

Aurizon Network's 2017 Draft Access Undertaking

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Image: Provisioning of electric traction locomotive at Jilalan provisioning shed

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1.0 Executive Summary

Aurizon Operations and other rail operators have made significant investment in narrow gauge electric locomotives for use in the central Queensland coal network. The current level of input cost relativity between electric and diesel locomotives, including diesel fuel costs, electricity supply costs and the access charges to the overhead power system places electric traction at a cost disadvantage to the diesel alternative in the Blackwater System.

These short term cost relativities provide increased incentives for investment in diesel locomotives and increase the bypass risk of the overhead power system. Under the current regulatory arrangements the costs of this bypass are transferred to remaining users of electric traction. A reduction in the utilisation rate in the Goonyella system may also strengthen the incentives for use of diesel services.

The bypass of the overhead power system in response to short term cost incentives raises the prices to existing users and prevents the system from achieving the cost efficiencies associated with the strong economies of scale inherent in the fixed infrastructure. The consequence of this cost shifting is that the marginal cost advantage obtained by the user of the rail transport services has potential greater negative long term impacts on system utilisation and efficiency. This can lead to a misalignment between the interests of an individual user of rail transport services and the total cost of ownership of rail transport services to users over the long term.

An effective regulatory framework should address this misalignment of incentives to support sustainable investment and utilisation of rail infrastructure. Those frameworks should also protect the interests of rail operators with rights to use the overhead power system from cost transfers arising from another rail operator's preference to utilise a diesel traction service.

Aurizon Operations does not believe the regulatory framework under the current approved access undertaking (UT4) and the continuation of those arrangements in (UT5) will address this misalignment and that the QCA has not properly established:

- whether promoting contestability for the declared service by permitting traction choice in electrified systems is in the long term interest of users of the declared service; and
- the potential economic consequences from allowing traction choice.

To address these issues Aurizon Operations recommends that UT5 include:

- > **an obligation to complete an assessment on the form of regulation and pricing of the overhead power system and implement appropriate reforms no later than 31 December 2017;**
- > **appropriate positive and negative incentives for narrow gauge locomotives in the Goonyella and Blackwater systems to prevent further decline in the electric utilisation, including a requirement for diesel services which are introduced after the date of the initial undertaking notice:**
 - **to make a contribution to the overhead power system commensurate to the associated costs being transferred to existing operators of electric services; or**
 - **to be subject to a reference train path multiplier which applies to the AT2, AT3 and AT4 tariff components.**

2.0 Introduction

Aurizon Operations and other rail operators have made significant investment in electric locomotives. This investment has a relatively long physical life and was made on the basis that the input cost relativity of electric locomotives with a diesel substitute over the long term represented the most efficient traction choice.

These decisions were also made on the basis of access to the overhead power system being a declared service and that the requirements of the *Queensland Competition Authority Act 1997 (QCA Act)* would support long term investment in the overhead power system and rail operators' complimentary investment in electric locomotives. It is also expected that the regulatory framework would provide appropriate economic signals to access seekers and users of rail transport service which support this long term investment.

Aurizon Operations does not hold reasonable confidence that the regulatory framework is aligned to this objective and that efforts to address these concerns through successive regulatory determinations will protect rail operators who have made significant complimentary investment in electric locomotives from the cost transfer associated with a rail operator's decision to bypass the overhead power system.

This submission identifies the misalignment of these short term incentives to bypass the overhead power system and the potential implications of these outcomes on the long term interests of users of rail transport services. Aurizon Operations is of the view that reforms to the regulatory framework to address regulation of the overhead power system under increasing competition for that service are necessary to ensure efficient utilisation of the declared service and future investment in locomotives and infrastructure occurs over the long term.

3.0 Consideration of AT5 in Approval of UT4

Aurizon Operations has made submissions to the QCA during the consultation period for UT4 expressing its concerns that the regulatory framework for establishing access charges for access to the overhead power system did not provide incentives for the efficient use and investment in electric traction. The QCA's Final Decision noted the basis of Aurizon Operations views in support of this position. These views include:

- > the use of a fully distributed cost pricing model is not appropriate for substitutable services;
- > the application of the object of Part 5 of the QCA Act (s. 69E) does not extend to promoting competition for the declared service;
- > the cost associated with the access price (AT5) for an individual access holder should not be dependent on the traction choice decisions of other users of the declared service;
- > the deferral of revenue associated with the application of an efficient price will only reduce the efficiency of future prices and represent an asymmetric risk to current users of electric services;
- > the pricing arrangements must not preclude the service provider from recovering its efficient investment; and
- > there is a need to obtain objective evidence of the performance differential between electric and diesel powered locomotives.

In approving UT4 the QCA Final Decision states:

We consider that the AT5 tariff is largely consistent with the object of Part 5 of the QCA Act, the pricing principles in section 168A of the QCA Act and appropriately balances the interests of Aurizon Network, access seekers and access holders.

Notwithstanding this, we consider that it is appropriate to review the AT5 tariff arrangements as part of the longer-term review of pricing arrangements. In particular, we acknowledge that there may be an issue with the AT5 tariff being an average price, which tends to push up the price early in the life of an asset, when the efficient economic signal would be a lower price.

Aurizon Operations welcomes the QCA acknowledgement that the AT5 rates may not provide an efficient economic signal but does not support the conclusion that the relevant matters of the QCA Act are satisfied. The QCA appears to rely on an expectation that the current rate will be short term and that long term utilisation will lower average prices. However, it does so without any objective statement of whether:

- > the demand and cost relativity of electric to diesel will provide a long term price path consistent with those expectations;
- > the competition for the declared service and those short term price signals will incentivise investment in diesel which will hinder achieving lower average prices; and
- > the long term interests of users with investment in electric locomotives and rights to use the service are being sufficiently addressed by not providing incentives for use of the declared service and avoiding cost transfers associated with bypass.

4.0 The long term sustainability of electric traction is at risk of short term bypass incentives

The current regulatory framework and input prices to alternative traction services place electric traction at a competitive disadvantage to a diesel alternative in the Blackwater System and potentially the Goonyella System.

The AT5 tariff as currently applied represents the rate necessary for the access provider to achieve revenue adequacy for the efficient costs associated with the provision of access to the electric overhead system. AT5 is calculated using a fully distributed cost approach and the revenue cap approach ensures the System Allowable Revenue is recovered from the forecast volumes for that year with any under-recovery capitalised and recovered in future years. However, as Aurizon Operations has noted in previous submissions the AT5 rate is not representative of an efficient price associated with the costs of use of an individual service (materially exceeds the marginal cost of use).

While access to the overhead power system is part of the declared service, the use of traction type is not mandated by the regulatory framework. This is essentially an asymmetric regulatory obligation whereby the provision of the service can be mandated but its use is not as:

- > a rail operator may elect to enter, or operate, in the rail haulage market using either electric or diesel traction;
- > the costs of the electric overhead power system can be bypassed by electing to use diesel traction; and
- > a rail operator's choice will be influenced by a number of factors, including its expectations on the relativity of diesel oil prices to electricity over the useful life of locomotives.

The commercial drivers of traction choice are complex and influenced by a number of financial and non-financial considerations. For example, rail operators may be strongly influenced by, among other things, the regulatory risks associated with uncertainty as to how AT5 rates will trend over time. This uncertainty

is associated with variation in utilisation rates or issues around interoperability between electrified and non-electrified systems.¹

Importantly, diesel and electric traction have materially different cost curves. For example, diesel services display relatively constant returns to scale with the main fixed cost being the establishment of re-fuelling and provisioning facilities. This can be contrasted with electric traction where the large fixed costs associated with investment in the overhead power system and connection to the National Electricity Market have strong economies of scale. Therefore, short term differentials in relative input costs and system utilisation rates may promote economic bypass of the overhead power system and prevent the efficiency benefits associated with realising the economies of scale of the existing power system investment.

4.1 Current level of competitive disadvantage incentivises bypass

In a competitive market, price is set not by average cost but by equilibrium in the market. Where the combined below and above rail costs for a diesel service are lower than the electric alternative a rail operator would need to either:

- > invest in diesel locomotives and provide diesel services; or
- > invest in electric traction services at a price equivalent to the diesel alternative.

The graph in Figure 1 shows the indicative above and below rail cost relativities in the Blackwater and Goonyella Systems based on the proposed AT5 and EC rates.

Figure 1. Illustrative Differential CQCN Total Freight Rates (FY17 Dollar Terms)²

[C-I-C]

Source: Aurizon Operations analysis of above and below rail costs on representative service and rail transport distance

The assessment indicates that under current market conditions and system utilisation rates there is a clear competitive disadvantage of electric traction in the Blackwater System. There is a marginal advantage for electric traction in Goonyella currently, however the margin may not be sufficient to prevent the entry of diesel traction to the corridor as a result of rail operators seeking to mitigate non-financial risks.

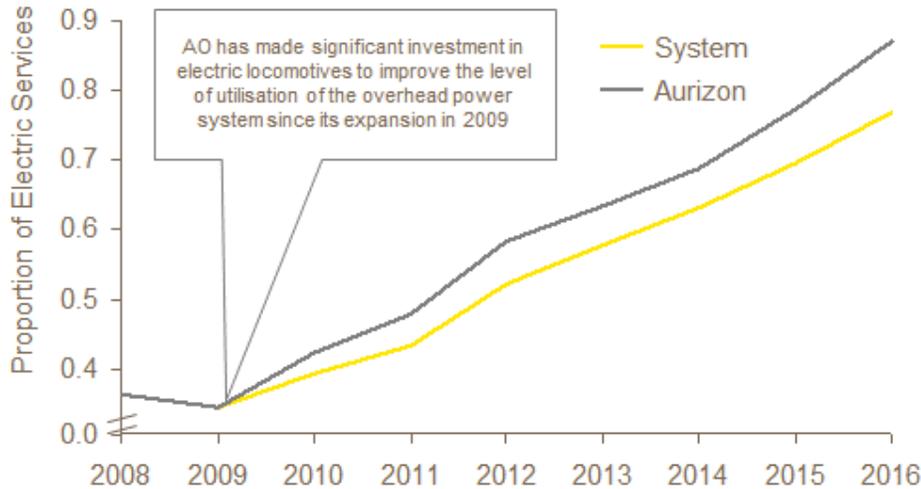
¹ Rail operators seeking to operate services over interconnected electrified and non-electrified systems may have a preference to operate some diesel services in electrified systems to accommodate demand variations in non-electrified systems in order to reduce resourcing requirements for that system.

² Excludes costs which are invariant to traction choice such as crewing.

4.2 Short term incentives to bypass are misaligned to long term interest of users of declared services

The greater the cost differential, the larger the risk and cost of rail operators bypassing the overhead power system and the AT5 rate increasing for the remaining services. Aurizon Operations has made significant investment in electric locomotives to increase the utilisation rate of the overhead power system in Blackwater as shown in Figure 2.

Figure 2. Percentage of train services operating as electric services in Blackwater



Source: Aurizon Operations and Public Quarterly Performance Reports

As per Figure 3, the AT5 access charge is highly dependent on the level of asset utilisation and the proposed AT5 rates for the Blackwater system reflect a low rate of capacity utilisation of the overhead power system. That is, while Aurizon Operations operates at a high level of electric utilisation of the UT5 volume forecasts a substantially lower AT5 rate could be achieved through:

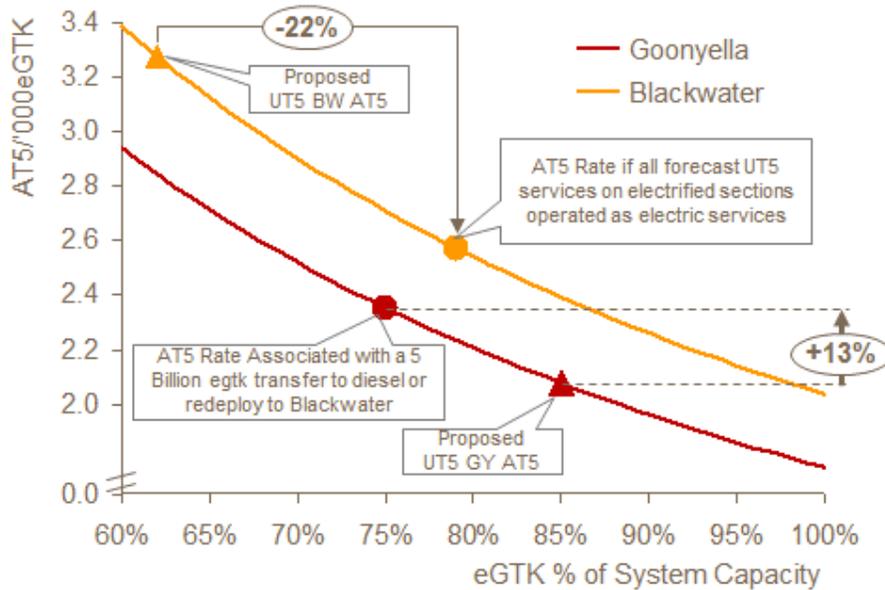
- increased proportion of services operating as electric at a system level; and/or
- the Blackwater System operating closer to its contracted capacity levels.

Assuming a Blackwater system capacity of 87 million tonnes per annum (port export capacity of 102 mtpa less an allocation of 15 mtpa to Moura) and that a change in gross tonne kilometres is linearly proportional to a given change in tonnage throughput, then the Blackwater proposed AT5 rate of \$3.31 per 000 egtk is representative of a system utilisation rate of around 63%.

In contrast the 100% electric utilisation to the ports of Dalrymple Bay Coal Terminal and Hay Point is commensurate to an overall system utilisation rate of approximately 86% and an AT5 rate of \$2.08 per 000 egtk.

Figure 3 also shows that a UT5 Blackwater AT5 access charge associated with all forecast services that are able to utilise the overhead power system would be 22% lower at \$2.58 per 000 egtk. Furthermore, a 10% reduction in forecast egtk for the Goonyella system would increase that AT5 rate to \$2.36 with consequential impacts on the competitiveness of electric traction in that system.

Figure 3. AT5 tariffs at different levels of system utilisation by electric services



Source: Aurizon Operations analysis of proposed UT5 electric system allowable revenues and forecast volumes (net tonnes and gross tonne kilometres).

The economic consequences of the slope of the price curve and its relationship with utilisation should be readily apparent. Each additional investment in diesel locomotives prevents the system from moving further down this cost curve and effectively sterilises a proportion of the system throughput able to contribute to achieving scale efficiencies.

While Aurizon has made significant investment in electric locomotives the current competitive conditions for electric may not support further investment in electric locomotive where it is necessary in a competitive market to meet the competitive equilibrium. This is a commercially rational approach in response to short term movements in input prices between diesel and electric traction. Importantly, without further investment in electric locomotives it may also be commercially beneficial for Aurizon Operations to redeploy existing electric locomotives to Blackwater. In this regard, Figure 3 also shows the impact of a reduction of 5 billion eGTK on the Goonyella AT5 rate.

The implications of the current pricing framework are that bypass of the overhead power system may benefit an individual end user through a lower rail freight cost at that time but it comes at the expense of raising the costs of all remaining users of electric traction and foregoing the exploitation of unexhausted economies of scale in the overhead power system. A failure of the regulatory framework to promote efficient utilisation of the declared service can lead to market failure associated with the negative externalities from individual choices on traction type.

4.3 There is considerable uncertainty with the longer term cost relativities between diesel and electric services

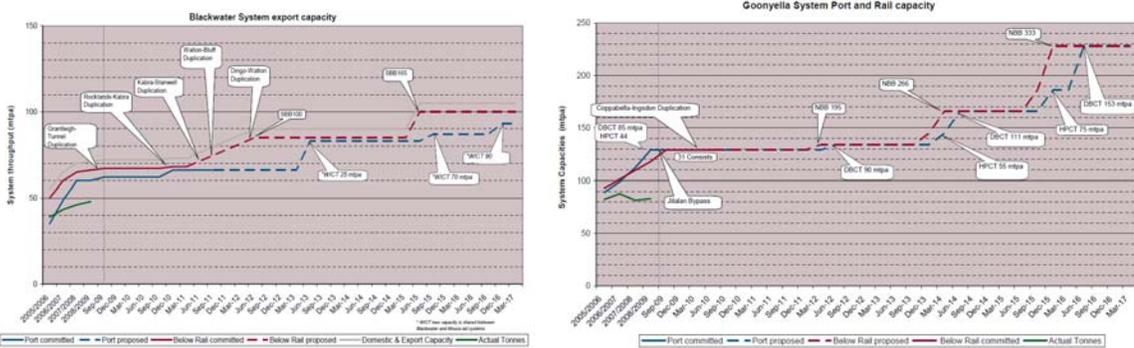
At the commencement of third party access regulation under Part 5 of the QCA Act in 1998 access to the overhead power system in the Blackwater and Goonyella systems was considered to be necessary to promote competition in the downstream rail haulage market. This broadly reflects the natural monopoly characteristics of the overhead power system and the material competitive advantage held by electric traction over diesel locomotives at that time. The scope for competition in the provision of the declared service was considered unlikely.

Subsequent efficient expansions of the overhead power system have occurred in response to a sufficient coalition of user support for additional overhead capacity. This largely reflected the longer term demand and relative costs assumptions prevailing at the time of those investment decisions.

Demand and input costs vary over time, leading to changes in the relative competitiveness of electric traction compared to diesel. These variations may create short to medium term incentives to bypass the overhead power system, contrary to the long term interests of users of the declared service. This is apparent in a number of key drivers of electric traction competitiveness including:

1. **Demand Forecasts:** Demand forecasts remain relatively constant over the UT5 period and well below the contracted capacity levels. Similarly, prospects for further expansions of port capacity and export growth above existing system capacities are substantially below the levels projected in the 2009 Coal Rail Infrastructure Master Plan (CRIMP), which are reproduced in Figure 4.

Figure 4. CQC System Export Capacity (2009 CRIMP)



Source. Aurizon Network 2009 Coal Rail Infrastructure Master Plan (p. 47 and p.68)

2. **Fuel Costs:** Fuel costs associated with changes in electricity generation mix, renewable energy schemes and suppressed diesel costs have had a material impact on the competitiveness of electric traction. The following graph shows the relative movements in benchmark wholesale electricity costs and the annual average terminal gate price for diesel.

Figure 5. Relative Price Movement in Wholesale Diesel and Electricity Costs in Queensland



Source: Queensland Competition Authority Benchmark Retail Cost Index (2007-2017), Australian Institute of Petroleum Terminal Gate Prices (Brisbane).

The graph shows that the terminal gate price for diesel has moved favourably relative to the changes in wholesale electricity prices with FY17 representing the largest cost differential over the period since 2007. A key contributor to this differential is the impact of the Renewable Energy Target scheme. There is also significant policy uncertainty as to the future generation mix in Queensland and the impact policy changes will have on future wholesale electricity prices.

- 3. Transmission Costs:** Transmission connection and use of system costs remain a significant component of the AT5 cost base. These costs are substantially fixed and the impacts of future asset renewal requirements for pre-2009 connection assets and the impacts on these costs from their potential removal as prescribed exit services further contributes to the uncertainty of prospective future AT5 rates beyond the UT5 period.

As locomotives have a physical asset life and rail transport agreements extend well beyond the term of an access undertaking rail operators must assess how these factors will vary over time to influence the relative competitiveness of electric traction. Similarly, the overhead power system has physical asset lives extending beyond the duration of rail transport agreements and investment is made on the long term return on those investments.

The temporal misalignment between the regulatory term, rail contract term and economic life of rail infrastructure can result in the regulatory framework not promoting the efficient utilisation of the declared service beyond a single regulatory period. Taking into consideration the sunk investment by rail operators in electric traction then facilitating the short term incentives to bypass the overhead power system may not be in the legitimate business interests of persons who have, and will seek to acquire rights to use the service.³

This circumstance could lead to regulatory failure where the potential economic outcomes of bypass are worse than efficiency losses that regulation is intended to address. This is particularly the case where the marginal efficiency gains from the introduction of diesel locomotives in Goonyella and increased levels of use in Blackwater are substantially outweighed by the unavoidable costs of transitioning to a lower level of electric system utilisation. The transfer of costs and loss of efficiency to rail operators with electric locomotives associated with bypass of the overhead power system cannot be considered a pareto optimal condition for efficiency.⁴

5.0 Specification of the economic problem to be addressed

Changes in relative inputs costs to traction types and electric capacity utilisation rates have increased the contestability of the provision of access to the overhead power system. Allowing a choice of traction type has promoted competition for the declared service which is inconsistent with the premise of regulating natural monopoly infrastructure.

While the QCA is aware of this increased level of contestability through prior regulatory decisions and submissions, it has not sought to make amendments to reform the regulatory framework in order to address the implications of regulation under competition or determine the long term economic costs associated with that competition.

A primary test of whether the regulatory framework is consistent with the object of economically efficient operation of, use of and investment in, rail infrastructure with the effect of promoting effective competition in upstream and downstream markets must necessarily address whether competition for the declared service is desirable and whether it is in long term interests of users of rail transport services. In this regard, the QCA needs to determine:

- A. if it is necessary to promote increased utilisation of the overhead power system and what changes are necessary to the regulatory framework to promote that objective; or

³ *Queensland Competition Authority Act (1997)*, section 120(1)(c)

⁴ The change in the allocation of costs arising from the use of a diesel locomotive can only be pareto optimal if the benefit of operating that service does not make other services worse off.

- B. whether the adjustment costs to transition to an alternative level of overhead power system capacity and utilisation exceed the marginal efficiency gains from increased use of diesel and how those costs should be distributed; or
- C. where those marginal efficiency gains exceed the adjustment costs to a lower level of utilisation of the overhead power system, what is the efficient transition to that state to minimise the total cost of ownership.

This assessment should consider the long term demand and input costs for both traction types as well as the externalities associated with diesel services. These externalities include, among other considerations, the positive externalities to users of non-electrified systems where interoperability allows for maintenance of a lower level of above rail resources, or the negative environmental externalities associated with greenhouse gases and other emissions. This should also have regard to the broader public interest regarding and the contribution renewable energy investment and use of electric traction can make to the policy objectives of lower carbon emissions output from the transport sector.

Where it is established that the competition and efficiency objectives of the regime are best met through transition to an alternate level of electric capacity and utilisation, it will be necessary for the beneficiaries of competition for the declared service to meet the costs of structural adjustment to the required capacity and utilisation levels. This is broadly consistent with the view that where costs are to be recovered in a more competitive market then the costs must be collected through the monopoly segment.

Alternatively, where it is preferable that the utilisation of the overhead power system is increased but is unable to do so due to rail operators sunk investment in diesel services then any costs associated with the loss of scale efficiency should be transferred to those parties.

A coherent regulatory framework should be informed by this assessment so that commercial arrangements and locomotive investment over UT5 do not inadvertently promote a structural decline in demand for electric services. The impacts of this investment on AT5 tariffs could prevent the industry from attaining the long run welfare maximising utilisation rates if:

- > further investment in diesel locomotives materially increases the structural adjustment costs required to be borne by users of rail transport services in reducing electric capacity in the future;
- > the structural adjustment costs of transitioning to an alternate level of electric capacity may be inefficiently inflated through the absence of a coordinated transition and cost optimisation; or
- > the structural adjustment costs materially exceed the incremental efficiency benefits from increased diesel use.

While the current reference train path multiplier (often referred to as a 'diesel' multiplier) is currently applied to the AT2 train path charge this may not provide an appropriate disincentive for diesel services due to the low proportion of AT2 in the overall access charge.⁵

These are necessarily matters the QCA should have regard in determining whether to approve an access undertaking. When regulation is well designed and appropriately applied it can deliver optimal supply chains for users and incentives for investment to improve supply chain efficiency.

6.0 Recommendations

Aurizon Operations is of the view that the assessment referred to above must be undertaken and appropriate reforms implemented within the 2017 calendar year. This assessment must also involve an

⁵ The AT2 rate is also materially less than the incremental costs of the Wiggins Island Rail Project.

appropriate level of involvement by the QCA to ensure that the assessment will address the necessary matters and include the evidence that QCA would expect to require in order for the QCA to accept a draft amending access undertaking.

Aurizon Operations is cognisant of expectations of producers, the QCA and the access providers to conclude UT5 within a reasonable timeframe. However, given the potential long term material economic and commercial consequences to rail operators with existing investment in electric locomotives of further irreversible commitments in diesel locomotives, the QCA statutory objectives requires UT5 to address the potential for bypass of the overhead power system in order to avoid longer term losses of economic efficiency.

Therefore, this assessment process should proceed in parallel with the QCA's consideration of UT5 and the approved access undertaking should include an obligation to complete this assessment and submit an amending access undertaking by 31 December 2017. The QCA should also specify the matters that the assessment should address.

The QCA should also ensure that UT5 implements an appropriate incentive mechanism so that near term investment in narrow gauge locomotives in the Goonyella and Blackwater systems is appropriately incentivised to be electric to prevent further decline in the electric utilisation.

As the intention of these incentives is to influence future rollingstock investment decisions they should apply only to incremental investment decisions and should apply until the relevant assessment and appropriate changes to the regulatory framework have been implemented. This approach is also consistent with ensuring the interests of users with existing access rights are not adversely affected. For the avoidance of doubt Aurizon does not believe that rail operators with existing investment in diesel should be adversely affected by the incentives needed to inform future investment decisions.

In order to achieve these outcomes, it may also be necessary to implement a disincentive price for incremental diesel use in Goonyella, Aurizon Operations' recognises that the QCA has in prior decisions expressed a preference that users of diesel services should not be required to make a contribution to the costs of the overhead power system. However, Aurizon Operations considers that this is a reasonable obligation to apply to incremental rollingstock investment given it is consistent with the principle of impactor/exacerbator pays associated with the transfer of costs to other users by the decision to bypass the overhead power system. Alternatively, the QCA should seek to apply the reference train path multiplier to the AT2, AT3 and AT4 tariff components for the introduction of additional diesel locomotives as opposed to its current application to AT2.

In summary, Aurizon Operations recommends that UT5 include:

- > **an obligation to complete an assessment on the form of regulation and pricing of the overhead power system and implement appropriate reforms no later than 31 December 2017;**
- > **appropriate positive and negative incentives for narrow gauge locomotives in the Goonyella and Blackwater systems to prevent further decline in the electric utilisation, including a requirement for diesel services which are introduced after the date of the initial undertaking notice:**
 - **to make a contribution to the overhead power system commensurate to the associated costs being transferred to existing operators of electric services; or**
 - **to be subject to a reference train path multiplier which applies to the AT2, AT3 and AT4 tariff components.**