA do not reflect QR Network's business, and the risk of estimation error with the beta estimates.

The QCA and ACG have made a case that QR Network's demand is uncorrelated with the broader economy. Therefore, it will have a low level of systematic risk and a commensurately low beta. The comments of the QCA and ACG in this regard fail to recognise the importance of the long-term perspective that is needed in assessing beta. Whilst the correlation of demand with the economy may be low in the short to medium term, it is more correlated in the medium to long term.

Further, and more fundamentally, the implications of demand for beta must recognise that beta is a measure of the relationship between equity returns of a company and the returns on the market. In setting prices, and hence determining returns, the markets take a long-term view (even in the short run) and react currently to changes in expectations about the future. The QCA and ACG fail to recognise this fundamental fact.

The QCA has proposed some changes that have the potential to reduce QR Network's exposure to loss in the event of an asset stranding, but only in relation to its new investments (that is, these measures will not apply to its existing $3.3 billion in assets). It is acknowledged that the measures dilute an argument for an uplift to QR Network's

beta from the value previously approved by the QCA, noting that an uplift was only proposed in the absence of a more satisfactory way of treating asymmetric risk, such as an explicit cashflow allowance, or alternatively, the imposition of measures that actually reduce the impact of this risk on the business. However, the key point is that QR Network's UT2 equity beta did not provide compensation for stranding risk. Therefore any perceived marginal reduction in stranding risk cannot be used as justification for reducing beta.

To consider an even further reduction in QR Network's beta, as suggested by the QCA, has no substance and will materially increase the risk of error. This in turn, could have a significant impact on QR Network's incentives to invest, at a time when the coal network is contemplating significant expansions. This could have significant adverse economic and social consequences.

In our opinion, the QCA's previous position of 0.90 for QR Network's equity beta was at the low side of a reasonable range, but acceptable. We do not believe the reduction to 0.80 is supportable and certainly do not agree that there is any basis for further reduction.

10 February 2010

Mr D. Gannaway
Principal Policy Analyst
Rail Access Services, QR Network
Floor 21 Pipenetworks House
127 Creek St
Brisbane QLD 4000

Dear Dean

Response to QCA re Profit Margin

This letter sets out our response to the Queensland Competition Authority's (QCA) draft decision in relation to QR Network's 2009 Draft Access Undertaking (DAU). Specifically we focus on the level of profit margin to be included in the self insurance premium.

Background

The allowance for self insurance included in QR Network's 2009 DAU was based on our report *"Review of Self Insurance Program: QR Limited – Central Queensland Coal Network"* dated 20 August 2008. In this report our estimate of QR Network's self insurance costs includes a 20% allowance for profit and the net cost of reinsurance based on commercial property insurance benchmarks at that time. Also of relevance was that our report assumed "pass-through" for derailment events in excess of $8 million.

Following the completion of our report, QR Network took a policy decision to pass-through weather events with losses greater than $1 million. This change hence reduced the risk of retained large losses and hence the required profit margin. The profit margin we adopted was made prior to this decision.

PwC Review and QCA's Draft Decision

On 18 December 2009 the QCA released it's draft decision in relation to QR Network's DAU. The QCA commissioned PwC Actuaries to review our report. PwC supported our self insurance estimates with the exception of the profit margin where they commented:

> *"QR Network's claim of 20% of the risk premium for cost of capital and profit was too high, given QR Network had 'less need to effect reinsurance' as large claims were passed through to customers, so a more appropriate capital and profit allowance would be 10%"*

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Our Response

The level of profit margin depends on the types of risks being written, the level of uncertainty surrounding those risks and varies from insurer to insurer and from year to year.

We agree with PwC's comments that a profit margin of 20% is high given QR Network's decision to adopt a pass-through threshold of $1 million (made after we provided our report) effectively removes the risk of large losses and catastrophes and hence provides a greater level of certainty than assumed in our report.

However, we believe that a 10% profit margin, as suggested by PwC, is too low given that:

- the average return on capital achieved by Australian general insurers over the past 5 years has averaged 17% (source: Australian Prudential Regulatory Authority Statistics), and
- unlike an insurer, QR Network only get the opportunity to re-price every 4 years whereas an insurer has the opportunity to re-price annually thus providing greater certainty as they can re-adjust premiums to recoup losses.

Reliances and Limitations

The results contained in our original report are dependent on future events, including regulatory, commercial, social and economic forces (for example changes to policy decisions). We assumed a continuation of the environment at the time of writing the report with allowance for known changes. It is quite possible that one or more changes to the environment could produce a financial outcome materially different from the estimates included in our report. In particular the profit margin used to calculate the notional self insurance premium was based on the pass-through arrangements described in our report. Revising the pass-through arrangements to include force-majeure events would alter our view of the margin appropriate for the UT3 forecast.

If you require further clarification on any aspect of our report, or this letter, or have any questions please do not hesitate to contact Rod McInnes or myself.

Yours sincerely

[redacted]

Mark Hurst

Deloitte.

QR Network Infrastructure Maintenance Review

Final Report

29 January 2010

Contents

Background

- The Coal Link Alliance Agreement is estimated to cost ~$170m per annum. The alliance, comprising Queensland Rail Network – Coal Systems (QR Network) and Queensland Rail Services – Asset Services (QR Services), was established for maintenance and asset management services to be provided for the operating rail network owned by QR Limited. Key drivers for the alliance are gaining access to scarce resources and specialised skills required to manage a complex stakeholder group in a capacity constrained environment.

- In September 2008, QR Network submitted the Access Undertaking for the 2009 regulatory period outlining maintenance costs for the Central Queensland Coal Region Network. This submission outlined a 15% profit margin earned by QR Services across all maintenance and asset management activities.

- The Queensland Competition Authority (QCA) have recently challenged select commercial constructs of this alliance, in particular the allocation of margin earned by QR Services for delivering said alliance activities.

- When compared to a selection of other industry alliances, it becomes evident this proposed payment structure is simple in its approach. The purpose of the alliance is to align the drivers of the service provider with the drivers of the network provider and pass through all direct and indirect costs with an agreed profit and/or overhead margin placed at risk (i.e. dependant on alliance partner performance measured against a set of pre-determined service delivery metrics).

- The QCA have proposed a margin on maintenance costs be calculated by adding 15% to direct wages budgeted by QR Services for the contract period. All other direct, indirect and overhead costs are to be reimbursed at a fixed cost with no margin applied. This would place a large proportion of maintenance costs at risk given the costs reimbursed to QR Services are not based on actuals, rather a budget which is prepared once every four years. QR Network have no opportunity to revisit the budget on the basis of fluctuations in the economic environment.

- Capacity outcomes are relevant for the coal supply chain because the network is constrained and there are significant consequences if the network was to fall into disrepair. Given this, QR Network are seeking to understand comparative industry alliance margin allocations and the impact of the current QCA position on the Coal Link Alliance which seeks to balance low unit cost and preserve network reliability for the Central Queensland Coal Region.

- QR Network have sought assistance from Deloitte to undertake a high level review of successful and comparable industry alliance arrangements, including how the service provider is compensated for costs incurred and appropriate returns. The scope of this document is confined to alliance margin, looking at how best to appropriately compensate the service provider and maintain capacity outcomes for the alliance and industry players.

The challenge for QCA and QR Network is to balance the commercial needs of the coal supply chain and the network operator

Commercial needs of the Coal Supply Chain[1]

Revenue:

- Capacity
- Availability
- Throughput

Costs:

- Minimise cost per tonne
- Productivity improvement

Asset Efficiency:

- High availability
- High reliability

Risks:

- Stranded assets
- Certainty of supply
- Reputational risk
- Safety
- Responsiveness

Commercial needs of the Network Operator[1]

Revenue:

- Capacity
- Availability
- Revenue cap
- Reasonable commercial return

Costs:

- Consumable availability and cost

Asset Efficiency:

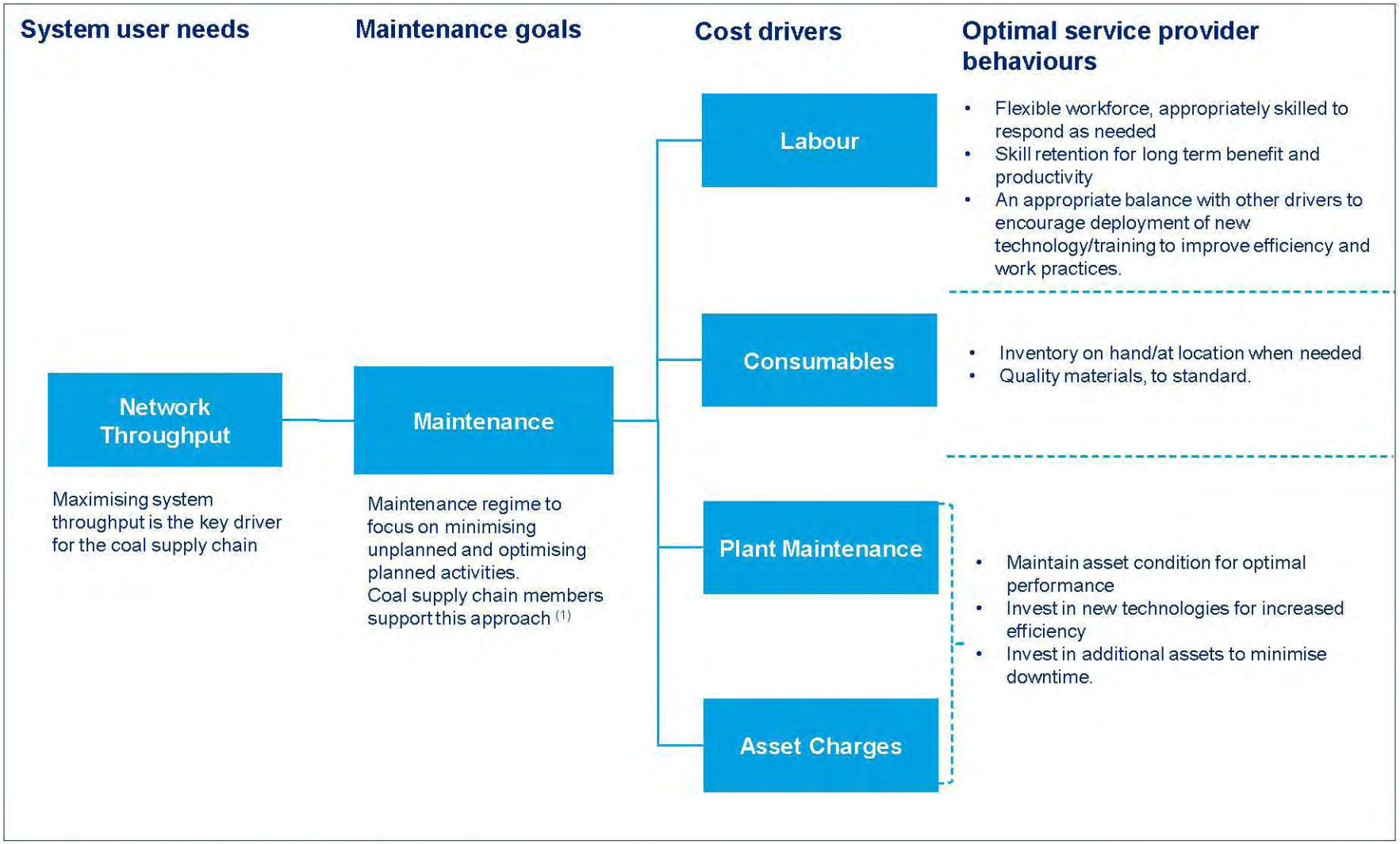
- Investment in new technologies
- Replacement and maintenance of assets
- Investing in multiple assets
- Working capital investment

Risks:

- Stranded assets
- Reputational risks
- Safety

Note:
(1) See Appendix for further detail supporting these commercial needs.

A component of striking this balance is to determine the appropriate maintenance strategy to maximise network throughput



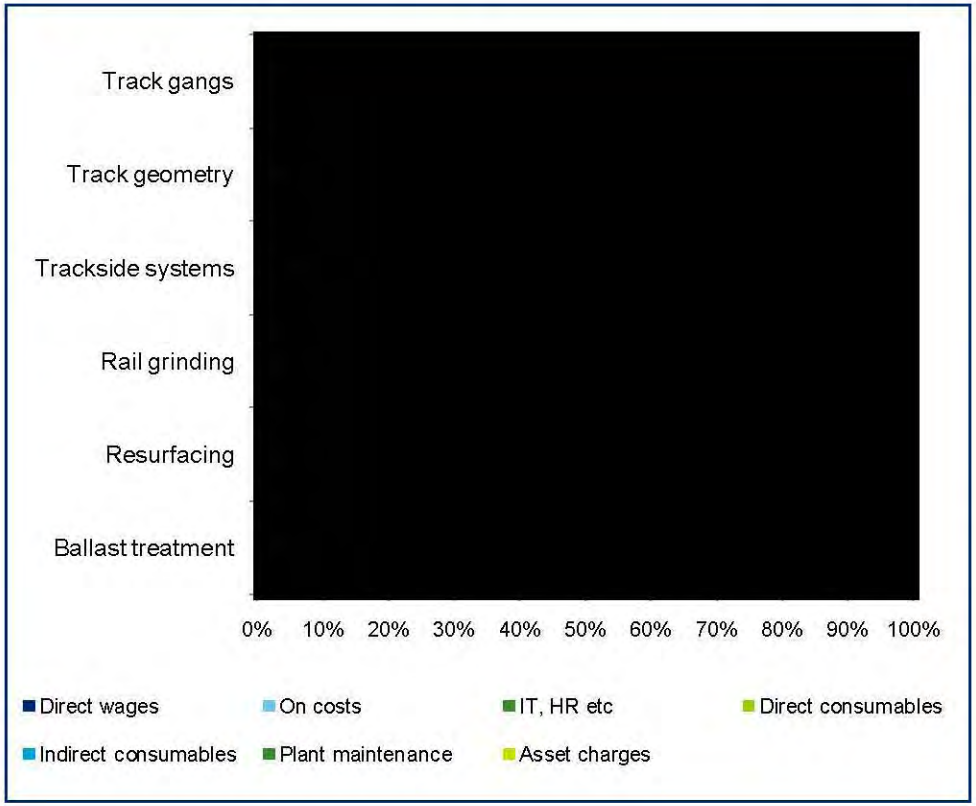
Source: (1) QCA Draft Decision, December 2009.

Contents

The QCA draft position of 15% on direct wages only would minimise activities with low direct labour and/or high asset requirements, which will be detrimental to network throughput

QR Network Maintenance Costs

(Average for UT3 period FY10-13, % of Total Maintenance Cost by activity and cost category)



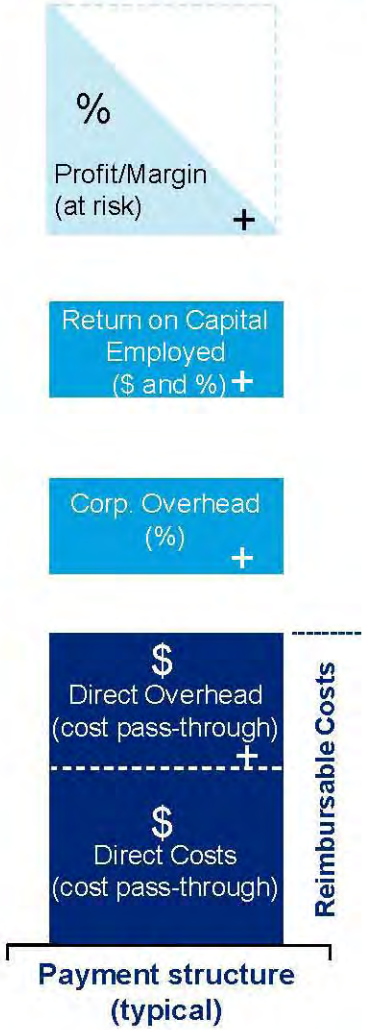
- Direct wages contributes only [redacted] to total maintenance costs
- All activities (with the exception of Trackside systems) have relatively low direct labour as a percentage of overall maintenance costs
- Rail grinding, in particular, incurs higher than average asset charges due to the asset-intensive nature of this maintenance activity
- Significant working capital for Track gangs, Track geometry and Ballast treatment activities, requiring an adequate return on capital employed (i.e. in-line with the current cost of capital)
- Both the original QR Network submission and the draft QCA position are based on a simplistic contracting style model which is not the most successful model for asset intensive businesses
- Should the QCA's margin position be adopted (i.e. 15% margin on Direct wages only), these maintenance activities are at risk of lowered investment from the service provider; without adequate cost reimbursement and margin allocation there is no commercial incentive for the service provider to continually invest in preserving or improving asset efficiency
- This is likely to erode maintenance asset and overall network reliability with detrimental effects on industry players given the network's current capacity constraints.

Source: QR UT3 Maintenance Cost Summary (Real and Nominal), provided by QR.

Our experience of successful models demonstrates that reimbursement of costs with margin for overhead, capital employed and profit is appropriate

Typical Alliance Payment Structure

(Not presently within Alliance Agreement)



- Reimbursable direct costs eligible for profit/margin, multiplied by a profit (or margin) percentage dependant on KPI performance
- Margin range to be set (or capped) within a fair range, to be agreed by both parties, dependant on service-delivery performance for the alliance period
- Typical profit percentage (of Direct Costs):
  - Not meeting KPIs: 0%
  - Meeting KPIs: 4-6%
  - Exceeding KPIs: 10-15%.

- Both parties to agree on capital value ($) to be used for alliance period (annually)
- Percentage return/margin to be applied to the capital base (10-11%, in-line with current cost of capital) and is designed to apply appropriate compensation for the use of capital employed and justifies investment in the capital asset
- If the return on capital is below the weighted average cost of capital there is a disincentive to hold the asset.

- All indirect and overhead costs reimbursed as an annual fixed charge
- Annual charges to be forecast at the commencement of the period, then translated to a percentage (ranging from 2% to 4%)
- Includes indirect/overhead costs that are not directly tied to a specific job but make up the head-office costs of running the alliance (e.g. IT, HR, CEO, Board).

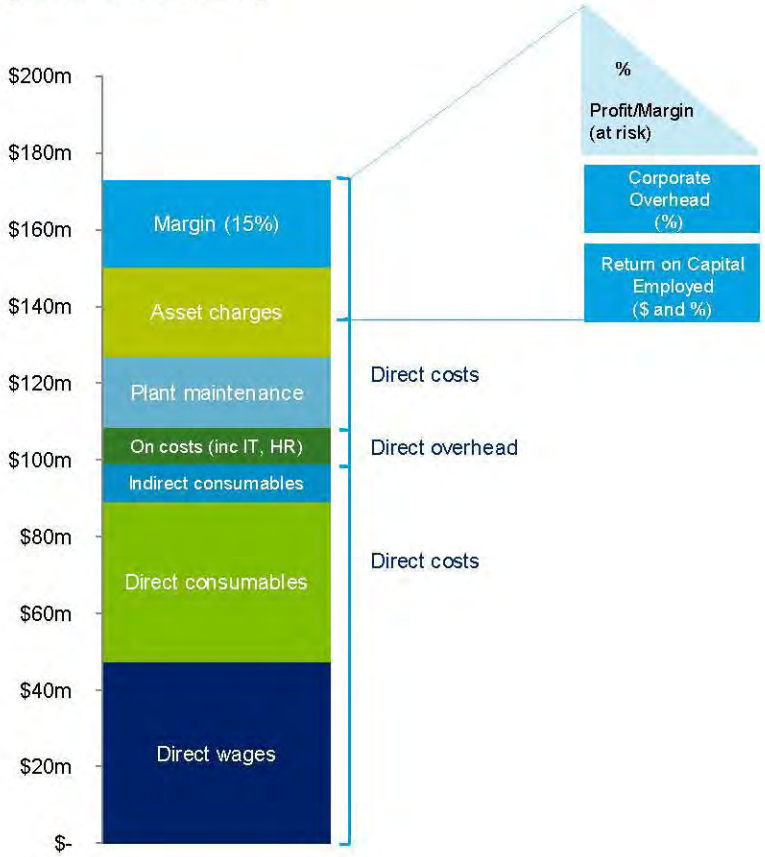
- Agreed Direct Overhead amount (including working capital) reimbursed; cost pass through to agreed budgeted level (annually)
- Comprising overhead costs that directly relate to the maintenance job (such as a work order) for example supervision, training, QA, safety.

- Comprises all Direct Costs as outlined within the Alliance Agreement (i.e. Labour, on-costs, materials, etc.) but excluding cost of debt
- Costs to be passed through as actuals, given the variable nature of the network and industry.

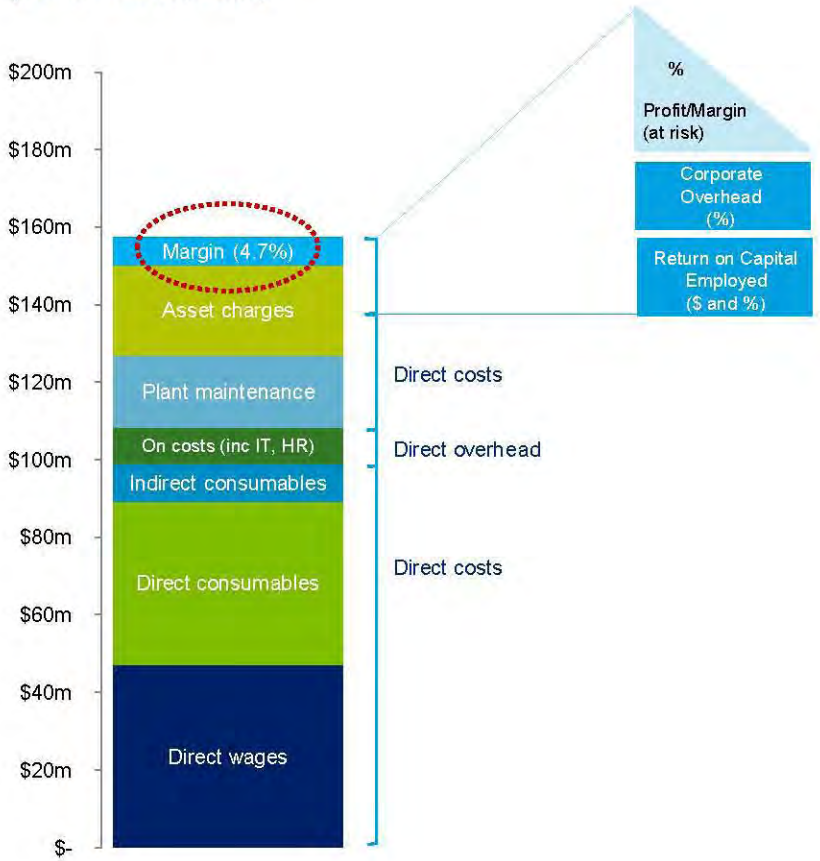
Although simple in its approach, the original QR Network submission was reasonable, and the current QCA draft decision commercially inadequate

QR Network's original draft access undertaking proposed a 15% margin on all direct costs to compensate for profit margin, corporate overhead and return on capital employed. The QCA in their draft response proposed a 15% margin on direct wages only. This translates to a 4.7% margin on all direct costs budgeted for the next four years.

QR Network Original DAU
(FY10 - FY13, A$m)



QCA Draft Response
(FY10 - FY13, A$m)

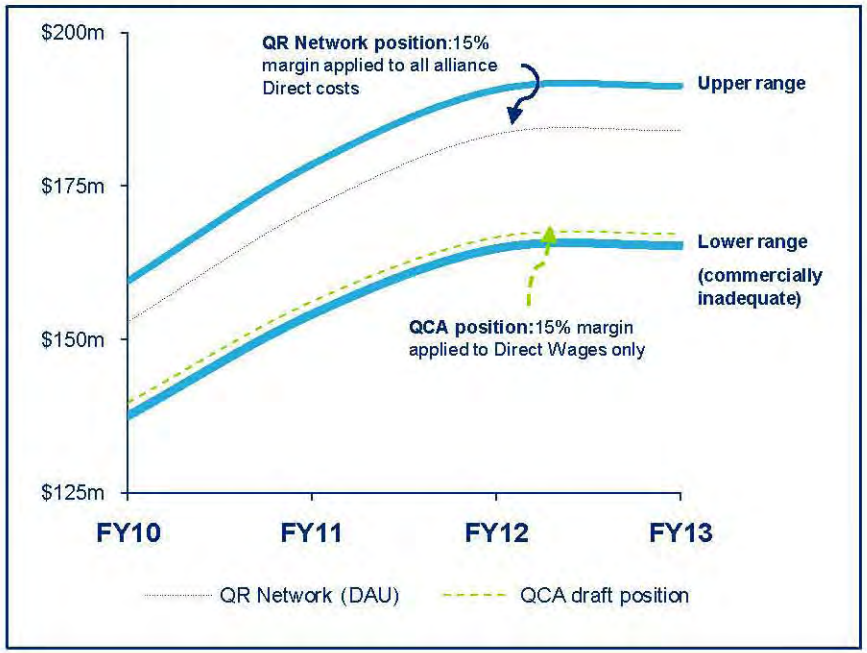


Source: QR UT3 Maintenance Cost Summary (Real and Nominal), provided by QR.

A better approach is to consider the 'middle-ground' that falls within the intent and best interest of the alliance and broader industry players

Differing Total Maintenance Cost Positions

(FY10 - FY13, A$m, Differing margin allocation options charted)



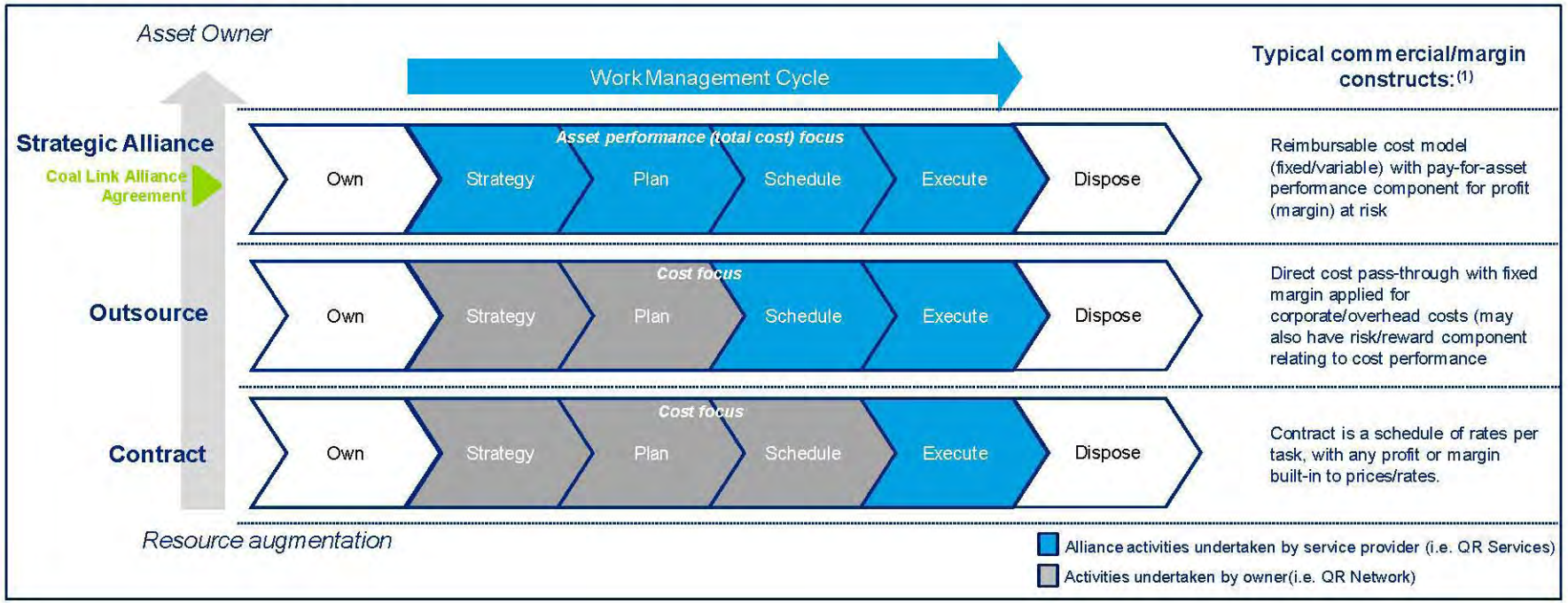
- The charted alternatives show the upper and lower ranges of an appropriate payment structure compared to other typical commercial arrangements
- The QCA draft proposal of 15% margin applied to direct wages only is at the lowest end of the range equating to ~0% profit margin, which is commercially inadequate
- The original QR Network position, whilst trending toward the upper range, presented a reasonable return
- An appropriate return on capital was not presented in either the original QR proposal or the QCA draft response. The model indicates where costs would lie taking return on capital employed into consideration
- Note; this does not consider any additional margin that QR Network may seek from the QCA to mitigate the risk of a fixed revenue stream (4 year regulatory period) against a flow through reimbursable alliance model.

Source:
*Notes:

[redacted]

The intent of the Coal Link Alliance Agreement is for QR Services to manage all constructs of the work management cycle

Typical Work Management and Commercial constructs of Contract, Outsource and Strategic Alliance arrangements



- The current Coal Link Alliance Agreement provides a flow through of direct and agreed overhead costs, with partial overhead and profit placed at risk.

Note:
(1) Based on Deloitte industry/client research; see Appendix for selected cases that further describe these three domestic and global alliance structures.

Successful alliance arrangements reimburse the service provider for reasonable costs and encourage appropriate asset investment

Australian Electricity Distributor[1]
(Alliance structure for provision of transmission and distribution projects)

Australian Metals Manufacturer[1]
(Alliance structure for maintenance and asset management)

North American Resources Company[1]
(Alliance structure for maintenance and asset management services)

- The QCA's position is for profit (or margin) to be only applied to the Direct Wages cost base, placing all other indirect/overhead costs at risk and dependant on the accuracy of the cost forecast/budget at the commencement of the contract period (i.e. every four years)

- Aside from differing to other comparable alliance agreements (above), this arrangement does not incentivise QR Services to re-invest in their assets to maintain high levels of system and asset reliability, as they are not adequately reimbursed for non-direct costs associated with delivering maintenance and other asset management services.

Note:
(1) Based on Deloitte industry/client research; see Appendix for selected cases that further describe these three domestic and global alliance structures.

Contents

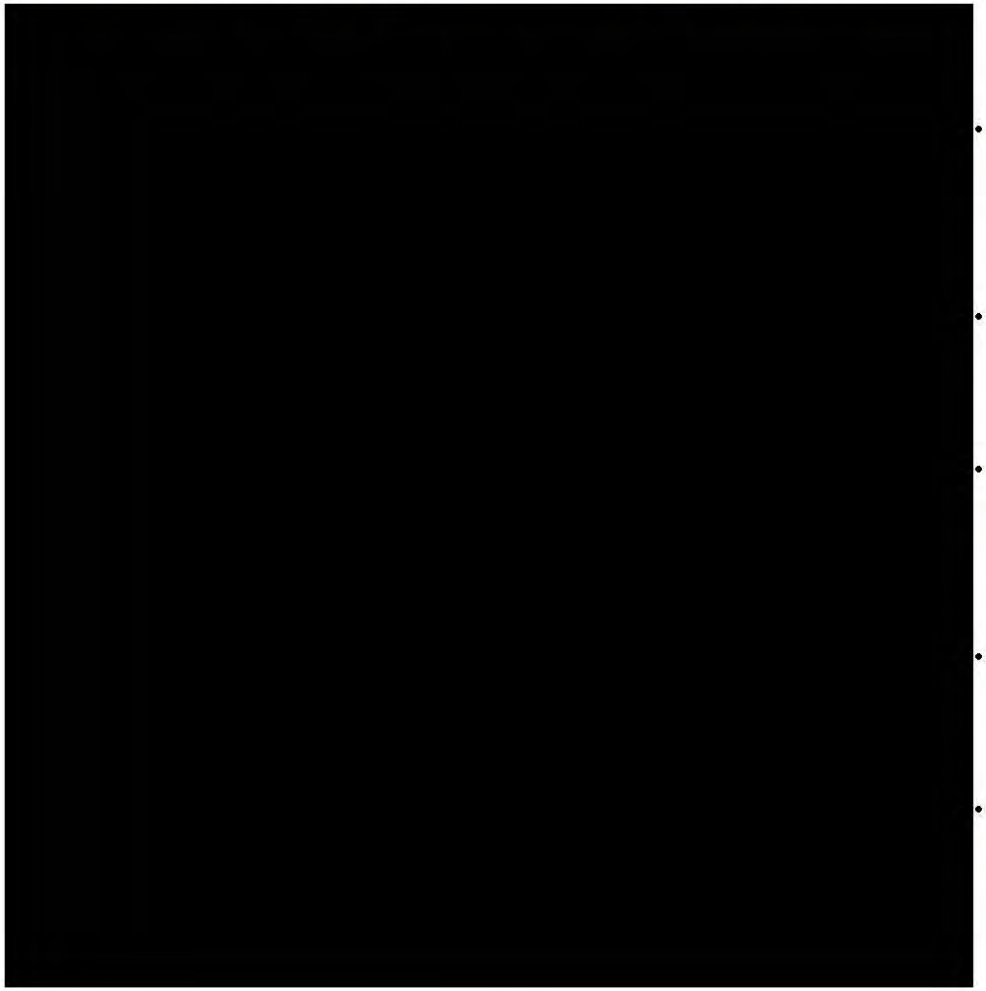
Next steps

- Both QCA and QR Network should seek to better align service provider commercial drivers with industry outcomes
- QR Network should work collaboratively with QR Services to move to a total cost focus on maintenance and asset management activities
- Develop a working model of the preferred payment structure for maintenance services.

Contents

Australian Electricity Distributor alliance structure for delivery of distribution and transmission projects

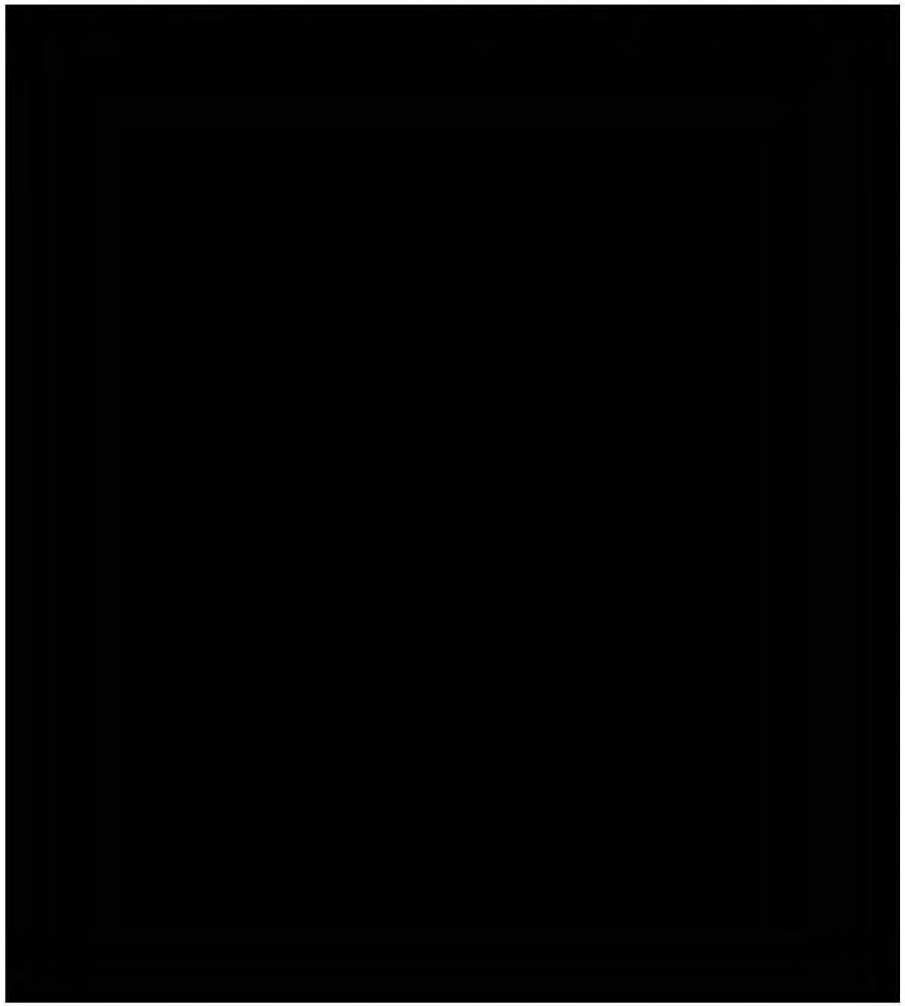
Australian Electricity Distributor Payment Model



- Intent of the contract is for Alliance partners to be accountable for end-to-end delivery capital works, including the procurement of materials
- The key driver of establishing the alliance was access to scarce skills
- A higher than average corporate/overhead margin utilised to cover specialised sourcing and procurement contract services, including warehousing material and inventory
- Profit (or Margin) is fixed at 17% of all Direct Costs incurred for the period (annually)
- A further performance payment is at risk; subject to Alliance partner performance against cost, service and quality KPIs measured throughout the contract period.

Australian Metals Manufacturer alliance structure for maintenance services

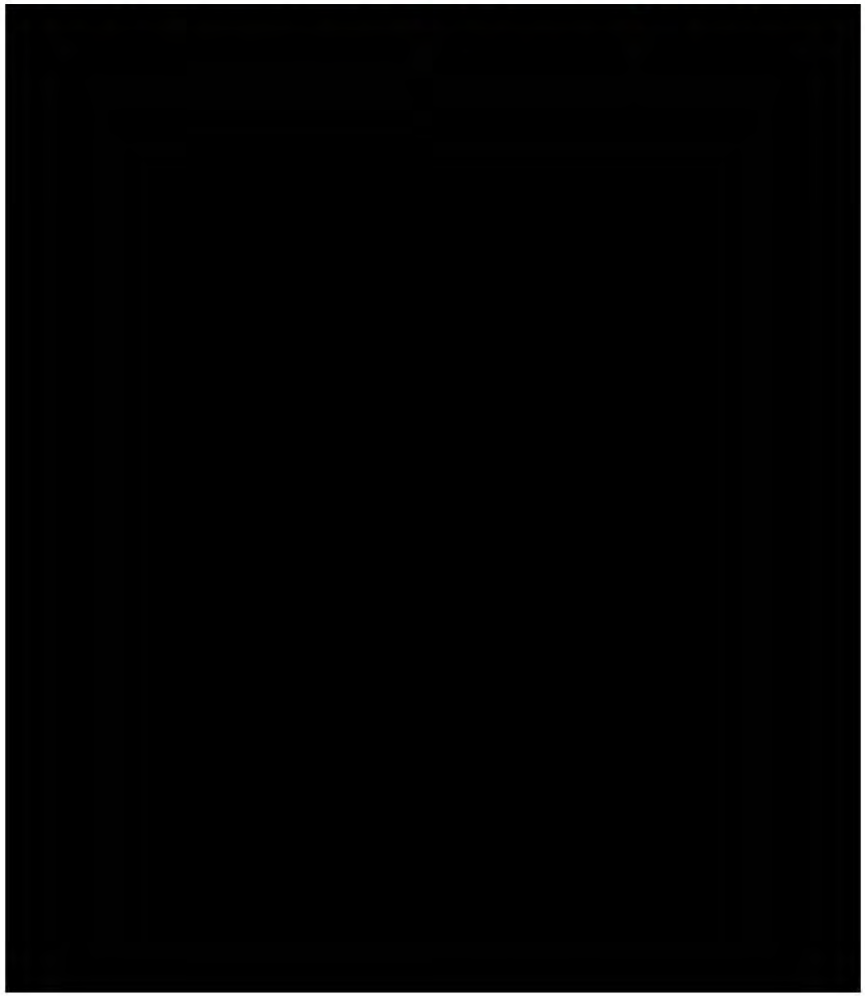
Australian Metals Manufacturer Payment Model



- Intent of the contract is for the Alliance partner to be accountable for maintenance services, utilising Alliance contractors and 3rd-party outsourcing arrangements – with a strong focus on asset investment (total cost)
- A blend of fixed and variable cost reimbursement, with a variable margin scale driven by service delivery performance
- Direct costs are passed through (variable) with Indirect and Overhead costs fixed under an annual Agreed Management Fee
- Profit (or Margin) is at risk, directly linked to budget cost and service-delivery performance of the Alliance Partner.

North American Mining, Processing and Refining alliance structure for asset management services

North American Mining, Processing and Refining Payment Model



- The Alliance partner is accountable for Asset Management services for a North American resources firm. Services comprise area maintenance, site-wide maintenance services, plant/equipment shutdowns and engineering/construction capital works
- The key driver of establishing the alliance was access to scarce skills
- Direct costs are passed through (variable) with fixed overhead rates (%) for Engineering and Corporate overheads
- Profit (or Margin) is at risk, with the respective percentage derived from a sliding scale of service-delivery/contract KPI performance. Asset owner retained the assets required for service delivery and maintenance capital budgets were agreed jointly by alliance members.

There are commercial realities in the coal supply chain that need to be considered when determining the appropriate maintenance regime

Revenue	Capacity	• Train section lengths and run times [1] as well as interaction with terminals [3]. • Existing capacity management as well as expansion projects [4]
	Availability	• Impact of maintenance and construction closures or operating decisions and the timely management of access requests [1] [5]
	Throughput	• Maximum level of tonnes through each coal supply chain system [1] [3]
Costs	Minimise costs per tonne	• Reasonable maintenance costs that minimise network downtime and service disruptions [2] [5] • Service is provided at an efficient cost [4]
	Productivity improvement	• Efficient maintenance practises (including labour and asset utilisation) [2]
Asset efficiency	High asset availability and reliability	• Capacity expansion is undertaken to meet supply demands at an efficient cost [4]
Risks	Stranded assets	• Above rail operator is able to mobilise assets with expected rail access entitlements [1] • Coal companies can access network capacity irrespective of above rail operator [1] [5]
	Certainty of supply	• Access rights are understood and can be provided with sufficient certainty to allow adequate planning [4]
	Reputational risk	• Ability to fulfil contractual obligations and respond to market shifts with relation to supply [4]
	Safety	• Operational incidents leading to unplanned maintenance requirement, network availability issues and potential network capacity reduction [5]
	Responsiveness	• Facilitate QR Network's ability to respond to the dynamic nature of the supply chain historically met by latent rail network capacity [1]

Sources:
(1) QR Freight Submission QR Network 2009 Access Undertaking
(2) Asciano Submission to the Queensland Competition Authority
(3) Goonyella Coal Chain Capacity Review – Second and Final Report
(4) QRC Submission to the Queensland Competition Authority
(5) QR Network Draft Access Undertaking.

The commercial dimensions for a network operator need to be balanced with those of the coal supply chain

Revenue	Capacity	• Increased capacity means greater access availability for above rail operators and potential throughput for coal companies as well as increased revenue generation potential [1]
	Availability	• Ability to provide access to operators within the Capacity Management and Network Management Principles [1] • Network unavailability during planned maintenance periods and any unplanned maintenance requirement [1]
	Revenue cap	• Revenue over or under plan is not reimbursed but is carried forward to adjust the FY 2 years hence [1]
	Reasonable commercial return	• Service is provided efficiently allowing a reasonable return to the operator taking into account risk and performance standards [2]
Costs	Consumable availability and cost	• Optimal inventory available at the time and location required at a reasonable cost [1] • Continued growth of consumable cost [1]
Asset efficiency	Investment in new technologies	• Consideration is given to the investment in new technologies (such as the ballast undercutter and single pass rail grinder) to minimise network downtime and increase reliability [1]
	Replacement and maintenance of assets	• The maintenance of plant is a requirement for reliability and availability and often needs to be undertaken by skilled tradespeople. As the assets age, they need to be replaced or undergo major overhauls [1]
	Investing in multiple assets	• Minimising network downtime while completing appropriate network maintenance activities may be achieved through investment in multiple assets for the same activity [1]
	Working capital investment	• An appropriate level of working capital is required to maximise availability of consumables in the regions required [1]
Risks	Stranded assets	• Reduction in coal traffic due to decrease in production in the region [1] • Non-utilisation of train paths. Can be resumed according to the Capacity Management and Network Management Principles [1]
	Reputational risks	• Ability to meet contractual obligations and maintain aging assets appropriately
	Safety	• Compliance to appropriate safe working procedures [1]

Sources: (1) QR Network Draft Access Undertaking
(2) QRC Submission to the Queensland Competition Authority.

Further analysis supporting how the current QCA margin allocation potentially erodes the balance of supply chain and network operator needs

	QR Network original margin allocation position	Current QCA margin allocation decision	Potential operational impact			Potential maintenance service provider impact of QCA current margin allocation position
			Network capacity	Network reliability	Network throughput	
Direct wages	15%	15%	X	X	X	**Cost over-run:** - Unbudgeted headcount - Exceeding budgeted overtime - Exposure to penalty premiums.
On costs Related to one-off new start employee costs (e.g. certification, system, recruitment etc.)	15%	0%	✔	✔	✔	**Maintenance quality risk:** - Increased use of contractors - Skill availability issues - Lack of responsiveness.
IT, HR etc.	15%	0%	✔		✔	**Cost overrun:** - Budgeted for forecast headcount only **Decreased incentive for work practise improvement.**
Plant maintenance	15%	0%			✔	**Higher than optimal asset utilisation:** - Higher plant usage leading to increased plant maintenance requirement - Plant availability will be the bare minimum **Reduced asset investment:** - Incentives to invest in plant maintenance are reduced (do the bare minimum) - No incentive for investment for improved efficiency.
Consumables	15%	0%		✔	✔	**Holding limited volume in limited locations (destock consumables):** - Decrease in timely provision of consumables - Responsiveness for unplanned consumable requirement limited.
Asset charges (depreciation and cost of debt)	15%	0%		✔	✔	**Reduced asset investment:** - Run down assets with decreased reliability - Retain aging assets - No incentive to invest in new assets/technologies.

Source: Deloitte analysis.

Assumptions

Figure/page	Assumptions
QR Network Maintenance Costs (page 9)	• All cost categories included. Averaged across four years (FY10-13). Forecast figures based on FY08 actuals • Cost categories include: Direct wages etc., on-costs, IT, HR etc., IT system, accommodation, airfares, ballast, fuel, hire charges, operation consumables, grinding stones, other consumables, consumables, indirect consumables, rep & run vehicles, rail, trade services, sleepers, track components, points and crossings, paints and lubricants, tools and equipment, other, plant maintenance, asset charges, on track vehicle maintenance and operation • Totals may not equal 100% due to chart rounding.
QCA Cost Allocation According to Proposed Alliance Payment Structure (page 12)	• Allocation of cost categories to the model performed in consultation with QR advisor • All cost categories included. Averaged across four years (FY10-13). Forecast figures based on FY08 actuals.
Differing Total Maintenance Cost Positions (page 13)	• All cost categories included. Averaged across four years (FY10-13). Forecast figures based on FY08 actuals • QR position includes 15% margin on all cost categories • QCA position presented as QR proposed maintenance costs with 15% margin only on Direct Wages. The figures reported in table 9 of the GHD report were not used as they have not explained sufficiently how the calculations were undertaken.

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Peer Review of QCA Draft Decision, QR Network 2009 Draft Undertaking, Western System DORC
QR Network

12 February 2010
Reference H327193
Revision 2

Document control

Document ID: Westernsystemdorc_Peerreview.Doc

Rev No	Date	Revision details	Typist	Author	Verifier	Approver
1	3/02/2010	Draft for Client Review	MNG	MNG	KAD	
2	12/02/2010	Final Report	MNG	MNG	KAD	KAD

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Contents

1. Background and scope

On 6 August 2008 Connell Hatch (now Aurecon Hatch) provided its Final Report on the Western System (Rosewood – Columboola) Depreciated Optimised Replacement Cost (DORC) assessment with a datum date 1 August 2007 defined as the basis for valuation.

The Final Report was derived from work completed following and including a site visit on 27-31 August 2007 and the Draft Report subsequently provided to QR Network on 1 April 2008.

Subsequently, QR Network submitted a draft 2009 access undertaking proposal to the Queensland Competition Authority (QCA) in September 2008. A revised proposal was submitted by QR Network in June 2009.

The QCA commissioned consultancy firm Everything Infrastructure (EI) to review the DORC valuation. The findings of EI's analysis supported QCA's Draft Decision 1.5, which states:

> *"The Authority requires that the opening value for assessing coal tariffs on the western, as of 1 July 2009, be set at $176.5 million."*

This compares with an opening value of $306.9 million proposed by QR Network in its revised proposal of June 2009.

1.1 Scope of this review

Aurecon Hatch was asked to assess the reasonableness and provided recommendations of the following key issues from the QCA's Draft Decision and the supporting EI report:

- Reintroduction of optimised assets;
- Removal of equipment refuges and backtracks;
- The number, quality and average length of bridges;
- The length of tunnels;
- Over-inflated Unit Rates given prices in the construction market at the time of assessment;
- Standardisation and use of a MEE despite differences in service requirements and quality of infrastructure either side of Toowoomba;
- Revised Asset lives;
- Reduction in QR Network Capital Expenditure claims in regards to the use of Modern Engineering Equivalent (MEE) for Unit Rates;
- Any other points of interest.

This report details Aurecon Hatch's assessment of these key issues and provides recommendation to QR Network.

2. Method of optimising assets

2.1 Details of the finding

EI state in their report:

> *"Based on the information provided that coal represents approximately 70% to 80% of the train paths available on the Western System, it is EI's opinion that the approach adopted for optimisation in the QRN's DORC calculation favours the non-coal users of the track and an alternative optimisation approach be considered.*
>
> *An alternative optimisation approach would be to identify a common network by assuming the whole Western System (less the branch lines, the dedicated grain facilities and the dedicated coal traffics) were available to all traffics and to then adopt a utilisation factor based on train path usage by the coal traffics."*

2.2 Assessment of the finding

While in principle we agree with the theory of cost allocation based on train path usage, we would suggest the following factors should be considered:

- That the costs for both common infrastructure and specific user infrastructure are correctly identified and separately dealt with.
- That the utilisation factors applied adequately reflect the system usage as a percentage of actual system capacity, not the theoretical capacity.
- That any spare capacity is correctly allocated within the utilisation factors.
- The demand for train paths may change over the regulatory period, due to expected increases/decreases in particular traffic types. This should be considered in the utilisation factor used.

2.3 Review of EI's method of calculation

Notwithstanding our assessment, we have reviewed EI's method of applying this finding to the DORC calculation.

In Table 6 of their report, EI has made the following adjustments to the common Network ORC for this finding:

Result of finding	EI's assessment of change to the Common Network ORC ($m)
Add: Optimised out components	31.8
Deduct: Coal only sidings	(2.8)

In reviewing these figures we have found that the total amount optimised in the model was $31.7m (track assets), however to determine the ORC, indirect costs were included at 31% (Total $9.8m), adding an additional $41.6m to ORC.

The coal only sidings include Oakey Coal Siding (29.838km), Jondaryan Coal Siding (42.73km) and Macalister Coal Siding (108.123km), which had ORC values of $0.77m, $1.24m and $1.53m in the model. However, as discussed in a later section, the cost of turnouts was mistakenly excluded from the model. The cost of all turnouts, including those for these coal only sidings, have been added back into the ORC separately and thus the turnout cost for these sidings should be removed. At a cost of $85k per turnout and an indirect mark-up of 31%, this equates to a cost of $668k for the 6 turnouts. In total the removal of the coal only sidings results in a deduction of $4.20m from the ORC.

Result of finding	AH's assessment of change to the Common Network ORC ($m) using EI's approach
Add: Optimised out components	41.6
Deduct: Coal only sidings	(4.2)

3. Equipment refuges and backtracks

3.1 Details of the finding

EI state in their report:

> *"Sidings have been treated as part of the main line for valuation purposes. We consider this is acceptable in the case of passing sidings, but not for equipment refuges and backtracks. A more appropriate value should be used, based on use of part-worn components as per QR policy. We also note that this is consistent with the Modern Engineering Equivalent standard. Removal of equipment refuges and backtracks would reduce the ORC value by approximately $2m or 0.3%."*

3.2 Assessment of the finding

Refuges and ballast/maintenance sidings are generally of a lower standard to the main line, typically using rail which has been cascaded from the main line. While this would reduce the valuation of these assets, the reduction would only be realised in the material cost of rail, as the delivery and installation cost would be comparable to main line track. Economies of scale in sleeper purchasing and the consistency in maintenance standards would dictate the other components of the track would remain at mainline standards. Based on the break down of the cost of rail from our estimators, the reduction in the unit rate for track in sidings is 68.5% of the mainline value.

3.3 Review of EI's method of calculation

Notwithstanding our assessment, we have reviewed EI's method of applying this finding to the DORC calculation.

In Table 6 of their report, EI has made the following adjustment to the common Network ORC for this finding:

Result of finding	EI's assessment of change to the Common Network ORC ($m)
Adjust (4) - Refuges	(2.0)

It is not clear from EI's report which sidings were removed to arrive at the reduction of $2.0m. In our review we have assumed the reduced unit rate for track has been used for the following sidings:

- Yarongmulu Maintenance Siding
- Murphy's Creek Maintenance Siding
- Spring Bluff Maintenance Siding
- Harlaxton Maintenance Siding
- Willowburn Maintenance Siding
- Oakey Maintenance Siding
- Dalby No 1 Dock Maintenance Siding
- Macalister East Maintenance Siding

This results in a deduction of $0.6m from the ORC.

Result of finding	AH's assessment of change to the Common Network ORC ($m) using EI's approach
Adjust (4) - Refuges	(0.6)

4. Bridges

4.1 Details of the finding

EI state in their report:

> *"There were 47 bridges with a total of 1.3km of bridge decking identified in the Rosewood to Toowoomba section of the DORC calculation. This number and extent of bridges is in conflict with the information provided in the Western System Information Pack – Issue 2 March 2006 (Information Pack). The Information Pack identified 68 timber bridges, 6 steel bridges and 5 concrete bridges for a total length of 2.2km of bridge decking. There is a similar discrepancy with the other sections of the Western System with the DORC identifying 33 in the Toowoomba to Macalister section and 38 in the Macalister to Columboola section. The Information Pack indicates that there are 22 timber bridges, 4 steel bridges and 3 concrete bridges in the section from Toowoomba to Dalby. Overall the DORC have included 126 structures identified as bridges. This compares with 108 shown in the Information Pack.*
>
> *In the QRN DORC valuation, bridges have all been valued by QRN at a standard rate per metre of span, regardless of type or location. As this is the sole rate used, we assumed that this includes substructure as well as superstructure. The rate appears to be in excess of achieved total (substructure and superstructure) costs in the CQCR. Accordingly, we asked for clarification of the substructure costs. QRN have subsequently confirmed that the rate is for both superstructure and substructure. On this basis we are of the opinion that the single averaged rate appears low. The rate used may be appropriate for the replacement of small timber bridges with concrete box culverts, but not for concrete bridges such as Doctors Creek. We are of the view that the bridge cost component of QRN's DORC is understated for concrete and steel bridges."*
>
> *"Adjusting the quantities and average lengths of bridges and increasing the standard cost rate by 5% for bridges would result in a reduction in the ORC of approximately $10.9 million or 1.8%."*

4.2 Assessment of the finding

The table below shows the length and number of bridges as shown in the Information Pack:

		Timber	Steel	Concrete	Total
Rosewood	No. of Bridges	68	6	5	79
to	No. of Spans	287	24	13	324
Toowoomba	Length (m)	1717.6	308.7	174.03	2200.33
Toowoomba	No. of Bridges	22	4	3	29
to	No. of Spans	88	13	6	107
Dalby	Length (m)	482.8	108.31	77.37	668.48
Dalby	No. of Bridges	51	0	0	51
to	No. of Spans	402	8	0	410
Miles	Length (m)	2101.8	83.5	0	2185.3
	No. of Bridges	141	10	8	159
	No. of Spans	777	45	19	841
	Length (m)	4302.2	500.51	251.4	5054.11

However, we note that this data does not match other sources within the Information Pack, such as the line diagrams. QR Network acknowledges inaccuracies within the Information Pack.

For this reason, the bridge data used in the DORC model was collected during the site visit in August 2007.

Within the DORC model there are 76 bridges between Rosewood and Macalister (excluding 5 which were included in the 2008 capital works), with a total length of 2,364m.

4.3 Review of EI's method of calculation

Notwithstanding our assessment, we have reviewed EI's method of applying this finding to the DORC calculation.

In Table 6 of their report, EI has made the following adjustment to the common Network ORC for this finding:

Result of finding	EI's assessment of change to the Common Network ORC ($m)
Adjust (5) – Bridges	(10.9)

Assuming 2,869m of bridge length is correct, this is an increase of 505m compared to the value in the DORC model. At the 5% increased rate proposed by EI, this equates to a direct replacement cost of $12.726m, which is an addition of $16.7m to the ORC when the 31% mark-up for indirect cost is applied.

Of the 2,364m of bridge length in the DORC model, 68m is Double Track Bridge and 59m is Road Overbridge. By applying the 5% uplift proposed by EI, and including the 31% uplift for indirect costs, the incremental increases are $2.49k/m, $1.64k/m and $1.57k/m for Double Track Bridges, Overbridges and Single Track Bridges respectively. This results in an addition of $3.8m to the ORC.

This results in a total addition to the ORC of $20.4m.

Result of finding	AH's assessment of change to the Common Network ORC ($m) using EI's approach
Adjust (5) – Bridges	20.4

5. Tunnels

5.1 Details of the finding

EI state in their report:

> *"The DORC calculation includes 11 tunnels for a total length of 1.7km. These tunnels only appear in the Rosewood to Toowoomba section of the Western System. The Information Pack shows 11 tunnels for a total length of 1.6km, which is about 5% less than the length used in the DORC. Using the length of tunnels as shown in the Information Pack would result in a reduction in the ORC of approximately $8.5 million or 1.4%."*

5.2 Assessment of the finding

The tunnel lengths used in the Aurecon Hatch model were taken from the QR Network Rail Access Line Diagrams (Appendix B of Information Pack).

The extract from these diagrams below shows that the tunnel at 142.365km is labelled incorrectly. Within the model it was assumed that these numbers were inverted, giving a tunnel length of 260m. The lengths of tunnels were not measured during the site visit in August 2007.

However, Appendix D (Speed Boards) of the Information Pack gives this tunnel's position as 142.365 to 142.445, a length of 80m.

The following table shows the various sources of tunnel data within the Information Pack. Based on this information, it is unclear which data source is most accurate.

Tunnel positions and lengths from Appendix D (Speed boards)		Tunnel positions and lengths from Appendix B (Line diagrams)		Rosewood to Toowoomba Table Page 10
Kms	***Lengths (m)***	***Kms***	***Lengths (m)***	***Total Length (m)***
71.750	-	71.740 – 71.870	130	
75.200	-	75.370 – 75.880	510	
142.040 – 142.105	65	142.040 – 142.105	65	
142.365 – 142.445	80	142.365 – 142.105	260	
144.470 – 144.530	60	144.470 – 144.530	60	
147.175 – 147.335	160	147.175 – 147.335	160	
151.000 – 151.105	105	151.000 – 151.105	105	
151.850 – 151.940	90	151.850 – 151.940	90	
152.610 – 152.665	55	152.610 – 152.665	55	
152.725 – 152.860	135	152.725 – 152.860	135	
153.735 – 153.885	150	153.735 – 153.865	130	
	900		**1,700**	**1,615.61**

5.3 Review of EI's method of calculation

Notwithstanding our assessment, we have reviewed EI's method of applying this finding to the DORC calculation.

In Table 6 of their report, EI has made the following adjustments to the common Network ORC for this finding:

Result of finding	EI's assessment of change to the Common Network ORC ($m)
Adjust (6) - Tunnels	(8.5)

Assuming 1,616m of tunnels is correct, at a unit rate of $81k per m, the reduction of 84m would reduce the total replacement cost by $6.8m, which equates to a deduction of $8.9m from ORC when the 31% mark-up for indirect cost is applied.

Result of finding	AH's assessment of change to the Common Network ORC ($m) using EI's approach
Adjust (6) - Tunnels	(8.9)

6. Over-inflated Unit Rates

6.1 Details of the finding

EI state in their report:

> *"The rates shown for track in the original 2009DAU submission appeared high when compared directly to contemporary supply values. QRN confirmed in their response to EI questions, that the rates for concrete sleepers, rail and ballast were "all up" rates including installation.*
>
> *The breakdown of the costs for the concrete sleepers, provided by QRN, showed separately the supply cost of the concrete sleepers. The cost provided by QRN was 62% higher than the cost to QRN from QR's sleeper manufacturing alliance established in 2006. Using the alliance cost amount for the sleepers would result in a reduction in the Optimised Replacement Cost (ORC) value for the Rosewood to Macalister section of approximately $7.9 million or 1.3%.*
>
> *As stated earlier, the steel rail price difference between 2003 and 2006 was 35%. If the unit rate for the rail used in the DORC calculation was reduced by a similar amount to reflect long term cost trends, then the ORC value would be reduced by approximately 5.6%."*

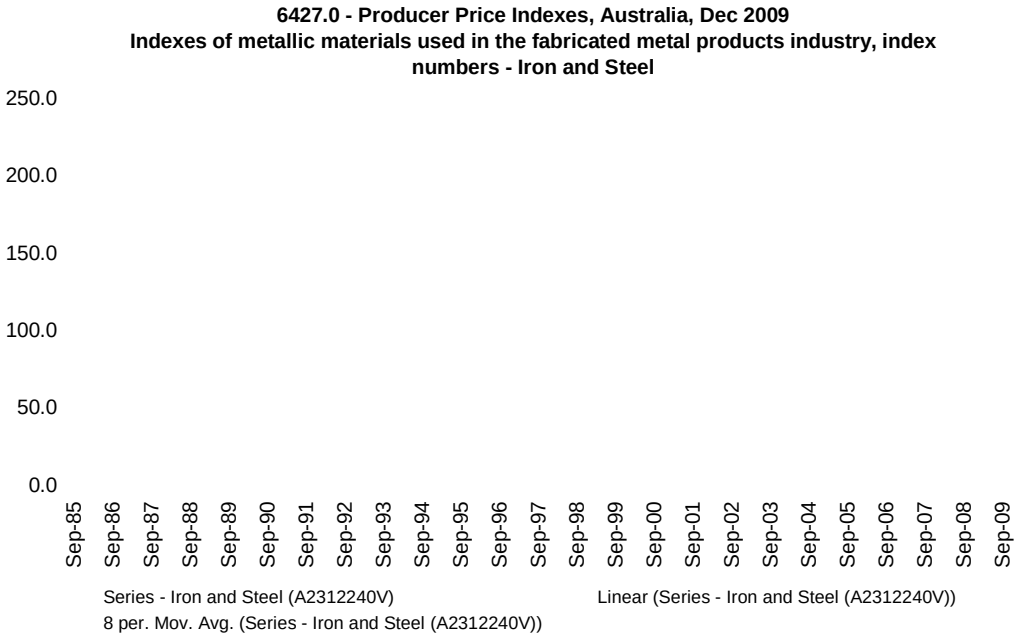
6.2 Assessment of the finding

Both sleeper and rail costs were determined by our estimator from a number of current rail projects as of 1 August 2007.

It is unclear from EI's report if the QR's sleeper manufacturing alliance price quoted is a comparable unit rate, and as shown in the following section, it is unclear how EI has applied this rate to determine their reduction to the ORC.

The graph below shows the historic trend of Iron and Steel as reported for metallic materials used in the fabricated metal products industry, which forms part of the ABS's Producer Price

Index. While not directly indicating the price of rail, this graph does show the trend for related product.



The relevant data points on the graph are:

Index Date	Index	Change
March 2003	116.2	
December 2006	155.5	33.8%
June 2009	181.7	16.8%

This graph shows a similar increase between 2003 and 2006 as stated by EI, however it can be seen that the 2003 value is significantly below the long term linear trendline.

6.3 Review of EI's method of calculation

Notwithstanding our assessment, we have reviewed EI's method of applying this finding to the DORC calculation.

In Table 6 of their report, EI has made the following adjustments to the common Network ORC for this finding:

Result of finding	EI's assessment of change to the Common Network ORC ($m)
Adjust (1) - Sleepers	(7.9)
Adjust (2) - Rail	(33.7)

From the details provided, we have not been able to determine how EI has arrived at their reduction of $7.9m for sleepers. Assuming the supply cost of sleepers is 61.7% of the price used in the DORC model, the total installed price per sleeper would be $184. This results in a deduction of $25.0m from the ORC.

EI has quoted the steel prices (for 60kg plain carbon steel rail) in 2003 and 2006 as $850/tonne and $1150/tonne respectively. In applying this difference, it appears EI have used 74% of the August 2007 unit rate for rail ($350/m), giving a rate of $259/m. However,

the unit rate of $350/m is for full installation of the rail. Based on advice from our estimator that approximately two thirds of the cost is for material, the reduced rate would be $289/m. This results in a deduction of $22.8m from the ORC.

Result of finding	AH's assessment of change to the Common Network ORC ($m) using EI's approach
Adjust (1) - Sleepers	(25.2)
Adjust (2) - Rail	(22.8)

7. Asset lives

7.1 Details of the finding

EI state in their report:

> *"As part of the review of the asset residual lives, EI compared the asset life adopted by QRN with the life of similar components in other rail systems. The results indicated that there were components where different asset lives could be adopted for the purposes of the DORC valuation. The major differences included:*
>
> - *Concrete sleepers are rated as 35 years life whereas most other rail systems adopt 50 years. Adopting the longer life value would result in a longer depreciation period and a lower depreciation rate.*
> - *Rail and Turnouts were rated by QRN as 35 years whereas other Australian railways adopt lives between 12 and 35 years. The QRN paper on UT3 Asset Lives for CQCR indicated for the asset class "Track Turnout Light" in the Moura system the proposed asset life would be 20 years.*
> - *Earthworks residual lives were shown as 190 and capped 50 years whereas other jurisdictions do not include this asset, as it has a long residual life and, in the case of the Western System, has been in place for over 100 years.*
>
> *Based on a study undertaken by Worley Parsons for QR and EI experience with similar assets in other rail network systems, the asset lives assumed for the purposes of this review are shown in Table 5.*

Table 5 - Assumed Asset Lives

Asset item	Asset lives used in QRN claim	Assumed asset lives (yrs)
Sleepers (concrete)	35	50
Rail	35	20
Turnouts	35	20
Ballast	35	20
Top 600	190	50
Roads	50	38
Fences	15	20
Signals	30	20
Bridges	102	50
Culverts	99	50
Earthworks	190	100
Tunnels	100	100
Land Acquisition	50	50
Telecom	30	20
Power Systems	30	20

Based on the asset lives shown in Table 5, the annual depreciation amount would be approximately $15.7M.

The claimed amount of depreciation shown in the Connell Hatch DORC calculation spreadsheets was $17.0M."

7.2 Assessment of the finding

The asset lives used in the DORC model where based on advice provided by QR Network.

7.3 Review of EI's method of calculation

Notwithstanding our assessment, we have reviewed EI's method of applying this finding to the DORC calculation.

The table below provides the annual depreciation and the % depreciated for both the original July 2007 assessment and the reassessment under both sets of asset lives.

	Original Assessment		Reassessment (as shown in section 10)	
	Original Asset Lives	**EI's Asset Lives**	**Original Asset Lives**	**EI's Asset Lives**
ORC	$684.9m		$693.4m	
DORC	$356.7m	$334.6m	$363.7m	$341.3m
Annual Depreciation	$12.81m/pa	$17.29m/pa	$12.84m/pa	$17.70m/pa
% Depreciated	47.92%	51.15%	47.55%	50.78%

8. Standardisation and use of MEE and treatment of Capital Expenditure

8.1 Details of the finding

EI state in their report:

"Part of the track between Rosewood and Toowoomba currently approaches the MEE standard used in the DORC valuation. The entire track west of Toowoomba is of a lower standard, and according to the information provided to this consultancy and observed during the site visit, there are no current plans to upgrade the mainline west of Toowoomba to the MEE standard used in the DORC valuation.

Valuing the asset from Toowoomba to Macalister at a lower MEE standard, reflecting the current difference in service capability of the asset and the operating future of various parts of the mainline, may result in a lower DORC valuation. As the Toowoomba to Macalister section represents approximately 56% of the DORC value and the track component is 52% of the total claimed DORC value, EI are of the opinion that a reasonable reduction of 10% in the cost of the track element for the track between Macalister and Toowoomba, would result in a reduction in the overall Rosewood to Macalister DORC valuation of approximately 2.9%."

The Surat Basin Track upgrade works is part of a 10 year program of upgrade works. The part of this program that was undertaken in the period following the August 2007 DORC valuation date to the OAV date at the start of the UT3 period, included 7.6 km of track reconditioning and the upgrade of 12 turnouts. The claimed amount for this work was considered reasonable by EI. In regard to

the treatment of this expenditure, EI refer to the QR approval documentation for the Surat Basin Track Upgrade: Stage 4 project dated 29/6/06. In that documentation, QR confirmed that the project was necessary so that the track can be maintained to a condition suitable for the current coal traffic task. The Surat Basin project was, therefore, not associated directly with any increase in capacity but was considered to be essential to maintain the quality and serviceability of the existing asset. EI therefore recommend special treatment of the Surat Basin Track upgrade expenditure to avoid double counting between the asset valuation and the capital expenditure claim and to ensure QRN can properly recover the capital expended on maintaining the line. EI recommend that the total value of the Surat Basin Track upgrade program in the period after August 2007 be deducted, on a present value basis, from the DORC asset valuation and the Surat Basin Track upgrade expenditure of $5.45M be included as part of the claimed capital expenditure for the 2007/08 and 2008/09 period.

8.2 Assessment of the finding

We believe the approach to determining the DORC should be kept consistent through the assessment. As there is only one MEE standard for Coal Railway lines and over 75% of traffic is Coal traffic, we believe this MEE standard should be applied.

8.3 Review of EI's method of calculation

While EI state that there would be an overall reduction in the DORC of 2.9%, this is not reflected directly in table 6 of their report. However the removal of $22.4m from the DORC for the forecast spending on Surat Basin Track Upgrade: Stage 4 has covered this finding.

9. Other points of interest

9.1 Turnouts

EI state in their report:

"We also noted in the questions provided to QRN that turnouts appear not to have been included in the valuation. There were 83 turnouts noted on the line diagrams provided for the optimised system. In their response to our questions, QRN confirmed the omission and agreed that the turnout cost should have been included. Inclusion of the turnouts would increase the ORC value by approximately $4.8m or 0.8%."

We agree that is was an omission in the original DORC which should have been included.

EI has given the following changes to the common Network ORC in table 6 of their report:

Result of finding	EI's assessment of change to the Common Network ORC ($m)
Adjust (3) - Turnouts	4.7

However nine of the 83 turnouts given in the line diagrams are within the Macalister to Columboola section, and thus excluded for the assessment. At a unit rate of $85k per turnout, the total replacement cost for the remaining 74 turnouts would be $6.29m (OCR of $8.24m with 31% mark-up for indirect costs).

Result of finding	AH's assessment of change to the Common Network ORC ($m) using EI's approach
Adjust (3) - Turnouts	8.2

10. Summary of assessment and recommendations

10.1 Summary of assessment

The following table compares the EI/QCA calculation of the Opening Asset Value (OAV) to Aurecon Hatch's Assessment of OAV using EI/ QCA's approach.

We have been unable to determine the source of the "Stated ORC Rosewood to Macalister", so we have adjusted the original DORC model to consider only the assets between Rosewood and Macalister. This has resulted in an OAV of $684.9m.

Result of finding	EI/ QCA's Calculation of OAV		AH's assessment of OAV using EI/ QCA's approach	
Stated ORC Rosewood to Macalister	**630.6**		**684.9**	
Add: Optimised out components	31.8		41.6	
Deduct: Coal only sidings	(2.8)		(4.2)	
Adjust (1) – Sleepers	(7.9)		(25.2)	
Adjust (2) – Rail	(33.7)		(22.8)	
Adjust (3) – Turnouts	4.7		8.2	
Adjust (4) – Refuges	(2.0)		(0.6)	
Adjust (5) – Bridges	(10.9)		20.4	
Adjust (6) – Tunnels	(8.5)		(8.9)	
Common Network ORC (Aug 2007)	**601.4**		***693.4***	
	[-29.3]		***[+8.5]***	
EI's Common Network DORC (Aug 2007)	**300.9**		**341.3**	
	[50.03% depreciated]		**[50.78% depreciated]**	
Remove forecast spend on Surat Basin	(22.4)		(22.4)	
QCA's Common Network DORC (Aug 2007)	**278.5**		**318.9**	
Spilt DORC to apply Network Pro-rata	**Pre-1995 Common Network**	**Investment since 1995**	**Pre-1995 Common Network**	**Investment since 1995**
Common Network DORC	230.0	48.5	270.4	48.5
Coal Share based on potential or actual train path availability	60.5%	75.6%	60.5%	75.6%
Coal-specific DORC	139.1	36.6	163.6	36.6
Plus coal-only infrastructure	1.4		2.1	
Coal-specific DORC	**177.2**		**202.3**	
Inflate and depreciate the DORC	(6.2)		(7.1)	
Incremental capital spending	5.5		5.5	
Opening Asset Value	**176.5**		**200.7**	

10.2 Calculation for QR Network's revised proposal

Based on the assessment provided above, QR Network has requested Aurecon Hatch to reassess the ORC/DORC valuation based on the values obtained through Aurecon Hatch's assessment using EI approach with the following alterations:

- Unit rate for rail to remain at the original DORC model value of $350 per metre.
- The total metres of bridges to be taken from the original DORC model, with EI's proposed 5% uplift on unit rates.
- The rail asset life to be taken as 30 years.

The following table provides a summary of this assessment:

Result of finding	Calculation for QR Network's revised proposal
Stated ORC Rosewood to Macalister	**684.9**
Add: Optimised out components	41.6
Deduct: Coal only sidings	(4.2)
Adjust (1) – Sleepers	(25.2)
Adjust (2) – Rail	0.0
Adjust (3) – Turnouts	8.2
Adjust (4) – Refuges	(0.6)
Adjust (5) – Bridges	3.8
Adjust (6) – Tunnels	(8.9)
Common Network ORC (Aug 2007)	***699.5*** ***[+14.6]***
EI's Common Network DORC (Aug 2007)	**350.0** **[49.96% depreciated]**

10.3 Recommendations

It is our opinion, based on our assessment, that Everything Infrastructure's approach to their review has been inconsistent to the detriment of QR Network, for example we suggest that it is inappropriate to mix a variety of datum dates and long term averages. The DORC valuation should represent the replacement cost at a given date, not the lowest cost achievable if the provision of components are taken at their lowest possible rate.

Also, we suggest that it is inappropriate to mix an MEE approach with as constructed costing to arrive at a valuation. Given that over 75% of the system capacity is coal traffic, we suggest that an MEE for coal is adopted as the Replacement Cost standard.

QR Network should give due consideration in their response to QCA's draft determination, to ensure that the arguments used are consistent. This is of particular interest with reference to the accuracy of data taken from the QR Information Pack, which in the case of bridges could lead to an increase to the ORC value by $20.4m, but may have a counter affect for a number of other assets.

Even if QR Network was to accept all of EI's assertions, and we are not suggesting that QR Network should, the Opening Asset Value that we have calculated in our assessment is well in excess of the figure determined by the QCA's consultant.