Aurizon Network Submission
2017 Electric Traction
Draft Amending Access Undertaking

Prepared by Aurizon Network Pty Ltd
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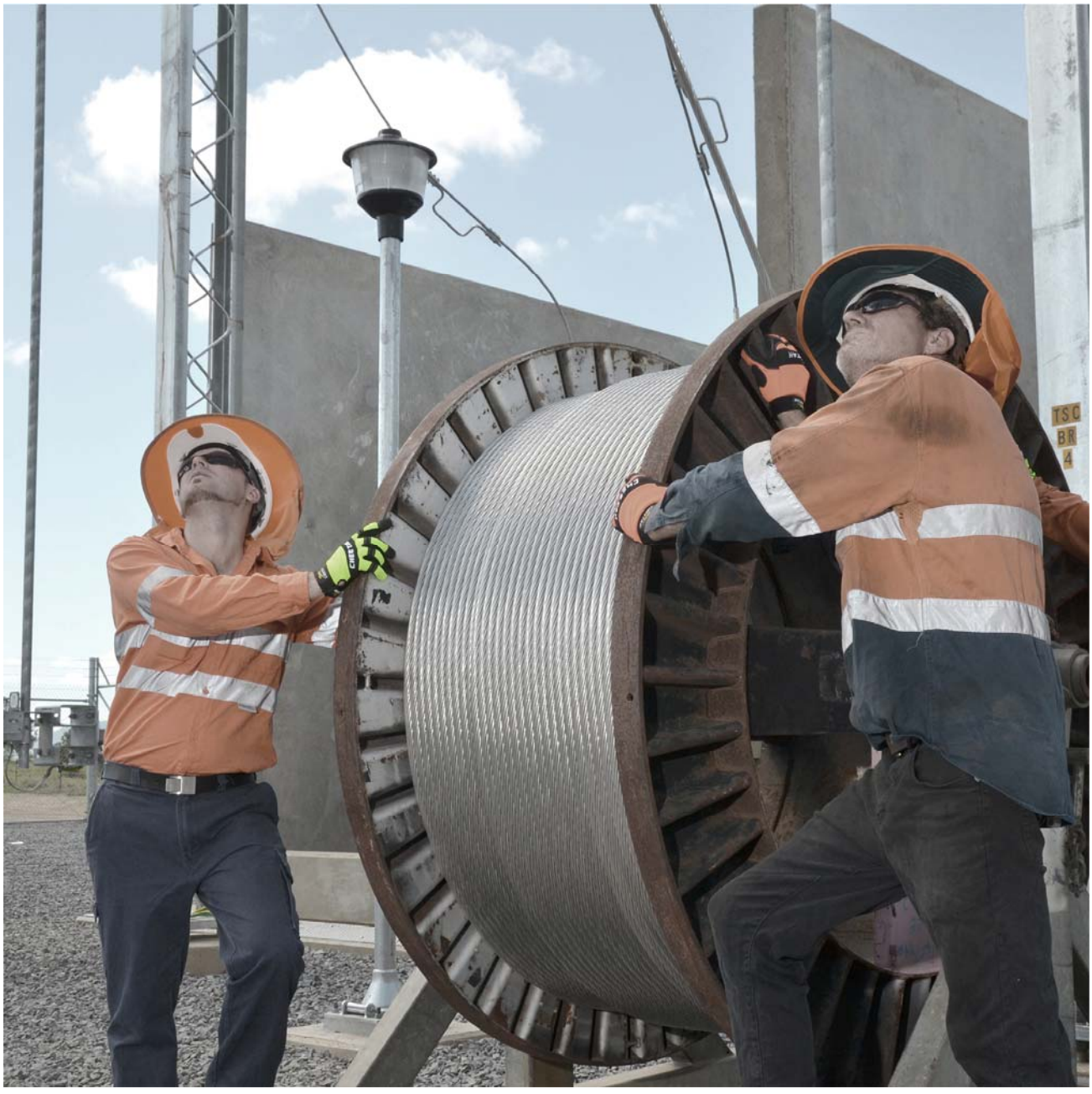

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1. Executive Summary

Aurizon Network Pty Ltd (**Aurizon Network**) is seeking Queensland Competition Authority *(***QCA**) approval of this 2017 Electric Traction Draft Amending Access Undertaking (**Electric Traction DAAU**) which proposes pricing reform for the electric traction component of Reference Tariffs (**AT5**). This reform is designed to address the economic anomaly of diesel users having the "free option" to use the electric traction infrastructure by converting from diesel to electric traction and to ensure that there is no unreasonable disadvantage to electric traction users simply due to the timing of a switch from electric to diesel traction.

Aurizon Network's electric traction infrastructure is part of rail transport infrastructure which forms the declared service (being use of a coal system for providing transportation by rail) under section 250(1)(a) of the *Queensland Competition Authority Act 1997* (Qld) (**QCA Act**). Accordingly, in the provision of access Aurizon Network is obliged to make electrical infrastructure available to access holders. To fulfil this obligation Aurizon Network has invested in and maintained the electric traction network across the Goonyella and Blackwater systems, facilitating optionality and competition in above rail markets.

What is the problem that Aurizon Network is trying to solve?

In summary, the key issues with the current form of pricing for electric traction are as follows:

- the AT5 tariff component of the Reference Tariff (which covers all costs associated with the provision of access to electric traction infrastructure, excluding the cost for the supply of electricity) is payable by electric traction users only and is not subject to any obligation to pay take or pay (should take or pay trigger for a particular coal system in any financial year). That is, diesel users do not currently bear any AT5 exposure. This structure means that practically, where a rail operator or end customer chooses not to use the electric traction component of the declared service, the remaining electric traction users effectively absorb a component of the fixed costs associated with that choice. Further, any under recovery of expected AT5 revenue is recovered through the revenue cap adjustment process resulting in increases to AT5 charges in a future period;

- even though diesel traction users have the option under the QCA approved standard access agreements between Aurizon Network and operators and end customers (**Access Agreements**), to use at any time electric rollingstock on Aurizon Network's electrical infrastructure, there is no value ascribed to this optionality in either those Access Agreements or in the calculation of the Reference Tariffs under Aurizon Network's Access Undertaking. The effect of this is that diesel users are considered by Aurizon Network to benefit from a "free option" to use electrical infrastructure without having to contribute towards any of the costs of the investments in and maintenance of that electrical infrastructure;

- the rising cost of energy and the falling cost of oil has impacted the current relative traction economics of an operator choosing whether to run electric or diesel trains, which is exacerbated by the fact that as demand for electric traction falls, the price of the electric traction services increases—that is, the lower the utilisation of electric traction, the higher the price which will drive a further shift by users from electric to diesel traction;

- the current pricing mechanism for electric traction under Aurizon Network's Access Undertaking allows the possibility of spiralling AT5 costs and potential impairment of Aurizon Network's electric traction assets. This is because the last remaining user of electric traction will bear all the cost associated with the use of the electrical infrastructure, whilst other users who have switched from electric to diesel traction retain a free option to switch back at any time that the variable cost of electric traction becomes cheaper than diesel. This is an unreasonable economic outcome, where cost efficiency is disproportionately distorted by the timing of users having access to diesel rollingstock; and

- Aurizon Network's obligation to provide access to electric traction infrastructure, regardless of the level of its usage, creates a stranding risk which Aurizon Network both cannot avoid and is unreasonably exposed to because it must maintain the electric traction infrastructure, even though that may not be the most economically efficient outcome.

The net effect of the current AT5 pricing framework is a distortion of pricing signals with respect to electric traction services. This creates a real stranding risk for both Aurizon Network's electric traction assets and operators' investment in electric rollingstock if utilisation levels for electric traction decrease. With a number of Access Agreements expiring over coming years, this has the potential for both existing and new operators in the Central Queensland Coal Network (**CQCN**) to switch to diesel traction, and in turn place pressure Aurizon Network's ability to recover costs associated with providing traction choice.

Aurizon Network is seeking AT5 pricing reform in advance of near term reinvestment decisions in relation to assets predominantly in the Goonyella coal system (**Goonyella System**) in the CQCN, as outlined in section 2.3.2. This reinvestment will be required to sustain the existing electric traction capacity in the Goonyella System and is required to be made by Aurizon Network as part of its obligations under its Infrastructure Lease[1], and the Access Agreements. The current AT5 pricing framework and the proximate stranding risk places Aurizon Network at risk of being in conflict with its legitimate business interests and the QCA prudency tests should it choose to reinvest. We note that stranding of the Aurizon Network infrastructure will also result in the stranding of an estimated $1bn of rollingstock investment by three operators.

A broad switch to diesel traction will have significant implications for efficient investment incentives in the CQCN as it risks stranding Aurizon Network's electric traction assets. Decline in the use, or the stranding, of Aurizon Network's electric traction assets will have broader macro-economic and social impacts including increases in Queensland regional electrical infrastructure costs and the ability for Queensland and Australia to meet future emissions targets.

Aurizon Network has consulted with customers and rail operators to seek feedback on how to best address this issue. This feedback has provided valuable input into developing this proposal. There is industry acknowledgement around the concerns raised by current electric traction pricing and the potential stranding risk for Aurizon Network, operators and end customers that have electrified rail spurs and long term exposure to electric traction pricing. Given the varied level of individual exposure to these issues across rail systems, operators and end customers, achieving agreement across all stakeholders around a specific AT5 pricing proposal is difficult. Nevertheless a number of central themes have emerged from this stakeholder engagement:

- Price reform needs to be traction neutral enabling end customers and operators to choose the most long term efficient form of traction moving forward;
- Changes to the pricing structure should be forward looking and, where possible, avoid any impact on the commercial arrangements governing rail haulage that have already been agreed between parties;
- Price reform needs to provide clarity and investment certainty to encourage future investment in rail haulage services;
- The pricing proposal should, to the greatest extent possible, be subject to the principle that the users of the electrical infrastructure pay for such use but recognise that a person with an option to use electric traction infrastructure should bear some cost associated with retaining that option.

Taking into account feedback from stakeholders, as well as guidance provided by the QCA in response to prior DAAUs on this topic and the requirements set out in s142 of the QCA Act, Aurizon Network is proposing a minimal socialisation approach to reforming the electric traction tariff. Under this approach:

[1] This is provided for in Clause 5.1(a) of Aurizon Network's Infrastructure Lease

- Variable connection charges will be reallocated from the AT5 tariff to the electric consumption tariff (referred to as the EC charge) ensuring that all variable costs for electric traction are recovered from electric users only;

- The AT5 tariff will be composed only of the fixed costs associated with the electric traction infrastructure and will be set based on a floor utilisation rate of 75% in Blackwater and 98%[2] in Goonyella, reflecting current utilisation levels;

- The AT5 tariff will continue to only be payable by electric train services;

- Any under recovery of revenue from AT5 tariffs would accordingly be a result of electric utilisation falling below the floor utilisation rate and would be recovered across all access holders in a rail system through the a revenue cap adjustment process, adjusting the AT3 tariff accordingly in two years' time.

In developing this proposal Aurizon Network has sought to ensure that the pricing reform:

- Only applies minimal changes to the existing tariff structures to minimise complexity and any impact on existing rail haulage arrangements;

- Is based on current electric traction utilisation rates. This approach both avoids uncertainty around predicting forecast utilisation levels and provides a measure of grandfathering for existing diesel services;

- Only applies a cost to diesel traction users where utilisation levels fall, i.e. where the option to switch traction has been exercised. Those greater number of diesel users will then, and only then, bear some cost of maintaining electric traction infrastructure, which will essentially reflect the costs of the option to be able to switch back to electric traction. The majority of the costs will continue to be borne by electric users. In the event that utilisation remains at or above current levels, there is no unrecovered electric traction revenue which needs to be socialised;

- Provides for traction neutrality. That is, this proposal does not seek to address the differential that may exist between electric and diesel traction at a point in time continuing to allow users the unimpeded freedom to choose the form of traction that will be most efficient in the long term. Aurizon Network will continue to work to deliver the most efficient costs associated with electric traction.

Ultimately this proposal seeks to provide that Aurizon Network recovers its efficient costs of providing the electric traction assets as required under the QCA Act, the Infrastructure Lease and Access Agreements and in doing so has an impact on diesel users commensurate only with the value of the option they retain at all times to change traction choice. The Electric Traction DAAU seeks to rebalance the pricing framework to ensure that each access holder contributes equitably to their portion of the cost of providing electric traction, whether that be by using the infrastructure, or by maintaining the option of traction choice.

Aurizon Network acknowledges that if the relative energy costs between electricity and diesel continue to widen in favour of diesel, electric traction will become economically unattractive. In these circumstances, Aurizon Network's proposal will provide for an orderly exit mechanism over a period of time by ensuring that those users with the longest dated exposure to the electric traction tariff are not exposed to vastly inflated charges as electric traction utilisation levels drop off.

This minimal socialisation proposal and rationale is set out in detail in Section 3, 4 and 5 of this submission.

[2] Proposed utilisation rates as per Aurizon Network's 2017 Draft Access Undertaking (UT5).

Aurizon Network is seeking the approval of the QCA to amend Aurizon Network's 2016 Access Undertaking (**UT4**), which is in operation until the earlier of 30 June 2018 or the date a QCA-approved replacement undertaking takes effect.[3] Aurizon Network recognises that UT4 may only remain in operation for a relatively short period and therefore any amendment to UT4 may similarly be of limited duration. However, it is Aurizon Network's intention that, to the extent appropriate tariff reform in connection with the recovery of costs associated with providing electric traction can be achieved in this regulatory process, Aurizon Network would seek to incorporate the reformed tariff arrangements in the access undertakings that follow UT4.

[3] See: Letter approval from the QCA dated 9 November 2017 which approved Aurizon Network's draft amending access undertaking to extend the term of the 2016 access undertaking (UT4)

2. Background to Electric Traction

Investment in electric traction in the CQCN was originally made in the 1980s by the Queensland Government in response to energy security concerns and a desire to promote industry in Queensland[4]. In 2010, this electric infrastructure was statutorily transferred to Aurizon Network pursuant to a Transfer Notice – Project Direction dated 29 June 2010 under the *Infrastructure Investment (Asset Restructuring and Disposal) Act 2009* (Qld) in connection with the public float of the Aurizon group (previously referred to as QR National).

Aurizon Network's electric traction assets are part of the rail transport infrastructure which forms the declared service under section 250(1) (a) of the QCA Act. Aurizon Network has an ongoing obligation to provide and maintain the electric traction assets under the Infrastructure Lease. By virtue of these assets being part of the declared service, in contracting access rights, Aurizon Network has also committed to our Access Holders to provide and maintain the electric traction assets whether operators run diesel or electric train services.

2.1 Legal Framework

Aurizon Network has legal obligations to operate, maintain, and provide access to electric traction infrastructure. The legal framework by which Aurizon Network provides access and maintains the electric traction infrastructure is comprised of the following:

1. **The declared service -** Aurizon Network is obliged to provide open access to the declared service, which by definition under the *Transport Infrastructure Act 1994* (Qld), includes the electric traction infrastructure

2. **Tenure Obligations** - Aurizon Network's infrastructure leases place obligations to manage, operate and maintain infrastructure, expressly including electric traction infrastructure; and

3. **Standard Access Agreements** – the standard Access Agreements provide for both electric and diesel traction types, and do not limit what an operator can use.

These obligations provide the context by which Aurizon Network is required to invest and continue to operate electric traction infrastructure. Details are provided below.

2.2.1 The declared service

Aurizon Network's electric traction infrastructure forms part of the declared service to which access is offered to each access holder. The declared service under Part 5, Division 2 of the QCA Act is described under section 250(1)(a) of the QCA Act, and includes the use of a coal system for providing transportation by rail.

The declared service relates to rail transport infrastructure which is defined in the *Transport Infrastructure Act 1994* (Qld). Relevantly that definition (Schedule 6, Dictionary, definition of "rail transport infrastructure") includes the use of overhead electrical power supply systems. The result is that the declared service includes services provided by that infrastructure, regardless of whether access seekers or access holders require the use of it.

It follows that Aurizon Network's obligation to provide access to that part of the CQCN that is electrified is without regard to traction type. This is consistent with the standard access and train operation agreements approved by the QCA and entered into by Aurizon Network pursuant to which the access holders have the right to utilise either diesel or electric traction, as discussed below.

2.2.2 Tenure obligations to maintain and operate the electric traction assets

The rail infrastructure comprised in the CQCN is held by Aurizon Network as a Lessee under two infrastructure leases with State Government controlled entities (**Lessors**). The leased infrastructure expressly includes the electric traction infrastructure.

Under these infrastructure leases Aurizon Network is required:

- to manage, operate, repair and maintain the lease infrastructure to specified standards and a failure to comply with that requirement may result in termination of the lease;
- to protect the property, title and rights of each Lessor in the relevant leased infrastructure; and
- at the end of the term, to return the relevant leased infrastructure to each Lessor in the condition that it is required to be to be managed, operated, repaired, maintained and kept under the lease.

The obligations in the leases carry with them a requirement for Aurizon Network to expend the necessary capital to maintain the infrastructure to standards specified in the leases. These obligations are agnostic in terms of traction type. They apply to all aspects of leased infrastructure including those parts that are necessary for electric traction.

Aurizon Network's compliance with its obligations under the infrastructure leases is universally relevant to all access holders. If Aurizon Network does not maintain all of the leased infrastructure, including the electric traction assets, all users including diesel users would be exposed to the risk of the termination of the lease, creating uncertainty and operational disruption until a replacement lessee with appropriate rail accreditations and operating systems is put in place.

2.2.3 Access agreement obligations to provide access to electric traction assets

The standard form access agreements approved by the QCA under past or current access undertaking provides Access Holders with the choice and contractual right to run either electric and/or diesel traction types. They do not limit access rights to a specific type of traction. In practice, access contracting has likewise followed the approach of the standard form access agreements, and do not limit access rights to a particular type of traction, subject to there being sufficient capacity in the electric assets to accommodate additional electric usage[5].

Consistent with the terms of the QCA endorsed standard access agreements, Aurizon Network is contractually obliged to provide all access holders with access for electric trains on electrified networks even where an access holder might initially choose to run only diesel trains. This has driven investment in the Goonyella and Blackwater Systems to ensure that sufficient electrical system capacity is available. The equipment in the Goonyella and Blackwater Systems has been designed to accommodate electric traction volumes of 140mtpa and 85mtpa respectively.

The price charged by Aurizon Network to an access holder who elects to operate diesel trains does not recover the efficient costs of providing access to the complete declared service, including the electric traction assets that Aurizon Network is legally obliged to provide. In particular, Aurizon Network does not recover from diesel operators on electrified parts of the CQCN a contribution toward the fixed costs associated with those electric traction assets that are incurred by Aurizon Network in return for providing traction choice.

This position is reinforced by the maintenance and management obligations under the Access Agreements. The UT1, UT2 and UT3 standard access agreements and the UT4 Standard Train Operations Deed all expressly refer to Aurizon Network being:

[5] Historic electric capacity constraints in Blackwater meant Aurizon Network had to place constraints on electric usage. As those system constraints were addressed by the commissioning of four additional feeder stations in Blackwater this is no longer the case.

- responsible for management of the “Nominated Network” and retaining control over all activities on the “Nominated Network”; and
- obliged to carry out “Maintenance Work on the Nominated Network” so that the Nominated Network is consistent with the Rollingstock Interface Standards, and the operator can operate train services in accordance with its scheduled times.

The Nominated Network is the “Infrastructure” detailed in a schedule to the Access Agreement, typically by reference to a diagram which does not distinguish between infrastructure used by operators of electric and diesel traction services.

Aurizon Network therefore has a contractual obligation to manage and maintain the electric traction assets. Relevantly:

- Aurizon Network has that obligation even if the access holder only operates diesel trains and even though, under the current tariff structure, that access holder does not contribute towards the costs incurred by Aurizon Network in complying with that obligation; and
- This obligation is as approved by the QCA.

This contractual obligation to manage and maintain the electric traction assets is consistent with the description of the declared service, the relevant obligations under the infrastructure leases and the access rights granted under Access Agreements.

2.2 Electric Traction Pricing

Under UT4, electric traction costs are recoverable through the AT5 component of access charges. The costs recovered under AT5 include the operation, provision and maintenance of the electric traction infrastructure which comprises of overhead lines, transformers, track sectioning equipment and high voltage connection points. The AT5 component of access charges is an average price, calculated in accordance with the pricing principles set out in UT4 and payable by electric train services only.

The AT5 access charge is calculated by dividing the electric Maximum Allowable Revenue (**MAR**) in the Blackwater and Goonyella Systems by the forecast electric utilisation rates for each system. The MAR components and electric utilisation rates are evaluated by the QCA as part of an annual assessment under UT4.

The MAR for electric infrastructure is calculated using a building block approach; the components of which include:

- return on capital;
- net depreciation;
- maintenance costs;
- operating costs (including transmission, connection charges and insurance); and
- interest and tax.

Electric energy costs are recovered through the separate EC tariff which is a straight pass through cost to access holders. The AT5 charge is not subject to take or pay and relies on the revenue cap adjustment process to recover any over or under recoveries in any one year by adjusting the AT5 charge in two years’ time.

The effect of the average cost methodology for calculating the AT5 charge is that, if utilisation in electric traction volumes lowers, the AT5 charge applicable to the remaining electric services increases. While operators do have an incentive to continue to use electric traction for the life of their electric rollingstock, in circumstances where operators

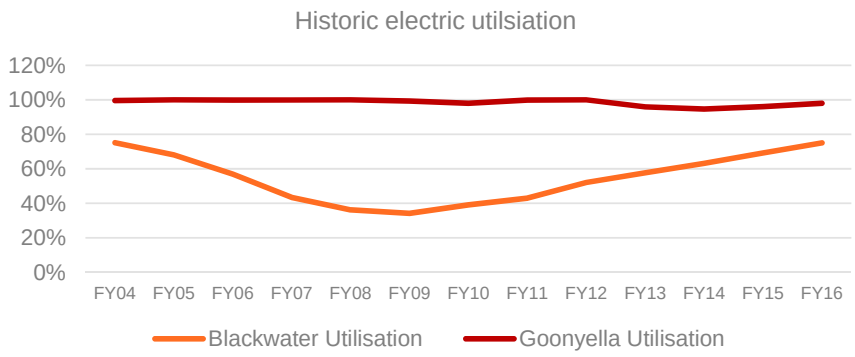
are investing in new locomotives, there is a higher risk that electric utilisation may fall. These new locomotive investment decisions may be triggered by existing electric locomotives reaching the end of their lives, haulage contracts being retendered and won by a different operator, or when total coal haulage volumes are expanding.

Each of these factors were apparent in the decline in electric utilisation in the Blackwater System, as a percentage of all services, in the mid-late 2000s. During this period, the following circumstances led to electric utilisation falling from 70% to less than 40% of total services:

- Queensland Rail's (**QR**) electric locomotives were reaching the end of their lives, and QR commenced a program of withdrawing electric locomotives for major refurbishment.
- Rapid expansion of coal haulage demand led to the emergence of capacity constraints in the power supply system
- The commissioning of new mines with non-electrified spurs, and Pacific National invested in diesel locomotives for its newly won rail haulage agreements.[6]

The initial withdrawal of electric locomotives for refurbishment caused the average cost of the AT5 charge to increase. This was coupled with investments in electrical capacity to ramp up to match capacity, being included in the electric RAB. Following the recent electrification of the Bauhinia branch line in the Blackwater System, electric utilisation has increased to the expected maximum electric utilisation given Pacific National's diesel fleet in the Blackwater System. By contrast, in the Goonyella System electric utilisation has been consistent and sustained.

Figure 1: Electric Utilisation across Goonyella and Blackwater



Despite the increasing and sustained electric utilisation in both the Goonyella and Blackwater Systems, the recent divergence in energy costs for diesel and electric traction has meant that the anticipated cost advantage for electric traction in the Blackwater System has not eventuated. Diesel and electric traction costs are now broadly equivalent in the Goonyella System.

The risk of AT5 charges increasing if electric utilisation falls will result in an incentive for access holders to consider investing in diesel locomotives. The proximate risk for Aurizon Network is the strong incentive for near term decisions by users and rail operators to convert to diesel services as a result of either access agreements, rail haulage agreements or rollingstock investments nearing their end of life and requiring renewal. In the absence of pricing reform, this could result in a spiralling shift from electric to diesel traction and potential stranding of Aurizon Network's electric traction assets.

[6] Noting at the time, there was insufficient electric capacity to enable Pacific National to operate these services with electric locomotives.

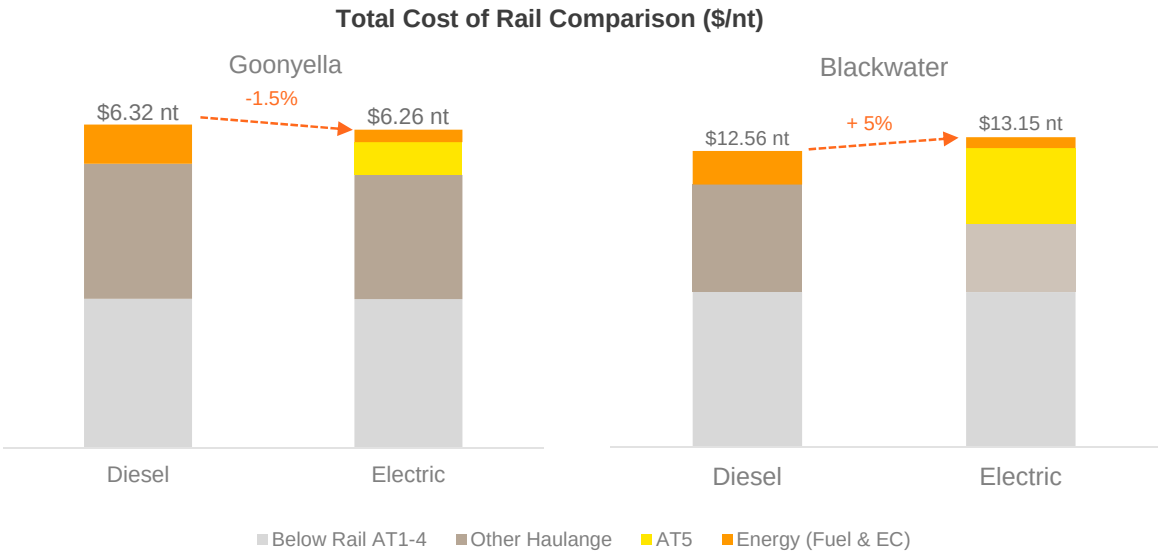
2.3 Current challenges facing Electric Traction

2.3.1 Asset stranding risk

The Goonyella System has historically been cost competitive for electric traction due to a lower average AT5 unit price achieved through high electric utilisation. This has supported the subsequent election by rail operators (Aurizon Operations, Pacific National and BMA Rail) to invest in and operate electric train services. Despite the increasing and sustained electric utilisation in both the Goonyella and Blackwater Systems, declining diesel prices combined with increasing electric energy prices has resulted in electric traction losing its historic cost advantage over diesel.

Due to the divergent energy costs for diesel and electric traction current comparative modelling[7] indicates that in the Goonyella System the costs of diesel and electric traction is close to parity and in the Blackwater System electric traction is now at a significant cost disadvantage. This can be seen in Figure 2 below.

Figure 2: Relative cost variation for average hauls in Goonyella and Blackwater

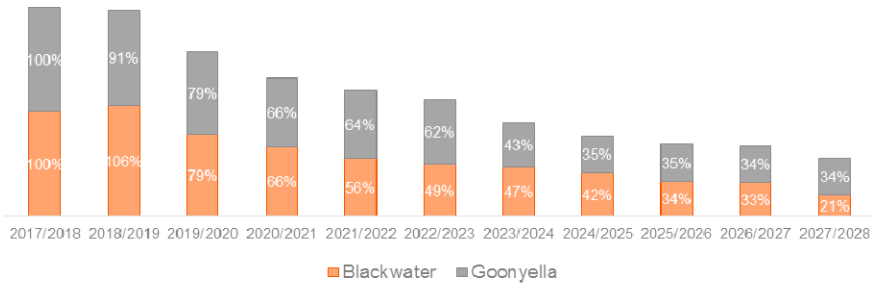


The potentially ongoing cost disadvantage of electric traction in the Blackwater System, together with the reduced differential between diesel and electric traction in the Goonyella System has substantially increased the risk that operators or end customers may bypass the electric network and operate diesel train services. It is acknowledged that as existing operators have complementary sunk investments in electric rollingstock they will have a preference to continue operating electric train services and the risk of switching is lower. However under the current pricing structure, increases to AT5 may reach a point where even existing operators will be incentivised to prematurely retire their electric locomotives and replace them with diesel.

The most immediate risk given the significant proportion of access rights due for renewal from 2019 – 2021 is the opportunity at these contracting points for new entrants or existing operators gaining market share, to inject diesel trains into the system and cause a material increase in the AT5 price and in turn impact the ongoing competitiveness of existing operators or other coal producers.

Figure 4: Percentage of Access Rights contracted vs. FY18

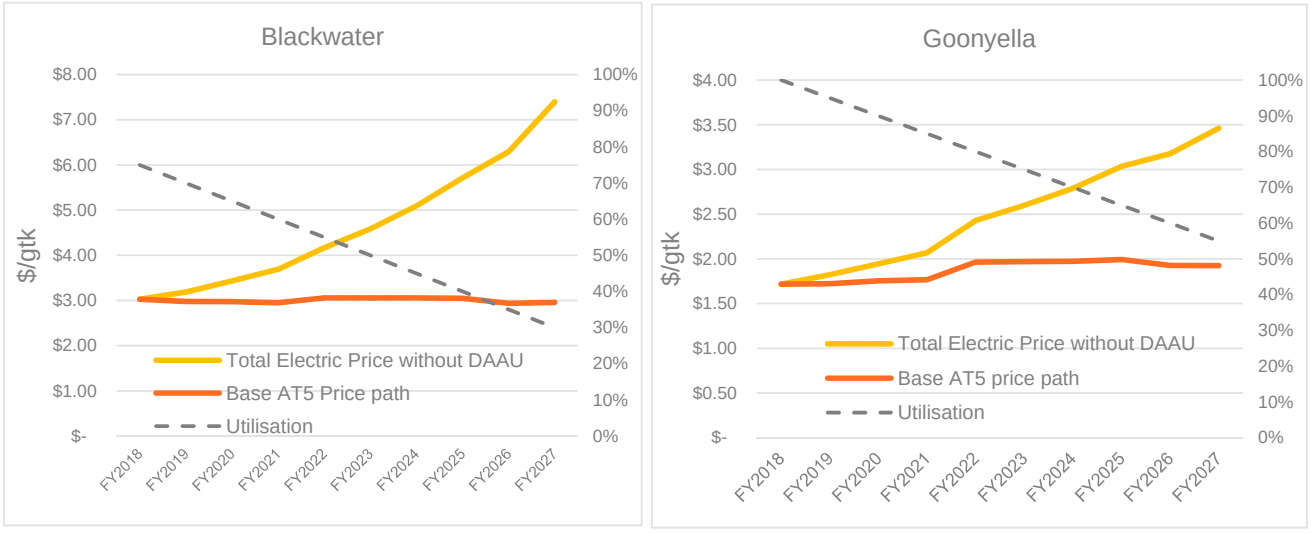
[7] Based on comparative modelling developed by Synergies Economic Consulting.



In addition to the current cost structure of electric and diesel traction, the high degree of uncertainty for future AT5 prices potentially makes diesel traction a significantly preferable traction choice for an operator going forward. This includes when an existing operator is required to replace expiring electric rollingstock or make additional rollingstock investment to meet increased demand.

The current AT5 pricing structure will be ineffective in the event that there is significant and continual moves to diesel traction, as increases to AT5 prices will further discourage use of electric traction and create a rapid spiralling effect. Ultimately, this will lead to increasingly rapid declines in electric utilisation, and may lead to stranding of Aurizon Network's electric traction assets. The below tables illustrates the impacts to AT5 price under the current pricing structure with a sustaining 5% year on year reduction in electric utilisation. The significant uncertainty that now exists over the future usage of electric networks, exacerbated by the ongoing cost disadvantage in the Blackwater System and more recent loss of cost advantage in the Goonyella System creates a significant asset stranding risk for Aurizon Network.

Figure 5: AT5 Price sensitivity to electric utilisation change

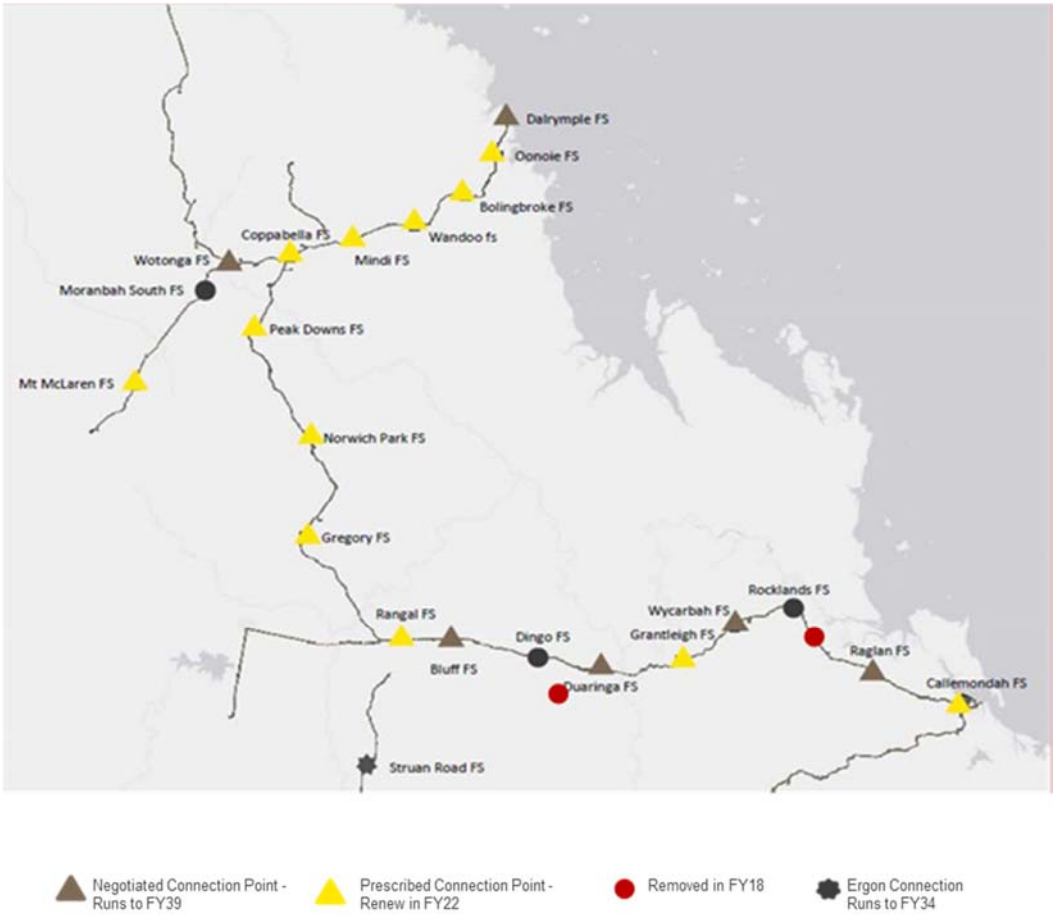


2.3.2 Medium term reinvestment decisions of Aurizon Network

The significant uncertainty over the future usage of the electric network has placed doubt on the prudency of sustaining capital reinvestment required in FY22 predominately in the Goonyella System. This investment is to replace electric infrastructure installed in the 1980's which forms the existing electric capability in the Goonyella System, including 12 feeder stations and connection points as indicated on the below map.

Due to the aging life of these assets (30+ years) there may be limited opportunity to significantly extend the life of these assets beyond FY22. This option will be considered and assessed by Aurizon Network as part of the detailed feasibility and option studies ahead of any final investment decision.

Figure 5: CQCN Connection Points



Based on high level studies done to date on reinvestment requirements, the expected reinvestment is in the order of ~$220m in capital. As noted above Aurizon Network will need to conduct detailed feasibility and option studies ahead of a final investment decision. These studies are planned over the course of FY18 and will include options to optimise the asset reinvestment to reduce the required reinvestment and ongoing costs. Factoring in required construction timeframes by Aurizon Network and Powerlink, a final investment decision is required by FY19.

A decision not to invest will substantially reduce electric traction capability across the CQCN. Initial analysis indicates that electric capacity is expected to reduce by 70% in the Goonyella system, and will mean that some branch lines will not be able to operate electric traction services. Failing to reinvest in the Blackwater system effectively removes the ability to operate any electric traction services due to the placement and connection and feeder stations across the network. This would have consequential impacts on operators who would be limited in their ability to use existing electric fleet and would be required to reinvest in new diesel locos.

The expected forward costs to operators of replacing their existing electric fleet with diesel locomotives is estimated to be ~$1bn[8]. In contrast to the required below rail reinvestment of ~$220m. Arguably a more efficient outcome for the industry would be to continue to invest in the electric network.

Given the potential stranding risk, in the absence of appropriate AT5 pricing reform, Aurizon Network is currently not incentivised to reinvest significant capital in Blackwater or Goonyella electric assets. However, failing to reinvest could place Aurizon Network in contravention with its legal obligations as described in Section 2.1 above. This clear divergence between the legal obligations Aurizon Network holds in relation to provision of electric traction infrastructure and the shortcomings of the current AT5 pricing regime which ought to provide sufficient revenue to Aurizon Network to meet its efficient costs of providing access to the electric traction infrastructure.

AT5 pricing reform is required to ensure that any future efficient reinvestment of electric traction infrastructure by Aurizon Network is recoverable. Additionally, Aurizon Network will separately seek QCA pre-approval as a pre-condition to the FY22 reinvestment decision. This process is expected to be undertaken in FY19 to provide sufficient time to resolve AT5 pricing and for Aurizon Network to complete the required technical feasibility studies into reinvestment options.

2.3.3 Timing imperative to resolution of AT5 pricing structure

Given the proximate stranding risk under the existing AT5 pricing structure and the approaching reinvestment decisions, Aurizon Network considers it imperative that AT5 pricing reform be achieved in a timely manner.

In the absence of AT5 pricing reform there is a genuine risk of a material increase in AT5 costs from injections of diesel train services across the CQCN, impacting on the competitiveness of existing operators, and Aurizon Network's ability to recover its prudent costs. Should this occur, it is likely that upcoming reinvestments may be imprudent. However, unless Aurizon Network is relieved of its obligations to the State, Aurizon Network would face the dilemma that it is required under the Infrastructure Lease to incur imprudent investment. Pricing structure reform is needed in order to prevent this occurring.

Aurizon Network has submitted this Electric Traction DAAU, proposing amendments to UT4. Timing is critical to enable the QCA and industry a reasonable opportunity to consider and work with Aurizon Network to resolve the AT5 pricing structure deficiencies in advance of the identified stranding risk and reinvestment decisions. It is recognised that a Draft Decision on UT5 is pending. There is value in seeking amendment under UT4 as timing of UT5 is uncertain, and if approved, this amendment may be implemented and applied through transitional tariffs.

Aurizon Network has not at this stage submitted a change to our proposed UT5 drafting due to a reluctance to disrupt and delay the UT5 process. Aurizon Network will commit to incorporating the accepted outcomes of this process into a further DAAU for UT5 once that is resolved. While electric traction utilisation is currently high, it is important to reform the AT5 pricing structure now in order to provide all users with certainty as to the arrangements going forward.

Aurizon Network's proposal as detailed below, has the benefit of creating little or no change until some of the risks outlined above materialise. It also provides customers across the CQCN with certainty around pricing structures, and the ability to make informed investment decisions. Proactive reform of the tariff arrangements will assist to avoid price shocks by seeking to recover the costs associated with electric traction from users of electric traction by avoiding large volumes of electric traction switching to diesel. The earlier tariff reform can be achieved, the less likely it will be that electric traction costs need to be recovered from all users, and, to the extent those costs do need to be recovered from all users, the less material those costs will be.

[8] Based on an assumption that 212 new diesel locomotives will be required to replace the existing electric rollingstock fleet across operators at a value of $6m per diesel locomotive and a requirement for 4 diesel locomotives per consist.

3. QCA past decisions

The QCA has previously considered two DAAUs submitted by Aurizon Network seeking to restructure the electric tariff component of access prices to address concerns around the signals that AT5 provides for utilisation of the electric network and the resulting risk that electric assets may ultimately be stranded. The context for these proposals was that electric expansion projects were in the process of being completed, but utilisation had not yet increased to take up this new capacity. Aurizon Network was concerned that the resulting high AT5 charge may discourage operators from electing to ramp up their utilisation of electric traction to the efficient level, thereby causing stranding of the newly installed capacity.

The 2011 DAAU proposed:

- a single network price for the overhead traction system (covering both Blackwater and Goonyella Systems), on the basis of the network benefits to Goonyella System users resulting from investment in Blackwater System electric assets, given the above rail operational interdependencies between the two systems;
- A mechanism to ensure that operators would pay the AT5 component of access charges for at minimum 90% of services that could feasibly be operated by electric trains, which was considered to reflect an efficient electric utilisation level across the combined Blackwater and Goonyella Systems. This reflected Aurizon Network's view that, over the long term, electric traction would provide a lower total haulage cost than either a mixed or a diesel only system, but that uncertainty around electric utilisation (and the resulting level of AT5) could discourage operators from electing to use electric traction; and
- Deferral of recovery of a revenue cap adjustment where it would result in more than a 5 per cent adjustment to electric traction costs in a single year, in order to increase the predictability of the AT5 charge.

The QCA's consultation process on this DAAU engendered a high level of stakeholder engagement and debate. In July 2012, the QCA published a Draft Decision not to approve the DAAU. Aurizon Network subsequently withdrew the DAAU, noting this as a sign of good faith and willingness to work with stakeholders as part of a separate consultation process aimed at addressing the identified concerns around AT5 pricing.[9] This separate consultation process resulted in Aurizon Network developing a revised DAAU proposal in early 2013.

The 2013 DAAU proposed, for the Blackwater System:

- to create greater price stability, to replace the current average cost AT5, set over a four year regulatory period and adjusted in accordance with the revenue cap framework, with an AT5 tariff fixed for eight years;
- in order to ensure that troughs in electric utilisation did not increase the AT5 tariff and further discourage electric utilisation, to establish this fixed AT5 tariff based on an 'efficient' level of electric utilisation of 85% for the Blackwater System, and to the extent that this did not recover all electric costs, to defer recovery of these costs until the end of the eight year period;
- an infrastructure under-utilisation payment (**UUP**) to recover any difference between the total approved costs of electric infrastructure and the revenue raised from the AT5 charge, which would be payable by all services on the network (including diesel services).

The QCA published a Draft Decision not to approve the 2013 DAAU in November 2013. Aurizon Network elected to withdraw the 2013 DAAU in January 2014 in order to allow the QCA and stakeholders to focus first on the finalisation of the QCA's review of UT4.

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[9] Aurizon Network letter to QCA, 22 January 2013. Available at: http://www.qca.org.au/getattachment/0597f968-73fe-41f7-996a-cf7f1b74a9dd/Aurizon-Network-22-January-2013-Letter-Withdrawing.aspx [Accessed: 5 April 2017]

These previous DAAUs focussed on addressing the concern that, following the expansion of electric network capacity, the AT5 tariff may discourage utilisation of the electric network in the Blackwater System that the expansion was designed to support. It was anticipated that, provided electric utilisation reached an efficient level, this would be sufficient to return a cost advantage to electric traction, which was considered necessary to prevent asset stranding.

While the 2013 DAAU was ultimately withdrawn to allow the QCA and stakeholders to focus on the UT4 review process, Aurizon Network anticipated that other initiatives, including expanding the geographical area over which electric trains could operate in the Blackwater system, would support the required increase in electric utilisation. This has in fact occurred, with electric utilisation in Blackwater increasing to in excess of 75% and Goonyella remaining at near 100% electric utilisation[10]. However, the longer term risks around electric utilisation levels remain, and will potentially undermine the efficient utilisation of, and investment in, electric infrastructure and rollingstock.

This Electric Traction DAAU has been developed in order to provide greater certainty for operators, end users and Aurizon Network as to the pricing of access to the electric network, creating a firm foundation upon which the merits of investing in electric infrastructure and rollingstock can be assessed. This Electric Traction DAAU has strong regard to the reasoning provided by the QCA as part of previous reviews. The aim is to develop a solution that is consistent with the QCA's decision-making framework under the QCA Act and with the principles it has set out in its response to previous electric traction DAAUs.

3.1 QCA Act requirements

In deciding whether to approve the Electric Traction DAAU, the QCA Act requires that the QCA may approve a DAAU only if it considers it appropriate to do so having regard to the matters mentioned in section 138(2). These are:

a. The object of Part 5 of the QCA Act;
b. The legitimate business interests of the owner or operator of the service;
c. If the owner and operator of the service are different entities – the legitimate business interests of the operator of the service are protected;
d. The public interest, including the public interest in having competition in markets (whether or not in Australia);
e. 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;
f. The effect of excluding existing assets for pricing purposes;
g. The pricing principles mentioned in section 168A;
h. Any other issues the authority considers relevant.

The object of Part 5 of the QCA Act is:[11]

> *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.*

[10] While services from Kestrel to DBCT use diesel trains, the origin of the haul results in these volume being classified as a Blackwater System haul.

[11] QCA Act, section 69E

The pricing principles in the QCA Act also provide guidance for establishing access charges for electrification assets. These principles provide that, in relation to the price of access to a service, the price should:[12]

a. Generate expected revenue for the service that is at least enough to meet the efficient costs of providing access to the service and include a return on investment commensurate with the regulatory and commercial risks involved; and
b. Allow for multi-part pricing and price discrimination when it aids efficiency; and
c. Not allow a related access provider to set terms and conditions that discriminate in favour of the downstream operations of the access provider, except to the extent the costs of providing access to other operators is higher; and
d. Provide incentives to reduce costs or otherwise improve productivity.

The QCA has previously applied these legislative requirements in its assessment of the 2011 and 2013 DAAUs. In these previous regulatory assessments, the QCA has identified a number of parameters that it considers must be met in order to appropriately balance these requirements. The QCA's position is summarised below.

3.2 Outcomes from previous QCA reviews

In its previous assessments of the 2011 and 2013 DAAUs, the QCA has acknowledged that the current AT5 pricing approach is not efficient due to the operation of the average pricing mechanism. In particular, it acknowledged that there might be a problem with the AT5 tariff being an average price, which tended to push up the price early in the life of an asset, when the efficient economic signal would be a lower price.[13] In this situation, a lower price in the early years of the asset life, where costs are higher and utilisation may be ramping up, would encourage use of the infrastructure and the recovery of fixed costs. The QCA stated:[14]

> *In its 2012 draft decision, the QCA accepted that the average price nature of the AT5 tariff meant it might give the wrong signals about utilisation of the electric infrastructure, as the price was high when there was ample spare capacity.*

This view is consistent with stakeholder views expressed at a workshop following the withdrawal of the 2011 DAAU:[15]

> *Many participants accepted that there was a problem with the average price structure of the AT5 tariff and that the high level of AT5 was not sending appropriate market signals for traction choice, because it reflected a short-term price spike at low utilisation levels.*

The QCA's consideration of this issue reflects its interpretation of the object clause in part 5 of the QCA Act, its application of the pricing principles and its views in relation to the legitimate interests of Aurizon Network, users and the public – in particular, having a pricing structure that promotes efficiency, is cost reflective and does not discriminate in favour of related parties.

In reviewing the QCA's previous consideration of the electric traction DAAUs, a key underlying principle is the QCA's view that the regulatory framework should be 'technologically neutral'. In considering the 2011 DAAU, the QCA was

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[12] QCA Act, section 168A

[13] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 3

[14] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 12

[15] QCA (2013). Workshop on Electric Infrastructure Tariff (AT5) – Issues Discussed, 23 January 2013, p. 1

not convinced that Aurizon Network's analysis that electric traction was more efficient than diesel was convincing or conclusive. As such, the QCA was not willing to endorse a regulatory framework that incentivised the use of electric locomotives over diesel but instead considered that this should be a matter for the market to determine. This view was reiterated in its Draft Decision on the 2013 DAAU where, in describing its overall approach to addressing the risk of bypass and asset stranding, the QCA stated:[16]

> *The QCA considers that, whether or not the risk of bypass has passed, it is reasonable to consider a tariff approach that gives the right signals for the efficient investment in, and use of, the rail infrastructure. However, the Authority considers that the tariff should be neutral and neither over or under signal the use of the electric infrastructure – traction choice should remain a decision of a competitive above-rail market.*

3.2.1 Objectives of access

The QCA has stated that the focus of the objects clause is on promoting economic efficiency of the below-rail infrastructure (the 'cause'), with the promotion of competition in related markets being the 'effect' of this. The QCA stated that the objects clause requires the DAAU to satisfy both the 'economic efficiency' and 'competition' limbs.[17]

As noted above, in considering the 2011 DAAU, the QCA was not convinced that Aurizon Network's analysis that electric traction was more efficient than diesel was convincing or conclusive. The QCA was not willing to endorse a regulatory framework that incentivised the use of electric locomotives over diesel, and preferred a framework that was neutral in terms of the pricing signals for use of electric or diesel technology. Further, the QCA considered that the 2011 DAAU proposal that train services that did not use the Blackwater electric network should share costs of that network would adversely affect competition in above rail markets.

While the QCA was satisfied that the 2013 DAAU proposal of a fixed AT5 tariff would send appropriate economic signals for use of the electric infrastructure, it did not consider that the UUP mechanism would promote economic efficiency of the below-rail infrastructure because it would result in electric users not paying for the full costs of the services they use and may over-encourage future investments in electric infrastructure which may not be efficient.[18] However, the QCA did not object in principle to an electric network underutilisation payment, noting that an alternative mechanism that made the UUP unlikely and immaterial may address the concerns about competition, investment and uncertainty for access seekers.[19]

3.2.2 Pricing principles

In terms of efficient pricing signals, the QCA emphasised that multi-part pricing and price discrimination to favour electric trains would only be appropriate if it could be shown that this aided efficiency. In considering the 2011 DAAU, the QCA was not convinced that electric traction was more efficient than diesel and as such there was insufficient basis to price discriminate in favour of electric traction. Further, the QCA was concerned the 2011 DAAU could adversely affect productivity, making the use of below-rail infrastructure less efficient, by eliminating traction choice as one of the ways competitors in above-rail markets could seek to differentiate themselves from their rivals.[20]

In terms of the 2013 DAAU, the QCA concluded the AT5 mechanism was largely consistent with the pricing principles as it would allow Aurizon Network to recover its costs and, potentially at least, could improve productivity

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[16] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 12-13

[17] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 42, 44, 46

[18] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 45

[19] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 50

[20] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 54-55

through efficient price signalling. However, the QCA remained concerned that the proposed UUP mechanism, given forecast coal demand and electric utilisation, would inevitably result in a significant UUP being levied on all users, including diesel operators. Given the significance of this charge, the QCA was concerned that the UUP would discriminate against diesel operators and in favour of Aurizon Network's related party, and would therefore erode above rail competition by creating a perception that rules could change to favour the incumbent, thereby reducing productivity.

3.2.3 Aurizon Network's legitimate business interests

Another key aspect of the QCA's consideration of previous electric traction DAAUs is the interpretation of Aurizon Network's legitimate business interests, in particular, in recovering its efficient costs and a risk-adjusted return in providing the service. In its November 2013 Draft Decision on the 2013 DAAU, the QCA cited the view of the Australian Competition Tribunal of what constitutes the legitimate business interests of the owner – namely, that 'legitimate business interests' meant the service provider should be allowed to recover its efficient costs of supply and earn a 'normal' return on investment. The QCA's view is that a legitimate business interest would also include:[21]

a. Allowing the owner/operator to recover its efficient costs of providing access to the service;
b. Providing the owner/operator with an appropriate rate of return on its capital; and
c. Not exposing the owner/operator to risks which are disproportionate to that return or which it cannot effectively manage.

The QCA has also acknowledged that the regulatory weighted average cost of capital (WACC) that applies to Aurizon Network does not compensate it for asset stranding risk. The QCA has confirmed that it does not intend to strand assets in the regulated asset base, and is keen to ensure future investments did not suffer from continuing stranding concerns. [22,23]

Although both electric DAAUs were consistent with Aurizon Network's legitimate business interests, this was not considered sufficient to outweigh the QCA's concerns regarding the other matters that it was required to consider.

3.2.4 Legitimate business interests of access seekers

The legitimate interest in access seekers not paying for infrastructure that they do not have a requirement to use is a key theme in the QCA's assessments of previous DAAUs. In particular, for both the 2011 and 2013 DAAUs, the QCA has upheld the view that diesel traction operators should not pay for electric traction infrastructure that they do not use.[24] However, the QCA has not addressed how this would ultimately be reconciled with Aurizon Network being able to recover the cost of stranded electric assets.

3.2.5 Public interest

The principles of competitive neutrality and traction choice have also been upheld by the QCA in previous decisions on electric traction DAAUs. Specifically, the QCA has not been convinced by arguments that electric traction is superior to diesel in terms of providing lower overall costs of haulage, or in terms of environmental impacts (a public interest consideration). Further, the QCA considered that traction choice is an assessment best made by above-rail operators and their customers in a competitive market.[25]

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[21] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 48

[22] QCA (2012); Draft Decision. QR Network Electric Traction Services Draft Amending Access Undertaking, July 2012, p ii

[23] QCA (2013); Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p 4

[24] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 45, 56

[25] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 11, 50-51

Notwithstanding the QCA's previous position in terms of environmental impacts and its relevance to the public interest consideration; Aurizon Network has briefly set out in section 5.4 the broader macro-economic social impacts that decline in and stranding of electric traction has both to Queensland electric energy infrastructure costs and Queensland government energy policies. This is in acknowledgment of the changed landscape both in the electric energy markets and energy policy that has occurred since the last QCA decisions on past electric traction DAAUs.

In particular, Australia has committed to the Paris climate agreement which requires 26-28% emission reduction below 2005 levels by 2030. The Australian government is currently reviewing its climate change policies with the review expected to conclude by end 2017. Penetration of renewable energy in the electricity generation mix, has increase substantially at the household, commercial and utility scale. This in turn has promoted the Australian Energy Market Commission to review existing market frameworks with substantial reform to existing electricity markets expected in coming years. Many state governments have also independently committed to both renewable energy and emissions targets. Many state governments have also independently committed to both renewable energy and emissions targets. The Queensland government has also committed to state based emissions targets that are more aggressive than those at the federal level.

Electric energy infrastructure costs

The location of Aurizon Network's electric infrastructure benefits other electricity consumers in regional Queensland through lower energy loss factors and reduced transmission infrastructure costs]. The energy consumed by Aurizon Network is substantial, representing ~1.3% of Queensland's total electricity consumption[26][27] and ~3.8% of Powerlink Queensland's regional load[28] making it a significant electric energy consumer and contributor to total shared transmission infrastructure costs in Queensland. Accordingly declines in energy load and the ultimate closure of Aurizon Network's electric traction assets will have flow on impacts to the ongoing energy costs to remaining residential and business consumers in Queensland.

Energy Policy

The electricity sector has been the primary lever utilised by the Federal government for delivering energy related environmental policy and reducing emissions, primarily through the Renewable Energy Target which targets 33,000 GWh of electricity generation from renewable sources (with the result of reducing the emissions intensity of Australia's generation mix). In Queensland, the State Government has recently announced policy positions specifically related to emissions including:

- Generate 50% of Queensland's energy from renewable sources by 2030
- 30% reduction in emissions on 2005 levels by 2030; and
- Zero net emissions by 2050.

In response to these policy positions, it is expected expect that Queensland's electricity emissions intensity will reduce over time. Under Queensland's current generator mix, electric trains present a lower carbon fuel emission

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[26] Calculated as a proportion of the 2016-17 forecast total annual operational consumption under a neutral scenario calculated by in the updated AEMO National Electricity Forecasting Report
https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/NEFR/2017/Update-to-2016-National-Electricity-Forecasting-Report-NEFR.pdf

[27] Calculated as a proportion of total annual transmission delivered energy in the North, Central West and Gladstone regions of Powerlink Queensland's network https://www.powerlink.com.au/About_Powerlink/Publications/Transmission_Annual_Planning_Reports/Transmission_Annual_Planning_Report_2016.aspx[29] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 12

[29] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 12

footprint than diesel trains. A change to the generator mix that includes more renewables, will further increase this differential.

Given the above, it appears that the public interest would be served by ensuring neutrality of traction choice is complimented by a regulatory regime that mitigates stranding risk and avoids a death spiral for electric traction given the broader public environmental policy goals.

Nevertheless, the Electric Traction DAAU maintains traction neutrality. Accordingly, if prevailing energy prices for oil and electricity persist and, in the event the market determines the preferred traction mode is diesel, it provides for an orderly exit which will allow mitigation and alternate remedies for the likely impact declines in and stranding of electric traction assets will have on the achievement of broader public environmental policy goals.

3.3 Summary of previous QCA decisions on AT5 pricing

This Electric Traction DAAU proposal has been developed having regard to the outcomes of the QCA's previous assessment of electric traction DAAUs, which we have distilled to the following principles for the AT5 pricing framework:

1. it should be technology neutral, in that it does not seek to promote a particular technology as superior in terms of minimising overall system costs, and should ultimately allow the market to determine the preferred traction technology;
2. it should encourage both the efficient use of infrastructure and efficient investment in infrastructure. In doing so:
    - the AT5 charge should be set in a way that promotes efficient utilisation of the electric network; and
    - The regulatory framework should provide incentives for investment decisions that reflect an efficient allocation of resources. Over-investment in electric assets should not be encouraged, but equally regulation should not prevent or delay efficient investment in electric assets;
3. it should clearly provide for Aurizon Network to recover its fixed and sunk electric investment costs, but in doing so:
    - to the extent possible, the costs of providing the electric network should be recovered from those access holders that use that electric network;
    - if this is not ultimately possible, any shortfall in the recovery of the electric network costs should be recovered from users in a way that causes the least possible distortion of demand, and in particular so as to:
        - cause the least change in the relative cost of electric and diesel traction; and
        - allocate to diesel services only the minimum necessary amount to allow Aurizon Network to recover the fixed and sunk costs associated with providing the electric network.

3.4 Previous assessments of AT5 support reform of current arrangements

The current AT5 pricing arrangement, which effectively charges the current electric services the average cost of using the electric network, does not meet all of the principles outlined in the previous section.

As noted above, in its previous assessments of the 2011 and 2013 DAAUs, the QCA has acknowledged that the current AT5 pricing approach is not efficient due to the operation of the average pricing mechanism. In particular, it has acknowledged that the AT5 tariff may give the wrong signals about utilisation of the electric infrastructure, as the price was high when there was ample spare capacity.[29]

[29] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 12

Of particular concern at the time of the 2011 and 2013 DAAUs was that electric utilisation in the Blackwater System was well below capacity following construction of new feeder stations on that system. There was concern that the low utilisation levels, and the resulting high AT5 charge, may cause the expected ramp up in electric utilisation to not occur. However, Aurizon Network notes that concerns about the average cost tariff while volumes are ramping up are now less acute than previously given that both Blackwater and Goonyella are approaching maximum possible utilisation of electrification assets:

- in the Blackwater System, electric utilisation rates have now ramped up significantly following the electric capacity expansions undertaken from 2008-2013, to around 75%. In the short to medium term, it is expected the maximum expected level will be 76%, given the continued operation of Pacific National's diesel trains and the diesel-only Gindi Minerva services. The marginal increase of 1% reflects the UT5 forecast which includes additional electric volume to the Wiggins Island Coal Export Terminal;

- in the Goonyella System, electric utilisation rates are forecast in UT5 to reach 100% per cent; and

- total coal volumes are forecast to remain stable over the medium term.

However, while actual electric utilisation levels have now ramped up to the maximum expected in the short-medium term, this does not diminish the potential concerns with the current tariff structure - being that it results in the distortion of pricing signals with respect to electric traction services. As electric traction capacity increases (demand falls) the price of the electric traction services increases, the fewer the number of electric traction services, the higher the price.

Operators will assess the merits of alternate traction modes on an ongoing basis. Obvious opportunities for traction shares to change are when coal producers re-tender their haulage task, or when existing locomotives reach the end of their physical lives. For so long as electric traction provides for the lowest overall haulage cost, then it would be expected that operators will continue to invest in electric locomotives. However, if diesel traction provides for the lowest overall haulage cost, and this outcome is expected to continue over time, then the market will inevitably move towards an increasing share of services being diesel operated. This is the approach advocated by the QCA in its draft decisions on the previous DAAUs, where it has stated that the market should determine the preferred traction mode.

If an operator determines that diesel is its preferred traction mode, and displaces existing electric locomotives through introducing diesel locomotives into a system, it will cause a reduction in the utilisation of the existing electric network. Under the current pricing approach, this will result in an increase in the AT5 charge, as Aurizon Network's fixed and sunk costs of providing the electric network are recovered over the reduced pool of electric services. This, in turn, increases the likelihood that operators will prefer diesel traction when the next opportunity arises for traction shares to change.

This pricing approach is likely to have numerous unintended effects which will undermine the efficient operation, use of and investment in both below rail and above rail electric assets, including:

- Further discouraging electric utilisation, even though the marginal cost of electric use remains low. Therefore, even if the forward looking costs of Aurizon Network and operators continuing to operate and invest in electric locomotives are lower than the costs of transitioning to diesel locomotives, the current pricing methodology will operate so as to encourage the transition to diesel locomotives;

- Existing operators in both the Blackwater and Goonyella Systems have significant sunk investment in electric locomotives, and will continue to operate those electric locomotives for so long as the forward looking cost of running electric locomotives remains lower than the forward looking cost of replacing those electric locomotives with diesel. Even in the event that the diesel traction becomes the preferred traction mode for a system, the most economically efficient outcome will be to maximise the use of the existing electric locomotives for their remaining lives, with an orderly transition path to a diesel system. However, as discussed in section 2.4.1, under the current pricing methodology, in the face of declining electric utilisation,

there will come a point where increases in the AT5 charge become so significant that the lowest cost option for an operator will be to prematurely retire its electric locomotives in order to replace them with diesel;

- Declining electric utilisation, and the risk of wholesale transition by existing operators to diesel, will mean that Aurizon Network will have little or no commercial basis to support investing in asset replacement in the electric network so as to maintain its standards for the life of the existing electric locomotive fleet. Therefore, as discussed in section 2.4.2, under the current pricing methodology, the lack of incentive for Aurizon Network to invest in asset renewal is likely to accelerate the transition to diesel, causing higher costs for operators forced to prematurely retire electric locomotives.

Therefore, while the current pricing methodology does provide an option for the market to determine its preferred traction mode, in the event that existing electric locomotives start to be displaced by diesel, this may snowball into a rapid and disorganised transition to diesel as operators scramble to avoid the costs imposed by a rapidly escalating AT5 charge. This will result in high transition costs for operators needing to reinvest in diesel locomotives and substantial stranded electric network assets for Aurizon Network.

This outcome is clearly inconsistent with the QCA's observations that the AT5 pricing methodology should encourage the efficient use of and investment in electric assets. This outcome is also inconsistent with the QCA's reasoning that the regulatory framework should be technologically neutral – in the event that diesel and electric traction offer similar overall cost structures, the risk of increasing AT5 charges (in the event that other operators choose to introduce diesel services into the system) and the potential for a subsequent high cost and disorderly transition to diesel locomotives would be likely to encourage operators to elect to use diesel locomotives over electric.

Finally, this outcome is not consistent with Aurizon Network recovering its efficiently incurred fixed and sunk electric investment costs.

4. Aurizon Network's AT5 Proposal

This section outlines Aurizon Network's proposal as set out in the Electric Traction DAAU to address the acknowledged problems with the current AT5 pricing approach.

4.1 AT5 Proposal

The AT5 proposal in the Electric Traction DAAU seeks to address the issues with the current pricing approach through the implementation of a limited number of related reforms to the determination of access charges, as set out below.

4.1.1 Categorisation of variable costs into the EC charge

The costs of providing the electric traction network include:

- Costs that vary with usage of the network – there are a small proportion of connection and transmission charges that do vary with utilisation, being the common transmission costs component;
- fixed costs which do not vary with usage of the network, and which include:
    - fixed sunk costs, which encompasses all sunk and committed costs associated with providing the electric network including return on and of Aurizon Network's regulated asset base (RAB) value for electric infrastructure as well as contracted connection charges that are fixed and committed on a long term basis in order to recover a return on and of transmission providers investment in connection assets;
    - unavoidable future costs, incorporating any currently uncommitted fixed costs that can only be avoided if electric traction ceases completely. This includes the costs of maintaining Aurizon Network's overhead and power supply systems, as well as connection charges for regulated connections (which can be avoided if the network is disconnected). This also includes any future investment in asset replacement that is necessary to maintain Aurizon Network's capability to run electric services;
    - avoidable future costs, which are uncommitted fixed costs that could potentially be avoided depending upon the level of electric demand. This primarily relates to any future investment in expanding the capacity of the electric network to cater for an increase in electric demand.

Aurizon Network proposes to remove the variable connection charges (such as Transmission Use of System Charges) from the AT5 cost base, and include recovery of these costs in the EC charge component. The EC charge component will therefore recover all of Aurizon Network's costs associated with providing the electric network that vary with usage, with the AT5 charge only used to recover fixed costs.

4.1.2 Recovery of electric traction costs through AT5

As is currently the case, the AT5 charge will be set as an average cost tariff for each of the Blackwater and Goonyella Systems, applied to egtk operating within the relevant system. In doing so:

- given that any amendment to UT4 is likely to take effect within the 'UT5' period, Aurizon Network proposes that the applicable cost components to apply from 1 July 2017 will be as set out in its UT5 maximum allowable revenue proposal;
- forecast coal volume from 1 July 2017 will similarly reflect that set out in Aurizon Network's UT5 proposal;

- Electric utilisation will reflect the current utilisation levels, being 75% of total services in the Blackwater System and 98% of total services in the Goonyella System, a level which Aurizon Network forecasts will be maintained over the UT5 regulatory period.

4.1.3 Revenue cap adjustment mechanism

The most significant change to the current arrangements is the manner in which the revenue cap adjustment mechanism will operate.

Under the Electric Traction DAAU, the AT5 charge is set to recover forecast electric costs from forecast electric services therefore fully reflects the difference in cost to Aurizon Network of providing access to diesel and electric services. Consistent with the QCA's past decisions, market participants then have the option to choose their preferred mode of traction based on these cost reflective prices. If market participants elect to introduce diesel locomotives in place of existing electric locomotives, this provides market evidence that, at this AT5 charge, diesel is the preferred traction mode. On the basis of this evidence, it would be clear that seeking to recover the fixed and sunk costs associated with the electric network from the remaining electric users would enhance the relative attractiveness of diesel locomotives and make it more difficult for electric locomotives to provide a competitive transport option. This would represent a partial stranding of the electric network.

In order to avoid negative efficiency consequences, the costs associated with the stranded component of the electric network should be recovered in a way that is least likely to distort future consumption decisions, that is, from all users of the system (both electric and diesel users) on a non-discriminatory basis.

Therefore, under the Electric Traction DAAU, for each of the Blackwater and Goonyella Systems (assessed separately):

- where actual AT5 revenue is lower from the allowable AT5 revenue, the revenue shortfall will be examined in order to identify the amount of the shortfall which is due to variation in actual coal volume compared to forecast and the amount which is due to variation in actual electric utilisation compared to forecast;
- any revenue cap adjustment that is the result of total coal volume differing from forecast will be recovered from all electric services, using the current AT5 revenue cap adjustment framework; and
- any revenue adjustment due to electric utilisation falling below the current utilisation – which will be defined as the 'Electric Utilisation Floor', will be recovered equally from all users of those systems, using a revenue cap adjustment framework to adjust the AT3 tariff.

4.1.4 Setting AT5 charges in subsequent regulatory periods

Consistent with the rationale for the revenue cap adjustment mechanism discussed above, the defined electric utilisation floor utilisation levels for each of the Goonyella and Blackwater Systems will continue to be used in determining the AT5 charge for all future regulatory periods. That is, in all future regulatory periods (including beyond UT5), the electric utilisation level used in determining AT5 will be no less than:

- for the Goonyella system, 98%; or
- for the Blackwater system, 75%.

For UT5, this is consistent with current forecasts. Therefore, in setting UT5 access charges, all costs associated with the electric network will continue to be recovered from electric users while electric traction remains the preferred traction mode for market participants. Existing diesel users will not be affected.

4.1.5 Future investment in electric network

The existing electric networks in both the Blackwater and Goonyella Systems have sufficient capacity to meet current and anticipated future electric demand. However, there remains potential that an increase in demand may

require an expansion of the electric network – either in terms of the geographic range of the network or in power supply capacity. In such circumstances, the current expansion pricing principles as set out in Part 6 of UT4 ensure the current AT5 price will not increase as a result of electric network expansions, with the exception being if the electric network expansion is shown to benefit the existing system users, Part 6 of UT4 requires a percentage of the electric network expansion costs to those existing system users.

To the extent the electric network expansion is required as a by-product of the expansion to an existing electrified system, as was the case in the Wiggins Island Rail Project expansion, it is expected that those costs will be socialised across all system users.

4.1.6 Proposed tariffs

The Blackwater and Goonyella Systems for the remaining UT4 period will be as per the approved transitional tariffs. However, upon finalisation of UT5, these will be adjusted to reflect the endorsed AT5 tariffs for the UT5 period commencing 1 July 2017. Adopting this proposed methodology for the UT5 period will result in proposed AT5 tariffs for the Blackwater and Goonyella Systems being as set out in Aurizon Network's UT5 tariff proposal, except for the impact of the categorisation of variable transmission charges into EC. The impact of these changes on the proposed UT5 tariffs are as follows.

Figure 6: Electric Traction Pricing reform pricing comparison

		Proposed UT5 Tariffs (Submitted) ($FY18)	**Proposed UT5 Tariffs** (updated to reflect reduced connection charges) ($FY18)	**UT5 Tariffs AT5 Pricing Reform** ($FY18)
Blackwater	AT5 ($/'000 egtk)	3.31	3.17	3.00
	Impact to EC ($/'000 egtk)	-	-	0.18
Goonyella	AT5 ($/'000 egtk)	2.01	1.94	1.76
	Impact to EC ($/'000 egtk)	-	-	0.18

4.2 How the Electric Traction DAAU proposal meets previous QCA decisions

Aurizon Network has sought to develop its AT5 proposal in line with the reasons provided by the QCA in its previous assessments. This section outlines how the Electric Traction DAAU is consistent with the views expressed by the QCA in its previous assessments of previous electric traction DAAUs.

4.2.1 Technology neutral

The key criteria from prior DAAU processes is that the QCA requires the AT5 pricing arrangements to be technology neutral. This means that the pricing approach should not seek to engineer or encourage a particular traction outcome, but rather present cost reflective prices that allow market participants to make their own assessment of their preferred traction mode.

The Electric Traction DAAU proposal is consistent with this criteria as it does not seek to promote a particular traction mode outcome. Unlike prior DAAUs, the AT5 tariff in the Electric Traction DAAU is not based on an aspirational level of electric utilisation which, if not achieved, would inevitably require that diesel services make some contribution to the cost of the electric network. Instead, the Electric Traction DAAU is based on the expectation that all electric costs in each system will be recovered from forecast electric services. In other words, it starts on the

premise that currently forecast electric services are expected to recover currently forecast electric costs, and adapts to whatever traction mix emerges from choices made by operators in the above-rail market.

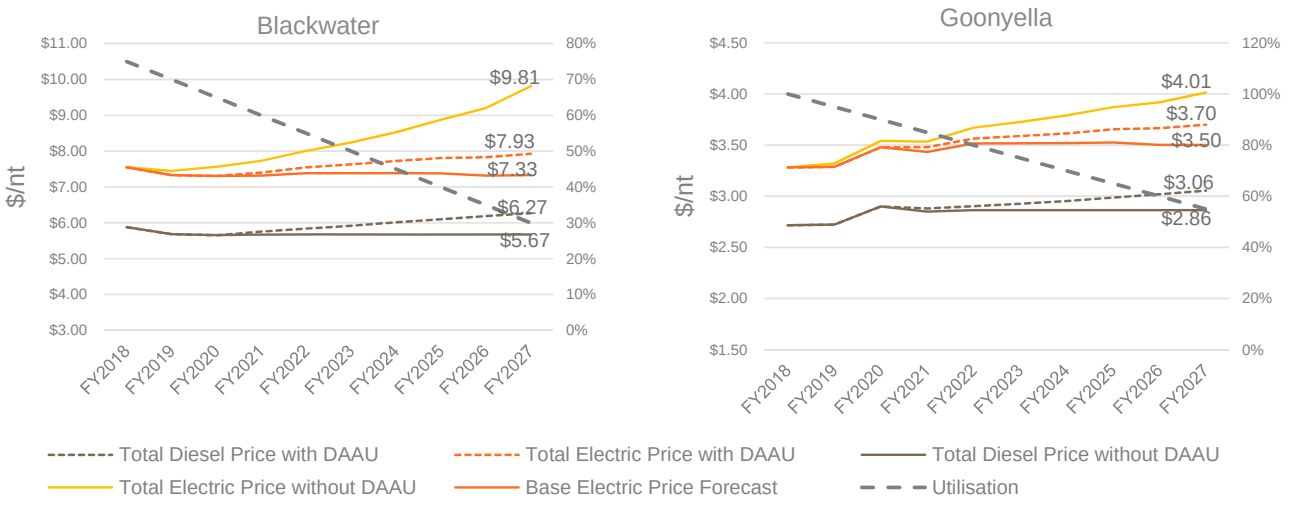
Where electric utilisation is maintained at its current level, this provides market evidence that the resulting AT5 charge can be applied to electric services without undermining demand for the electric network, and electric services will continue to recover all costs associated with the electric network.

However, where the market response to this level of AT5 charge is to introduce diesel locomotives, displacing existing electric locomotives, this will result in the revenue received through AT5 falling short of the costs incurred in providing the electric network. In this event, attempting to recover the cost shortfall from the remaining electric services will simply widen this gap and make electric trains even less attractive, undermining the ability of electric traction to compete with diesel and further encouraging substitution to diesel haulage. In these circumstances, substitution to diesel causes a partial stranding of Aurizon Network's below rail electric network. The Electric Traction DAAU proposal establishes an alternate way of recovering the costs of these stranded assets through an AT3 revenue cap mechanism.

While the AT3 revenue cap mechanism proposed to recover these stranded asset costs in the Electric Traction DAAU differs from the UUP put forward in the 2013 DAAU, it has some similarities to the UUP payment in that it would be charged to all services as an increase to their track access charge, regardless of their traction type. While the QCA proposed to reject the UUP, its concerns substantially reflected the impact of the aspirational assumptions used to establish the proposed AT5 charge, and the resulting materiality of the expected UUP. As noted by the QCA in its Draft Decision on the 2013 DAAU, it did not object in principle to the UUP mechanism and its views on the proposal may have been different if the expected UUP charge was anticipated to be unlikely and immaterial. Aurizon Network reiterates that for the Electric Traction DAAU, the AT5 charge has been set with the expectation of recovering all forecast electric costs from forecast electric services. Provided that electric utilisation is maintained at existing levels, the recovery of electric network costs through the AT3 revenue cap mechanism will be unlikely. Further, if this recovery mechanism is triggered, it is applied to all services (both electric and diesel) in a consistent way, thereby maintaining the cost differential between access charges for electric and diesel services. Even if there is some reduction in electric utilisation in each system, provided that as anticipated electric traction remains the dominant traction type, the resulting increase in total access charges for all services (including diesel services) will be minor.

For example, should a 5% year on year reduction in electric traction utilisation occur, the impact on the total AT2 - AT4 access charge that is payable by all users is less than 1% p.a. A summary of the modelled pricing impacts is shown below.

Figure 7: Pricing Reform Scenario Analysis



Importantly, this proposal relies on market evidence that electric services cannot sustain the existing level of recovery of fixed and sunk costs before any attempt is made to recover costs through the AT2-4 revenue cap adjustment process. There is no attempt to anticipate the market's assessment through a pre-determination of the level of AT5 that electric services can 'afford' before demand is affected, and unlike previous DAAUs, there is no attempt to engineer an outcome where operators will prefer to run electric services.

4.2.2 Encourages efficiency

Efficient utilisation of infrastructure

Given the premise of the Electric Traction DAAU is to set cost reflective charges for diesel and electric services, and allow the market to respond to these charges, it is important to seek, to the extent possible, that these charges are established in a way that promotes the efficient utilisation of the electric network.

As discussed in section 3.2 and 3.4, in previous DAAUs Aurizon Network has highlighted, and the QCA has accepted, that the current average cost nature of AT5 does not necessarily provide pricing signals for efficient utilisation of the below rail electric network.

Notwithstanding this, the Electric Traction DAAU retains the general structure of AT5 as an average cost tariff, which recovers all costs, including fixed and sunk costs, on the basis of egtk. Given the high degree of fixed and sunk costs associated with providing the electric network, it is difficult to design a tariff structure that both promotes efficient utilisation of the electric network and achieves the objective of recovering these costs from electric services on a non-discriminatory basis. While an efficient price structure would aim to recover a greater proportion of fixed and sunk costs from those users whose demand is most insensitive to price, ultimately all of the electric demand is able to be bypassed by diesel locomotives and is therefore similarly sensitive to price. Further, seeking to implement this form of price discrimination is highly likely to affect competition in the above rail market. The choice to retain an average cost structure for AT5 reflects that Aurizon Network sees no other viable tariff structure for recovering its fixed and sunk costs on a non-discriminatory basis from users of the electric network.

However, there are opportunities to minimise some of the inefficiencies that arise from the current AT5 pricing approach. The Electric Traction DAAU seeks to address and minimise these inefficiencies, within the parameters set down by the QCA in its previous assessments of electric traction DAAUs, thereby improving the signal for efficient utilisation of the below rail electric network. This is explained below.

Electric utilisation risk

Notwithstanding that electric utilisation has now risen in the Blackwater System so that utilisation of both Blackwater and Goonyella Systems is now at the maximum level anticipated in the medium term, operators will continue to assess the merits of alternate traction modes on an ongoing basis. There is the potential that electric utilisation may fall from its current levels. Obvious opportunities for traction shares to change are when coal producers re-tender their haulage task, or when existing locomotives reach the end of their physical lives.

The greatest efficiency concerns with the current average cost AT5 is that, in the event that existing electric locomotives are displaced by diesels, the tariff structure responds automatically by increasing the charge to the remaining electric services even though the market has already demonstrated that this will contribute to further loss in demand. This is likely to create a range of negative efficiency impacts.

1. **Risk profile impacts traction choice**

   For so long as electric traction provides for the lowest overall haulage cost, then it could be expected that operators will continue to invest in electric locomotives. However, when considering whether to invest in new electric or diesel locomotives, operators will consider a range of issues including capital cost, operating cost, flexibility and risk. From an efficiency perspective, it is important to ensure that decisions of rail operators requiring new locomotive investments are not tilted towards diesel solely because of the risk that electric services will be required to bear an increasing share of the recovery of sunk electric investments.

In the context of a competitive above rail market, the current AT5 pricing arrangement creates a significant additional risk in relation to the purchase of electric locomotives as the level of the AT5 charge is dependent not only on the costs of alternate energy sources, but also on other (competing) operator's choice of traction type. That is, to the extent that an another operator chooses to introduce diesel locomotives, displacing existing electric locomotives, responsibility for recovery of the stranded asset cost currently falls solely on the remaining electric services. Under current AT5 pricing methodologies, this option is likely to be particularly attractive for a new operator with no existing electric locomotives, not only due to the current cost of diesel traction being similar or lower than electric, but also as electing to use diesel traction will increase the costs borne by its competitors who are committed to use electric traction.

This risk factor (which is the result of the regulatory pricing framework rather than the underlying costs and benefits of each traction mode) is likely to discourage new or expanding operators from further investment in electric locomotives. Where the overall cost of each traction type is similar, as is currently the case in the Goonyella system, this factor alone may be sufficient to cause an operator to elect to adopt diesel technology.

The Electric Traction DAAU will address this issue by allowing an operators' assessment of the benefits of investing in electric locomotives to be made independently of their assessment of the likelihood of other operators also choosing to invest in electric locomotives. This will create a more neutral risk profile between diesel and electric locomotives in relation to below rail access charge risk.

2. Distortion of future consumption decisions

In the event that existing electric locomotives are displaced by diesels, the existing AT5 tariff structure responds automatically by increasing the charge to the remaining electric services. This applies notwithstanding that the level of the AT5 charge will inevitably have been a material factor in an operator's decision to adopt diesel technology instead of electric. Locomotives are long lived assets and the impact of this decision on the utilisation of the electric network will be apparent over the long term. This is evident in the Blackwater system where Pacific National's investment in diesel locomotives (made in an environment where there was insufficient electric capacity for it to adopt electric technology) means that there is no realistic prospect of electric utilisation in that system increasing beyond 76% while those locomotives continue to operate.

Under the current AT5 pricing approach, the long term increase in AT5 due to the recovery of fixed and sunk assets over a smaller pool of electric services may mean that an operator will no longer be able to achieve a cost benefit from operating electric locomotives on the system. The methodology used to recover these fixed and sunk electric network costs – being from remaining electric users – will distort the decisions of those users in terms of their future traction choices, and will encourage the further introduction of diesel locomotives into the systems.

The Electric Traction DAAU will address this issue by establishing the current utilisation of the systems as a 'floor' utilisation level, meaning that reductions in utilisation below the current level will not automatically increase the AT5 charge, thereby discouraging remaining electric users (or potential new electric users) from using the electric network.

3. 'Orderly exit' if diesel emerges as the preferred traction mode

If diesel traction is expected to provide the lowest overall haulage cost, and this outcome is expected to persist over time, then the market will inevitably move towards an increasing share of services being diesel operated. This is the outcome advocated by the QCA in its draft decisions on the previous DAAUs, where it has stated that the market should determine the preferred traction mode.

Nevertheless, even in circumstances where the market has reached a view that diesel traction is the preferred mode for a system, given the substantial degree of sunk investment in electric traction – by both

Aurizon Network and operators - the best outcome for that system will be to encourage an 'orderly exit' from electric traction, involving the continued use of the existing electric fleet over its remaining life.

However, under the current AT5 pricing arrangements, a reduction in electric utilisation will cause an increase in AT5 to the remaining electric users, potentially encouraging further reductions in electric utilisation and creating the so-called 'death spiral' in AT5 charges. As discussed in section 3.4, once electric utilisation falls below a certain level, the resulting increase in AT5 charges will become so significant that operators will be incentivised to prematurely retire electric locomotives and purchase new diesel locomotives in order to avoid incurring AT5 charges. If this occurs, there will be a flight from electric traction as operators seek to avoid the spiralling costs of using electric traction. This will, in turn, impose significant costs on both Aurizon Network, above-rail operators who have made major investments in electric assets, and coal producers who are serviced by electric trains. In particular, there will be:

- high transition costs for operators who have invested in electric locomotives, due initially to the spiralling AT5 costs, and ultimately due to the costs associated with prematurely retiring existing electric locomotives and investing in new diesel locomotives;
- a dilemma faced by Aurizon Network because, unless Aurizon Network is relieved of its obligations to the State, Aurizon Network may be required under the Infrastructure Lease to incur investment that may be imprudent; and
- substantial stranded electric network assets, including assets recently constructed by Aurizon Network to meet anticipated electric demand, and which have been accepted by the QCA as being prudent and efficient.

Should the market ultimately determine that diesel is the preferred traction mode and dominate the network, then an efficient pricing approach will seek to minimise these transition costs as the market shifts, allowing maximum utilisation of above and below-rail electrification assets for as long as possible in order to recoup those investments.

The Electric Traction DAAU, by ensuring AT5 does not increase as electric utilisation falls, will encourage the continued use of existing electric locomotives for their remaining life and will provide Aurizon Network with the incentive to maintain the below rail electric network in order for this to occur.

Further, if a preference for diesel traction changes in the future due to cost changes in favour of electric traction, this model will encourage the re-introduction of electric trains into the system as the AT5 tariff will not have increased due to the decisions of operators to introduce diesels during the intervening period. Re-introducing electric trains in such circumstances would be highly desirable as it would result in more efficient utilisation of the sunk below rail electric infrastructure and would reduce the extent to which there is a cost recovery shortfall being borne by all users (including diesel users).

The Electric Traction DAAU is consistent with the QCA's preference for having a pricing approach that does not seek to encourage a particular traction mode, rather leaving it for the above-rail market to determine. However, should the market determine over time a preference for diesel traction, then this model promotes an 'orderly exit' from electric traction that minimises transition costs by maximising utilisation of remaining electric infrastructure for its useful life. This would reflect an efficient use of the below rail infrastructure in these circumstances, and would also encourage existing above-rail electric operators to maximise the utilisation of their existing electric fleet. Further, should the market swing back towards a preference for electric traction at some point, this model also ensures that there is an ability to do this.

In summary, the Electric Traction DAAU will mean that, where existing electric locomotives are displaced by diesel, the resulting changes in AT5 will not further widen the cost differential between electric and diesel, further discouraging operators from using or investing in electric locomotives (as would be the case under the current AT5 approach). Levying a charge on <u>all</u> users to recover costs of the partial stranding of electrify network assets (where utilisation falls below the defined floor) as a result of users' traction choice appears to be the only viable way to recover these fixed and sunk costs in way that does not distort future consumption and investment decisions.

Efficient investment in infrastructure

Future investment in electric infrastructure will potentially fall into two categories:

- expansion of the below rail electric network to allow for the operation of additional electric train services; and
- replacement of life expired assets (and major maintenance related capital expenditure on existing assets) in order to allow the below rail electric network to continue to operate to an appropriate service quality standard [or should it be to the required service levels?]

The QCA's previous assessments required that the Electric Traction DAAU incentivise efficient investment in electric infrastructure, and in particular that it does not over-incentivise investment in electric infrastructure. Investment in expansion of the electric network should only occur where there is a high degree of certainty over the demand that will make use of the new assets. Investment in asset replacement should occur where there is ongoing demand for the electric network - it is important that the regulatory framework not prevent or delay efficient asset replacement.

The Electric Traction DAAU includes a number of features that support this criteria and which promote efficient investment in electric infrastructure, as set out below.

Expansion investment

Expansion of the below rail electric network will be efficient where:

- it is necessary to meet incremental demand for electric services on the network;
- the price that the incremental demand is prepared to pay at least meets the cost of the expansion and contributes to the cost of the existing below rail electric network; and
- the overall avoidable cost of meeting this incremental demand using electric haulage is lower than the avoidable cost of meeting this incremental demand using diesel haulage.

The Electric Traction DAAU provides that Aurizon Network will only undertake such expansion investment where it has sought and received pre-approval from the QCA that the investment is prudent and that the scope is efficient. Further, in order to demonstrate prudency of the expansion investment, any proposal to expand the below rail electric network must be accompanied by a commitment from customers to underwrite the project, so that the expansion does not increase the exposure of other users to a requirement to contribute to the recovery of sunk below rail electric investments.

These arrangements, together with the AT5 charge being set to recover all forecast electric costs from currently forecast electric services, will better signal efficient investment by not pricing access to electric traction on the basis of an aspirational electric utilisation level (as was proposed under previous DAAUs). This means that the proposal does create the risk of artificially supporting new investments.

Asset replacement investment

In contrast to capacity expansion investment, asset replacement investment is, to a substantial extent, unavoidable, recognising that:

- Aurizon Network has ongoing legal obligations to provide access to the electric network under its lease agreement with Government, under the service declaration under the QCA Act and in accordance with its Access Agreements; and
- not reinvesting in the electric assets in order to maintain their capability will undermine the ability of operators to efficiently run their services (both electric and non-electric).

In this context, it is essential from an economic efficiency perspective that Aurizon Network has an incentive to undertake such investment, as the negative efficiency consequences of the investment not proceeding are material. For example, as discussed in section 2.4.2, if Aurizon Network does not reinvest in the assets to the point that it

could no longer provide access to electric services, this could cause the costly and inefficient premature retirement of a significant fleet of electric locomotives. However, it also remains important to ensure that Aurizon Network does not have an incentive to 'over invest' in asset replacement expenditure.

As discussed in sections 2.4.2 and section 3.4, Aurizon Network considers that the current AT5 pricing arrangements are likely to cause a material disincentive for it to invest in significant asset replacement expenditure given the uncertainty about how such investments will be recovered in the event that demand for electric services were to decline in future. The Electric Traction DAAU will address this issue by providing clarity and certainty about Aurizon Network's ability to recover these costs under alternate electric demand scenarios, while maintaining the integrity of the above-rail haulage market.

4.2.3 Achieving cost recovery

A reliable mechanism for the recovery of sunk investment costs and unavoidable asset replacement costs is essential for Aurizon Network, not only from the perspective of meeting its legitimate business interests in being able to recover the investment costs reflected in its regulated asset base given it is not otherwise compensated for stranding risk, but also in order to maintain incentives for future efficient investment in below rail assets, which would be undermined if Aurizon Network perceived a material risk that QCA approved investments in the network could subsequently be stranded. This is also consistent with the Pricing Principles in the QCA Act (see section 5.5).

The QCA has indicated in its previous assessments of electric traction DAAUs that it supports recovery of sunk electric investment, provided that, to the extent possible, cost recovery is from electric services. Given the QCA's strong desire to avoid distorting competition between diesel and electric services, where it is not possible to recover all sunk investment costs from electric services, the shortfall should be recovered so as to:

- cause least change in the relative cost of electric and diesel traction; and
- allocate to diesel services only the minimum necessary amount to enable Aurizon Network to recover its fixed and sunk costs of providing the electric network.

Consistent with the pricing principles in the QCA Act, the proposed AT5 pricing approach must provide Aurizon Network with a means of recovering the efficient costs of providing the declared service, of which access to the below rail electric network is a part. This should include the recovery of its sunk investment costs, which were incurred in order to meet demand for the service and which have been accepted by the QCA as prudent and efficient in the circumstances.

The QCA has previously indicated that it does not support a pricing approach that requires diesel users to pay for assets that they do not use. However, as discussed previously, in the event that operators ultimately prefer diesel traction, causing a partial stranding of electric assets, seeking to recover this stranded asset cost solely from remaining electric users will exacerbate the cost advantage of diesel traction, further encouraging the introduction of diesel locomotives to the system. There is no feasible tariff structure that allows Aurizon Network to recover its stranded electric investment costs that does not ultimately recover some of those costs from all services, including diesel services.

Consistent with the QCA's reasoning in relation to previous DAAUs, the Electric Traction DAAU anticipates the recovery of all costs of the below rail electric network from electric services, up to the point at which there is market evidence that doing so is contributing to a loss in demand for electric services. Provided that electric utilisation is maintained at its current level, this provides market evidence that this level of recovery of fixed and sunk electric network costs can be recovered from electric services without undermining demand for the electric network, and electric services will continue to recover all costs associated with the electric network.

However, where diesel locomotives have displaced existing electric locomotives causing a partial stranding of the assets, the Electric Traction DAAU does not seek to recover the stranded asset cost from the remaining electric services, as there is market evidence that the current level of recovery of fixed and sunk costs cannot be sustained without a loss in demand for the electric network. As previously discussed, attempting to recover the cost shortfall

from the remaining electric services will simply widen this competitiveness gap and make electric trains even less attractive, further encouraging substitution to diesel haulage.

Importantly, this proposal relies on market evidence that electric services cannot sustain the existing level of recovery of fixed and sunk costs before any attempt is made to recover costs in an alternate way. There is no attempt to anticipate the market's assessment through a pre-determination of the level of AT5 charge that electric services can 'afford' before demand is affected, and unlike previous DAAUs, there is no attempt to engineer an outcome where operators will prefer to run electric services. However, by taking this approach and allowing the market to determine its preferred traction mode, Aurizon Network is clearly bearing significant market risk on the demand for its electric network. Given its ongoing obligations under the regulatory framework to make the electric network available, both under the terms of the service declaration and its existing access agreements, it is imperative that the regulatory framework respond in the event that the market determines that it prefers diesel traction for an increasing proportion of services, by providing an alternate mechanism for Aurizon Network to recover its costs associated with the electric network.

Given these circumstances, the most efficient approach is to allocate the stranded asset costs in a way that is least likely to distort decisions by users in terms of how they operate on the network. The current AT5 pricing arrangements do not achieve this as they require that all stranded electric costs are allocated to the remaining electric services. This will distort operators' usage and investment decisions further away from electric and towards diesel. The Electric Traction DAAU seeks to minimise this distortion by recovering stranded asset costs in a technologically neutral way across all services so as to maintain the existing differentials between electric and diesel traction. It does this by recovering these costs through a revenue cap adjustment to AT3 and AT4 charges.

In summary, the Electric Traction DAAU seeks, to the extent possible, to recover AT5 costs from electric services only. There will be no recovery of electric costs from diesel services unless there is market evidence that the current AT5 charge is contributing to a loss in electric demand, in which case asset stranding concerns arise. In this eventuality, the model provides for the minimum contribution necessary from diesel users required to address stranding concerns. This is consistent with the principles of recovering costs in the most efficient, least distortionary way possible.

As discussed in section 4.2.1, Aurizon Network has conducted analysis showing the likely impact of this approach on diesel users, including testing this based on a range of reasonable scenarios. This analysis shows that the impact to AT3/AT4 will be incremental only.

5. Appropriateness of Aurizon Network AT5 Proposal

The previous section discussed how the Electric Traction DAAU proposal aligned with the criteria that may be drawn from the QCA's previous assessments of Aurizon Network's 2011 and 2013 DAAU proposals. These criteria are based on the QCA's application of the decision criteria in the QCA Act to those proposals. This section specifically identifies how the Electric Traction DAAU proposal (which was developed to align with the criteria drawn from the QCA's previous assessments) also aligns with the decision criteria in QCA Act, and confirms the appropriateness of the Electric Traction DAAU proposal.

5.1 Object of Part 5 of the Act

The object of Part 5 of the QCA Act 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.

As outlined in section 4.2.1, the Electric Traction DAAU model promotes the efficient operation of and use of the below-rail electric infrastructure within the constraints provided by the QCA guiding criteria, and in particular addresses a number of limitations of the current AT5 pricing approach. One of the greatest deficiencies of the current AT5 pricing approach is that existing electric traction users are at present, absorbing a cost for diesel users to have the free option to change traction types.

The Electric Traction DAAU introduces measures to promote efficient utilisation of the below-rail electric network in a way that is consistent with the criteria that may be drawn from previous QCA assessments, and promotes an economic outcome for traction choice. Specifically, AT5 will be established so as to recover forecast electric costs from forecast electric services, and is technology neutral by not seeking to encourage a particular traction choice by operators, leaving this to the above-rail market to determine. As such, it does not 'over-signal' investment in electric traction or impact on the competitive haulage market.

However, in the event that the market's response to this choice is to introduce further diesel locomotives into either the Blackwater or Goonyella Systems, displacing existing electric locomotives, the Electric Traction DAAU accepts this market evidence that the current level of AT5 is contributing to a loss in electric demand. In these circumstances, the introduction of diesel locomotives in place of electric locomotives reflects a partial stranding of the electric network. The Electric Traction DAAU avoids imposing the costs of the partially stranded electric network only on the remaining electric services, recognising that this creates a further cost differential between electric and diesel, and further discourage operators from using or investing in electric locomotives (as would be the case under the current AT5 approach). Rather, it recovers these costs in a way that is least likely to distort users' consumption and investment decisions, by spreading the stranded asset costs to all users via the AT2-4 revenue cap adjustment. This mechanism ensures that the cost of these stranded assets is borne on an equivalent basis by all services that have the option at any time to use either form of traction, and does not change the relative cost of diesel and electric services – as a result, this mechanism will avoid any distortion of competition in the above rail market.

In the event that the market ultimately determines that diesel is the preferred traction mode, the Electric Traction DAAU model creates the opportunity for an 'orderly exit' in which the continued use of sunk investment in electric locomotives by above-rail operators (and sunk investment in the electric network by Aurizon Network) is encouraged for the remaining lives of those assets.

The Electric Traction DAAU includes mechanisms to promote an efficient level of investment in the electric network by:

- setting AT5 on the basis of current achieved electric utilisation rates, rather than using an assumed aspirational level of electric utilisation. This will provide a more accurate reflection of electric demand and a more efficient price signal for future investments;

- providing Aurizon Network with a clear framework for recovery of reinvestment costs to support a decision to invest in significant electric network asset replacement;

- strengthens the mechanisms designed to ensure that such investment only occurs where it is prudent and efficient by requiring that Aurizon Network only undertake significant asset replacement investment where it has sought and received pre-approval by the QCA that the investment is prudent and efficiently scoped; and

- providing that investment in expanding electric network capacity will only occur where Aurizon Network has sought and received pre-approval by the QCA that the investment is prudent and efficiently scoped, and that in order to demonstrate prudency of the expansion investment, any proposal to expand the below rail electric network must be accompanied by a commitment from customers to underwrite the project, so that the expansion does not increase the exposure of other users to a requirement to contribute to the recovery of sunk below rail electric investments.

5.2 Legitimate business interests of Aurizon Network

By providing a mechanism that allows Aurizon Network to recover the efficient costs it has invested in electric assets and to mitigate asset stranding risk (which is not otherwise compensated by the WACC that Aurizon Network is permitted to earn on regulated assets), the Electric Traction DAAU is consistent with its legitimate business interests. By being technology neutral, the proposal does not seek to influence traction mode decisions in the above-rail market and, therefore, does not benefit Aurizon Network's related operator, who is the largest provider of electric services across the Blackwater and Goonyella systems. Similarly, it does not 'over signal' investment in electric traction in a way that distorts competition in that market or which favours Aurizon Network's related operator.

By accepting the QCA's reasoning that the regulatory framework should be technology neutral and allow the market to determine the preferred traction mode, Aurizon Network is clearly bearing significant market risk on the demand for its electric network. However, as discussed in section 2.2, Aurizon Network retains obligations to maintain current electric infrastructure and renew assets, including as a result of the service declaration under the QCA Act, and through its access agreements with operators which give operators the option (but not obligation) to operate electric services on their allocated train paths. Given these obligations, it is imperative that the regulatory framework provide an alternate mechanism for Aurizon Network to recover its costs associated with the electric network in the event that the market determines that it prefers diesel traction for an increasing proportion of services.

The Electric Traction DAAU provides such an alternate mechanism by recovering any revenue shortfall arising from a reduction in electric utilisation from all services (including both electric and diesel services) via the AT2-4 revenue cap mechanism and appropriately charging all customer for the benefit obtained in having optionality.

5.3 Interests of access seekers, access holders and Rail Operators

The QCA has previously identified that it considers the interests of access seekers, access holders and operators include ensuring they only pay for the infrastructure they use and for the benefit they obtain for retaining traction choice.

Consistent with this reasoning of the QCA, the Electric Traction DAAU sets the AT5 at a level such that forecast below-rail electric costs will be recovered from forecast electric services. The interests of access seekers, access holders and train operators are also upheld in the sense that the Electric Traction DAAU retains traction choice and does not seek to encourage a particular traction mode choice by access seekers.

Provided that electric utilisation is maintained at existing levels, the recovery of any electric network costs through the AT2-4 revenue cap mechanism will be unlikely. However, in the event that users respond to this traction choice by electing to introduce diesel locomotives, with the result that electric utilisation falls from current levels, this will provide market evidence that the current AT5 is contributing to a loss in electric demand. This will be recognised as a partial stranding of the electric network.

In such circumstances, the costs associated with the stranded component of the assets will be recovered from all users in in a consistent way, thereby maintaining the cost differential between access charges for electric and diesel services. This is considered to be the mechanism that is least likely to distort decisions on consumption and investment by electric or diesel services, and least likely to distort competition in the above rail market. Even if there is some reduction in electric utilisation in each system, provided that as anticipated electric traction remains the dominant traction type, the resulting increase in total access charges for all services (including diesel services) will be minor.

As a result, this mechanism is considered to be in the interests of all access seekers, access holders and rail operators. This pricing approach ensures that access holders will only pay for the infrastructure that they use, consistent with the QCA's requirements, except under the scenario where asset stranding actually occurs, where limited adjustments are made to the access charge applicable to all services. Further, while electric traction utilisation is currently high, it is in the interests of all access seekers, access holders and rail operators that the AT5 pricing structure is reformed early in order to provide all users with certainty as to the arrangements going forward. This is so users making decisions about investing in electric or diesel locomotives understand the basis upon which prices will be determined. The earlier tariff reform can be achieved, the less likely it will be that electric traction costs need to be recovered from all users, and, to the extent those costs do need to be recovered from all users, the less material those costs will be.

The Electric Traction DAAU proposal seeks to adopt and retain, wherever possible, the mechanisms already utilised in the current regulatory framework. This includes:

- retaining the existing general structure of AT5 as an average cost tariff applied to egtk;
- establishing AT5 for the remainder of UT4 (and UT5) on the basis of currently forecast electric network costs and with a floor utilisation equal to currently forecast electric utilisation, ensuring that there is no material cost to users as the result of the transition to the new arrangements; and
- adopting the existing revenue cap mechanisms to apply price adjustments, meaning that the mechanisms by which prices will be adjusted are already known and understood by all parties.

Access seekers, access holders and train operators may also be said to benefit from the regulatory certainty that would be provided by finally resolving the problems with the current AT5 pricing approach that have been widely acknowledged. This issue has been raised over a number of years and Aurizon Network has sought to address it through various DAAUs. Yet despite general acknowledgement of the problems caused by the current AT5 pricing approach, the issue remains unresolved. By taking on board the QCA's reasoning in its previous assessments of electric traction pricing in developing this proposal, Aurizon Network has sought to develop a revised AT5 pricing approach that is consistent with the QCA's requirements while addressing the very real issue of asset stranding risk, and the current competitive distortion where diesel users do not bear any costs for the benefit they receive through retaining traction optionality. We consider that it would be in the interests of all stakeholders for this issue to be finally resolved. Further, in light of previous QCA decisions on this matter, we do not see any other mechanism that could address this stranding risk.

This enhanced regulatory certainty will also remove a key area of risk that is unique to investment in electric locomotives. That is, an operator that elects to run electric trains currently bears the risk associated with other parties' decisions regarding traction mode, as a decline in overall electric volumes on the network will result in AT5 increasing for the remaining electric users. This is a disincentive to invest in electric traction introduced by the regulatory pricing approach which may distort investment decisions by access seekers/operators, particularly where the cost structures offered by electric and diesel locomotives are similar.

Should this situation not be resolved and the current arrangements retained, and Aurizon Network's electric assets become stranded, then as discussed in section 3.4, there will be significant costs to all network users, including diesel operators. As noted in section 4.2.3, the AT5 pricing approach in the Electric Traction DAAU provides an opportunity for an 'orderly exit' from electric traction in a way that minimises transition costs for all network users. It does this by allowing the maximum utilisation of existing above and below-rail electric assets for as long as possible

in order to recoup past investments. This will also minimise any cost impost on diesel users in the event of asset stranding.

In the event that the market does ultimately prefer diesel traction and the network transitions to a predominantly diesel network, the AT5 pricing approach in the Electric Traction DAAU will manage asset stranding risk through gradual price adjustment, eliminating major price shocks. This will be in the interests of all access holders/operators. This is shown in the modelling of this scenario, as discussed in section 4.2.1.

5.4 Public interest

The QCA has previously identified the development of the coal industry and having competition in related markets as relevant when considering the public interest.[30]

Aurizon Network considers that the Electric Traction DAAU proposal will support the development of the coal industry by providing regulatory certainty around the issue of AT5 pricing and addressing the issue of asset stranding risk in a way that is consistent with the QCA's requirements – namely, ensuring that, to the extent possible, electric costs are recovered from electric users, that there is no 'over signalling' of investment in electric traction and, hence, no anti-competitive impact in the above-rail market. This regulatory certainty will underpin investment in both above and below-rail infrastructure in the Central Queensland Coal Network, to the benefit of the coal industry.

Moreover, the public interest in having competition in related markets is upheld by this proposal as it retains traction choice and does not seek to encourage a particular traction mode through a positive price signal favouring that mode. This means that traction outcomes will reflect the relative merits of the alternate technologies given the full cost of each option, and will not be guided by the AT5 pricing approach. Importantly, the Electric Traction DAAU proposal also aims to ensure that in the event that there is any stranding of the electric network, the method used to recover any stranded electric network costs does not distort usage and investment decisions, and hence does not distort competition in the above rail market. This technologically neutral approach also ensures competitive neutrality as Aurizon Network's related above-rail operator will not specifically benefit from an approach that seeks to encourage electric traction.

State and federal emissions policies are also relevant to the QCAs consideration of electric traction. The Federal government has committed to reducing national emissions by 26-28% on 2005 levels by 2030. Relevantly, the Queensland Labor government is pursuing an independent target of 50% electricity from renewable sources, and 30% reduction in total Queensland emissions (on 2005 levels) by 2030. Electric traction is more efficient than diesel and likely to become increasingly so as the Queensland generation mix transitions away from coal. Further, the Queensland government target of zero net emissions by 2050 would be more difficult to achieve without electric traction. By way of reference, the electric traction fleet is roughly equivalent to 500,000 new electric vehicles on the road and displacing the need for approximately 100 million litres of diesel annually[31]. While not determinative, the role the electric traction plays in supporting broader public policy considerations associated with climate change adaptation and emissions policy are relevant to the QCA's decision.

Should the market determine that the network become predominantly diesel then, as noted above, there will be significant transition costs and economic losses to both Aurizon Network and above-rail operators that have invested in electric assets under the current AT5 pricing approach. The Electric Traction DAAU proposal provides a mechanism to minimise these economic losses, to the benefit of the entire network and, ultimately, the coal industry.

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[30] QCA (2013). Draft Decision. Aurizon Network 2013 Blackwater Electric Traction Pricing Draft Amending Access Undertaking, November 2013, p. 50-51

[31] Aurizon Sustainability report (2017), http://www.aurizon.com.au/~/media/aurizon/files/sustainability/aur11177_sustainabilityreport_lr_singlepages.pdf, p. 37 accessed 28 November 2017

5.5 Pricing Principles

The pricing principles in the QCA Act require that Aurizon Network be able to recover the efficient costs of providing the declared service, including a risk adjusted rate of return. The Electric Traction DAAU meets this requirement as it provides a mechanism to recover the sunk cost of stranded electric assets where utilisation falls from current levels. Allowing the network owner the opportunity to recover the efficient costs of its investments in the network is critical in providing an incentive to continue to invest in maintaining existing capacity as well as expanding capacity as required. A regulatory pricing approach that does not allow this efficient cost recovery will be detrimental to efficient investment in the network.

Consistent with the QCA's previous decisions, the proposal does not seek to use a pricing structure to encourage a particular traction choice. However, we note that the current AT5 pricing arrangements risk promoting inefficient outcomes in terms of utilisation of the existing electric network as, in the event that diesel locomotives are introduced into a system (indicating that the current AT5 is contributing to a loss in electric demand), the AT5 would increase. This would increase the competitiveness gap between electric and diesel locomotives, encouraging further take-up of diesel. The Electric Traction DAAU would instead recover this stranded asset cost from all users of the system on a non-discriminatory was, in order to avoid distorting usage and investment decisions between diesel and electric traction.

The Electric Traction DAAU also includes a commitment by Aurizon Network to mechanisms that will strengthen its incentive to make prudent future investments in electric infrastructure. In particular, any new investments in the electric network will:

- be subject to existing prudency tests in the access undertaking and QCA pre-approval (where they exceed $15m in value)
- for significant asset renewal projects and for any network expansion projects, will be subject to regulatory pre-approval by the QCA to ensure prudency and efficiency of project scope; and
- for any electric network expansion projects, will require contractual commitments by customers to underwrite the investment and which will ensure that the expansion does not increase the exposure of other users to a requirement to contribute to the recovery of sunk below rail electric investments. These projects will remain subject to the expansion pricing principles already incorporated in Aurizon Network's access undertaking.

Aurizon Network's commitment to these processes provides surety for all stakeholders that stranding risks associated with future investment in electric capacity will be mitigated to the extent possible.

Attachments:

1. Aurizon Network's Proposed Access Undertaking drafting amendments