QR Network

December 2011

Submission to QCA: Electric Access Draft Amending Access Undertaking

Table of Contents

Executive Summary

Background

QR Network provides an electric traction service to customers in the Goonyella and Blackwater systems of the Central Queensland Coal Region (CQCR). Goonyella operates on the basis of 100% utilisation by electric services, whereas Blackwater operates as a mixed system, operating both electric and diesel services. Access seekers have a choice of whether to run electric or diesel services, with specific components of the reference tariff (AT5 + EC charge) applying to electric services. Supply chain participants have invested significantly in electrification assets in recent years to provide this electric traction capacity in CQCR.

The most economically efficient outcome for the coal system in terms of traction choice is one that maximises the use of electric traction in both the Blackwater and Goonyella systems. The approach used for pricing for use of the electric network in the existing access arrangements does not properly align the costs with the benefits from usage of the electric network.

The existing access arrangements in relation to traction options are therefore not consistent with the objective of the third party access regime and the pricing principles, in that they:

- promote sub-optimal investment and use of electric traction infrastructure by creating a disincentive to use electric traction in the Blackwater system;
- promote technology that does not provide the least cost system from a whole of rail perspective, which is the relevant perspective for end customers; and
- do not provide a price signal that promotes reduced costs and increased rail system productivity in terms of traction mix.

This issue is becoming critically important, as the coal industry's demand for the rail system to further improve efficiency continues. Queensland's coal industry has always enjoyed a leading cost position on the global supply curve. It is imperative that this is maintained in an environment of uncertain world demand and the emergence of competing sources of supply from new deposits in other countries, particularly in the thermal coal market. Achieving the most efficient rail system will leave the Queensland coal industry best placed to capitalise on opportunities for growth. In this context, the incentives for inefficient behaviour that are created by the current access framework are impeding QR Network's ability to respond to this need.

The proposals outlined in this submission are necessary to promote efficient use of and investment in rail infrastructure, as they will substantially address the concerns with the current access framework.

Proposed amendments

QR Network is proposing the following changes to the 2010 AU to address the issues with the current pricing approach:

- Pricing to reflect network benefits – Introduction of a single network AT5 charge, determined based on the total costs and total forecast utilisation of the electric network as a whole.
- Electric utilisation rebate – Introduction of a requirement that operators pay AT5 for at least 90% of train services that can feasibly be operated with electric trains.
- AT5 to provide long term price signal – Amendments to provide that, where revenue adjustments in a single year are substantial, QR Network may defer recovery of revenue cap amounts so that the total increase in AT5 is no greater than 5% per annum. Any unrecovered amount will be carried forward for recovery in a following year.

Pricing to reflect network benefits

A single AT5 charge recognises the network benefits to Goonyella users of the investment in electric assets in the Blackwater system, and better price signalling of true costs and benefits will occur, which in turn will promote efficient investment in electric assets.

QR Network acknowledges that this proposal was put forward as part of the development of the 2010 AU, but the QCA was not convinced that it was necessary. Further analysis confirms that ignoring network benefits may render investment in electric assets in Blackwater uneconomic due to the incentives that are created for operators and end users to invest in diesel locomotives, even though electric traction provides the most efficient outcome.

Electric utilisation rebate

An important consideration is providing greater confidence to all participants in the supply chain about the future level of utilisation of the electric network. Due to the high level of fixed costs for the electric network, the benefit to the whole supply chain of maximising electric utilisation – which provides the lowest total rail cost solution – can only be achieved with high levels of utilisation of the electric network.

There is a transition point where, if utilisation falls, or even fails to grow sufficiently, the cost for electric services will rise to a level higher than the cost for diesel services. As the access framework allows the electric network to be bypassed (ie. it allows diesel trains to be run on the electrified network), any operator considering traction choice will need to consider the risk of other parties bypassing the electric system, which will undermine the benefits of running electric services by increasing the costs borne by that operator. Uncertainty about this traction choice of other operators and, hence, the overall level of electric utilisation, can undermine efficient investment choices.

The electric utilisation rebate will mean that the electric network utilisation risk that is borne by an operator only relates to its own utilisation of the electric network, not the utilisation by other market participants. If operators use electric trains for at least 90% of the gtk they run on the electrified network, they will bear no additional cost.

AT5 to provide long term price signal

A critical factor for operators and end users in making an investment choice in favour of electric locomotives over diesel is to have confidence that the costs of accessing the electric network will not rise over time to levels that make the use of diesel locomotives a more cost effective option. The current access arrangements and pricing approach result in significant volatility in the AT5 charge and this volatility can disguise the long term benefits of electric traction.

This is addressed by amendments to permit QR Network to defer recovery of revenue cap amounts so that the total increase in AT5 is no greater than 5% per annum. Any unrecovered amount will be carried forward for recovery in a following year.

In addition, the Blackwater system electric operating costs have been reduced by $6.2 million to more accurately reflect the long term transmission network connection cost.

Access charges for diesel trains

To be consistent with the pricing principles in the QCA Act, access charges for diesel services should be fully cost reflective. However, there are a number of examples where the access charges do not actually reflect the full cost that those services impose on the rail system. At this point, no amendments are proposed to the 2010 AU to address this issue. However, when QR Network submits reference tariffs for new services that use non-electrified connections, if these services require mainline capacity enhancements on the electrified network, the cost of the electrifying these capacity enhancements will be included in the incremental cost to be recovered from the diesel services using the non-electrified connections. QR Network will also be reviewing its approach to the capacity multiplier applicable to non-standard trains as part of its next Draft Access Undertaking.

1. Purpose of submission

QR Network aims to provide the rail network services that support the most efficient delivery of rail haulage services to end customers in the CQCR. This includes promoting the efficient operation of and investment in the rail network, including the network's electric traction assets. This is consistent with QR Network's commercial objectives as well as with the objectives of economic regulation of below rail services under the Queensland Competition Authority (QCA) Act 1997.

With the benefit of some years of experience, it has become evident that the current approach to establishing access arrangements for alternate traction choices (i.e. diesel or electric traction) are not consistent with achieving this objective. QR Network has significant concerns about the implications of continuing with this approach in future because, as is demonstrated in this submission, it will have adverse implications for QR Network's ability to deliver the most efficient, least-cost services to end customers, potentially compromising the competitiveness of the Queensland coal industry. It will also have material adverse consequences for QR Network's legitimate business interests, which in turn will constrain its future capacity to invest in further capacity enhancements. Accordingly, it is necessary to make changes to the way that access arrangements for alternate traction options are applied, to ensure that the most efficient investment decisions are made.

This issue must now be addressed as operators and end customers are about to make decisions about whether to invest in diesel or electric locomotives for running services into WICET. This has triggered the need for QR Network to submit this DAAU now in order to change the access framework around the regulatory treatment of access for alternate traction options to ensure that the most efficient investment decisions are made from the perspective of the whole coal supply chain.

The purpose of this submission is to explain the proposed amendments, by discussing the issues regarding the regulatory treatment of access for alternate traction choices, and the proposed approaches to address these issues. It is structured as follows:

- Background to the issue;
- Objectives of access arrangements;
- Problems with current access framework regarding traction choices;
- Sources of underutilisation of the electric network;
- Proposals for change;
- Description of specific amendments to the access undertaking; and
- Concluding comments.

2. Background

Supply chain participants have invested a significant amount of capital in electrification assets in recent years to provide electric network capacity in the Goonyella and Blackwater systems. In addition, to support the provision of this electric capacity, QR Network has entered into long term supply agreements for significant sums with a Transmission Network Service Provider (TNSP). As services provided by electric network are included in the definition of the rail transport infrastructure for the purpose of the declaration of services under the QCA Act, the arrangements for accessing the electric network are regulated and subject to the provisions of the 2010 AU.

Over time, it has become apparent that the issues associated with promoting the most economically efficient investment in and use of traction-related assets – that is, the access arrangements that apply for electric versus diesel traction – are very different to the issues associated with promoting efficient investment in other below rail assets. Specifically, the electric traction network is able to be readily bypassed by an operator, simply by choosing to operate diesel services on the network, meaning that the electric traction mode must at all times be competitive with the alternate diesel traction mode.

To date, in QR Network's regulatory reviews, there has been limited consideration of the issues that impact on the use of and investment in the electric network as distinct from the issues that impact on the use of an investment in other track assets. As a result, broadly similar regulatory pricing approaches have been applied to both electrification assets and track assets. This 'one size fits all' approach fails to properly take into account the issues associated with traction choice, and the problems arising in promoting the most efficient rail solution.

QR Network sought to partially address this issue as part of the 2010 AU, by proposing a single electric network tariff. The QCA did not accept this approach at that time on the basis that it considered it was not clear that the access framework applying to traction choice would promote inefficient outcomes.

QR Network has since undertaken detailed analysis of the question of what traction mix best reflects the most efficient outcome for the coal system overall and, further, what access framework will best support this efficient outcome. This analysis demonstrates that maximising the use of electric traction in both the Blackwater and Goonyella systems will create the lowest total rail system cost.

Given this, it is concerning that the access framework around traction choice creates an incentive in favour of running diesel services and investing in diesel trains. This has become apparent based on evidence of developments in the haulage market in the CQCR in recent years, with an increasing expression of intent by operators and end customers to use diesel services on the electrified network, particularly in the Blackwater system.

The Blackwater system is currently in a transition period where large investment to create a step change increase in electric capacity is being made, but the benefit of this in terms of increased utilisation is yet to occur. In this environment, the access framework and pricing approach has operated in such a way as to make the option of investing in diesel trains to run on the electrified network increasingly attractive to haulage operators and end customers. However, if they do invest in diesel trains to run these services, the Blackwater system utilisation will never increase to the level where the overall cost benefits of the electric network investment are realised. In effect, the short term price for access to the electric network services determined through the regulatory framework is misaligned with the long term economics and sustainability of the electric network and, consequently, with the efficient operation and investment in the CQCR rail infrastructure as a whole.

Achieving the objective of providing efficient and least cost infrastructure services relies on operators and, indirectly, end customers, to invest in electric rollingstock to achieve the utilisation levels necessary to achieve this least cost outcome. This issue is becoming critical as operators and end users are about to make decisions about whether to invest in diesel or electric locomotives for running services into WICET.

3. Objectives of access arrangements

Part 5 of the QCA Act sets out the guiding principles for access arrangements and access pricing. These include the objective of the third party access framework in Part 5 and pricing principles which are to guide the setting of prices in an arbitration or under an access undertaking.

The access arrangements relating to the declared service include access to the electric network, as reflected in QR Network's Access Undertaking. They need to support the overarching objective of the access regime in Part 5 of the QCA Act. This objective is as follows:[1]

"The object of this part is to promote the economically efficient operation of, use of and investment in, significant infrastructure by which services are provided, with the effect of promoting effective competition in upstream and downstream markets".

This objective makes it clear that the access framework is intended to promote competition for the purpose of promoting social efficiency gains, and not to promote competition for competition's sake. This is an important consideration as it indicates that the QCA should have close regard to the implications of its regulatory decisions on the economically efficient operation and use of infrastructure as a primary objective.

The pricing principles in the QCA Act also provide an important guide to regulatory price setting. Relevant principles here include that access prices should:[2]

"(a) generate expected revenue for the service that is at least enough to meet the efficient costs of providing access and include a return on investment commensurate with the regulatory and commercial risks involved;

(b) allow for multi-part pricing and price discrimination when it aids efficiency;

(c) not allow a related access provider to set terms and conditions that discriminate in favour of the downstream operations of the access provider or a related body corporate of the access provider, except to the extent the cost of providing access to other operators is higher; and

(d) Provide incentives to reduce costs or otherwise improve productivity."

It is important that, in proposing an access framework to apply in relation to alternate traction choices, QR Network's proposals are consistent with the objects clause and the pricing principles. It is also critical that the QCA assesses these proposals in terms of how well they achieve the objects of the QCA Act, and whether they are consistent with the QCA Act pricing principles.

In this context, it is important to establish upfront a clear picture of what the access arrangements need to achieve in order to be consistent with the QCA Act objects clause.

3.1 What traction choice is most economically efficient?

The first limb of the QCA Act objects clause is:

"… to promote the economically efficient operation of, use of and investment in, significant infrastructure by which services are provided …"

---

1 QCA Act, cl. 69E
2 QCA Act, cl. 168A

In order to ensure that the access arrangements offered for different traction types best align with the QCA Act objects clause, the first issue to examine is the implications of traction choice on the nature, cost structure and performance of the infrastructure by which the rail services are provided.

This objective requires the QCA to consider whether the proposed changes will promote:

- the economically efficient use of the below rail network;
- the economically efficient operation of the below rail network; and
- the economically efficient investment in the below rail network.

This cannot be measured by looking at the below rail network in isolation. The network will be operated and used in an economically efficient manner if it is operated and used in a way that reduces the overall cost of rail haulage (i.e. if users are encouraged to make the most efficient traction choice). Investment in the network will be efficient if that investment results in the lowest overall cost of rail haulage (i.e. if QR Network is encouraged to make the most efficient investment decisions).

In considering this issue, it is important to note that the alternate traction modes have very different trade-offs between above and below rail costs. The key areas of trade-off are:

- electric traction requires substantial below rail investment in power supply and distribution infrastructure, but this is countered by lower above rail costs (eg. due to faster cycle times, lower energy costs and different maintenance regimes for electric traction);
- electric and diesel locomotives will have different performance characteristics which may lead to different train performance characteristics (eg. acceleration, braking, speed on grades). This in turn has implications for the extent of below rail track infrastructure that needs to be installed – trains with lower performance create congestion on the network and will therefore require a greater level of installed below rail capacity.

Electric and diesel traction are effectively different technologies that can be used by rail operators to provide their rail haulage services. As the different traction options involve quite different trade-offs between above and below rail costs, the most relevant focus for the assessment of the economically efficient outcome is to consider the whole of the rail haulage service. There is little point in pursuing the lowest below rail cost solution if this does not translate to the lowest overall sustainable cost of haulage. Importantly, this is the outcome that the end customers of the service are seeking.

Economic efficiency in relation to the operation of, use of and investment in below rail infrastructure will be promoted by decisions that (assuming the same service quality in terms of regularity, reliability and scheduling of services is provided by both traction types) will provide the lowest cost for the rail component of the supply chain (ie. above and below rail combined) to mining customers. The rail haulage solution that achieves the lowest total cost will therefore reflect the most efficient operation and use of below rail infrastructure, consistent with the intent of the rail access regime. This in turn will be the solution that will best promote competitiveness in the related market of coal production. This enhancement of competitiveness in the upstream coal production market will promote investment in mining and associated infrastructure by allowing for the exploitation of more marginal resources, and thereby enhancing social economic welfare.

The rail haulage solution that achieves the lowest total rail cost reflects the most economically efficient operation and use of the below rail infrastructure.

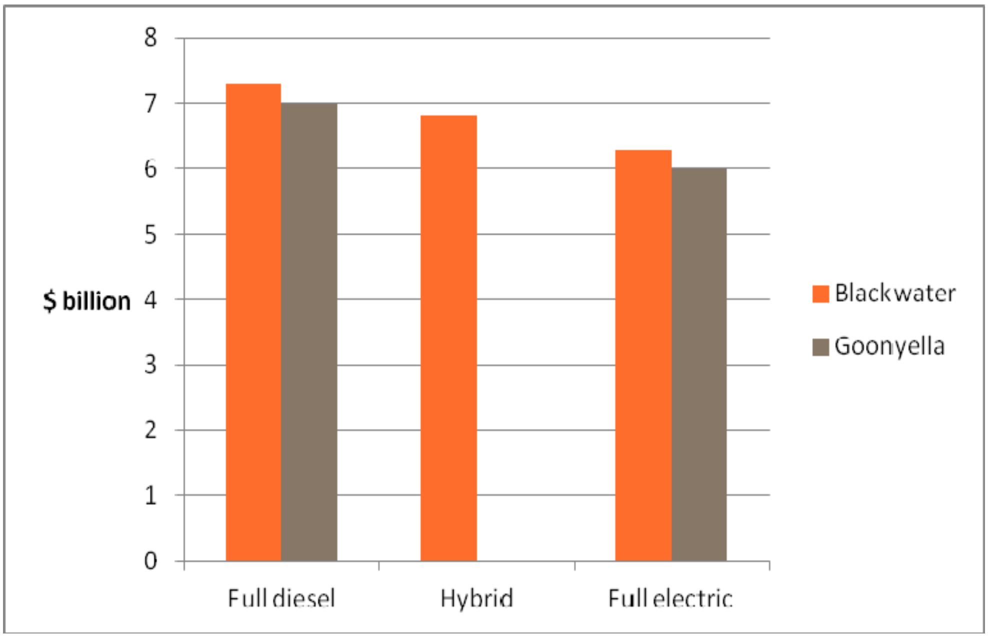
For both the Goonyella and Blackwater systems, maximising the investment in, and use of, electric traction will provide for the lowest total rail cost to the mining industry.

QR Network has conducted a comprehensive analysis of delivering a rail haulage service using electric versus diesel technology. The assessment has been made based on the Total Cost of Ownership, which primarily comprises capital, operating and maintenance costs, as this will drive the prices charged to users. As the relative efficiency of each traction type needs to be considered from both an above and below-rail perspective the analysis has been done on a whole-of-rail system basis.

Three scenarios have been evaluated, being a ‘full electric’ case, a ‘full diesel’ case and a hybrid case. The latter is of particular relevance in the Blackwater system and reflects the mix of traction types that can currently operate in that system. The analysis has been conducted over a 30 year period, with cashflows discounted to a present value using a pre-tax Weighted Average Cost of Capital. Over the horizon of the analysis, throughput has been assumed to increase from 86 Mtpa to 290 Mtpa in Goonyella, and from 69 Mtpa to 156 Mtpa in Blackwater. While these volume increases are large, when viewed in light of the expansion plans of the Queensland coal industry, they are in fact quite conservative.

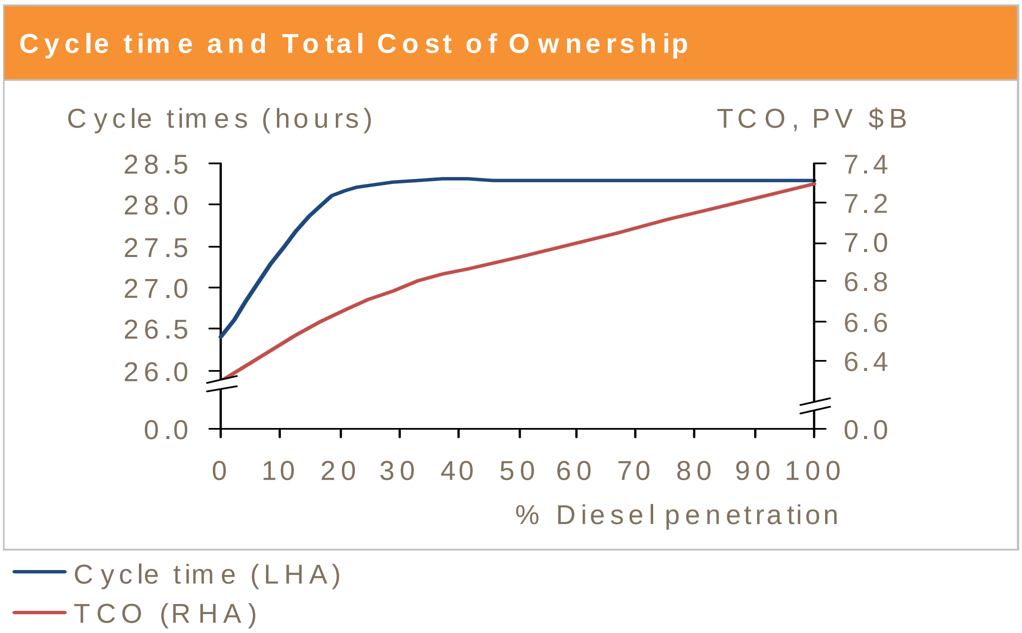
The analysis shows that electric traction has a clear inherent advantage over diesel traction, with the TCO of the full electric scenario being approximately $1 billion below the TCO of full diesel in both systems. The TCO for each case is as follows.

Figure 1: Total Cost of Ownership ($billion)



The main drivers of the differences are a full electric system's higher throughput and speed efficiency. Electric consists can operate at a faster cycle time, which in turn reflects advantages in faster section run times, acceleration and fewer provisioning requirements. This is shown in the figure below.

Figure 2: Cycle time and Total Cost of Ownership: Blackwater



The key cost driver of the TCO difference is in above-rail capital and operating costs. The most significant difference is energy costs, which are materially lower for electric traction, reflecting more efficient utilisation of energy and the shorter cycle times (after considering the impact of the carbon tax on energy prices). Above-rail capital costs for electric are also lower, reflecting the fewer number of consists required to haul the same tonnes, as well as the requirement for one less locomotive per consist.

As would be expected, below-rail expenditure for an electric system is higher than diesel (based on the incremental cost of installing and maintaining electric network infrastructure). However, when the TCO is examined on an integrated basis, this is more than offset by the relative efficiencies of operating electric consists compared to diesel (putting aside other benefits such as environmental benefits). Investment in electric network infrastructure is therefore necessary in order to enable these benefits to be realised. Overall, this directly translates into lower total haulage costs for users. The conclusions of this analysis remain robust to changes in the key assumptions that drive the inherent advantage of electric over diesel traction.

The TCO for the full diesel scenario includes $400 million of Powerlink break costs in Blackwater and $220 million in Goonyella. If these costs are excluded, there is still a material cost advantage for the full electric scenario. The above numbers do not include the impact of asset impairment if the systems transitioned to full diesel. This would have a material and adverse impact on QR National, QR Network and other operators who have invested in electric assets.

This analysis confirms an unequivocal advantage for electric over diesel traction from a whole-of-rail system perspective. Hybrid operations clearly reduce costs relative to the full diesel scenario but are not the lowest cost traction type for the system. In saying this, QR Network is not proposing that the Blackwater system should be transitioning to full electric. What this does show is that if electric trains are unable to fully exploit their inherent advantage in a hybrid system, these efficiency benefits will rapidly diminish. This will be the case if diesel utilisation occurs at substantive levels in either the Blackwater or Goonyella systems.

A more detailed overview of this analysis is provided in Appendix A. As noted above, this assessment is supported by a comprehensive, whole of rail system analysis. In undertaking this analysis QR Network recognises that the key conclusions need to hold firm regardless of the identity of the rail operator. That is, what is the solution that delivers the lowest cost to customers without being contingent on any specific strategies that have been, or may be, employed by QR National's coal haulage business. At the same time, the analysis must also be based on realistic and relevant data, which QR Network can more readily source from QR National. Sensitivity analysis has then been used to determine the extent to which outcomes are sensitive to key above rail inputs. As a result, QR Network's TCO analysis contains highly confidential information relating to QR National's coal haulage business.

QR Network acknowledges that the QCA and industry stakeholders need to be confident that they can rely on the conclusions of this assessment. As such, QR Network will be happy for the QCA to subject the TCO analysis to detailed review and validation. However, in order to protect QR National's confidential information, QR Network requires that this review be undertaken for the QCA by a consultant, the identity of whom is satisfactory to QR National, and who will enter into a confidentiality arrangement direct with QR National in relation to this information.

In summary, promoting the maximum feasible utilisation of the electric network, and encouraging further investment in electric traction capacity in the Blackwater and Goonyella systems, will increase productivity and promote 'least cost' solutions for the mining industry. This is the economically efficient outcome which, in accordance with the objects clause established in the QCA Act, should be promoted through the access arrangements.

Maximising the use of and investment in electric traction for both the Blackwater and Goonyella systems will promote the least cost rail haulage solutions for the mining industry, and therefore reflects the most economically efficient outcome.

3.2 Implications for competition

The second limb of the Part 5 objective is:

"… with the effect of promoting effective competition in upstream and downstream markets."

The expectation of the objects clause is that, by promoting efficient use of and investment in infrastructure by which services are provided, competition in related markets will be promoted also. In essence, the objects clause envisages that efficient investment and utilisation of infrastructure is a precursor to promoting competition in upstream and downstream markets.

Relevant upstream and downstream markets include: coal tenements; seaborne coal sales; above rail haulage; and port terminal coal handling services. Of these markets, the above rail haulage market is the market that is most directly affected by the access arrangements applying to traction choices. QR Network does not consider that there will be any adverse impact on competitive conditions in the haulage market by adopting an access framework that provides an incentive for the most economically efficient outcome (ie. maximising the use of electric traction). The haulage market encompasses both diesel and electric services, which are effective substitutes for each other. This is evidenced by the mix of diesel and electric services operated by both QR National and Pacific National in CQCR.

Critically, the haulage market is already a competitive market, with competition between operators effectively constraining any ability to exercise market power. Further, there are no material barriers to entry for the use of electric traction by operators providing haulage services compared with the use of diesel traction. There is an established market for the purchase of narrow gauge electric locomotives suitable for heavy haul transport services, both within Australia and internationally[3], and rail operators can maintain electric locomotives, either through developing this capability internally, or through sourcing maintenance services from external providers. In addition, the geographic scope of the electrified network covers the majority of the Queensland coal haulage market, therefore also providing operators with scope to relocate electric locomotives if rail haulage contracts are not renewed upon expiry, minimising barriers to exit for the market.

Given that Pacific National has entered the Queensland rail haulage market using both diesel and electric hauled services, this provides strong practical evidence that there are not unduly high barriers to entry for electric services.

If it were considered that, by promoting the use of electric traction in the Blackwater and Goonyella systems, operators would face additional barriers to entry to the haulage market, then this runs counter to the decision to include the electric network in the declaration in the first place. If there were barriers to entry for the use of electric services such that stakeholders were concerned that effective competition could not be achieved using electric services, then it would be unlikely that providing regulated access to the electric network would in fact promote competition in the rail haulage market. That is, the declaration of the electric network should itself be reviewed, as this would mean that it is unlikely that the 'promotion of competition' criteria would be met.

Providing incentives for the use of electric train services will not have an adverse impact on competition in the rail haulage market (i.e. it is neutral) and will promote competition in other dependent markets, because it will lower the overall cost of rail haulage.

A more detailed overview of related markets and competition impacts associated with QR Network's proposals is given in Appendix B.

3.3 What this means for access arrangements

In order to best support the objectives of Part 5 of the QCA Act, the access arrangements for different traction types should:

- promote the utilisation of electric traction in the electrified systems (Goonyella and Blackwater), as this will minimise the overall costs of the rail system to coal haulage customers; and
- allow operators the choice of whether to provide services using diesel or electric locomotives, but the access charge for diesel trains should efficiently signal the costs of that choice by reflecting the full costs imposed on the rail system by the operation of those diesel trains.

Signalling the true costs of choosing to run diesel trains is critical to efficient cost-reflective pricing. If the full impact of traction choice on total system costs is not reflected in the pricing of diesel services, then this will distort competition in the haulage market and result in inefficient outcomes from an economic welfare perspective. As such, a failure to take account of the 'external' costs imposed by diesel services (ie. costs that are imposed on the rail system but not borne by the operator or end customer) will fail to promote the overarching objective of access, namely to promote efficient use of and investment in infrastructure. Fully cost-reflective pricing for both diesel services operating on an electrified system will promote efficient outcomes.

[3] In March 2011, Transnet Ltd finalised a contract with Mitsui & Co for the purchase of 32 new electric locomotives (valued at US$230m) for use in the haulage of iron ore in South Africa. This is in addition to 154 electric locomotives purchased by Transnet Ltd from Mitsui & Co between 2006-2008.

QR Network's view is that each access seeker should be charged cost reflective prices – that is, prices that vary in accordance with changes in the cost or risk of providing access. This is consistent with the approach in QR Network's Access Undertaking. In principle, the cost that any access seeker should bear is the incremental cost of meeting their demand while simultaneously preserving the contracted level of access to all other users of the system.

Matching private costs (ie. those charged to an operator via access charges) and social costs (ie. the costs imposed on the rail system) is a pre-requisite of an efficient access regime.

4. Problems with current access arrangements

Even though electric trains offer the lowest total system transport cost for both the Blackwater and Goonyella systems, if the AT5 + EC charge creates an outcome that, for the marginal train, means that diesel traction offers a cheaper solution, use of diesel traction will be encouraged, leading to higher overall costs for the coal industry.

During the 2010 AU, the AT5 + EC charge for the Blackwater system has in fact been at a level that has meant that diesel traction appears to be comparable to electric. When high revenue cap adjustments to AT5 are added to this, diesel traction actually appears cheaper than electric. This is the case even though it has been clearly established that maximising the use of electric traction in the Blackwater system will lead to the lowest overall rail haulage cost.

In economic terms, the private costs to the access seeker using diesel traction do not reflect the social costs – that is, the overall cost to the rail system – of that technological choice. In order to achieve the lowest privately incurred cost, rail operators are incentivised to invest in, and operate, diesel locomotives on the Blackwater system. It is apparent that the pricing arrangements for alternate traction choices under the current access arrangements do in fact distort the decision regarding traction choice in favour of diesel trains.

This has been the result of a combination of factors:

- diesel trains are not being charged for all of the costs that they impose on the network, creating inefficient incentives to use diesel trains. There are unpriced negative externalities within the rail system associated with use of diesel; and
- the approach used for pricing for use of the electric network does not properly align the costs with the benefits from usage of the electric network.

A detailed discussion on the specific elements leading to the ineffectiveness of the current access framework, and proposals to address these elements, are detailed in the next sections of this submission.

5. Sources of underutilisation of the electric network

Appendix A demonstrates that maximising the utilisation of electric traction in both the Blackwater and Goonyella systems will provide the most efficient outcome, as it will lead to the lowest total rail transportation cost for end customers. However, achieving this lowest rail transportation cost outcome is heavily dependent on the choices that rail operators make when investing in and operating their locomotive fleet. These choices will determine the actual level of utilisation of the electric network.

There are a range of reasons why the electric network may not be utilised to its full capacity. As noted above, the approach used for determining access arrangements for alternate traction choices does not properly align the private cost borne by operators with the total cost imposed on the rail system due to those choices. This has the result of promoting inefficient underutilisation of some parts of the electric network.

Prior to discussing the specific strategies that QR Network has incorporated into the DAAU to address this issue, it is useful to first identify the key current or potential sources of underutilisation of the electric network, and whether these are likely to be influenced by the misalignment between the private and system costs of different traction choices.

5.1 Coal volume variability

Historic records show that there is significant variability in the volume of coal railed on the coal systems and that, in aggregate, total actual coal railed has tended to be below contract volumes. Railings below contract will occur for a variety of reasons, including issues associated with coal supply, shipping demand, weather events and supply chain infrastructure availability. A further issue that impacts on the extent to which actual coal volumes reflect contracted volume is the risk preference of the contracting customer, i.e. whether they have contracted for the volume they expect to rail on a regular basis, or whether they have contracted for a level of volume that allows them some surge capacity.

As rail network capacity (including electric network capacity) must be installed by QR Network to supply its contracted volume commitments, actual utilisation of the network at a level below contracted volumes will result in some underutilisation of rail network and electric network capacity.

It is important to recognise that this potential source of underutilisation of the electric network is independent of traction choice. As a result, it is not likely to be influenced in any way by the extent of alignment between the private and system costs of different traction choices.

Previous regulatory reviews have considered in detail how reference tariffs should be set and applied to deal with coal volume risk. It is now accepted that end customers are best placed to manage most coal volume risk, and this was reflected in the 2007 change in QR Network's underlying form of regulation to a hybrid revenue cap, rather than a hybrid price cap.

The risk of underutilisation of the electric network resulting from coal volume variability is best managed by end customers - as has previously been established in QR Network's regulatory reviews.

5.2 Efficient locomotive fleet mix

The most productive use of the electric network will be achieved where 100% of services that can feasibly be operated with electric trains (i.e. services that operate from an electrified origin to an electrified destination) are run as electric services. This is because the electric network costs are largely fixed, and the marginal cost to the electric network from the operation of an additional electric train is low.

However, it will not necessarily be efficient for an operator to invest in and maintain an electric locomotive capacity at a level that allows for 100% utilisation of the electric network (i.e. the situation where all feasible electric train services are actually run as electric train services).

An important issue for an operator to consider is identifying which locomotive fleet (including which mix of electric and diesel locomotives) will give that operator its least cost means of reliably providing its required rail haulage task.

The operator will determine its baseload locomotive requirements, taking into account the train services that it needs to provide and the cycle time that it expects to achieve, as well as an amount of surplus or buffer locomotive capacity, which is required for a range of reasons:

- to ensure continuity of operation in the event of locomotive unavailability (eg due to maintenance requirements, incidents or failures);
- to accommodate variation in network availability (eg as the result of major periodic maintenance); or
- to accommodate volatility in demand.

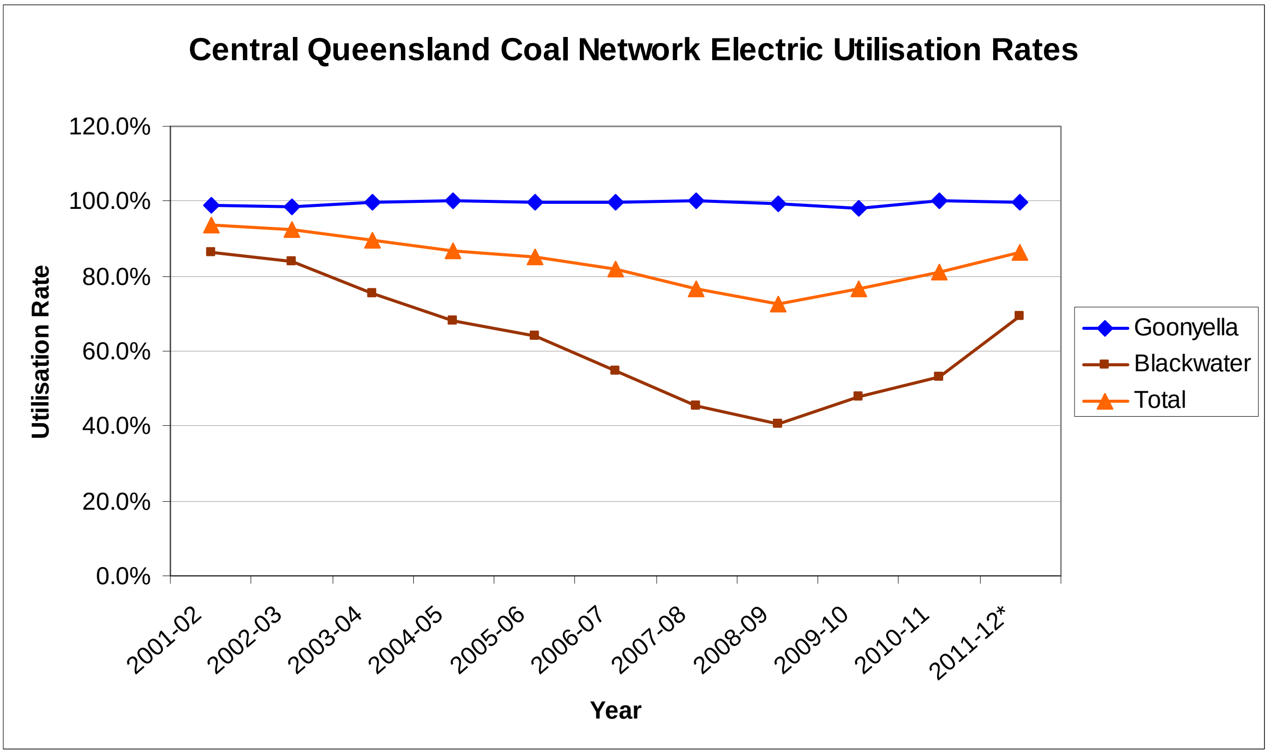
This buffer locomotive capacity is likely to have a lower utilisation than the baseload locomotive capacity. However, the rail operator will seek to optimise its locomotive fleet across its entire rail haulage task so that the buffer capacity is provided in the way that maximises its potential utilisation.

From an overall locomotive fleet perspective, in a network that includes both electrified and non-electrified systems, this buffer capacity is likely to be carried at lowest cost using diesel locomotives. This is primarily because diesel locomotives can be more flexibly deployed over both the entirety of the coal systems and beyond to other freight networks in Queensland, therefore having greater opportunities for utilisation. In addition, the higher capital cost of electric locomotives relative to diesel may make them more expensive than diesel at the lower utilisations expected on back up or reserve haulage capacity (although this will be offset somewhat by the fewer number of electric locomotives per consist).

Given these considerations, the lowest cost locomotive fleet mix for an operator is likely to be electric locomotives for baseload locomotive capacity on the electric network (i.e. locomotives that are expected to operate at high utilisation levels on the electrified network) and diesel locos for buffer capacity (i.e. locomotives that are expected to swing between systems to address short term variations in locomotive requirements). The optimal fleet mix is therefore likely to one that results in less than 100% utilisation of feasible electric paths.

This cost tradeoff is evident even in a single operator system. For example, when Queensland Rail was the vertically integrated monopoly provider of rail haulage services in central Queensland, it continued to operate a limited number of diesel services on the electrified network. Figure 3 shows historical electric utilisation rates for electrified origin to destination services up to 2011-12 YTD.

Figure 3. Historical Electric Utilisation Rates



* year to date utilisation rate, measured up to 30 November 2011

For the period between 2001-02 to 2003-04, total network utilisation rates were at or above 90%. Beyond 2004, two key factors influenced the electric utilisation rate – rapid growth in total coal volumes and the Queensland Rail rollingstock refurbishment program, both of which occurred over the period of 2004-2010.

Queensland Rail's rollingstock refurbishment plan reflected a major reinvestment in its electric locomotives. As part of this plan, near life expired electric locomotives were progressively withdrawn from the fleet and subjected to major refurbishment, which resulted in the locomotives having a performance capability and remaining life comparable to new electric locomotives. The overall growth rate for coal exports also increased markedly over the 2004-2010 period, so the impact on total electric utilisation from Queensland Rail progressively withdrawing electric locomotives for refurbishment, and using more readily available diesel locomotives to meet the overall demand, was magnified. Importantly, the diagram above also shows that the Goonyella system users have not experienced any reduction in utilisation rates while the aggregate level of electric rollingstock capacity fell below overall demand for train services – the utilisation of buffer diesel capacity has been entirely directed to the Blackwater system.

The data also shows that utilisation levels are increasing with completion of the rollingstock refurbishment program and investment by operators in additional new electric rollingstock capacity. While utilisation levels remain below the long-run efficient utilisation rate, they are expected to increase once the Blackwater electric capacity upgrade is complete in 2012, and restrictions on electric train numbers in the Blackwater system are lifted. However, it is uncertain whether, without regulatory changes, they will be returned to or maintained at the long run efficient level.

It is important to recognise that the way that access charges are applied for alternate traction choices will influence this utilisation rate. Figure 3 shows the substantial decline in electric utilisation rates that occurred over the period of Queensland Rail's rollingstock refurbishment program from 2004-2010. The phased withdrawal of electric locomotives for refurbishment, and the use of more readily available diesel locomotives to provide replacement locomotive capacity, was an efficient way to manage rollingstock resources. However, pricing arrangements that passed the costs of lower electric utilisation directly to the operator may have incentivised an alternate asset management strategy with a lower impact on electric utilisation. Further, if the access charging arrangements for diesel trains do not reflect the full cost that they impose on the rail system, this will reduce the apparent cost of diesel trains and will be likely to increase the proportion of the fleet that operators maintain as diesel locomotives.

Pricing must reflect the efficient utilisation level of an electric network as the result of the need to maintain buffer locomotive capacity.

5.3 Operator preferences for locomotive fleet flexibility

It is important to recognise that the life of locomotives is significantly longer than the typical term of a rail haulage contract. Therefore, when making locomotive investment decisions, rail operators will consider both their preferred traction type to provide their current rail haulage task, as well as the flexibility to reallocate those locomotives to other services should contracts expire and not be renewed. Operators will consider their likely market share both within the electrified network, the broader CQCR and other narrow gauge rail networks.

The vast majority of the bulk haulage task on Queensland's narrow gauge railway networks is operated on QR Network's electrified coal systems, and this haulage task is continuing to grow. Therefore, there are substantial opportunities for operators to reallocate electric locomotives within these systems. However, diesel locomotives offer a broader geographic scope over which they can be reallocated than do electric locomotives. As a result, rail operators may wish to retain diesel locomotives for a portion of their services on the electric network in order to retain the maximum flexibility to reallocate those locomotives as rail haulage contracts expire.

In addition, as the electrified systems are connected with non-electrified systems, operators may see additional benefits from maintaining a more flexible locomotive fleet in order to maximise their ability to capitalise on short term commercial opportunities.

These factors may lead operators to prefer to invest in diesel locomotives to provide part or all of their baseload locomotive capacity in the electrified systems.

The way that access charges are determined and applied for electric trains, and the way that they are differentiated between diesel and electric trains will be critical factors for operators in making these decisions. If the private costs borne by operators in choosing a particular traction type are not aligned with the costs that are imposed on the rail system as a result of that choice, the fleet investment decisions made by individual rail operators will impact on the costs borne by all other users in the rail system.

If the private and system costs of different traction choices are not aligned, operators may derive private benefits with the resulting cost to the rail system being borne by other users of the system.

5.4 Operational deployment decisions

Once an operator has made its decision on what mix of locomotives it will include in its locomotive fleet, it will still need to make decisions on a daily basis about how it deploys its locomotive fleet in order to provide its required rail haulage task.

Where total coal volumes required to be railed by the operator are less than the operator’s rail haulage capacity, the operator can choose whether to deploy a diesel or electric train. In this instance, the incremental cost to the rail system of the operator deploying an electric train is very low compared to deploying the diesel train. However, if the access arrangements applicable for the electric train do not reflect this low incremental cost (as presently occurs as the operator is able to completely avoid paying the AT5 access charge by not running an electric train), the costs borne by the operator may actually encourage it to deploy diesel trains in preference to electric.

This pricing structure could encourage high variability in utilisation of the electric network, and significant difficulty in accurately forecasting electric utilisation. These operational deployment decisions will therefore impact on the costs borne by all other users of the electric network.

The access framework should signal to operators the low incremental cost associated with deploying electric trains.

6. Proposal – electric access charges to reflect network benefits

QR Network proposes in the DAAU to amend the 2010 AU to ensure that electric access charges reflect the network benefits that flow from the use of electric services on the system.

6.1 Existence of network benefits

As demonstrated above, to maintain an efficient level of utilisation of electric locomotives, it is expected that less than 100% of feasible electric train services will actually operate as electric train services across the entire electric network. Some level of underutilisation reflects an efficient use of the electric network, and is expected to occur for whatever size and capacity of electric network that is available. However it is important to recognise that this underutilisation will not necessarily present evenly throughout the electric network.

One of the key benefits of the electric network for operators is that, given the electrified network incorporates both the Blackwater and Goonyella systems (which covers the majority of train services operated on the CQCR), they have the flexibility to deploy their rollingstock fleet in the most commercially beneficial way. The access framework does not tie the use of specific locomotives, or types of locomotives, to particular train service entitlements or geographic areas. Therefore, once an operator has determined the appropriate mix of electric and diesel locomotives to include in their fleet, they can then choose to deploy this fleet in the most productively efficient way.

Historically, it has been more productive for operators to run all train services in the Goonyella system using electric locomotives. Allocating only electric locomotives to the Goonyella system has the following benefits for operators:

- it avoids introducing congestion into the Goonyella system as a result of multiple train types with different performance characteristics. As diesel trains already operate on the Blackwater system, this additional congestion cost is already present on that system; and
- the operating cost differential between diesels and electrics is considerably wider in Goonyella. While this is the result of a number of reasons, a major factor is that the electric access charge is significantly lower in the Goonyella system than in the Blackwater system.

As Goonyella and Blackwater operate as interconnected systems, this has meant that Goonyella typically runs 100% of feasible electric train services with electric trains. In the event that buffer capacity is required for Goonyella, electric locomotives can be diverted from Blackwater, allowing the maintenance of the 100% electric traction on Goonyella. Any shortfall in capacity on Blackwater resulting from this switching is managed through reserve diesel traction on that system (which can be managed jointly with the adjoining diesel-only Moura system). Consequently, backup capacity for Goonyella is effectively held in the form of diesel capacity on the Blackwater/Moura systems. The effect of this allocation of rollingstock is shown in Figure 4 below.

Figure 4: Effect of rollingstock allocations on electric utilisation rate

Indicative Scenario	Goonyella	Blackwater	Total CQCR
Required train consists to run on feasible electric paths for contracted volume	45	24	69
Baseload train consists (90% of all consists for system)	41	22	63
Rollingstock allocation	45	19	63
Electric utilisation rate	100%	79%	91%

This outcome can clearly be seen in Figure 3 above, which shows electric utilisation rates for the Goonyella and Blackwater systems for the last ten years. That diagram shows that the Goonyella system users have not experienced any reduction in utilisation rates while the aggregate level of electric rollingstock capacity fell below overall demand for train services – rather the utilisation of buffer diesel capacity was entirely directed to the Blackwater system.

This arrangement is the most productively efficient given current operating and access arrangements – that is, it provides for the lowest overall cost – in that it allows 100% utilisation of electric traction in the system which has the lowest electric train operating costs and, further, allows scale economies in the provision of reserve locomotive capacity to be secured across the combined Goonyella-Blackwater-Moura systems, rather than individual systems.

It should be recognised however that the most productively efficient allocation of locomotives may change with changing circumstances. For example:

- the connection of the non-electrified Newlands system into the Goonyella system via GAPE may be expected to result in the introduction of diesel trains for some Goonyella system services - over time, this connection with Newlands will have implications for the operators' preferred traction mix in the Goonyella system; or
- if diesel penetration in the Blackwater system increased to the extent that QR Network no longer provided an electrified network in Blackwater, then reserve locomotive capacity in the Goonyella system would be likely to be held as diesel.

6.2 Proposal

QR Network is proposing to amend the 2010 AU to introduce a single whole of network AT5 charge. Under this approach, the Network AT5 charge will be determined based on the total costs and total forecast utilisation of the electric network as a whole, rather than of individual geographic components of the electric network. This will mean that:

- total electric network costs will reflect the combined cost base for the Blackwater and Goonyella systems;
- total forecast electric network utilisation will reflect the combined forecast electric network utilisation for the Blackwater and Goonyella systems; and
- the revenue cap associated with AT5 will also operate on a network basis, rather than for individual geographic components of the electric network.

This network-wide approach to pricing of electric traction was proposed by QR Network in the development of the 2010 AU. The proposal was not accepted by the QCA at that time on the basis that:

- the QCA considered it was incongruous that the investment could be efficient and required, yet at the same time need to be combined with the Goonyella system asset base in order to reduce the price effect of the investment;
- the QCA did not accept the assertion that combining tariffs for the two systems was necessary for QR Network to invest in electric infrastructure in Blackwater; and
- the QCA accepted that heavier utilisation of Goonyella electric assets tends to result in lower prices relative to Blackwater. However, it noted that this was also true for track infrastructure, yet there was no proposal from QR Network to amalgamate those non-electric assets.

Critically, QR Network considers that in reaching these conclusions, the QCA did not take adequate account of the presence of network effects that influence traction choice. In particular, the QCA did not take adequate account of the risk that, by not taking network effects into account in the development of AT5 tariffs for Blackwater and Goonyella, the resulting price may render investment in electric assets in Blackwater uneconomic due to the incentives that are created for operators/end users to bypass the electric network by using diesel locomotives. This outcome means that, even though the investment in electric traction is efficient (in that it is necessary to achieve the lowest total rail haulage cost) the network is not operated or used efficiently, in that the access regime creates incentive for inefficient bypass, producing a more costly rail haulage product. In effect, the current pricing approach fails to reflect the network benefits to Goonyella users of QR Network's investment in electric assets in the Blackwater system, with the result that prices are distorted in such a way as to discourage efficient investment in electric assets.

In light of the legislative principles that must underpin the QCA's assessment of this proposal, there is a valid case for amending the AT5 methodology to take account of these network effects of traction choice. This is elaborated in the next section.

6.3 Consistency with requirements of QCA Act

Section 138 of the QCA Act provides that, in assessing a draft access undertaking, or a draft amending access undertaking, the QCA must have regard to a number of matters including:

- the objects of part 5;
- the pricing principles set out in section 168A;
- the legitimate business interests of the owner or operator of the service (and, if these are different entities, that the legitimate business interests of the operator are protected);
- the interests of persons who may seek access to the service, including whether adequate provision has been made for compensation if the rights of users of the service are adversely affected; and
- the public interest, including the public interest in having competition in markets (whether or not in Australia).

QR Network submits that its proposal to introduce a single whole of network AT5 tariff is consistent both with QR Network's legitimate interests, the interests of access seekers and holders and also the public interest in competition and the efficient allocation of resources. This proposal, by promoting efficient investment in and use of rail infrastructure and by taking proper account of the costs and risks to QR Network in providing an electrified network across both Goonyella and Blackwater, is consistent with the pricing principles and the objective of the access regime in Part 5 of the QCA Act.

6.3.1 Object of third party access framework

As outlined above and detailed in Appendix A, maximising the use of electric traction creates the least cost solution to providing rail haulage services to the market for seaborne coal. As there are good reasons, based on efficient locomotive utilisation, why operators will retain some diesel locomotives to run on the electric network (discussed above), it is unlikely that utilisation of 100% of the entire electric network will be achieved. Given that Blackwater electric locomotives effectively provide the reserve locomotive capacity for the Goonyella system, diesel locomotives operating on Blackwater effectively provide the reserve locomotive capacity for the entire electric network.

Clearly, in deciding how they will invest in and operate electric trains, operators take account of the opportunities for utilisation of those locomotives over the entire electric network, not just on specific geographic segments of the network. Despite this network benefit, the current pricing approach makes no allowance for this. Rather, unit access prices (per egtk) for access to the electric network are determined by dividing the total fixed costs of the below rail electric assets on an individual system by the total electric hauled volume on that system. Because the Goonyella system achieves utilisation rates of 100% but (given the use of buffer diesel locomotives) the Blackwater system achieves significantly lower utilisation rates, this effectively results in "overcharging" Blackwater and "undercharging" Goonyella.

This current approach is inefficient even on a static basis, as it increases the cost of rail haulage on the Blackwater system for all Blackwater users. However, on a dynamic basis it is doubly inefficient. The higher electric traction charges on Blackwater make electric traction less attractive on that system, further encouraging operators to maximise the number of electric locomotives allocated to the Goonyella system. This reduces demand for electric traction in Blackwater, which in turn raises the unit access charges for electric traction in that system. This further decreases the attractiveness of using electric traction in Blackwater.

The eventual consequence of this is that the access pricing regime is likely to prevent the achievement of scale efficiency in the provision of back-up and top-up locomotive capacity across the combined networks and will frustrate the development of the least cost mix of technologies on the Blackwater system. These factors will result in significantly higher coal haulage costs for the mines. This outcome is inconsistent with the objective of the regime, namely to promote efficient use of and investment in rail infrastructure.
In order to prevent this outcome, it is essential that the impacts of economically efficient underutilisation of the electric network are directed in a way that minimises the potential to create an inefficient incentive for operators to run diesel locomotives in preference to electrics. In doing so, the access framework will promote the most efficient outcome, which is to maximise the utilisation of electric traction in both the Blackwater and Goonyella systems.

QR Network considers that adopting a Network AT5 tariff will be the most effective way of setting the electric access charge in order to achieve this outcome.

6.3.2 Pricing principles

QR Network acknowledges that it is critically important that the resulting network AT5 tariff remains consistent with the pricing principles established in section 168A of the QCA Act. Reiterating the relevant pricing principles, the access prices must:

"(a) generate expected revenue for the service that is at least enough to meet the efficient costs of providing access and include a return on investment commensurate with the regulatory and commercial risks involved;

(b) allow for multi-part pricing and price discrimination when it aids efficiency;

(c) not allow a related access provider to set terms and conditions that discriminate in favour of the downstream operations of the access provider or a related body corporate of the access provider, except to the extent the cost of providing access to other operators is higher; and

(d) Provide incentives to reduce costs or otherwise improve productivity."

Importantly, these pricing principles do not constrain the price that QR Network is entitled to apply to users of the electric network in the Goonyella system. The pricing principles reflect the broader economic objectives, in that they must be *at least* sufficient to ensure that the access provider can generate expected revenue to meet the *efficient costs* of providing access to the declared service, and that they should provide incentives to *reduce costs or otherwise improve productivity*.

The proposal to charge a Network AT5 is supported by the pricing principles. The pricing principles ensure that the provider of a regulated service is able to recover the efficient costs of its investments, and allow prices to be set to support this outcome in the least distorting way (as average cost will almost always exceed short run marginal cost). Put another way, this means that the pricing principles allow QR Network to set access charges for the electric network as a whole, even if this has the effect that revenues from users of the electric network in the Goonyella system exceed the efficient costs of providing that portion of the electric network, provided that this promotes efficiency by creating the minimum distorting incentives for operators to use diesel services on the electrified network.

The proposal to apply a Network AT5 may give rise to concerns about whether this creates a cross-subsidy from Goonyella users to Blackwater users. In this regard, the literature on this issue concurs that a cross subsidy could only occur where the price for the Goonyella users (adjusted for any network effects) exceeds:

- the current replacement costs of the Goonyella electric network; and
- the operating costs associated with maintaining the Goonyella electric network on a stand-alone basis.

Effectively, this test is aimed at identifying the price at which an alternate user could replicate the service and is the price that would prevail under workable competition. The current Goonyella AT5 charge reflects fully distributed costs under a building block model based on historical sunk costs for that geographic component of the network. The resulting price is not reflective of the costs associated with replacing the current service capability, nor is it reflective of the cost which will give rise to incentive to bypass the service.

Accordingly, the Network AT5 charge will only result in a breach of these pricing principles if it would result in the AT5 charge on the Goonyella system being set at a level could promote bypass of the system, either because it exceeds the cost of replacing the system, or because it promotes the use of diesel services to bypass the electric network. QR Network does not consider that this outcome is likely to occur from the adoption of a single network AT5.

Similar principles are reflected in the National Electricity Rules, where geographical averaging occurs for the total recovery of the allowable revenue, but provides that incremental costs that arise in one geographic location can be allocated to existing users in other geographical locations, where the incremental costs exceed the historical roll-forward costs in the Regulatory Asset Base. This is permitted as it is considered to promote the objectives of the National Electricity Market.

QR Network considers that a Network AT5 which results in the Goonyella price not exceeding replacement costs and not promoting the inefficient bypass to diesel (i.e. the total costs of service provision continue to be lower at the electric utilisation threshold of 90%) is consistent with the pricing principles and the objects clause. Further, if prices are not set in a way that reflects these network benefits, and the result of this is that the pricing of electric access compared to diesel access in the Blackwater system promotes the inefficient use of diesel services, then the pricing framework will clearly not meet the requirements of these pricing principles.

In addition to the pricing principles established in the QCA Act, QR Network's 2010 AU also includes pricing principles that reference tariffs must be assessed against. These pricing principles establish pricing limits for services, and for combinations of services, that are linked to a formulaic determination of maximum allowable revenue based on Regulatory Asset Base values. However, the pricing principles also, in Section 6.2.1(b) of the 2010 AU, provide that, subject to the approval of the QCA, QR Network may establish or vary a reference tariff in a way that is inconsistent with these price limits, if that is for the primary purpose of promoting efficient investment by either QR Network or another person in the relevant transport supply chain. QR Network notes that the Network AT5 charge may exceed the pricing limits set out in its access undertaking for some combinations of services. However, given that these arrangements are proposed with the specific purpose of promoting the most efficient investment in locomotives, these arrangements should be accepted by the QCA in accordance with Section 6.2.1(b) of the 2010AU.

6.3.3 QR Network's legitimate business interests

QR Network has invested substantial capital in expanding the electric network (both in terms of the geographic scope of the electric network, and in terms of its power supply capability). By mid 2012, the Regulatory Asset Base value of the below rail electric investment is estimated to be $613.5 million – including $346.2 million in the Blackwater system and $267.4 million in the Goonyella system.

A substantial amount of this investment has occurred in the last 3 years and has been undertaken by QR Network with the full support of the end customers and operators. Customer involvement in master planning for the coal network and in accepting the scope of specific proposed investments is a part of the regulatory capital expenditure approval process in the 2010 AU. In line with this process, the expenditure by QR Network in recent years on electrification assets proceeded with the full knowledge and support of end users and operators. This recent investment has included:

- $90.2 million in the Goonyella system, to build new feeder stations at Dalrymple Bay, Bollingbroke and Mindi, and to electrify passing loops, duplications and new balloon loops; and
- $204.9 million in the Blackwater system, to build new feeder stations at Raglan, Bluff, Duaringa and Wycarbah and to electrify mainline duplications.

In addition, in order to connect these new feeder stations to the transmission network, QR Network has entered into long term connection agreements with a TNSP for substantial sums.

However, the nature of the investment required in the transmission networks to expand power supply capability has meant that many of these investment decisions, including the related connection agreements, have needed to be made 3-4 years prior to the expected commissioning of capacity enhancements. This timeframe has been necessary primarily due to the time required to identify a corridor for transmission connection infrastructure, including gaining necessary planning approvals and corridor acquisition.

In light of these long lead times, QR Network needed to commit to these investments prior to end customers having selected rail operators for their rail haulage tasks, and prior to those rail operators committing to their expected traction mix. Therefore, this investment was predicated on certain assumptions about utilisation that were based on the support of end users and operators for this investment. Specifically, QR Network assumed that, given end user and operator support for this investment in electric infrastructure, they would invest in rollingstock in a consistent manner.

The most significant of these investment decisions has been the additional Blackwater feeder stations and associated connection costs. QR Network has committed to these investment and supply agreements with the TNSP in reliance on the acceptance of scope and level of support by the Blackwater Customer Group.

If the QCA prevents the adoption of the Network AT5 proposal, and the approach used to establish the AT5 tariff continues to be based on an approach that treats the Blackwater and Goonyella systems as independent systems with no recognition of the network benefits to users, the prices resulting from the regulatory framework are likely to result in Blackwater users seeing only marginal benefits from the use of electric trains. This will leave the Blackwater system highly vulnerable to reductions in electric utilisation rates, for example due to:

- the private value to operators of flexibility from diesel locomotives exceeding the apparent net benefits of electric locomotives; or
- operators viewing electric traction as a riskier investment, due to the extent that the cost structure relies on the utilisation choices made by their competitors.

Continued reductions in electric utilisation in the Blackwater system will necessarily impact on QR Network's ability to fully recover the value of its investment in the Blackwater system electric assets. This situation is clearly contrary to QR Network's legitimate business interests. To address this, the establishment of a Network AT5 tariff is an important way to ensure operators and end users face a price signal that promotes the use of electric traction in both the Blackwater and Goonyella systems, which reflects the most efficient outcome.

Providing effective price signals to operators and end users to maximise the use of electric traction across both systems is therefore consistent with QR Network's legitimate business interests as owner and operator of the declared service.

6.3.4 Legitimate business interests of users of the service

Users of the declared service fall into two categories – the rail operators running trains on the network, and the end customers who are the ultimate beneficiaries of the rail haulage services. QR Network understands that changes in its reference tariffs are typically passed from rail operators directly through to end customers. Therefore, in considering changes to QR Network's proposed reference tariffs, the QCA needs to consider their potential impact both on rail operators and on end customers.

Rail operators

QR National's coal haulage business is the major operator of electric services in both the Blackwater and Goonyella systems. QR National has invested in a substantial fleet of electric locomotives, which is the traction choice that will provide the most efficient outcome for the coal industry. In particular, the vast majority of electric services on the Blackwater system are operated by QR National. This reflects that Pacific National currently has a limited market share on the Blackwater system, and that the currently limited electric network capacity has been contracted to QR National.

As has already been identified, if the QCA prevents QR Network from reflecting the network benefits in the determination of the AT5 charges, the Blackwater system will be highly vulnerable to reduced electric utilisation. If electric traction prices are determined as if the systems are independent of each other and electric utilisation on Blackwater diminishes, the cost structure of electric services will rise to exceed the cost structure of diesel services.

This outcome will in turn leave QR National vulnerable to economic stranding of part of its electric locomotive fleet. This outcome may occur even though maximising the use of electric traction will lead to the lowest overall rail system costs. Setting the AT5 on the Blackwater system in a way that leaves QR National vulnerable to such an outcome is contrary to QR National's legitimate interests.

Pacific National also has a significant electric fleet that it operates primarily in the Goonyella system. Given that Pacific National has made this investment in electric locomotives on the basis that they offer a lower overall cost structure than diesel, provided that the single Network AT5 maintains electric traction with a lower overall cost structure than diesel traction on the Goonyella system, this should not be contrary to Pacific National's legitimate business interests. Pacific National currently has only a small market share on the Blackwater system and does not therefore have a substantial fleet committed to this system.

End customers

End customers interests are best served if the access arrangements promote the lowest overall costs of rail haulage services – that is, maximising the utilisation of electric traction. Moreover, Blackwater users are currently bearing all of the costs of underutilisation of the entire electric network. The Goonyella users are getting a cost advantage at the direct expense of Blackwater users.

Provided that the access charges meet the requirements of the objects clause and the pricing principles, these should best meet the legitimate business interests of end customers.

6.3.5 Public interest

The QCA Act requires that the QCA consider the public interest, including the public interest in promoting competition. QR Network considers that the public interest is best served by creating the lowest cost supply chains, thereby promoting efficient economic and regional development associated with new mining developments. This is best achieved through promoting the most efficient rail haulage solution for the network, namely maximising the use of electric locomotives on the electrified systems.

As the Network AT5 charge will reflect the network benefits that exist for operators, it will effectively signal which traction mode will achieve the least total system cost.

Within this overall objective of promoting the use of electric traction on the electrified systems, competition in the rail haulage market will be promoted by offering non-discriminatory terms and conditions of access to the electric network to competing operators. This is a key feature of the reference tariff framework, as the reference tariff applies for the operation of a reference train service, regardless of who the operator of that service is.

As such, the proposed approach of establishing reference tariffs with recognition of the network benefits of the electric network will best promote the public interest.

The public interest will also be promoted through the use of traction technologies which will allow the coal supply chain to achieve energy security and sustainability. An increased reliance on electric energy can create the following value:

- Security and sustainability of energy supply. Presently, the vast majority of diesel utilised for diesel traction is imported and thus subject to the often volatile global supply and demand forces. Through QR Network developing long term purchasing strategies, including on-market procurement, long term contracting and potentially even ownership of generation capacity, not only will energy supply be assured, but critically it is able to be controlled domestically and most likely at greater value.
- Technological advancement. Under the expectation that diesel and electric traction locomotives will gain equally from advances in traction engines, then the primary differentiation between the two modes will be energy sourcing arrangements. With significant advancement in both thermal and renewable energy generation likely in the near to medium term, and no medium or long term indication of significant diesel derived energy production advancements, electric traction is well positioned to achieve technological advancement.
- Environmental benefits. Large scale ‘cleaner’ thermal electric energy production and dedicated renewable electric energy production will provide carbon and environment related benefits for the Australian economy. In contrast, it is anticipated that diesel traction will continue to rely on fossil based fuels with high carbon intensity. The public benefit of transitioning to a lower carbon economy is reflected in the various state and commonwealth energy policies which have a strong environmental intent to increase electricity supply from renewable and gas sources.

In relation to the environmental benefits that are achievable through electric energy, it is noted that there are a range of existing policy instruments aimed at achieving ‘cleaner’ electric energy generation. In this regard the obligations on retailers to procure Gas Energy Certificates and Renewable Energy Certificates artificially inflate the market based price of electric energy for the end-user. Accordingly, the current environmental policies and value of these certificates (particularly with existing small scale renewable energy schemes) increase the EC tariff rate by approximately $0.16. This impact will diminish as the market responds to the introduction of the carbon tax and low carbon intensive energy sources become increasing competitive in the market without reliance on mandatory targets.

However, the policy objectives sought by these arrangements are not predicated on the prospect of energy substitution between electric (renewable) and non-electric usage (non-renewable). Therefore, while the electric energy price is currently increased to reflect these ‘clean’ energy objectives, there are no commensurate obligations on the sourcing of ‘clean’ diesel fuel, eg a requirement to source a percentage of diesel from alternate non-fossil based fuels. Such an obligation would have a clear and significant impact on the wholesale price of diesel. Accordingly, the current price of diesel (inclusive of the fuel excise rebate) is artificially low compared to electric energy when these environmental considerations are accounted for.

In the long term, the promotion of electric traction is commensurate with government policy objectives to reduce the carbon intensity of the Australian economy, and is therefore in the public interest.

7. Proposal – electric utilisation rebate

7.1 Confidence in overall electric utilisation levels

One of the most important issues to address in the access framework is to provide greater confidence to all participants in the supply chain about the future level of utilisation of the electric network. As has already been established, maximising the use of electric traction will provide the lowest total cost rail solution for both the Blackwater and Goonyella systems. However, due to the high level of fixed costs for the electric network, this overall benefit can only be achieved with high levels of utilisation of the electric network. There will be a transition point where, if utilisation falls sufficiently, the cost for electric services will actually rise to a level higher than the cost for diesel services.

Because the access framework allows the electric network to be bypassed (i.e. allows rail operators to run diesel trains on the electrified rail network), any operator or end user who is considering which traction type to use will need to weigh up the cost advantages of running electric services (which are significant, provided that all other operators/end users run electric services) with the risk that other parties will bypass the electric system by running diesel services, and that this cost benefit may dissipate. Uncertainty about the likely traction choices of other participants in the system will lead to uncertainty about whether the clear benefits of electric traction will in fact be realised.

There are a number of reasons for uncertainty about the traction choices of other participants in the rail systems. First, as discussed earlier in this submission, misalignment between the private costs of access by an operator and the social costs imposed on the rail system by that operator may incentivise the operator to invest in diesel locomotives in order to accrue private benefits, with the costs of that choice being borne by the other system participants.

Second, in a strongly competitive environment for rail haulage services, a rail operator may be uncomfortable with the extent to which the cost structure for electric traction is dependent on the traction choices of its competitor. The operator may perceive electric locomotives as a riskier choice than diesel, simply because it has less control over the cost structure for electric services. However, the cost of this decision will ultimately be borne by the end users, as a decision to introduce diesel locomotives will prevent them from achieving the lowest total cost rail solution.

The risk of this outcome occurring is particularly high in the Blackwater system as in the short term, given the current regulatory framework and the timing of electric capacity increases, the cost structure of electric and diesel traction are quite similar. Uncertainty about the traction choices of rival operators may lead an operator to prefer to invest in diesel locomotives rather than electric. While this may appear to be cost neutral to end customers in the short term, in the longer term this will embed a higher overall cost structure for rail haulage services. Given the current extent of indications by operators and end customers that they are considering utilisation of diesel traction for WICET services, there is clear evidence that this process is already underway.

Therefore, unless a mechanism is created that provides operators and end users with confidence in the overall level of electric network utilisation, or at least ensures that they do not bear the costs of rival operators' utilisation decisions, the competitive rail haulage market may actually prevent the most efficient outcome being achieved. Such a mechanism is critical in order to ensure that rail operators do not perceive electric locomotives to be a high risk choice.

7.2 Proposal

QR Network proposes to amend the 2010 AU to introduce a requirement that operators pay AT5 for at least 90% of train services that can feasibly be operated as electric train services.

In order to achieve this outcome, the 2010 AU will be amended to provide that:

- all train services that can feasibly be run as electric trains (i.e. that run from an electrified origin to an electrified destination) will be charged AT5 – these train services will be referred to in the 2010 AU as Assessable Traction Services;
- on a quarterly basis, operators will be reimbursed an Electric Utilisation Rebate, which will be determined by multiplying, for that operator:
  - the difference between the total gtk operated from Assessable Traction Services and the greater of the total actual egtk or 90% of the total gtk operated from Assessable Traction Services; by

– the applicable AT5 rate;
- EC will continue to be charged on actual egtk.

By setting the benchmark utilisation of the electric network at 90%, QR Network is providing a reasonable allowance for the operation of diesel services over the electrified rail network, consistent with the least cost provision of buffer locomotive capacity. This level of utilisation is conservative compared to the historic electric utilisation rates that were achieved prior to the reduction in electric utilisation levels that occurred throughout QR National's rollingstock refurbishment program, and prior to capacity constraints emerging in the Blackwater electric network. As a result, it is expected that this electric utilisation rate should be achievable by operators.

Importantly, the rebate is assessed in relation to the operator's utilisation of the entire electric network – Blackwater and Goonyella combined. It does not seek to direct electric utilisation levels to specific access agreements or to specific geographic sections of the network and, as such, it continues to allow the operator the flexibility to utilise its electric fleet in the most operationally effective way. If operators continue to see a benefit in maintaining the Goonyella system with 100% utilisation of electric paths and using the Blackwater system as the buffer system, then this mechanism does not undermine this outcome.

The legal structure for implementing this mechanism has been developed in order to ensure that it can be applied equally for all train services, regardless of the access undertaking that applied at the time the relevant access agreement was entered into. This is achieved because:

- the obligation to pay the AT5 tariff component is implemented through a change in the specification of the reference tariff – as such, it will be incorporated into all existing access agreements as well as new access agreements; and
- the obligation on QR Network to pay the Electric Utilisation Rebate to operators is incorporated into the 2010 Access Undertaking and is legally enforceable on QR Network, even though it may not be included in specific access agreements.

Provided that operators actually use electric trains for at least 90% of the gtk that they operate on the electrified network, they will bear no additional cost from the introduction of this arrangement. Further, the electric network utilisation risk that is borne by an operator will then only relate to its utilisation of the electric network, not the utilisation of other participants in the coal system. In this sense, the Electric Utilisation Rebate operates as a form of take or pay on electric utilisation by an operator, but has the benefit of not imposing on operators any electric network take or pay obligations relating to whether or not coal was actually railed on the network. The coal volume risk continues to be passed through to end customers via the revenue cap mechanism.

When applied in conjunction with the Network AT5 tariff, this proposal will:

- ensure that the AT5 tariff is set at an efficient level over the entire electric network, reflecting the network benefits available to operators for optimising their efficient rollingstock buffer capacity; and
- ensure that operators are not incentivised to inefficiently invest in diesel locomotives for the provision of baseload capacity in either the Blackwater or Goonyella systems.

Together, these proposals target the key sources of underutilisation that are likely to be impacted by a misalignment of private costs faced by an operator in choosing a traction type, and total costs imposed on the rail system from that choice.

7.3 Consistency with requirements of the QCA Act

The matters that need to be considered by the QCA in assessing an amendment to the 2010 AU are set out above (in the discussion on the single network AT5 proposal).

QR Network believes that its proposal to introduce an Electric Utilisation Rebate is consistent both with QR Network's legitimate interests, the interests of access seekers and holders and also the public interest in competition and the efficient allocation of resources. This proposal, by promoting efficient investment in and use of rail infrastructure and by taking proper account of the costs and risks to QR Network in providing an electrified system across both Goonyella and Blackwater, is consistent with the pricing principles and the objective of the access regime in Part 5 of the QCA Act

7.3.1 Objectives of third party access framework

As has been identified earlier in this submission, maximising the use of electric traction for both the Blackwater and Goonyella systems is the most efficient outcome, as it will provide for the least cost rail solution for the mining industry.

QR Network acknowledges that the Electric Utilisation Rebate provides a very strong incentive for maximising the use of electric traction in the electrified systems. However, as there are not materially higher barriers to entry for the use of electric traction by operators providing haulage services compared to the use of diesel traction, there is no reason to believe that this will have an adverse impact on competition in the rail haulage market. As a result, an access framework that promotes the use of electric traction on the Blackwater and Goonyella systems will best meet the requirements of the objects clause.

The Electric Utilisation Rebate will promote the most efficient system outcome by encouraging investment in electric traction as it will give QR Network the necessary confidence in the electric utilisation rates that will occur to support ongoing investment in expansions in electric network capacity – this issue is discussed in further detail below in relation to QR Network's legitimate business interests. It will also give operators and end customers the necessary confidence to invest in electric locomotives for the provision of rail haulage services by:

- reducing the need for an operator to factor into its investment assessment the risk that competing operators will choose to bypass the electric network; and
- ensuring that operators who do choose to bypass the electric network do not impose additional costs on other users of the system as a result of that decision – this issue is discussed in further detail below in relation to the interests of access holders.

7.3.2 Pricing principles

As previously noted, the key elements of the pricing principles are that access charges:

- generate revenue that is at least enough to meet the efficient costs of providing access;
- allow price discrimination where this promotes efficiency; and
- provide incentives to reduce costs or otherwise improve productivity.

The pricing principles do not prohibit the application of the AT5 tariff component to diesel services, provided that this provides incentives for the overall reduction of costs or improvements in productivity. Because this proposal will encourage the most efficient use of the Blackwater and Goonyella systems (by encouraging the use of electric traction), QR Network submits that this strategy is consistent with requirements of the pricing principles, as it will reduce the costs of providing access to the declared service and promote productivity in dependant markets.

The importance of the pricing framework in incentivising the efficient utilisation of the electric network can be seen through the historic utilisation rates for the electric network shown earlier in this submission in Figure 3. Of particular note is the substantial decline in electric utilisation rates that occurred over the period of QR National's rollingstock refurbishment program from 2004-2010. The phased withdrawal of electric locomotives for refurbishment, and the use of more readily available diesel locomotives to provide replacement locomotive capacity, was an efficient way to manage rollingstock resources. It would not have been prudent for the above rail operator to invest in additional electric rollingstock to substitute for the withdrawal of electric locomotives for refurbishment, given the uncertainty as to the future market growth and competitive market outcomes. However, appropriate pricing arrangements for access to the electric network would have ensured that the consequential below rail price impacts of these decisions were not transferred to other parties, and may have incentivised an alternate asset management strategy with a lower impact on electric utilisation.

As noted in relation to the proposal for the single network AT5, it is also necessary to consider the compliance of this proposal with the pricing principles established in the 2010 AU. Again, it is noted that the Electric Utilisation Rebate may result in QR Network exceeding the pricing limits set out in its access undertaking for some combinations of services. However, given that these arrangements are proposed with the specific purpose of promoting the most efficient investment in locomotives, QR Network submits that these arrangements should be accepted by the QCA in accordance with Section 6.2.1(b) of the 2010 AU.

7.3.3 QR Network's legitimate business interest

As discussed earlier in relation to the Network AT5 proposal, QR Network has invested substantially in the electric network, including major electric network capacity enhancements over the last 3 years. The nature of these investments has meant that QR Network has needed to make its investment commitments well in advance of end customers committing to an operator for their rail haulage services, and therefore well in advance of operators' being able to commit to the type of rollingstock they will use to provide those rail haulage services. QR Network therefore has relied on expressions of support and customer voting outcomes to gauge likely utilisation of the electric network.

However, the extent of recent expressions of intent from operators and end users to consider the operation of diesel services in the Blackwater system means that QR Network can no longer rely on expressions of support and positive customer voting processes to give it confidence in the long term utilisation of the electric network. If actual investment in electric locomotives does not occur to the extent necessary to achieve the utilisation level assumed by QR Network, then the cost of operating electric haulage services will rise and may exceed the cost of providing diesel services.

QR Network has invested substantially in the Blackwater system in an investment that:

- was strongly supported by the end customers, to the extent that QR Network was heavily criticised for not making the investment decision earlier;
- needed to be committed to by QR Network prior to end customers committing to operators, and operators committing to locomotive fleets; and
- most importantly, if utilised to the extent anticipated, will result in achieving the lowest cost rail solution for the Blackwater system.

Allowing those end users and operators to subsequently choose to bypass that investment by running diesel services is clearly contrary to QR Network's legitimate business interests.

Importantly, this issue is not only relevant to QR Network's past investment decisions in electric network capacity – it is also important to ensure that QR Network's legitimate business interests are protected with respect to future electric network enhancements. The timeframes for future electric network investments are again likely to mean that QR Network will need to commit to those investments well before operators are in a position to commit to rollingstock purchases. As the lowest rail system cost will be achieved only if QR Network makes early commitments to electric network investments, supply chain participants need to provide QR Network with confidence in the level of utilisation of the electric network in order for it to commit to those investments.

Unless QR Network has confidence in the level of utilisation that it can expect for the electric network, it will not be able to support investing in further enhancements of the electric network. This will then undermine achievement of the most efficient system outcome.

7.3.4 Legitimate business interests of users of the service

As noted earlier, users of the declared service fall into two categories – the rail operators running trains on the network, and the end customers who are the ultimate beneficiaries of the rail haulage services.

Rail operators

The consistency of this proposal with the legitimate business interests of rail operators needs to be considered at two levels. First, the conceptual reasonableness of the introduction of the Electric Utilisation Rebate, and second the practical reasonableness of the threshold and implementation arrangements, given the existing fleet held by the operators.

This proposal will significantly reduce the risk and uncertainty faced by an operator in seeking to evaluate different traction options, as the operator will not need to factor into its investment assessment the risk that competing operators will choose to bypass the electric network, driving up the electric access charge faced by the remaining electric users.

This proposal makes rail operators accountable for their utilisation of the electric traction network, but only to the extent that they control that risk. Any reduction in utilisation that results from coal not actually being railed on the network will not impact on the level of the rebate payable to operators. The only thing that impacts on their total price paid is the traction choice that they make in relation to the services actually operated. The arrangements also reflect that rail operators will not efficiently hold sufficient electric rollingstock to run all feasible electric services with electric locomotives. As such, the proposal allows operators to run up to 10% of feasibly electric services using diesel trains, without any pricing consequence. The operators also have the option of running further diesel services, however if they choose to do this, the charges to that operator will reflect the full costs imposed on rail system from that choice.

However, the result of this proposal will be to create a strong incentive for rail operators to invest in and maintain electric locomotives for operation on the electrified network. As has already been established, there are not material barriers to entry for the utilisation of electric locomotives compared to the use of diesel locomotives. In addition, the adoption of the Electric Utilisation Rebate should reduce concerns from operators that electric locomotives are a riskier investment choice than diesel, given they will no longer rely on the uncertain utilisation decisions of competing operators in order to achieve the cost benefits of electric traction. As a result, providing an incentive to operate the more efficient electric locomotives on the electrified networks should not be contrary to the legitimate business interests of rail operators.

Operationally, the Electric Utilisation Rebate does not seek to constrain where operators actually deploy their electric rollingstock, therefore allowing the operators the flexibility to deploy them in the most productively efficient manner and location. As a result, the rebate should not have any negative impact on the operator's productive efficiency in providing rail haulage services.

From an implementation perspective, QR Network proposes that the rebate proposal be implemented from 1 July 2012. By this time, the new Blackwater feeder stations will have been commissioned, and there will be no restrictions on the extent to which electric services can operate in either the Blackwater or Goonyella system (apart from Rolleston and Minerva train services, which operate off non-electrified spurs in the Blackwater system).

As soon as possible upon commissioning of the feeder stations, QR National intends to withdraw a substantial number of diesel locomotives from the Blackwater system and introduce electric locomotives. QR National has advised that, by July 2012, it expects that it will be able to operate at least 90% of feasible electric services (over both Blackwater and Goonyella) with electric locomotives. As noted earlier, Pacific National currently runs a significant electric fleet in the Goonyella system and has a low market share in the Blackwater system – as such, QR Network expects that Pacific National will similarly be able, by July 2012, to run at least 90% of feasible electric services (over both systems) with electric locomotives. If Pacific National can show that this will not be the case, QR Network is happy to consider additional transitional measures.

End customers

As noted earlier, in most cases, rail operators pass changes in reference tariffs directly through to end customers. As a result, a decision by an operator to bypass the electric network and utilise diesel services not only impacts on the competitive position of the operator of electric services, but also directly increases the costs faced by the end customers using those services.

The QCA Act specifically requires that, in considering the interests of access seekers, the QCA explicitly consider whether adequate provision has been made for compensation if the rights of users of the service are adversely affected. Under the current access framework, a decision by one operator or end user to bypass the electric network does adversely affect the rights of existing users of the service, both directly by increasing the costs that they face for rail haulage services, and indirectly by preventing them from ultimately having available to them the lowest total cost rail haulage services.

The primary benefit of the Electric Utilisation Rebate to end customers is that it will strongly incentivise the use of electric traction in the Blackwater and Goonyella systems. By doing so, it will promote the lowest cost rail haulage solution for the coal industry. Further, the Electric Utilisation Rebate ensures that any private benefit that incentivises an access seeker (end customer or operator) to bypass the electric network and run diesel services does not transfer costs to the remaining users of the coal system.

7.3.5 Public interest

The QCA Act requires that the QCA consider the public interest, including the public interest in promoting competition. QR Network considers that the public interest is best served by creating the lowest cost supply chains, thereby promoting efficient economic and regional development associated with new mining developments. This is best achieved through promoting the most efficient rail haulage solution, namely maximising the use of electric locomotives on the electrified systems.

Within this overall objective of promoting the use of electric traction on the electrified systems, competition in the rail haulage market will be promoted by QR Network offering non-discriminatory terms and conditions of access to the electric network to competing operators. This is a key feature of the reference tariff framework, as the reference tariff applies for the operation of a reference train service, regardless of who the operator of that service is.

QR Network notes that the Electric Utilisation Rebate proposal does provide a strong incentive for operators to invest in and maintain an electric fleet. As identified at the beginning of this submission, QR Network does not consider that there are significantly greater barriers to entry for operators for the utilisation of electric locomotives than for diesel, so a strong incentive to utilise electric locomotives should not create a reduction in competition in the rail haulage market. Importantly, the Electric Utilisation Rebate does not require full utilisation of the electric network and reflects the inherent efficiency benefits of permitting a reasonable level of diesel services to operate within the electrified network while preserving the economic viability of the 'declared service'.

QR Network notes that this approach may impact on the opportunity for a new rail operator to be able to effectively enter the market on a small scale. A small scale entrant may be required to maintain electric utilisation either at 100% or less than 90% to achieve its optimal above rail cost structure. For example if the operator has only three consists then it can either operate at 100% or 66% electric utilisation.

QR Network understands that, if the competitive haulage market were in its infancy, this may be a cause for concern[4]. However, there is now strong competition in the rail haulage market, and the pricing arrangements should not promote inefficient entry at the cost of increasing the price to other users. QR Network does not consider that it would be appropriate to embed a higher cost structure for all users of the coal supply chains simply in order to promote the ease of market entry for a small scale new operator. In this instance the small scale operator should be subject to AT5 up to the threshold utilisation level of 90% and factor that it into their commercial analysis for determining their preferred locomotive fleet mix.

A further issue that should be considered in the public interest is promoting the necessary co-ordination of investment required for development of an electrified rail network. As noted earlier, investments in the electric network have a long lead time, and therefore need to be made well before end customers commit to operators, and those operators commit to their locomotive fleets. These electric network investments can also be large, creating substantial step changes in capacity. The recent Blackwater investments are a good example of this, where investment in a further four feeder stations (with a value approaching $200 million) was required to enable additional electric trains to run on the network, however no further additional feeder stations are now required on the Blackwater mainline to operate up to 156mtpa with electric services.

The lumpiness of this investment, combined with more gradual increases in demand, will result in the system going through transition periods where operating an electric train on that may well be more expensive than operating a diesel train. In a competitive rail haulage market, the response of an operator during this transitional period is likely to be to utilise diesel services, as (at that point in time) this will provide a cheaper solution than electric. However, this becomes a self fulfilling prophecy, as by introducing diesel trains into the system, this will prevent the electric network achieving the necessary volume density at which the cost benefit becomes apparent.

By removing the incentive to move to diesel trains during this transition period, the Electric Utilisation Rebate will ensure that the system moves through this transition period, so that the cost benefits of electric traction are achieved. This is clearly in the public interest, as promoting the lowest cost rail solution will improve the competitiveness of the Queensland coal industry.

---

[4] In its 2002 decision on the Rail Arbitration Guideline No.1 relating to incremental capacity consumption charges, the QCA considered that, as competition in the above rail market was at a very early stage, there would be benefits of increasing competition that would accrue to all existing and future users and therefore it was appropriate that all users bear some costs associated with facilitating market entry by new operators. .

While the Goonyella system now operates at high electric utilisation rates (reflecting the clear cost benefit of electric traction), it is likely that it too went through such a transitional period at least once during its development. However, as it was provided by Queensland Rail as a vertically integrated monopoly rail provider, Queensland Rail was able to internalise these risks and take a long term view of the least cost solution.

In addition, as noted in the discussion of public interest in relation to the Network AT5 proposal, in the long term, the promotion of electric traction is commensurate with government policy objectives to reduce the carbon intensity of the Australian economy, and is therefore in the public interest. Introduction of the Electric Utilisation Rebate will promote the public interest as it strongly incentivises the utilisation of electric traction in the Blackwater and Goonyella systems.

8. Proposal – AT5 to provide long term price signal

8.1 Benefits of price stability

It is essential that operators and end users understand the long term pricing implications of the choice of alternative traction modes. This does not have to take the form of price certainty – it is unlikely to be possible for QR Network to provide price certainty on electric costs as many of the factors impacting the charge are not within QR Network's control. This is not dissimilar to the situation for diesel trains as, diesel prices cannot be defined with any certainty. However, it is important that the electric costs have a reasonable degree of predictability. This is necessary so that operators and end users can make informed investment decisions when deciding on their rollingstock fleet.

QR Network considers that the current pricing framework for electric access does not provide sufficient long term predictability or adequate price signals to allow operators and end users to make these informed decisions. This is for a number of reasons:

- the AT5 charge is determined to fully recover costs over the regulatory period (typically four years);
- there can be significant variability in AT5 charges between regulatory periods, at least partly because of the depreciation method used and the fact that there is no recognition of volume ramp-up effects following capacity increases; and
- revenue cap adjustments are determined in relation to discrete geographic components of the electric network and are recovered over a single year (with a two year lag). The impact of these revenue cap adjustments has caused substantial volatility in the AT5 charge on a year by year basis, due to actual electric utilisation being at levels below forecast.

The proposals already outlined in this submission will significantly improve the predictability of the AT5 tariff as greater confidence will be able to be placed on forecasts of utilisation given that they will be determined on a whole of system basis, rather than individual corridors, and that this level of utilisation will be supported by the Electric Utilisation Rebate arrangements.

However, there may be some ongoing price volatility due to:

- the way that the tariffs are determined in each regulatory period, particularly in relation to volume and depreciation profiles; and
- coal volume variability, which will continue to drive revenue cap adjustments to AT5. While the mechanisms included in the 2010 AU to allow more accurate predictions of coal volume will help to manage these variations, it remains possible that where major disruptions occur (such as the 2011 floods) the size of these revenue cap adjustments could still be significant.

8.2 Proposal

QR Network is proposing to amend the 2010 AU to provide that, where revenue cap adjustments in a single year are substantial, QR Network may defer recovery of the revenue adjustment in order to maintain the increase in AT5 at no more than 5% per annum. Any unrecovered amount will be carried forward for recovery in a following year.

In addition, the Blackwater system electric operating costs have been reduced by $6.2 million to more accurately reflect the long term transmission network connection cost. In future access undertakings, QR Network will also consider whether there is a need to alter the depreciation profile of electric network assets with the aim of ensuring that short term issues do not result in spikes in the AT5 tariff component.

8.3 Consistency with legislative principles

QR Network submits that this proposal is consistent with the legislative principles underpinning third party access in the QCA Act.

8.3.1 Object of third party access regime

Moderating volatility in prices by carrying forward revenue cap adjustments to subsequent years beyond a certain threshold is an appropriate means of providing greater certainty for all market participants regarding future price increases for AT5. The operation of the revenue cap and other elements of the access regime noted above have tended to drive significant volatility in AT5. This is not consistent with the objective of the access regime, as unnecessary volatility creates undue risks and uncertainty for market participants which, in turn, will not promote efficient investment decisions in the above and below rail markets.

8.3.2 QR Network's legitimate business interests

QR Network's approach in submitting this DAAU is to propose a range of measures designed to promote the efficient utilisation of electric infrastructure. The impact of the revenue cap smoothing proposal on QR Network's legitimate business interests should be seen in this light.

QR Network's legitimate business interests are promoted by avoiding the situation where short term issues increase the price of access to the electric network to such an extent that electric traction appears to be more expensive than diesel. As noted above, this creates uncertainty for operators and end users and potentially reduces their confidence in investing in electric locomotives.

However, where this price stability is achieved by QR Network deferring the collection of revenue (as is the case with deferring recovery of revenue cap adjustments and changing depreciation profiles), then achieving this price stability actually increases the amount of revenue that needs to be collected from future use of the electric network. Deferral of revenue is therefore only appropriate if QR Network has confidence in the future level of electric utilisation, and that this level of utilisation will be sufficient to allow it to recover this deferred revenue while continuing to achieve the desired price stability.

QR Network therefore believes that it is essential that this measure is only implemented as part of a package of proposals that address utilisation issues more broadly. Specifically, it should only be adopted in conjunction with the Network AT5 tariff and the Electric Utilisation Rebate proposals.

8.3.3 Legitimate business interests of access holders

The proposal create a less volatile AT5 through deferral of revenue by QR Network will not have any adverse effect on operators or end customers. Rather, it will be beneficial to operators by giving them greater confidence in the predictability of the long term price path for electric access, therefore giving them greater confidence to invest in electric locomotives.

Moreover, the impact of this proposal will apply equally to QR National as an operator of rail haulage services as it does to third party operators. As such, this proposal is not in any way discriminatory as it does not distinguish between operators.

Similarly, end customers are likely to benefit from a reduction in AT5 volatility as it will result in better matching of the long term costs of providing electric capacity to the long term utilisation of the network. Also, by giving operators greater confidence in the predictability of the long term price path for electric access, this proposal will create greater confidence for operators to invest in electric locomotives. This outcome will help deliver the most efficient outcome for end customers as it will deliver the lowest overall rail system costs.

8.3.4 Public interest

Creating incentives in the access regime through pricing signals and other mechanisms, such as mechanisms to reduce unnecessary volatility in AT5, to achieve the most efficient investment in and utilisation of rail infrastructure will promote the public interest. This is because it will promote an efficient allocation of resources, with a 'least cost' supply chain making more marginal mining deposits economic and thereby furthering economic development in Queensland. As noted above, this proposal does not have any adverse competitive impacts, so has no detrimental impacts on the public interest in competitive markets.

9. Access charges for diesel trains

9.1 Additional rail system costs associated with diesel trains

While operators will always have the option of running diesel services, QR Network considers that the underlying principle should be that the pricing of diesel services should be cost reflective – that is, the full costs imposed on the rail system by the diesel services should be paid by diesel users.

As noted earlier in this submission, signalling the true costs of choosing to run diesel trains is critical to efficient cost-reflective pricing. If the full impact of traction choice on total system costs is not reflected in the pricing of diesel services, then this will distort competition in the haulage market and result in inefficient outcomes from an economic welfare perspective. Therefore, matching private costs (ie. those charged to an operator via access charges) and social costs (ie. the costs imposed on the rail system) is a pre-requisite of an efficient access regime.

This view is consistent with the approach to price differentiation in access charges provided for in the 2010 AU which provides that prices may be differentiated on the basis of cost and risk.

There are a range of circumstances where the access charges for diesel services do not actually reflect the full cost that those services impose on the rail system. One of the more notable of these circumstances is where QR Network needs to expanding the electric network for the planned operation of diesel trains:

- while the spur to the mine and/or port can be built as non-electrified track, mainline expansions should be built to the standard of the mainline (ie. electrified);
- this is the case as the benefits of an expansion (duplication or passing loop) in creating additional capacity rely on all of the trains on the system being able to use that expansion, so that the trains can be despatched more regularly. It is likely to be the case that not electrifying the mainline expansions will negatively impact on the service that can be provided to the existing electric users of the mainline, as they will face significantly greater scheduling restrictions than will the diesel services;
- if the mainline expansion (including electrification) is occurring for the benefit of diesel only services (ie. the origin or destination not electrified), there is no potential for additional electric usage as a result of that expansion.

The cost of electrifying the mainline expansion is part of the cost of expanding the track for the diesel only services, and should therefore be recovered by the users of that non-electrified connection. The current approach for identifying the cost of capacity consumption of non standard trains significantly understates their capacity impact on the rail system. In particular, the dollar per path cost is significantly understated and the capacity multiplier approach does not reflect the real impact of trains with different section run times. Therefore, the real costs of non standard trains are borne by other users through whole of system charges.

Operating trains with different performance characteristics within the network may also sterilise future lower cost capacity expansions. For example, the despatch rate of trains reflects the minimum required train separation on the network, which cannot be set at a level less than the time required for trains to traverse the longest section on the network. If the operation of lesser performing trains means that reductions in train separation cannot be achieved, substantial amounts of track construction (duplication or even triplification) may be required to achieve the necessary increase in capacity.

While this issue is not specific to electric/diesel comparisons, diesel locomotives do typically have different performance characteristics than electric locomotives, particularly in the area of acceleration and performance on grades. Where the diesel trains are not charged for the full cost of their capacity impacts, some of these costs are therefore absorbed by electric services, distorting traction choice in favour of diesel.

9.2 Proposal

At this point in time, QR Network is not proposing to make any amendments to the 2010 AU to address these issues. However, when QR Network submits reference tariffs for new services that use non-electrified connections, if these services require mainline capacity enhancements on the electrified network, the cost of the mainline electrification will be included in the incremental cost to be recovered from the diesel services using the non-electrified connections.

QR Network also notes that it is reviewing its approach to the capacity multiplier applicable to non-standard trains. This issue will be addressed as part of its next draft access undertaking.

10. Content of DAAU

10.1 Amendments to Schedule F

Consistent with the above discussion, the attached DAAU implements the following proposals, effective from 1 July 2012:

- a single Network AT5 tariff, applying across the Blackwater and Goonyella systems;
- an Electric Utilisation Rebate arrangement, based on a target electric utilisation rate of 90%;
- a change to the reference train characteristics to specify that the reference train service is one which does not regenerate electricity back into the overhead traction system (note, this is included for the purpose of allowing different EC arrangements to apply for train services that regenerate electricity);
- amendment to the revenue cap arrangements to apply a single Network Revenue Cap Adjustment Amount; and
- amendment to provide the ability to extend large revenue cap adjustment amounts, which are defined as those that will increase the AT5 tariff component by more than 5% in a year, to be recovered (or returned) via price adjustments across more than one year.

Due to the introduction of the target electric utilisation rate of 90%, the egtk forecasts relevant to the determination of the AT5 rate need to be reviewed to be consistent with this target utilisation rate for assessable electric services. QR Network will submit to the QCA revised system forecasts for 2012-13 in early 2012 as per the annual review of reference tariffs in accordance with Clause 3.1.1 of Schedule F Part B. However, QR Network has included an amended AT5 tariff in the DAAU for indicative purposes. To determine this indicative AT5 tariff, QR Network has used the approved system forecasts for the 2011-12 Year as the basis of modelling the revised AT5 price. The 2011-12 forecast is assumed to be a more reliable indicator of volumes in 2012-13 than the those initially approved for the 2010 AU.

As the QCA is not likely to have made a decision on this DAAU by the time that QR Network is required to submit revised system forecasts for 2012-13, as part of that submission, QR Network will include proposed tariffs consistent with the approved 2010 AU as well as proposed tariffs consistent with this DAAU.

10.2 Amendment to Reference Tariffs

The currently approved AT5 reference tariffs for the 2012-13 year (excluding revenue cap adjustment amounts) are shown in Table 1.

Table 1: Approved 2012 AT5 reference tariff

System	AT5
Goonyella	$2.22
Blackwater	$4.57

The forecast transmission connection costs included in the 2010 AU reference tariff determination were based on forecasts of the expected connection charges. These negotiations have now been completed. The negotiated connection charge per site for the four additional Blackwater feeder stations is lower than initially forecast at the time the 2010 AU cost base was determined. This impact of this reduction is approximately $6.2 million. The revised System Allowable Revenues for the CQCR is shown in Table 2.

Table 2: 2012 Approved and Adjusted System Allowable Revenues

	Approved SAR	Revenue Cap Adjustment Amounts*	Change in Connection Costs	Adjusted SAR
Blackwater	$82,404,883	$20,271,588	($6,231,007)	-
Goonyella	$82,146,208	$9,679,615	-	-
CQCR	-	-	-	$188,271,287

* The QCA has not yet approved these revenue cap adjustment amounts for the 2010-11 Year which are applicable to the variation of reference tariffs in 2012-13.

The volume forecasts used establish the reference tariff need to be consistent with the expected level of revenue recovery relevant to the 90% electric utilisation threshold. QR Network assumes that the Goonyella system will continue to operate at full utilisation of the electric network. Accordingly, the balance of the 90% of total gtk forecast from assessable traction services will involve a utilisation level in the Blackwater System of less than 90%.

The indicative 2012-13 volume forecasts relevant to the determination of Network AT5 are detailed in Table 3.

Table 3: 2012 Forecast gtk and egtk

	gtk('000) from Assessable Traction Services	Utilisation Rate	Adjusted (e)gtk ('000) Forecasts
Goonyella	37,115,855	100%	36,932,371
Blackwater	27,073,949	76.97%	20,838,452
Total	64,189,803	90%	57,770,823

* Note there are minor variations between the gtk forecast and the adjusted (e)gtk forecast associated with the 2010 AU pricing model treatment of cross-system services.

The varied 2012-13 AT5 reference tariff components associated with this DAAU (reflecting the changes to SAR and to the assumed proportion of gtk operated as electric services) are shown in Table 4 (without revenue cap adjustment) and Table 5 (including QR Network's proposed revenue cap adjustment). For information, the tables also break the tariff into Goonyella and Blackwater tariffs, consistent with the current charging approach.

Table 4: 2012-13 Proposed AT5 Reference Tariff (without 2010-11 Revenue Cap Adjustment Amounts)

	Approved SAR	Connection Cost Adjustment	Varied Reference Tariff
Goonyella	$2.22	-	$2.22
Blackwater	$3.95	($0.30)	$3.66
CQCR	$2.85	($0.11)	$2.74

Table 5: 2012-13 Proposed AT5 Reference Tariff (with proposed 2010-11 Revenue Cap Adjustment Amounts)

	Approved SAR	Revenue Cap Adjustments	Connection Cost Adjustment	Varied Reference Tariff
Goonyella	$2.22	$0.26	-	$2.49
Blackwater	$3.95	$0.97	($0.30)	$4.63
CQCR	$2.85	$0.52	($0.11)	$3.26

11. Concluding comments

The existing access framework relating to the choice between electric or diesel traction is contrary to the objective of the third party access regime and the pricing principles set out in Part 5 of the QCA Act. In particular, current arrangements:

- promote sub-optimal investment and use of both below rail and above rail infrastructure. This occurs as a result of the current access framework creating a disincentive to operators to use electric trains, resulting in a high risk of under-recovery of costs of electric assets, thereby increasing asset stranding risk;
- promote technology that does not provide the lowest total rail system cost. The total rail system cost is the relevant perspective to assess the productive efficiency of infrastructure as it determines the cost to end users of rail services. In effect, it determines rail supply chain efficiency; and
- do not provide a price signal that promotes reduced costs and increased productivity. That is, the price signals under the current approach provide a disincentive to use electric traction in the Blackwater system even though maximising the utilisation of electric traction in the Blackwater system will provide the lowest total rail system cost.

Importantly, the current arrangements are not consistent with the pricing principles in the QCA Act in that they do not result in prices that are commensurate with the risks involved for QR Network and, further, do not provide an incentive to reduce costs or otherwise improve rail system productivity in terms of traction choice. This is because electric users are required to bear the full cost of the electric system, while diesel users impose additional costs on these services but do not bear these costs. This is contrary to the principle of cost reflective pricing. Moreover, QR Network is at risk of not recovering the costs of its electrification assets on the Blackwater system due to pricing distortions in favour of diesel leading to declining electric utilisation.

For these reasons, QR Network considers that the proposals outlined in this submission are necessary to promote efficient use of and investment in rail infrastructure as they will substantially address the concerns with the current approach.

Appendix A – Total cost of ownership analysis

Purpose

The purpose of this analysis was to undertake a financial assessment of the comparative cost of delivering a rail haulage service using electric versus diesel technology. The cost was assessed based on the Total Cost of Ownership (TCO) model, which captures the cost of investing in the rail system assets, as well as operating and maintenance costs. This in turn reflects the key drivers of prices charged to the users of the above and below-rail services. The TCO is calculated as the present value of the relevant cashflows, discounted using an appropriate rate.

In undertaking a whole of rail system analysis QR Network recognises that the key conclusions need to hold regardless of the identity of the above-rail operator. That is, what is the solution that delivers the lowest cost to customers without being contingent on any specific strategies that have been, or may be, employed by QR National's coal haulage business. At the same time, the analysis must also be based on realistic and relevant data, which QR Network can more readily source from QR National. Sensitivity analysis is used to determine the extent to which outcomes are sensitive to key above-rail inputs.

From a shareholder value perspective one of the most significant issues for QR Network is its investment in below-rail network infrastructure, and the extent to which traction choice could result in its investment in electric assets being stranded (this will also be an issue for QR National's investment in electric rollingstock). However, it recognises the importance of presenting the cost comparison before the costs of asset stranding are considered. The analysis is therefore presented exclusive of any asset impairment impacts.

The analysis does include the cost of early termination of QR Network's connection agreements with Powerlink (these costs are material and is an actual cashflow impact if a system transitions to full diesel traction). These break costs have been separately identified. While QR Network recognises that the relative merits of one traction type over another needs to be clearly demonstrated independent of these impacts, their consideration is still relevant within the context of QR Network's legitimate business interests and investment in the facility (refer section 120(1)(c) of the *Queensland Competition Authority Act 1997*).

This Appendix summarises the outcomes of QR Network's analysis. It will provide:

- an overview of the methodology
- a description of the key assumptions used in the analysis
- a presentation and discussion of the outcomes.

Overview of Methodology

Process

The analysis was conducted over a time horizon of 30 years (to 2042). The modelling has considered the impacts in the Goonyella, Blackwater and Newlands systems. Given the focus of this submission is on the implications of traction technology choice in the Goonyella and Blackwater systems, the impacts on the Newlands system have not been considered here.

Of the Goonyella and Blackwater systems, the latter is of particular interest given the relatively higher utilisation of diesel assets in this system, which has resulted in the operating principles being tailored to cater for the slower diesel cycle times (hence not allowing electric traction to perform to its full operating efficiency). The potential introduction of diesel hauls in the Goonyella system will see this system devolve into the current Blackwater situation. This in turn will result in a significant increase in the total cost of ownership and a loss of economic efficiency in that system.

Accordingly, this summary will focus in more detail on the analysis conducted for Blackwater. As well as showing the actual impacts of hybrid operations in this system, it also provides an appropriate case study for increased diesel utilisation in the Goonyella system should that eventuate.

As outlined above, QR Network's approach to this analysis is based on replicating actual operating conditions in the coal systems. This is necessary in order to understand the relative performance of each traction type in the 'real world' environment. While a more hypothetical analysis can be a useful starting point, it is not considered appropriate to make decisions based on an analysis that is removed from the actual environment and risks oversimplifying inherently complex relationships.

There are three main fleet mix scenarios that have been modelled. The scenarios allow a comparison between a 'full electric' and a 'full diesel' system, as well as considering the impact of a hybrid system that reflects current operations in the Blackwater system. Existing traction decisions are committed under current contracts, with the 30 year tonnage profiles based on a combination of contracted tonnes (short term) and forecast port capacity (medium to long term). To simplify the analysis and to ensure consistent and equitable treatment between mines, it has been assumed that the transition to full traction cases occurs in 2013. The three scenarios are as follows.

Table A.1: Description of scenarios (Blackwater system)

Scenario	Description
Full electric	This is actually 97% electric utilisation given the Minerva spur is not electrified. It assumes that Rolleston and WICET transition to electric traction in 2014. It should be noted that under this case a small diesel fleet will still be maintained to cater for surge capacity requirements (as demonstrated following the 2011 floods in Goonyella).
Full diesel	This is 100% diesel utilisation, assumed to occur in 2013.
Hybrid	This is based on the current mix of traction type in operation in each system, assuming that all mines with electrified spurs will be using electric traction. The starting fleet mix comprises approximately 37% diesel, where all spurs / branches not currently electrified remain so for the duration of analysis.

While not modelled, changes to the operating principles / paradigms (e.g. headway separations, scheduling, signalling, section lengths, etc.) are expected to yield significant TCO benefits to the electric case that are not available to the diesel case.

Outputs

Scenarios

In order to enable a clear comparison of the total costs of operating a diesel versus an electric rail system (above and below-rail), it is instructive to compare the TCO of a full electric system with a full diesel system (noting the caveat above where under the 'full electric' case a small diesel fleet will still be maintained). This allows the true underlying costs of each traction type to be compared without having to consider the operational effects of running both traction types on the one system.

As outlined above, the analysis is independent of the identity of the operator (that is, the costs to the 'owner' assume 100% above and below-rail utilisation). The impairment of assets that could result if the system transitioned to full diesel traction has not been included.

Inclusion of the current hybrid system within the scope of analysis is important because this not only reflects the costs based on current operations, but it also demonstrates the impact of introducing diesel traction into an electric system. As will be shown below, this has a significant impact on operating efficiency. Certain assumptions therefore need to be made regarding the interactions between the traction types and in particular, the implications for cycle times. QR Network has analysed this in detail, as will be described further below.

The TCO comparisons are presented in pre-tax nominal terms. This is considered appropriate given the key driver of the cost of rail system operations are capital, operating and maintenance costs. QR Network would be happy to provide estimates on a post-tax basis however this is not expected to alter the relativities between diesel and electric traction.

The cashflows have been discounted using a pre-tax nominal Weighted Average Cost of Capital (WACC). While different discount rate assumptions may alter the magnitude of the differences between the options, it should not change their relative ranking. Overviews of all of the assumptions that have been used in the model are provided below.

Impact of exit costs

Additional scenarios have been modelled to consider this impact if a system transitions to full diesel traction. The 'base case' comparison of the TCO under all three scenarios includes the cost of terminating Powerlink connection agreements but excludes the impairment of above and below rail assets (diesel and electric). The Powerlink break costs have been separately identified.

Sensitivity and break even analysis

Sensitivity analysis has been undertaken on a number of key diesel and electric variables (based on variations from the base case assumption of plus or minus 10%). A break-even analysis of these variables has also been undertaken. This estimates the percentage change in each variable required to make the full diesel and electric TCOs equivalent. This in turn reflects the point of indifference between diesel and electric traction (all other factors being held constant).

Assumptions

The most significant assumptions underpinning the analysis are as follows.

Inputs/cost drivers:

- WACC: discount rate used to calculate the present value of the costs of ownership
- volume forecasts: drives capital and operating expenditure requirements
- cycle time (based on Dynamic Capacity Modelling): drives operating efficiency and capital expenditure requirements
- assumed hybrid fleet mix (refer above): used to model hybrid system scenario.

Costs:

- below-rail capital expenditure
- below-rail operating and maintenance costs
- above-rail capital expenditure
- above-rail operating and maintenance costs

The rationale for these assumptions is provided below. QR Network's treatment of Powerlink break costs and asset impairment is also explained. QR Network would be happy to provide the QCA with a full list of the assumptions used.

WACC

A separate pre-tax WACC was used to discount the above and below-rail costs of ownership. The assumed pre-tax above-rail WACC is based on QR National's target hurdle rate and is considered an appropriate benchmark rate of return for an above-rail operator in this market. The pre-tax below-rail WACC is based on QR Network's approved post-tax nominal (vanilla) WACC of 9.96%.

Changes in the WACCs applied should not alter the rankings of different scenarios.

Long-term volumes

The tonnage profile assumed for each system is as follows:

- Goonyella: starting point is current contracted tonnes of 86 Mtpa, increasing to 290 Mtpa by 2042
- Blackwater: starting point is current contracted tonnes of 69 Mtpa, increasing to 156 Mtpa by 2042.

As noted above, the 30 year tonnage profiles are based on a combination of contracted tonnes (short term) and forecast port capacity (medium to long term). As there is a possible range of outcomes for medium to long-term tonnages based on forecast port capacity and system throughput, QR Network adopted the mid-point of those forecasts for the purpose of this analysis.

Cycle time

The key measure that reflects the operational characteristics of each traction type is cycle time. This in turn is an important driver of operating efficiency as reductions in cycle time will allow for increases in throughput. Cycle time therefore also directly impacts capital investment requirements as longer cycle times will contribute to capacity constraints, triggering network augmentations earlier.

To estimate cycle times, QR Network has used a combination of:

- ‘greenlight’ simulations of section-run-times (that is, consists were allowed to run through a simulated cycle and were not stopped at any signals during the course of their journey);
- simulated stop-start analysis, (that is, the delays that occur as consists approach and depart stations to allow for train crosses); and
- observed mini-cycle durations (where provisioning differentials is the significant driver of overall cycle time differences, as will be outlined further below).

This approach seeks to replicate the current operating environment based on the existing network infrastructure (that is, a brownfields approach) and the system operating principles that have been proposed for the Wiggins Island Rail Project (WIRP).The analysis has attempted to incorporate non-systemic factors that impact operations on a day to day basis, through applying a 5% section run time penalty equally to both traction types.

Of particular significance are the achievable cycle times in a hybrid system. Where a system is limited to the one traction type, the cycle time of that system will reflect the fundamental operational efficiency of that traction type. However, as the rate of hybrid operations increases the tendency is for the operating principles to cater to the average cycle time of the slower traction type.

In particular, one important issue that had to be considered is the existing operational constraints at Callemondah yard. Currently, electric consists must queue behind diesel consists at the inbound to port diesel maintenance shed, which increases the ‘mini-cycle time’ (queue time) for electric consists. This impact is a consequence of the current operating constraints at Callemondah, rather than being reflective of the comparative operating efficiency of electric versus diesel services. This in turn could distort the comparison between diesel and electric technology. In order to remove any bias, QR Network has therefore assumed that both traction types are not impacted by current infrastructure constraints and perform in accordance with observed provisioning specifications.

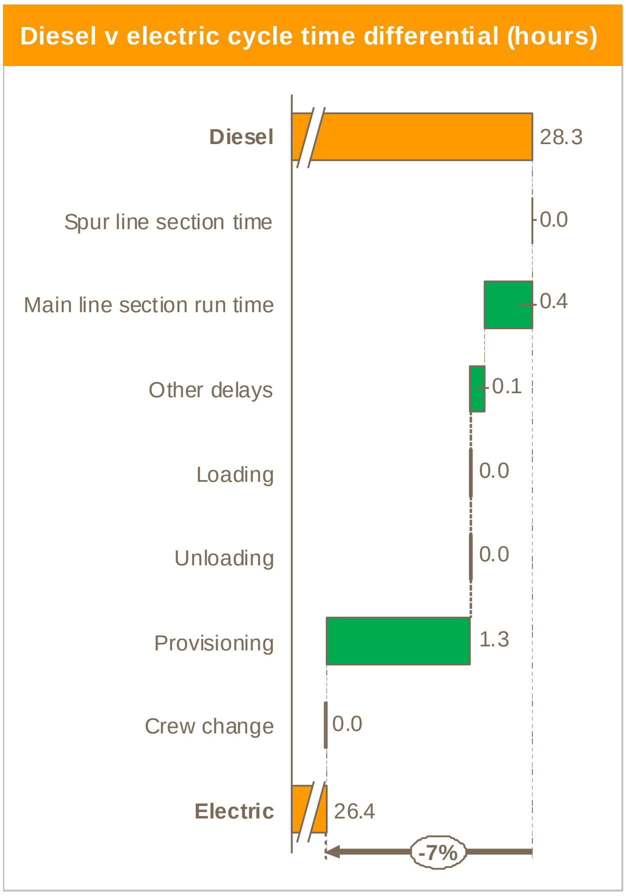
Other key assumptions are provided in Table A.2.

Table A.2: Cycle time modelling assumptions

Element	Base assumptions	Rationale
Above-rail		
Consists modelled	Electric: 3 x 3,800 locomotives + 98 x 106 t wagons Diesel: 4 x 4,100 locomotives + 98 x 106 t wagons	These consists represent the expected predominant technology given current crossing loop lengths etc. It has been noted that the 4 header diesel can haul up to 116x106t wagons and a 4 header electric can haul over 120x106t wagons, with the TCO outcome insensitive to both cases.
Section run times	Section run times created using a train performance simulator.	Primarily used in order to provide an unbiased analysis of each traction type under unconstrained conditions.
Start/Stop times	Start/Stop times determined through a train performance simulator. Determined for both electric and diesel consists for all potential stopping points on the network.	Electric and diesel consists have different acceleration profiles due to the higher horsepower of electric locomotives being able to utilise higher tractive effort.
Provisioning		
Duration and frequency	Diesel consists provision each cycle, including refuelling front and rear locomotives. Electric consists re-sand every 5th trip and re-sand remote locomotives every 10th trip.	Each traction type is assumed to provision in line with current operating specifications for 4100 and 3800 locomotives.

The cycle time advantage of electric over diesel traction is illustrated below.

Figure A.1: Diesel and electric cycle times - Blackwater



This analysis showed that electric traction has a clear advantage over diesel in terms of cycle times in the Blackwater system, with a cycle time of 26.4 hours for electric compared to 28.3 for diesel. The main drivers of this advantage are as follows:

- main line section run time differences (0.4 hours) – this is because diesel consists are slower lifting the ruling grades compared to electric consists;
- other delays (0.1 hours) – this reflects the slower acceleration time to balance speed for diesel consists;
- provisioning time (1.3 hours) – electric locomotives only require re-sanding every fifth trip and re-sanding of remote locomotives every tenth trip. Diesel locomotives, on the other hand, require refuelling each trip, which materially increases average provisioning time.

Below-rail capital expenditure

As noted above, this analysis is based on a brownfields approach that assumes that current contracted volumes are delivered via the existing network infrastructure and design configuration. Forecasts have then been made of additional capital investment required over the horizon of the analysis, which comprises:

- growth capital required to accommodate the assumed growth in long-term volumes as outlined above; and
- maintenance expenditure that is capital in nature.

The main driver of growth capital is system throughput (volume). As outlined above, the capacity of the network to accommodate any given level of contracted volumes will be impacted by cycle times. Based on these relationships QR Network generated a linear track investment profile in order to forecast required investment in track infrastructure. This profile is a function of capacity utilisation (number of consists) and the ratio of track length to distance travelled.

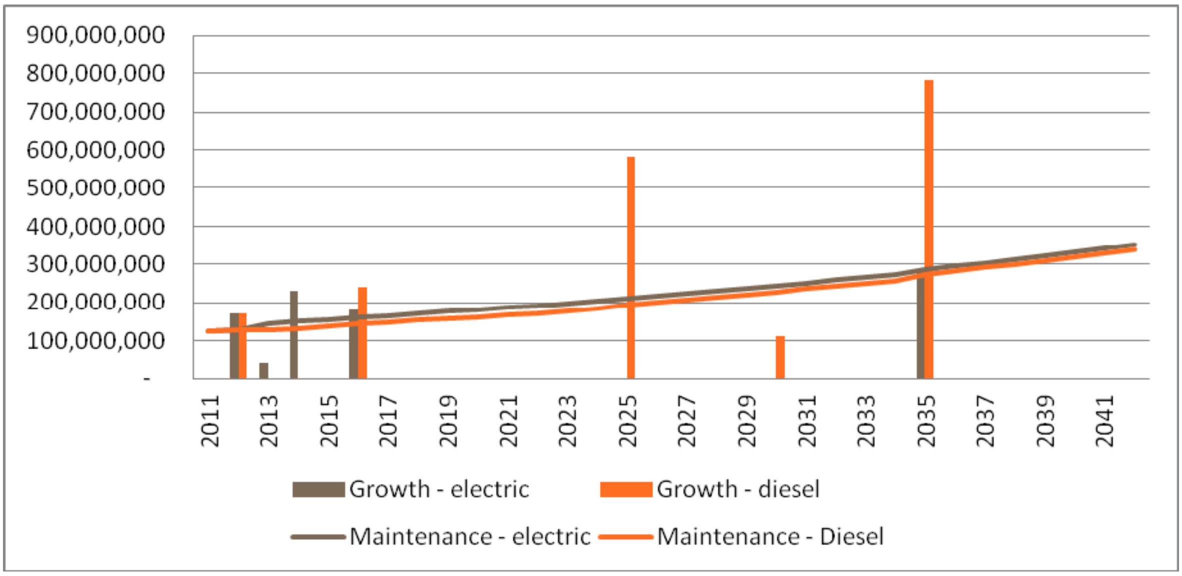
For an electric system, volume and distance drives the expenditure required on feeder stations. These feeder station requirements were determined based on capacity and demand matching analysis (this is more accurate than the formula-driven approach which has been utilised historically). Investment in overhead wiring was based on tonnage profile growth.

QR Network has verified that the current investment in electric capital (being four new feeder stations which are near completion in Blackwater, an additional feeder station for Rolleston and the addition of Wotonga in Goonyella) combined with asset renewal (in situ) can support forecast tonnages in the full electric case. Feeder station capital expenditure has been sensitised and is not considered to be a material driver of system TCO. Investment in overhead wiring is also included.

Non-electric maintenance capital forecasts are based on stress-tested unit-rate assumptions and are driven by volumes, payloads, distance and cycle time. Maintenance capital for electric assets will be primarily driven by the number of feeder stations.

The forecast capital expenditure for the diesel and electric cases is shown in Figure A.2 below for the Blackwater system.

Figure A.2: Growth and maintenance capital expenditure (Blackwater, $)



This shows that forecast capital expenditure for growth is materially higher for diesel than electric, which is driven by the slower cycle time for diesel, as outlined above. However, this difference is offset by the higher maintenance capital expenditure requirements forecast for electric.

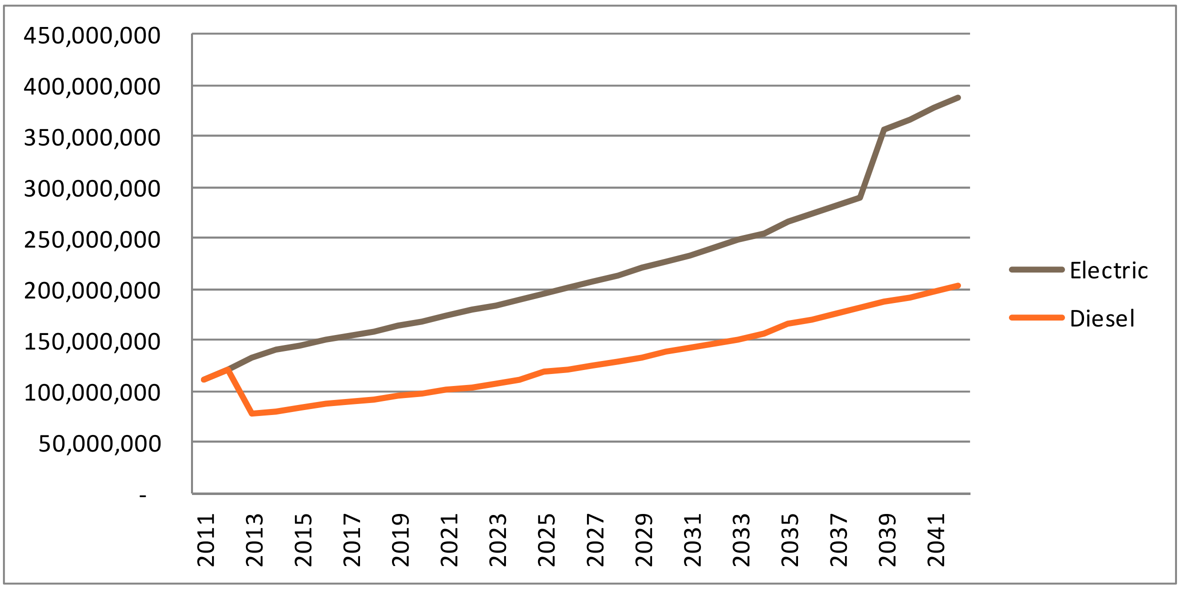
Below-rail operating and maintenance expenditure

Below-rail operating and maintenance expenditure requirements are mainly driven by volumes, payloads, distance and cycle time (this impacts civil, communications, signalling, track and electric traction maintenance). For an electric system operating and maintenance expenditure is also incurred for the feeder stations connections, the costs of which are driven by the number of feeder stations, as discussed above.

The other component of expenditure is overheads. These costs have been allocated at a system level and accordingly there is no difference between the scenarios in terms of forecast corporate overhead costs.

Over the horizon of the analysis period below-rail maintenance expenditure is higher for electric compared to diesel, as shown below.

Figure A.3: Below-rail maintenance expenditure ($, Blackwater)

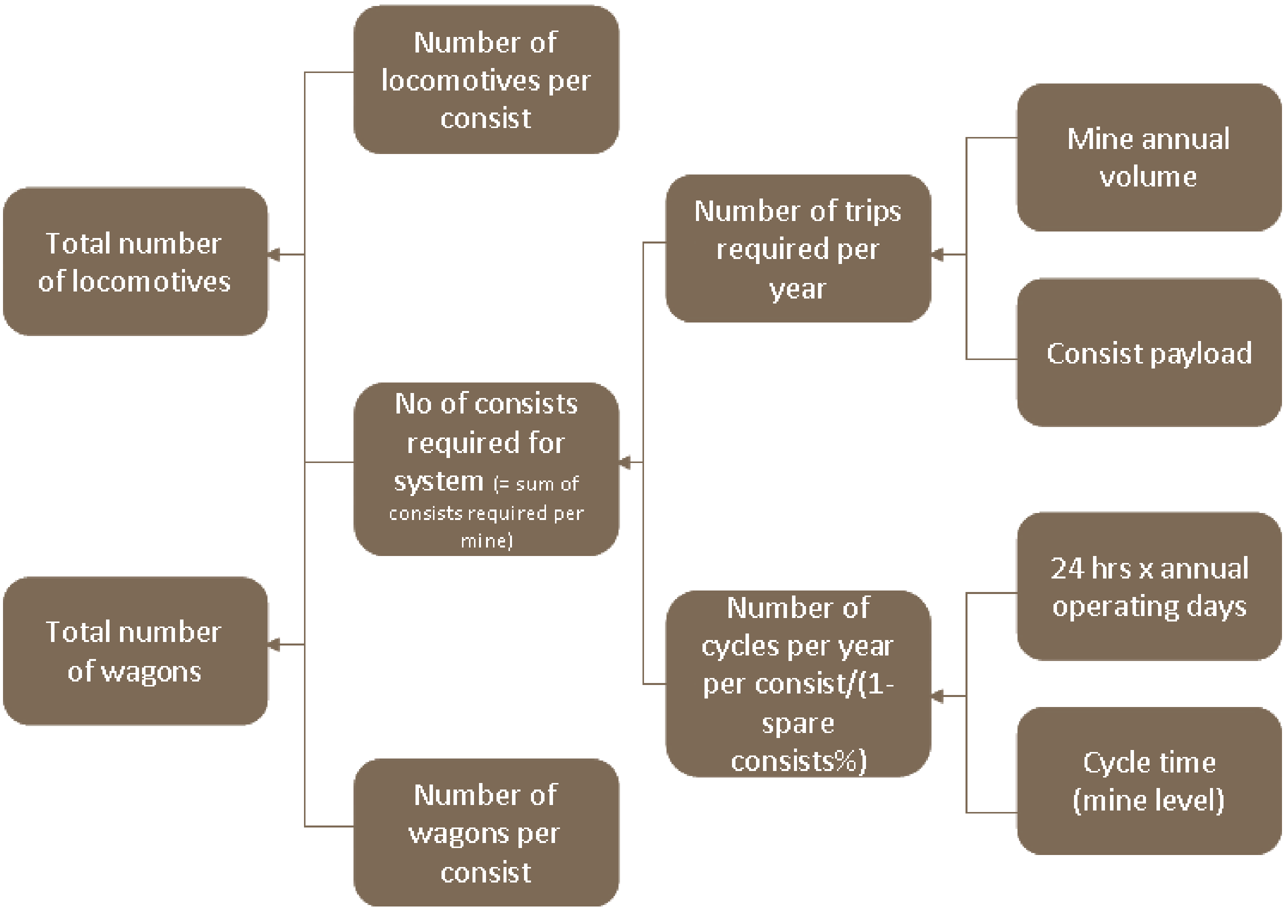


Above-rail capital expenditure

Above-rail capital investment in locomotives and wagons will also comprise growth and maintenance capital. Investment in yard facilities may also be required to accommodate future growth.

One of the key inputs into this assessment is the total number of locomotives and wagons that will be required. This was determined based on the relationships shown below.

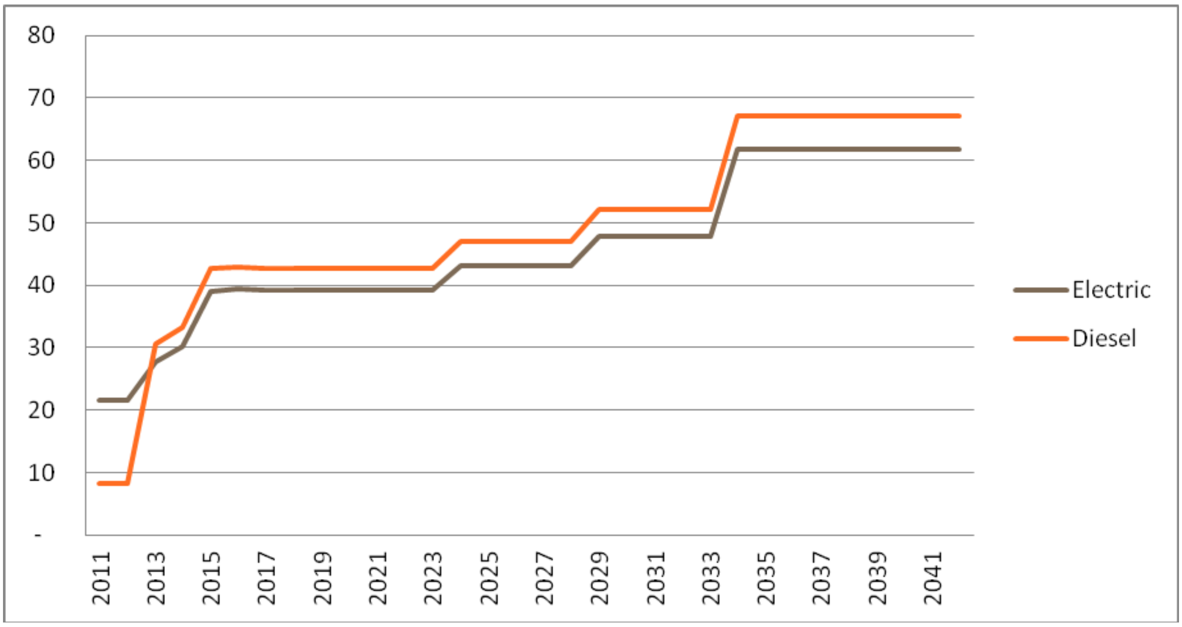
Figure A.4: Rollingstock calculation



These relationships will also influence above-rail operating and maintenance costs, as discussed below.

Given above-rail cycle times are higher for diesel (and throughput will therefore be lower for any given number of consists in operation in the system), it is expected that a greater number of diesel consists will be required compared to electric to haul the same annual volume. This was confirmed in the analysis, with the comparison of the forecast number of consists required in the Blackwater system per year shown below.

Figure A.5: Above-rail consist requirements (Blackwater)



While the cost of an electric locomotive is about 30% higher than a diesel locomotive, the ‘standard’ electric consist only requires three locomotives compared to four for a diesel consist. Assuming the same number of wagons in each consist, the cost of a diesel consist will be higher than the cost of an electric consist. As fewer electric consists are required to haul the same number of tonnes, above-rail capital expenditure will be lower in a full electric system.

It is understood that Pacific National has cited a materially lower unit cost for diesel locomotives that can be sourced from China. It is assumed that any operator maintaining a sizeable fleet would be able to secure locomotives at this price to the extent that it is available in a competitive market and could be sourced using different purchasing arrangements. Nonetheless, the cost of diesel locomotives has been subject to sensitivity testing, as discussed below.

Above-rail operating and maintenance expenditure

The main drivers of operating and maintenance expenditure are as follows:

- labour costs, which are determined by the number of consists in operation and the number of crew per consist;
- maintenance costs, which are determined by the number of locomotives and wagons in operation and the kilometres travelled (refer Figure A.4 above);
- energy costs (including carbon tax), which are based on:
  - for diesel traction, the cost of fuel;
  - for electric traction, the cost of electricity;
- corporate overhead.

Labour costs

The crew requirements for a diesel and electric consist are the same. However, with more consists in operation to haul the same number of tonnes, labour costs for diesel will therefore be higher than electric.

Maintenance costs

As outlined above, maintenance costs will depend on the number of locomotives and wagons in operation and the number of kilometres travelled. Again, the key driver of differences in costs between electric and diesel will be the number of locomotives and consists required, which are higher for diesel. It is also cheaper to maintain electric locomotives on a per unit basis. Accordingly, above-rail maintenance costs will be higher for diesel than electric.

Energy costs

Energy cost is a variable cost that is driven by haul distance. Forecasting energy costs required assumptions to be made regarding future diesel and electricity prices, including the likely impact of the carbon tax. QR Network engaged Arcadia Energy to provide 30 year electricity price forecasts based on various carbon pricing regimes. 30 year diesel price forecasts were provided by a third party consultant. QR Network used the ex-carbon tax forecasts and then calculated the carbon tax in dollars per tonne of carbon based on the new legislative guidelines. The assumed volume of energy to produce one tonne of carbon was:

- 346 litres of diesel
- 1.1 Mwh of electricity

The assumed starting price is $23 per tonne of carbon in 2012, increasing to $73 per tonne by 2042. The assumed energy prices with and without the carbon tax impact are shown below.

Figure A.6: Forecast diesel price

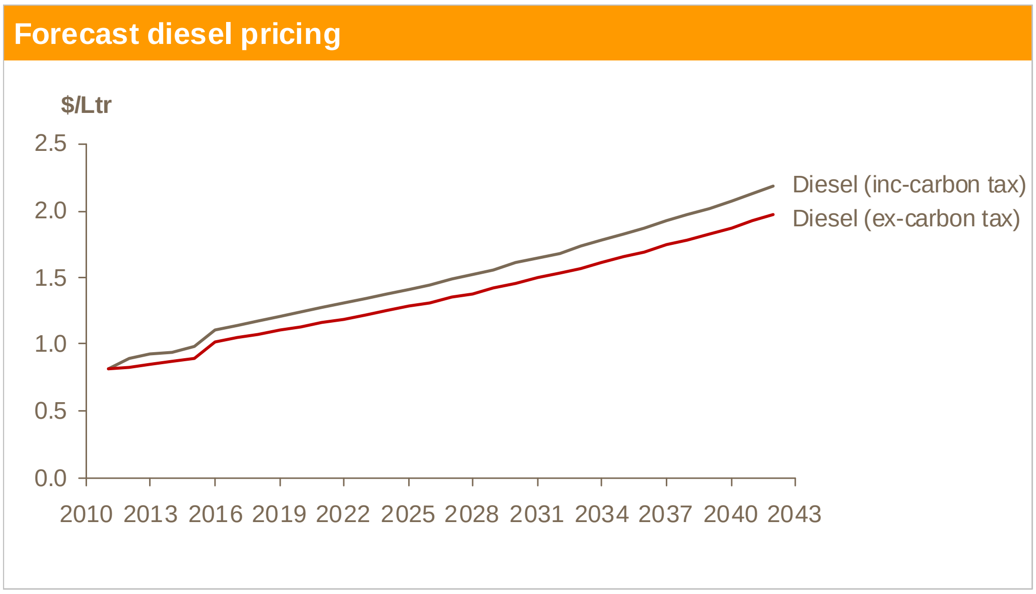
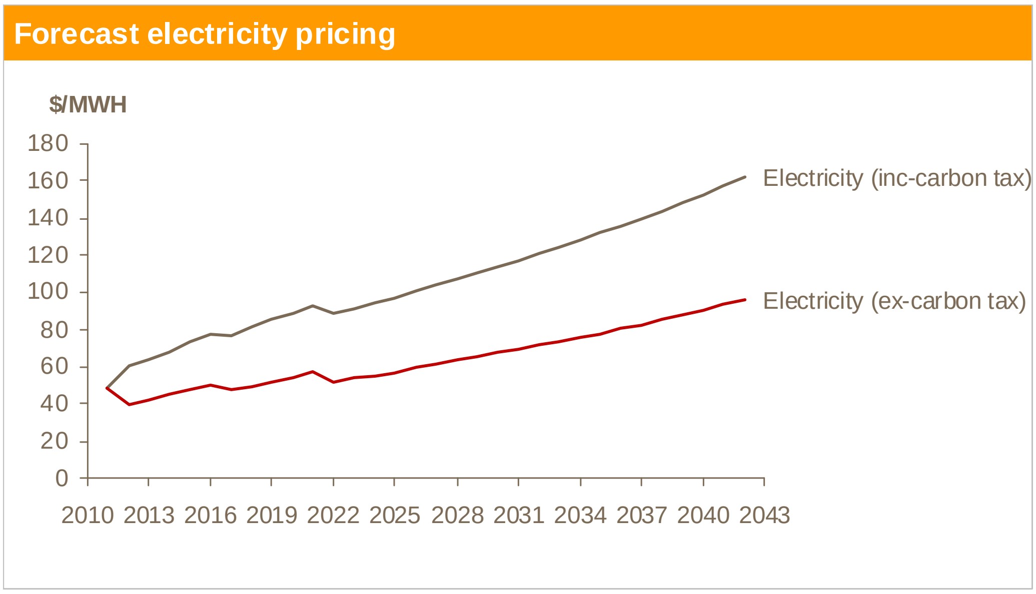


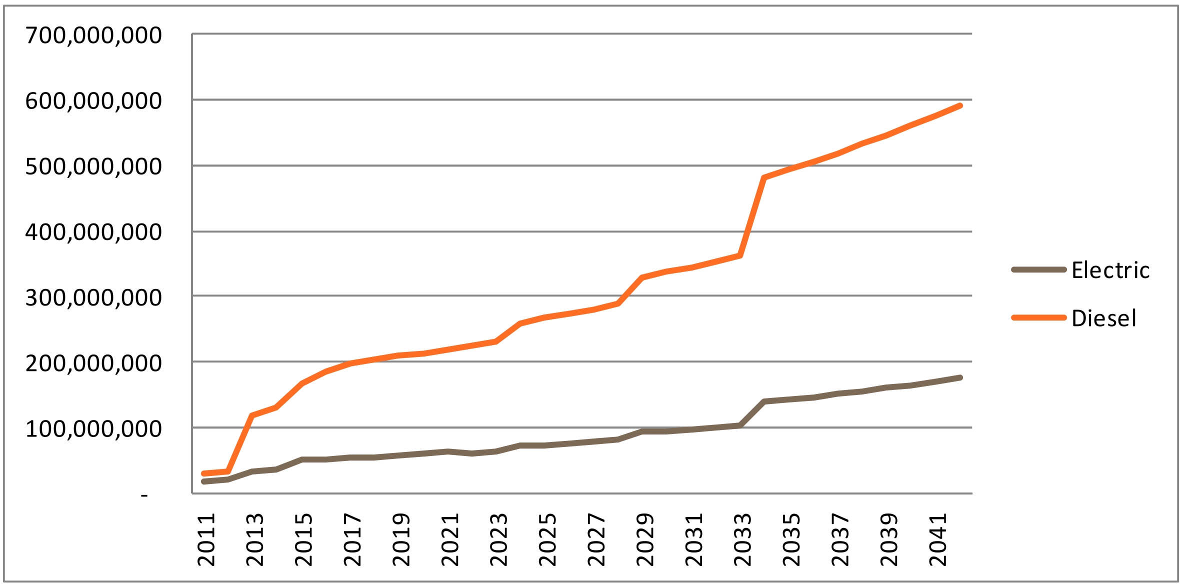
Figure A.7: Forecast electricity price



These pricing assumptions have also been subject to sensitivity testing, as discussed below.

Based on the above pricing assumptions and the required utilisation of each energy source for the relevant traction type, the total above-rail energy costs were estimated. The profile of these costs over the forecast period is shown below.

Figure A.8: Above rail energy costs ($, Blackwater)



This shows a material difference between projected energy costs over the forecast horizon, with the differential widening at an increasing rate. The main drivers of this difference are as follows:

- the slower cycle times for diesel means that more consists are required to deliver the same tonnages, which results in a higher fuel consumption;
- diesel combustion is a less efficient source of power per kilometre (5.5 litres per kilometre of fuel is consumed for diesel relative to 0.0303 MwH per kilometre of electricity for electric); and
- diesel consists require more locomotives (4 DEL v 3 EL) in order to accelerate to balance speed and maintain speed over ruling grades (a significant limiting factor for diesel traction in the Blackwater system).

Corporate overhead

As outlined above, as these costs are allocated at a system level there will be no difference between the assumed corporate overhead costs for electric versus diesel.

Treatment of electric traction exit costs

As outlined above, the two main consequences of QR National having to exit the electric traction market are:

- costs incurred by QR Network in having to terminate its connection agreement with Powerlink; and
- the impairment of the above- and below-rail electric assets.

The assumed treatment of each of these impacts in the TCO analysis is explained below.

Powerlink break costs

QR Network will incur costs in the event of early termination of its connection agreement with Powerlink. An agreement is entered into for each new feeder station and the agreements have a 30 year term.

The charge payable under that agreement has a capital and operating/maintenance component, with the former comprising around 60% of the connection charge. The break costs reflect the value of the unrecovered capital, taking into account any value in the assets that could be recovered following termination of the contract. QR Network has assumed that this recoverable amount would be low (only about 20% of the remaining capital value), given most of the assets have been built specifically for the site. The costs of removing the assets (which has been assumed to be around 15%) must also be included.

Based on these assumptions the estimated break costs are forecast to be around $400 million in Blackwater and $220 million in Goonyella (these numbers are in present value terms). This cost is significant. For example, the costs for Blackwater reflect the capital value remaining in the connections facilities for the four feeder stations that are currently being completed. No such costs have been modelled for above-rail however it is possible that such costs could be incurred depending on the terms of the contract.

Asset impairment

Under the accounting standards an asset cannot be carried in the financial statements at an amount that exceeds the recoverable amount.[5] This recoverable amount is determined as the higher of:

- the amount that can be recovered through the value-in-use of the asset (which is based on the expected future cash flows that can be derived from that asset); and
- the fair value of the asset, or the amount that is expected to be obtainable from the sale of the asset in an arm’s length transaction between knowledgeable and willing parties.

Given there is not an active secondary market for electric railway assets (particularly network infrastructure, although this will also be the case for above-rail assets if QR National exits this market), it will be difficult to estimate fair value. For electric network infrastructure, the amount that could be recoverable from value-in-use is likely to be zero (other than components that could be used as spares for the Goonyella system), assuming that the costs could not otherwise be recovered via QR Network’s below-rail revenue.

[5] Refer AASB136 Impairment of Assets.

For the above-rail assets it is assumed that where possible, rollingstock will be cascaded to other systems. While some of the electric above-rail fleet could be utilised in the Goonyella system for growth tonnes a significant number of these assets would still be stranded.

If the Blackwater system moved to full diesel operations, QR Network and QR National will need to write down the value of the below and above-rail assets based on the above tests (that is, the value of the assets will need to be recorded at the new recoverable amount). The amount of the write down will also need to be expensed in the Profit and Loss Statement. Accordingly, impairment has more of a balance sheet impact rather than a direct cash flow impact.

Outcomes

TCO of scenarios

As noted previously, in order to understand the cost differences between the different traction types, a comparison can be made between the TCO of running a full electric rail system versus a full diesel system. The results for each system are shown in the following table.

Table A.3: TCO outcomes: full diesel versus full electric scenarios

System	Full diesel	Full electric
Blackwater	$7.3 billion	$6.3 billion
Goonyella	$7.0 billion	$6.0 billion

There is therefore a $1 billion difference in the total costs of owning and operating each traction type in both systems over thirty years.

The key driver of this difference is in above-rail capital and operating costs. The most significant driver is energy costs, which are materially lower for electric traction, reflecting more efficient utilisation of energy and the shorter cycle times (after considering the impact of the carbon tax on energy prices). Above-rail capital costs for electric are also lower, reflecting the fewer number of consists required to haul the same tonnes, as well as the requirement for one less locomotive per consist.

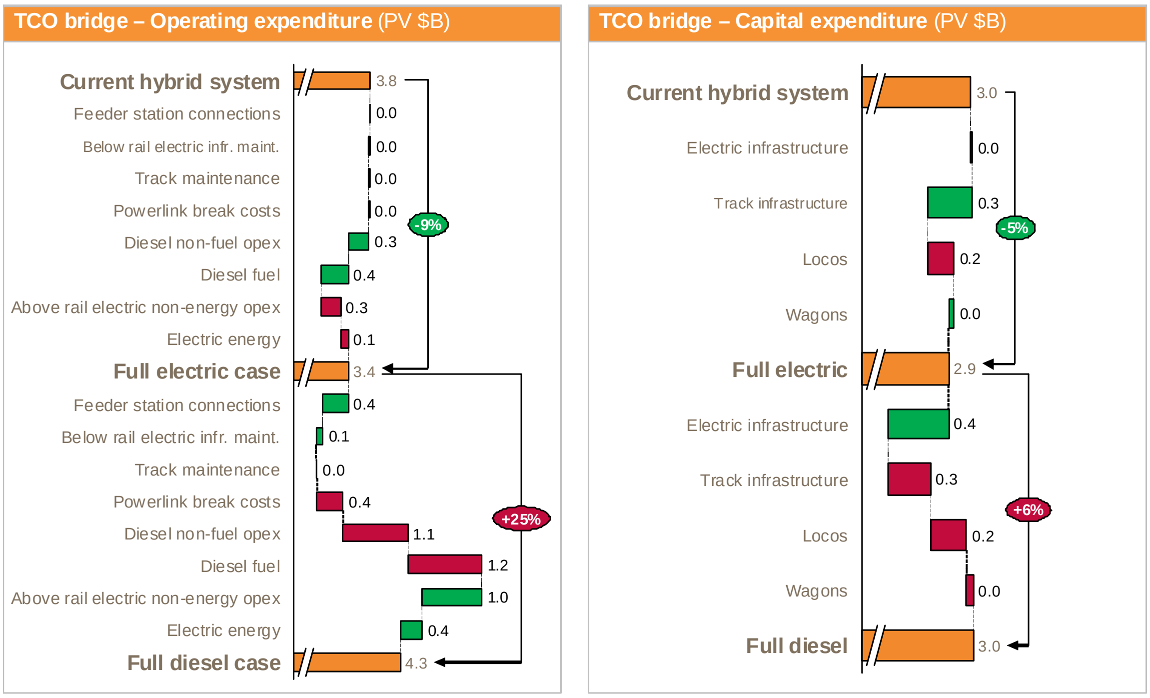
As would be expected, below-rail expenditure for an electric system is higher than diesel (based on the incremental cost of installing and maintaining electric network infrastructure). However, when the TCO is examined on an integrated basis, this is more than offset by the relative efficiencies of operating electric consists compared to diesel (putting aside other benefits such as environmental benefits). Investment in electric network infrastructure is therefore necessary in order to enable these benefits to be realised. Overall, this directly translates into lower total haulage costs for users.

The TCO for the full diesel scenario includes $400 million of Powerlink break costs in Blackwater and $220 million in Goonyella. If these costs are excluded, there is still a material cost advantage for the full electric scenario, as the TCO would still be in the order of $600 million below the full diesel scenario in Blackwater and $780 million below in Goonyella.

As outlined above, in the Blackwater system the hybrid scenario assumes that all mines with non-electrified spurs (including Rolleston) run diesel consists. The TCO of this scenario is $6.8 billion, which is $0.5 billion higher than the full electric scenario. The key drivers of the difference were outlined above.

More detail on the drivers of the capital and operating expenditure differences for each scenario are provided below.

Figure A.9: Breakdown of TCO differences: operating and capital expenditure (Blackwater)



The green bars in the above figure represent costs that would be avoided or reduced in transitioning to the next scenario. The red bars represent additional costs that would be incurred in transitioning to the next scenario. The above representation includes Powerlink break costs of $400 million for Blackwater. If these costs are excluded the present value of operating and maintenance costs under the full diesel scenario would be $3.9 billion.

This analysis confirms an unequivocal advantage for electric over diesel traction from a whole of rail system perspective. Hybrid operations clearly reduce costs relative to the full diesel scenario but is not the lowest cost traction type for the system. In saying this, QR Network is not proposing that the Blackwater system should be transitioning to full electric. What this does show is that if electric trains are unable to fully exploit their inherent advantage in a hybrid system, these efficiency benefits will rapidly diminish. This will be the case if diesel utilisation reaches a material level in either the Blackwater or Goonyella systems.

Impact of impairment

Break costs and impairment will only be triggered if it is decided to transition to a full diesel system. As outlined above, QR Network has estimated that the break costs of transitioning to full diesel would be $400 million in Blackwater and $220 million in Goonyella, which has been included in the full diesel TCO. Significant asset impairment would also occur as below-rail electric assets would largely be stranded. For example, if the Blackwater system transitioned to full diesel only a certain proportion of the above-rail fleet could be cascaded into the Goonyella system (presuming Goonyella remained predominantly electric).

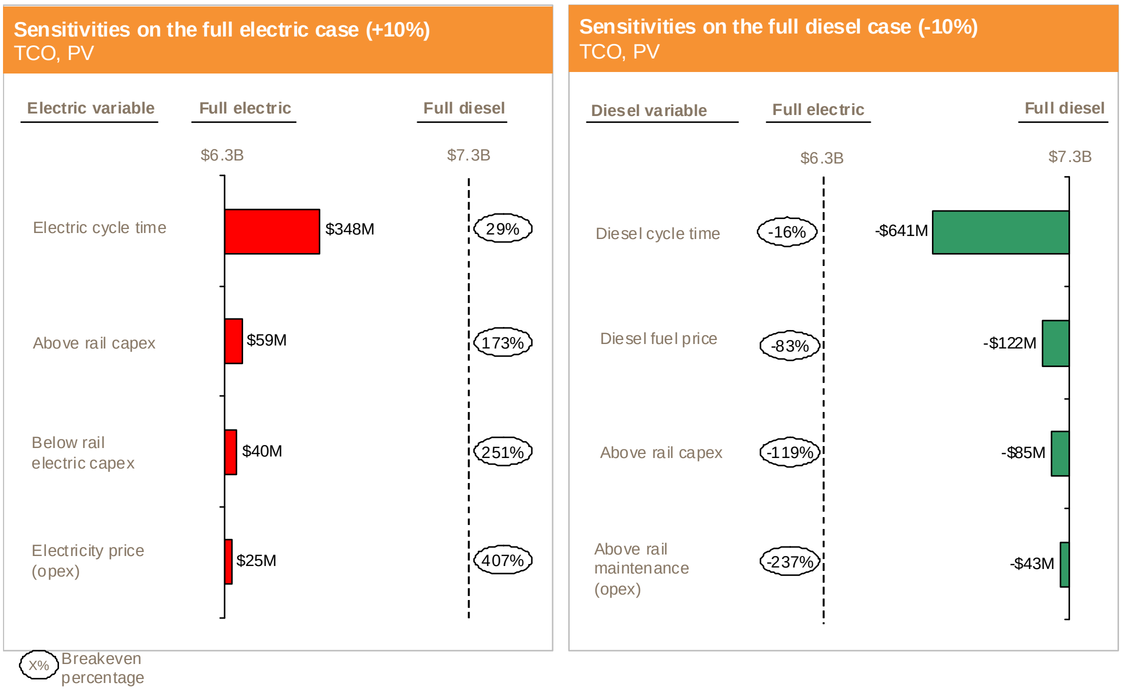
QR Network recognises that the evaluation of diesel versus electric technology needs to be made on its own merits, before the impact of existing investments in electric assets is considered. The preceding analysis shows a clear advantage to electric traction independent of these impacts. However, if QR National has to exit the market for electric traction this analysis shows that it would have a material and detrimental impact on the business, as well as QR Network's. It will also impact other operators that have invested in electric assets.

Sensitivity analysis

Sensitivity analysis was conducted on key drivers of the TCO. This calculates the impact on the TCO of variations in the assumptions of plus or minus 10%. The breakeven percentage change was also estimated. For example, in comparing the transition between the full diesel and full electric case, the breakeven is the percentage change in the variable required to equate the TCO of the full diesel case to the electric case.

Figure A.10 compares the full diesel and full electric cases in the Blackwater system.

Figure A.10: Sensitivities between full electric and diesel cases



The figure on the left evaluates the impact of a 10% increase in variables that drive electric traction's inherent advantage. The circled numbers show the percentage increase that would be required to increase the full electric TCO to equate to the full diesel TCO. The figure on the right evaluates the impact of a 10% decrease in variables that drive diesel traction's inherent disadvantage. The circled numbers show the percentage decreases that would be required to bring the full diesel TCO down to the full electric TCO.

This shows that material movements in the key drivers are unlikely to change the preference for electric traction over diesel. For example, electric cycle time would need to increase by 29% to increase the TCO of the full electric case to equal the full diesel case. In QR Network's view, such an increase in a full electric system is not plausible (given current / expected / safe speed limits), unless it was due to exogenous factors that fundamentally affected the operation of the system (in which case such factors are also likely to affect diesel cycle times).

This also highlights the significance of the energy cost differential, with a 407% increase in electricity prices required for the full electric TCO to equal the full diesel TCO. Further, even though below-rail capital expenditure for a full electric system would be higher than the full diesel case, it would need to increase by another 251% for the electric TCO to equal the full diesel TCO.

As outlined above, sensitivity analysis has also been conducted on the cost of acquiring diesel locomotives (where Pacific National has indicated procurement prices materially lower than QR Network's modelled price based on locomotives that can be sourced from China). Examining the full diesel case shown on the right in the above figure, the analysis implies that above-rail capital expenditure would need to fall below $0 in order to the full diesel case to break-even with electric (or a 119% reduction in costs). Similarly, the price of diesel fuel would need to fall by 83% in order to change the preference for electric traction.

QR Network therefore considers that the results of this analysis are robust to changes in key assumptions.

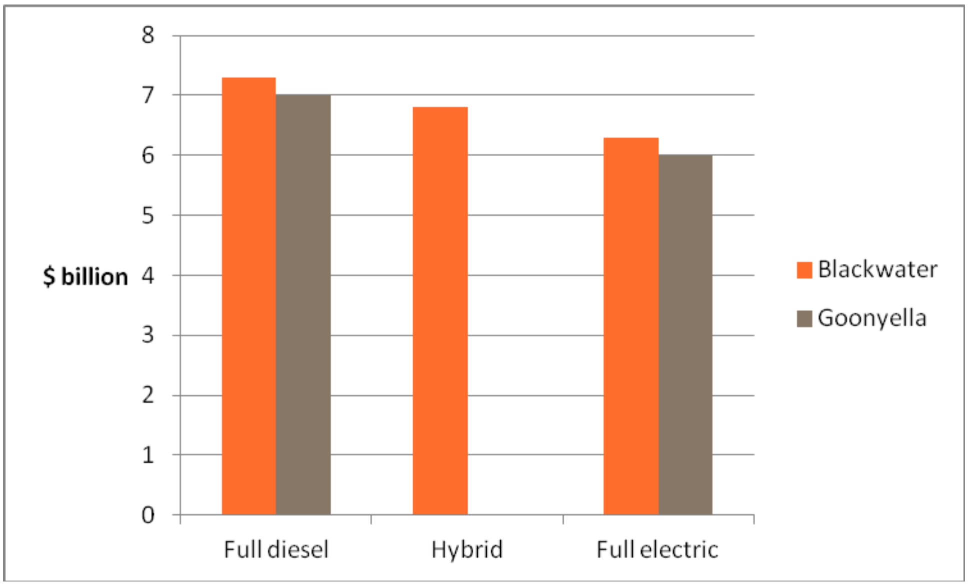
Summary and conclusions

QR Network has conducted a comprehensive analysis of delivering a rail haulage service using electric versus diesel technology. The assessment has been made based on the Total Cost of Ownership, which primarily comprise capital, operating and maintenance costs, as this will drive the prices charged to users. As the relative efficiency of each traction type needs to be considered from both an above and below-rail perspective the analysis has been done on a whole-of-rail system basis.

Three scenarios have been evaluated, being a 'full electric' case, a 'full diesel' case and a hybrid case. The latter is of particular relevance in the Blackwater system and reflects the mix of traction types that can currently operate in that system. The analysis has been conducted over a 30 year period, with cashflows discounted to a present value using a pre-tax Weighted Average Cost of Capital. Over the horizon of the analysis, throughput has been assumed to increase from 86 Mtpa to 290 Mtpa in Goonyella, and from 69 Mtpa to 156 Mtpa in Blackwater.

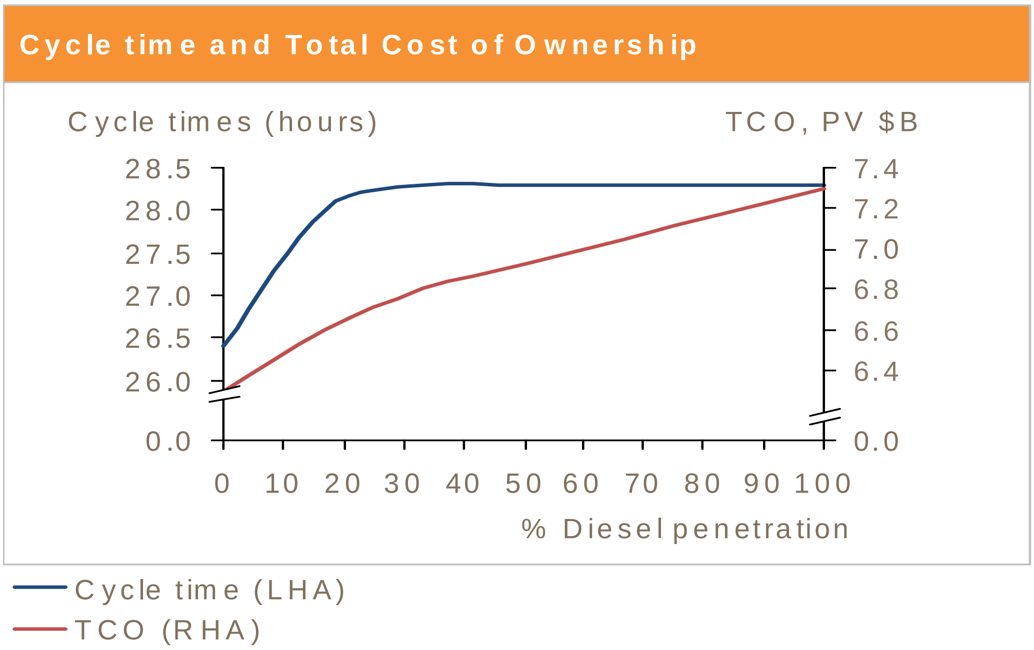
The analysis shows that electric traction has a clear inherent advantage over diesel traction, with the TCO of the full electric scenario being approximately $1 billion below the TCO of full diesel in both systems. The TCO for each case is as follows.

Figure A.11: Total Cost of Ownership ($billion)



The main driver of the differences are a full electric system's higher throughput and speed efficiency. Electric consists can operate at a faster cycle time, which in turn reflects advantages in faster section run times, acceleration and fewer provisioning requirements. This is shown in the figure below for the Blackwater system.

Figure A.12: Cycle time and Total Cost of Ownership: Blackwater



The key cost driver of the TCO difference is in above-rail capital and operating costs. The most significant difference is energy costs, which are materially lower for electric traction, reflecting more efficient utilisation of energy and the shorter cycle times (after considering the impact of the carbon tax on energy prices). Above-rail capital costs for electric are also lower, reflecting the fewer number of consists required to haul the same tonnes, as well as the requirement for one less locomotive per consist.

As would be expected, below-rail expenditure for an electric system is higher than diesel (based on the incremental cost of installing and maintaining electric network infrastructure). However, when the TCO is examined on an integrated basis, this is more than offset by the relative efficiencies of operating electric consists compared to diesel (putting aside other benefits such as environmental benefits). Investment in electric network infrastructure is therefore necessary in order to enable these benefits to be realised. Overall, this directly translates into lower total haulage costs for users. The conclusions of this analysis remain robust to changes in the key assumptions that drive the inherent advantage of electric over diesel traction.

The TCO for the full diesel scenario includes $400 million of Powerlink break costs in Blackwater and $220 million in Goonyella. If these costs are excluded, there is still a material cost advantage for the full electric scenario. The above numbers do not include the impact of asset impairment if the Blackwater system transitioned to full diesel. This would have a material and adverse impact on QR National, QR Network and other operators who have invested in electric assets.

This analysis confirms an unequivocal advantage for electric over diesel traction from a whole-of-rail system perspective. Hybrid operations clearly reduce costs relative to the full diesel scenario but is not the lowest cost traction type for the system. In saying this, QR Network is not proposing that the Blackwater system should be transitioning to full electric. What this does show is that if electric trains are unable to fully exploit their inherent advantage in a hybrid system, these efficiency benefits will rapidly diminish. This will be the case if diesel utilisation reaches a material level in either the Blackwater or Goonyella systems.

Appendix B - Impact on related markets

The QCA Act sets out an overarching objective for the access regime in Part 5. This is:

"The object of this part is to promote the economically efficient operation of, use of and investment in, significant infrastructure by which services are provided, with the effect of promoting effective competition in upstream and downstream markets"

The expectation of the objects clause is that, by promoting efficient use of and investment in infrastructure by which services are provided, competition in related markets will be promoted also. In essence, the objects clause envisages that efficient investment and utilisation of infrastructure is a precursor to promoting competition in upstream and downstream markets.

This Appendix briefly describes the various upstream and downstream markets that are related to the market for the declared services – below rail services – and the likely impact the proposals in this submission relating to the treatment of below rail electric traction services will have on competition in those markets. While not a declaration assessment in terms of considering the impact on related markets 'with and without' access to electric traction services, it is worthwhile to examine the potential impact of the proposed arrangements for these services on the competitive conditions in related markets given the intention of the access regime as set out in the objects clause.

1. Relevant related markets

The most relevant related markets to the market for below rail services are the:

- coal tenements market;
- seaborne coal sales market;
- above rail haulage market; and
- port terminal coal handling services market.

Coal tenements market - a tenement is the right to carry out prospecting, exploration or mining activity in respect of a specific piece of land, a right created through licence issued by the State. Tenements are limited in time and area, with constraints on the ability of the tenement holder to tie up a tenement that it has no intention to develop. The tenement holder may also choose to sell part or all of the rights in the tenement to another party, including the rights to mine any deposits.

Seaborne coal sales market – there are a large number of coal producers in Queensland (and NSW) which compete to sell coal to overseas customers. While it may be reasonable to distinguish coking and thermal coal sales, this distinction is not relevant for the purpose here. The market for seaborne coal sales is highly competitive.

Above rail haulage market - the above rail services market in Queensland presently includes the two major operators - QRN and Pacific National. In general, mines contract directly with above rail operators for the supply of above rail services. While concentrated, this market is competitive, with evidence that operators compete vigorously for market share.

Port terminal coal handling services market – as coal handling terminals are dedicated facilities, this market will consist of the coal handling terminals that are within the feasible geographic scope of producers to utilise in exporting their coal. There are a number of coal handling terminals in CQCR – Abbot Point Coal Terminal, DBCT, HPCST, RG Tanna and Barney Point. There are also plans to develop new coal terminals at Abbot Point, Dudgeon Point and at Wiggins Island (WICET).

2. Affected markets

Rail haulage market

Of these markets, the above rail haulage market is the market that is likely to be most directly affected by the access arrangements applying to traction assets. The key consideration is whether the proposed arrangements designed to promote the adoption of electric train services over diesel services will have any adverse impact on competition in this market. QR Network does not consider that competition will be adversely affected because:

- electric and diesel train services are in the same market (above rail haulage) and are effective substitutes for each other. This is evidenced by the fact that a mix of diesel and electric services are presently operated by both QRN and Pacific National;
- the market is already competitive. Entry by third parties has already occurred in this market, placing an effective constraint on any potential market power of QRN. It is very unlikely that the types of changes in the regulatory treatment of traction assets proposed here will have any material adverse impact on the competitive conditions in the above rail market;
- the declaration of below rail services means that access to below rail services is subject to economic regulation. This is for the benefit of competition in the above rail market. In particular, the access framework as set out in the Access Undertaking includes the terms and conditions for operators/end users to negotiate access and, ultimately, have recourse to binding arbitration. This access framework provides a protection for access seekers in terms of gaining entry to the above rail market. Moreover, access seekers retain a choice between operating diesel and electric trains. The proposals here merely seek to ensure that the pricing arrangements are fully cost reflective;
- there are no material barriers to entry or exit to the market which would make entering the market with the intention to run an electric service more difficult than running a diesel service. In other words, entering the market with an electric service is unlikely to pose any additional barriers for an access seeker than would a diesel service.

Seaborne coal sales market

As noted above, the seaborne coal sales market is already highly competitive. While the Queensland coal industry enjoys a strong position in this market, this position will change as coal production is forecast to grow substantially. This growth will result in an increasing proportion of lower value, thermal coal which is sourced from higher cost deposits that are more distant from export port facilities. The result of this will be an increased proportion of production from lower margin deposits. In this environment, achieving the lowest total transport cost to market is of paramount importance.

The proposed changes are likely to increase the competiveness of the Queensland coal industry in the seaborne coal sales market as they will promote the lowest total cost rail solution for all users of the Blackwater and Goonyella systems.

3. Conclusions

In summary, for all the related markets to the market for declared services, the market that is most likely to be affected by QR Network's proposed changes to the access arrangements for traction assets is the above rail market. For the reasons outlined above, QR Network does not consider that the proposed changes will have any material adverse impact on competitive conditions in those markets. Accordingly, the proposed changes remain consistent with the intent of the access regime as set out in the objects clause.