



**Asciano Response to Submissions
to the QCA Draft Decision on the
QR Network DAAU relating to
Electric Traction Issues**

Asciano Submission to the QCA

November 2012

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1 EXECUTIVE SUMMARY

Asciano continues to oppose the QR Network Draft Amending Access Undertaking (DAAU). Asciano does not believe that any new information has been provided to the Queensland Competition Authority (QCA) which either supports the QR Network DAAU position that electric traction is more efficient than diesel traction in the context of the Queensland coal chain or which refutes the Asciano position that locomotive traction decisions are best left to the market. Consequently Asciano believes that the QCA has to continue to adopt the position in its Draft Decision and reject the DAAU.

Various parties are proposing alternative solutions to the issues identified in the initial DAAU; however Asciano believes that the QCA must focus on making a decision on the DAAU lodged with the QCA in December 2011, rather than address alternative solutions. Asciano supports the further development of solutions to electric traction pricing issues, but Asciano does not believe that the current regulatory process is the correct forum to raise and discuss potential solutions not included in the DAAU. Asciano would support the appointment of a third party facilitator to seek a solution acceptable to all parties. However, the facilitator should not be the QCA as the QCA should have the role of a decision maker in relation to the DAAU rather than a role as a facilitator.

In resolving the electric traction pricing issues Asciano believes that any solution must meet the following criteria:

- it must meet the requirements of the QCA Act and Access Undertaking;
- it must allow for market based decisions on traction;
- it must be competitively neutral and non-discriminatory for above rail operators and traction types, that is it must not favour one rail operator or traction type over another, distort competition in the above rail market or have an anti-competitive impact in the above rail market; and
- it must ensure future pricing certainty via transparent pricing methodologies and regulatory certainty; and
- it must ensure pricing methodologies and outcomes are efficient for electric and diesel traction operators and for users of both the Goonyella and Blackwater systems.

This submission is public.

2 INTRODUCTION AND OVERVIEW

Asciano welcomes the opportunity provided by the QCA to provide further submissions in response to the submissions made to the QCA Draft Decision on the DAAU. In making this submission Asciano continues to oppose the DAAU as proposed by QR Network. Asciano does not believe that any new information has been provided which;

- definitively supports the DAAU position that electric traction is more efficient than diesel traction in the context of the Queensland coal chain; and
- definitively refutes the position that locomotive traction decisions are best left to the market and individual investors (where the infrastructure pricing in the market is reflective of the efficient cost of providing the service).

Asciano notes that various parties, including QR Network, are proposing alternative or amended solutions to the perceived problems which resulted in the initial DAAU, being submitted. However, Asciano strongly believes that the QCA's primary focus should be on making a decision on the DAAU submitted to the QCA in December 2011, rather than addressing alternative or amended solutions. Given this focus, Asciano strongly believes that the QCA has to continue to adopt the position of its Draft Decision and reject the DAAU. Asciano does not believe that any new information which definitively supports the DAAU has been provided.

Asciano notes that the majority of submissions to the QCA Draft Decision consultation process which came from participants in the Queensland coal supply chain broadly supported the QCA Draft Decision, although some participants sought that the QCA act quickly to resolve current issues with AT₅ tariffs in the Blackwater system. The notable submissions that did not support the QCA Draft Decision were QR Network, who as the proponent of the DAAU would be expected to continue to support their DAAU, and QR National which is a fully related party to QR Network.

Asciano supports the further development of alternative solutions to electric traction pricing issues raised by the DAAU, but Asciano does not believe that the current

regulatory process is the correct forum to raise and discuss potential solutions to the perceived electric traction problems identified by QR Network.

Asciano, like other participants in the Queensland coal supply chain, supports a resolution to the electric traction pricing issue which is acceptable to the coal supply chain. In particular the current lack of resolution is creating uncertainty which is delaying investment in rolling stock.

In seeking a resolution to the electric traction pricing issue Asciano strongly believes that the QCA should have the role of a decision maker and arbitrator in relation to a formal proposed amendment rather than a role as a facilitator engaged with industry participants in developing such an amendment. Asciano would support the appointment of a third party facilitator, appointed or otherwise endorsed by the QCA, to seek a solution acceptable to all parties within the parameters of the QCA Act. Asciano notes that this current regulatory process may have been less problematic if QR Network had consulted with train operators and end users prior to the submission of its DAAU in December 2011. QR Network only expressed a desire to consult with stakeholders when it became apparent there was substantial stakeholder opposition to the DAAU.

In considering the electric traction pricing issues Asciano notes that the September 2012 QR Network Revenue Adjustment submission to the QCA shows that the Blackwater system recorded an over recovery of the AT₅ tariff component of \$2.4 million because electric gross tonne kilometres were 8% above forecast even though system gross tonne kilometres were 10% below forecast¹.

Asciano notes that in email correspondence in October 2012 the QCA identified eight issues which it considered relevant to further consideration of the DAAU. While Asciano discusses these issues in the body of this submission, Asciano has provided explicit comment on these issues identified by the QCA in Attachment One.

Asciano has also commissioned a paper from Competition Economists Group (CEG) which addresses several of the issues identified in expert reports prepared for QR Network and QR National. This CEG paper specifically comments on the paper

¹ QR Network Revenue Adjustment amounts (2011-12) Revenue Cap September 2012 page 6

prepared by Ergas, Robson and Owen for QR National and the papers prepared by Sapere and NERA for QR Network. The CEG paper is attached at Attachment Two.

3 WHY THE QCA MUST CONFIRM ITS DRAFT DECISION

3.1 Asciano's Position

As outlined above, Asciano believes that the QCA should focus on making a decision on the DAAU lodged with the QCA in December 2011, and that given this Asciano believes that the QCA has to continue to adopt the position it put forward in its Draft Decision and reject the DAAU. Asciano does not believe that the positions put forward in its April 2012 submission on the electric traction issue have been negated by anything that has subsequently been put forward in the regulatory process. The key positions in the Asciano April 2012 submission are outlined below:

- the QR Network analysis supporting the DAAU is flawed as;
 - it is based solely on data from QR National's above rail operations. No data from other above rail operators operating in Queensland was used even though these operators have trains which differ in performance to QR National trains. Based on the QR National above rail operations data the QR Network analysis concludes that electric trains are more efficient than diesel trains. The inclusion of a broader data set may change this conclusion;
 - it assumes that centralised planning (with QR Network as the central planner) is preferable to an approach which allows market participants to make their own decisions;
 - it assumes electric infrastructure and electric trains are costless;
 - it does not allow for the stranding or impairment of electric infrastructure, electric trains or diesel trains;
 - it does not allow for further technology developments with diesel trains, and in effect locks in electric technology for the next twenty to thirty years regardless of developments in technology or other factors which may impact the attractiveness of diesel and electric trains;
 - it does not take account of the complexity and capital intensive nature of electricity production and delivery systems and the potential for outages in these systems; and

- it does not take account of the operational flexibility of diesel trains, in particular diesel trains can service mines without electrified loops and can provide service during electricity outages.
- the DAAU pricing proposals are not economically efficient as;
 - they are not cost reflective between systems and in particular they result in cross subsidies from users of the Goonyella system to users in the Blackwater system; and
 - they are not cost reflective as diesel trains are required to pay tariffs which reflect the costs of electric infrastructure even though this infrastructure is not being used by the diesel train.
- the above rail operator which benefits from the DAAU is QR National, a fully related entity of QR Network, and as such the DAAU distorts competition in the above rail market and has an anti-competitive impact. QR National benefits from the DAAU as follows;
 - the DAAU proposes a single AT₅ tariff across both systems, which has the affect of increasing the AT₅ tariff in Goonyella where both Asciano and QR National operate electric trains and reducing it in Blackwater where only QR National operates electric trains;
 - the DAAU proposes that diesel trains pay the AT₅ tariff even though they are not using the electric infrastructure. This proposal disadvantages Asciano who operates proportionately more diesels than QR National. This impact is most marked in the Blackwater system where Asciano operates only diesels. Under this DAAU proposal Asciano and its end users are subsidising electric infrastructure in the Blackwater system that is used almost exclusively by QR National;
 - QR National has excess electric locomotives and is in a position to respond in a short time frame to the changed pricing signals that would result if the DAAU was accepted by the QCA. Neither Asciano nor any new entrant to the above rail market could respond in this time frame.

Overall the QR Network analysis which supports the DAAU is based on the proposition that electric locomotives are more efficient than diesel locomotives. As this position is flawed the entire basis of the DAAU is flawed. Asciano does not

believe that the positions it put forward in its April 2012 submission have been negated by anything subsequently been put forward in the regulatory process, and consequently the QCA has to continue to adopt the position in its Draft Decision and reject the DAAU.

3.2 Asciano Response to QR Network and QR National Positions on the QCA Draft Decision

In responding to the QCA Draft Decision both QR Network and QR National have raised several issues and arguments which Asciano comments on below. Asciano does not believe that any of the issues or arguments raised by QR Network and QR National definitively demonstrate that electric traction is more efficient than diesel traction in the context of the Queensland coal chain or definitively refute the position that locomotive traction decisions are best left to the market and individual investors.

3.2.1 Efficiency of Electric Traction Compared to Diesel Traction

QR Network Modelling

The original QR Network DAAU was based on an assumption that electric traction was more efficient than diesel traction in the Queensland coal chain. As outlined above this position was based on flawed modelling.

QR Network essentially admits that Asciano diesel locomotives are more efficient than the QR National diesel locomotives that it uses in its model but claims that it does not use the Asciano data as it would be an inappropriate comparison and would distort the purpose of their analysis (QR Network submission section 3.1.2.1 page 18).

It is unclear to Asciano why QR Network would compare efficient QR National electric locomotives to inefficient QR National diesel locomotives. Any approach which is seeking to find efficient outcomes but which uses data inputs based on a known inefficient operation should have its methodology and results strongly queried. This is particularly the case when using the efficient operation data changes the outcomes of the modelling.

Asciano believes that the appropriate approach would be to compare the most efficient diesel trains to the reference train specification for the relevant QR Network system. However, even if one traction type or the other was found to be more

efficient via such modelling the choice of traction type should still be left to the individual market participants.

Submissions Supporting Electric Traction

QR Network continues to support the position that electric traction is more efficient than diesel traction by relying on third party submissions, positions or analysis which concludes that electric traction was more efficient than diesel traction.

In particular Asciano notes that there were numerous submissions to the QCA Draft Decision supporting electric traction which were made by entities who are not participants or potential participants in the Queensland coal supply chain. These submissions demonstrate that in particular circumstances (for example circumstances related to geography, market condition, and haulage tasks), then electric traction may be an efficient option. However, the direct relevance of these submissions to the specific circumstances of the Queensland coal supply chain is questionable.

Obviously it would be possible to get submission from rail companies undertaking diesel traction heavy haul operations throughout the world supporting the efficiency of diesel² but this would not necessarily be relevant to the Queensland coal supply chain or assist in resolving the issues raised by the DAAU.

Overall, market participants making the capital investment decisions relating to locomotives should have a choice as to whether they use diesel or electric traction, and this choice should be able to be made on the basis that the price of using the electric infrastructure is reflective of costs and there are no cross-subsidies between traction modes or coal systems.

Technology

QR Network notes (QR Network Submission section 3.1.2.4 page 25) that:

QRNN acknowledges that it has not sought to incorporate the impact of technological advances in locomotives engineering into the TCO analysis. Seeking to estimate the specific improvements that will be achieved is difficult and will be highly contentious.

² For example Asciano understands that all US Class 1 operators undertake their heavy haul tasks with diesel locomotives.

In making this comment QR Network are missing the relevant point. The issue with future developments in technology is not that the QR Network modelling is deficient because it has not included assumptions relating to technological change but that issues such as technological change cannot be modelled with any accuracy. Any modelling which is used as a basis to dictate the future behaviours of independent market participants is fundamentally flawed. Asciano's concern is that as many real world considerations cannot be adequately modelled (for example technological change) relying on the outcomes of a model to materially dictate the behaviours of third parties should be avoided.

These market participants should be allowed to make their own decisions based on their own views of future developments rather than be dictated to by a model which can never adequately incorporate assumptions regarding these developments. Such traction choice is more likely to be efficient if prices reflect efficient and relevant costs and so send appropriate price signals.

3.2.2 Competition Issues

Competition in the Locomotive Supply Market

Lack of competition in the market for the current supply of electric locomotives to the Queensland coal supply chain has been identified as an issue. For example QR Network (QR Network submission section 3.3.2.2 page 33) makes the point that although there is currently only a single supplier of narrow gauge electric locomotives there are potential entrants into this market and as such this issue should not be over-stated as an issue of concern.

Asciano agrees that there are potential entrants into the market for the supply of narrow gauge electric locomotives but whatever the number of potential suppliers there is currently only a single supplier of heavy haul narrow gauge electric locomotives in Queensland. Any regulatory developments which seek to marginalise diesel traction will place this single supplier in an even stronger position in the medium term as competition from diesel locomotives is no longer a valid commercial or competitive concern.

In particular Asciano notes the ACCC position (as cited in the QCA Draft Decision page 31) that effective competition requires more than the threat of competition. Effective competition requires that the competitors be active in the market while holding a sustainable market position. Given this position Asciano believes that lack

of competition in the market for the supply of electric locomotives to the Queensland coal supply chain will remain a concern until a new entrant actually enters the market.

In the event that other companies eventually entered the market to supply narrow gauge electric locomotives in Queensland the competition in locomotive supply would still be reduced under the DAAU as diesel locomotives would no longer be an effective substitute for electric locomotives.

Above Rail Haulage

QR Network (QR Network Submission section 3.3.2.1 page 32) claims that the QCA has set the effective competition benchmark at a level which is too high. However, the QCA is not setting the effective competition benchmark independently but rather the QCA Draft Decision is relying on both legal precedence and the position other key regulatory institutions (such as the ACCC and the ACT) in determining this benchmark. Given this Asciano believes that the benchmark determined by the QCA is appropriate.

It seems clear that the marginalisation of diesel traction by the DAAU process would reduce effective competition in above rail haulage markets if the DAAU were accepted. To counter this position QR Network (QR Network Submission section 3.3.2.3 page 37) notes that there are a range of factors on which Asciano and QR National compete, such as price, technology and service. This may be true but one of these factors on which they compete is the mode of traction. In addition the mode of traction could also be expected to directly contribute to other factors on which Asciano and QR National compete, such as technology and service.

QR Network (QR Network submission section 4.4 page 56) argues that the DAAU has no impact on competition in upstream or downstream markets, while simultaneously acknowledging (QR Network submission section 3.3.2.3 page 37) that the DAAU has a short term impact on Asciano's customers (but not QR National's customers). Asciano query how the DAAU has no impact on competition if it the DAAU only impacts a single competitor (in a market with two competitors).

The DAAU also has a broader negative impact on above rail competition as the DAAU demonstrates to both current competitors of QR National and potential new entrants that QR Network will seek to use the regulatory process and its natural

monopoly position to disadvantage competitors of QR National. Such behaviours create a disincentive for further competition in the above rail market.

Overall Asciano believes that the DAAU, whether intentionally or not, negatively impacts on Asciano's above rail operations and positively impacts on QR National's above rail operations. QR Network essentially agrees that Asciano is negatively impacted by the DAAU while QR National is not. Given the DAAU distorts competition in the above rail market and has an anti-competitive impact it should be rejected by the QCA.

4 POTENTIAL SOLUTIONS

Asciano, like other participants in the Queensland coal supply chain, supports a resolution to the electric traction pricing issue which is acceptable to the coal supply chain. In particular the current lack of resolution is creating pricing, contracting and regulatory uncertainty, which is delaying investment in rolling stock, and presumably delaying investment in other sections of the coal supply chain.

In order to address this uncertainty Asciano would welcome the opportunity to enter into good faith discussions with industry participants to resolve the electric traction pricing issues. While Asciano would welcome the opportunity to enter into such discussions, Asciano does not believe that the current DAAU formal regulatory process is the correct forum to openly discuss potential solutions to these issues.

Asciano would support the appointment of a third party facilitator, appointed or endorsed by the QCA, to seek a solution acceptable to all parties within the parameters of the QCA Act. In seeking a resolution to electric traction pricing issues Asciano strongly believes that the QCA should have the role of a decision maker and arbitrator in relation to a formal proposed access undertaking amendment rather than a role as a facilitator engaged with industry participants in developing solutions which may then be developed into access undertaking amendments.

Any stakeholder consultation process organised by a third party facilitator should be transparent, with meeting agendas and minutes being available to all participants. In particular, in the event that during the consultation process any one rail operator is present at a meeting with end users or QR Network, then the other rail operator must be present at this meeting.

In resolving the electric traction pricing issues Asciano believes that any solution must meet the following criteria:

- it must meet the requirements of the QCA Act;
- it must meet the requirements of the current Access Undertaking unless an Access Undertaking amendment is contemplated;
- it must allow for industry participants to make market based decisions on traction;
- any supporting modelling must be robust and avoid the flaws previously identified by Asciano and others;
- it must be competitively neutral and non-discriminatory for above rail operators and for traction types, that is it must not favour one rail operator or traction type over another, distort competition in the above rail market or have an anti-competitive impact in the above rail market;
- it must ensure future pricing certainty via transparent pricing methodologies, regulatory certainty;
- it must ensure pricing methodologies and outcomes are efficient for:
 - electric and diesel traction operators. The pricing should send efficient pricing signals which reflect the costs of infrastructure used and not include the costs of infrastructure related to other traction modes: and
 - users of both the Goonyella and Blackwater system. The pricing should reflect the costs of infrastructure in the rail system used rather than infrastructure in other rail systems.

5 CONCLUSION

Asciano continues to oppose the DAAU as proposed by QR Network. Asciano does not believe that any new information has been provided which either supports the DAAU position that electric traction is more efficient than diesel traction in the context of the Queensland coal chain or which refutes the position that locomotive traction decisions are best left to the market and individual investors. As such Asciano believes that the QCA Draft Decision should not be substantially amended in moving towards a Final Decision.

Various parties are proposing alternative solutions to the issues identified in the initial DAAU; however Asciano believes that the QCA should focus on making a decision

on the DAAU lodged with the QCA in December 2011, rather than address alternative solutions.

Asciano supports the further development of alternative solutions to these issues, but the current regulatory process is not the correct forum to debate these potential alternative solutions. In seeking a resolution to the electric traction pricing issue Asciano would support the appointment of a third party facilitator to seek an industry based solution acceptable to all parties. Any solution must meet the following criteria:

- it must meet the requirements of the QCA Act and Access Undertaking;
- it must allow for market based decisions on traction;
- it must be competitively neutral and non-discriminatory for above rail operators and traction types, that is it must not favour one rail operator or traction type over another, distort competition in the above rail market or have an anti-competitive impact in the above rail market; and
- it must ensure future pricing certainty via transparent pricing methodologies and regulatory certainty; and
- it must ensure pricing methodologies and outcomes are efficient for electric and diesel traction operators and for users of both the Goonyella and Blackwater systems.

ATTACHMENT 1 – ASCIANO RESPONSE TO ISSUES IDENTIFIED BY QCA

In email correspondence of 8 October 2012 QCA identified eight issues which it considered relevant to further consideration of the DAAU. Asciano comments on these issues are outlined in this Attachment.

Traction Choice

The QCA Draft Decision position was that choices regarding electric and diesel traction should be made by participants in a competitive market where prices efficiently reflected costs of providing electric infrastructure.

Asciano strongly endorses this QCA position. Choices made in a competitive market will be more efficient than any centrally dictated position that one type of traction is preferable. For any centrally dictated position to be efficient requires the entity making the decision to be omniscient and take into account all relevant data and information in modelling prior to determining a position. This relevant data includes the current and future costs and benefits to all participants in the Queensland coal supply chain (including locomotive suppliers).

Given that such centrally dictated decision making is unlikely to be efficient Asciano believes that the efficiency and flexibility of market outcomes should continue to be relied upon by the Queensland coal supply chain.

Benefits of electrification

The QCA identify that a substantial amount of new information on the benefits of mainline electrification has been submitted.

Asciano does not dispute that electric traction can be a valid and efficient method of operating heavy haul railways in certain circumstances and Asciano itself operates electric traction locomotives in Queensland. Asciano's concern is not with electric traction per se, but with the DAAU's requirement that electric traction be favoured over diesel traction via pricing distortions and inefficiencies.

Any move to rely more heavily on electric traction through regulatory fiat will magnify the disadvantages of electric traction and negate the benefits of diesel traction. In particular diesel traction provides the following benefits:

- increased flexibility – diesel traction can operate during electric outages and on lines which are not electrified;
- lower infrastructure costs – diesel traction has lower infrastructure costs;
- technological diversity – having more than one form of traction allows for a broader scope of potential technological development; and
- operating benefits – diesel traction allows trains to operate with shorter headway distances between each train.

The increased flexibility and lower infrastructure costs highlighted above are particularly important for mines which are served by non-electrified spur lines. The costs of constructing electric infrastructure to serve distant, lower volume or marginal mines are unlikely to be economically justified.

QR Network originally raised concerns regarding the efficiency of diesel traction based on the superior performance of QR National electric locomotives over QR National diesel locomotives. Asciano believes these concerns are over-stated as data based on the performance of non-QR National diesel trains shows diesel and electric locomotives have comparable performance levels. Asciano does not believe that any material has been produced in submissions to the QCA Draft Decision which supports the position that electric traction is demonstrably more efficient than diesel traction in the Queensland coal supply chain.

Object of Part 5 of the QCA Act

The QCA Draft Decision position was that the object clause of Part 5 of the QCA Act focuses on the economic efficiency of network infrastructure and its impact on competition in related markets, whereas economic efficiency of the whole of the rail haulage service was relevant in the context of the public interest criterion.

The QCA notes that QR Network and QR National have contested the QCA interpretation of the object clause. In particular Asciano notes that QR Network's consultant NERA conclude that ignoring the related nature of costs in the supply chain will deliver inefficient outcomes (QR Network Submission Section 2.3 page 12). In making this point it is unclear to Asciano what particular legal expertise is being used to advise the QCA on the interpretation of the QCA Act. Asciano believes that the QCA approach does not ignore these costs, as indicated by NERA, but rather it includes them in the public benefit test.

Competition in Electric Locomotive Supply

The QCA Draft Decision identified the potential lack of competition in the market for the supply of electric locomotives. Numerous submissions to the QCA Draft Decision made the point that although there is currently only a single supplier of narrow gauge electric heavy haul locomotives for this market there are potential entrants into this market and as such this issue should not be over-stated as an issue of concern.

Asciano agrees that there are potential entrants into the market for the supply of narrow gauge electric locomotives but the fact remains that there is currently only a single supplier of heavy haul narrow gauge electric locomotives in Queensland. Any regulatory developments which discourage operators from choosing diesel traction will place this single supplier of electric locomotives in a stronger position in the medium term as competition from diesel locomotives is no longer a concern. Even if other companies entered the market to supply electric locomotives competition in locomotive supply would still be reduced as diesel locomotives would no longer be an effective substitute for electric locomotives.

Competition in Rail Haulage Market

The QCA Draft Decision identified the Blackwater and Goonyella systems as separate rail haulage markets; however QR Network has subsequently argued that Blackwater and Goonyella are not separate markets. Asciano believes that to date QR Network's actions imply that the Goonyella and Blackwater system are separate markets. For example QR Network has separate pricing regimes, separate system rules and separate indicative trains for these systems.

QR Network provides no compelling evidence to counteract the QCA's position of separate markets for the purpose of assessing the impact of the DAAU. The QCA Draft Decision correctly articulates the extremely limited demand side substitution. QR Network in their submission point to supply side substitution, but provide no evidence that supply side substitution is effective enough to defeat a SNIP³ given the barriers to switching and lack of availability of competitive switching capacity.

³ Small but significant and non-transitory increase in price – a standard test used by competition authorities to determine market definitions.

Strategic Conduct

The QCA note that the QR Network and QR National submissions, (and specifically the Ergas, Robson and Owen paper at Attachment A of the QR National submission and the NERA paper at Attachment A of the QR Network submission) have argued that above-rail operators may behave strategically and use the access framework to increase costs of their rivals. In particular QR Network (QR Network Submission attachment C page 58) argue that a rival⁴ operator might introduce diesel trains in the Blackwater system with the intent of reducing the utilisation of the electric network and thus increasing the cost of providing electric traction for QR Network's fully related above rail service provider QR National.

Asciano have commissioned a report by CEG to consider, amongst other issues, the issues raised in the Ergas, Robson and Owen paper and the NERA paper in regard to strategic conduct. This report is attached to this submission at Attachment 2. The CEG paper shows that the strategic behaviours outlined in these reports are driven by unrealistic explicit and implicit assumptions and are not representative of the circumstances facing access seekers or miners in the Blackwater system. These strategies would not be pursued by a company seeking to maximise its profits.

In addition to the comments provided by CEG, Asciano notes that at the time it entered the Blackwater system in 2007 Asciano was informed by an independent consultant, who was in discussions with QR Network, that the Blackwater system could not accommodate AC electric locomotives due to power and signalling constraints. Consequently Asciano made a twenty year investment decision to invest in diesel locomotives for Blackwater system operations. Asciano note that subsequent to this decision QR National has commenced operating AC electric locomotives in the Blackwater system. This decision to use diesel traction in the Blackwater system was driven by QR Network's operational constraints rather than any overt strategic behaviour.

Asciano believes that in relation to the DAAU the more pertinent issue relating to strategic behaviour is the fact that an integrated above and below rail provider, such as QRN can submit a regulatory document from its below rail subsidiary QR Network that has a direct negative impact on the competitors of its above rail subsidiary QR

⁴ Asciano believes that from a QR Network perspective an operator, whether related to QR Network or not, should be viewed as a customer or consumer rather than a "rival".

National. As a new entrant to the above rail market Asciano has very limited scope to engage in strategic behaviour, however as the natural monopoly infrastructure provider and as the dominant above rail provider QRN has a broad scope through which to engage in strategic behaviour.

The potential for strategic behaviour by QRN would be substantially reduced if QR Network and QR National were not vertically integrated. In particular QR Network would have no strategic reason to submit a DAAU which results in an outcome which strategically benefits its fully related above rail entity while damaging this entity's competitor.

Asciano does not believe that in the future an operator will introduce diesel trains in the Blackwater system with the intent of reducing the utilisation of the electric network and thus increasing electric infrastructure unit prices. Asciano believes that if pricing of infrastructure reflect costs then operators will make what they believe is an efficient traction choice taking these costs onto account. Asciano does not believe that in a competitive market an operator will make an inefficient decision in order to negatively impact a competitor. Such an inefficient decision is only likely to expose the operator that makes the decision to a more efficient new entrant.

Asset Stranding

Asciano notes that while the DAAU is couched in terms of the benefits of electricity vs diesel traction in the context of coal system efficiency the DAAU's fundamentally concern and driver is avoiding the potential for asset stranding to occur to electric assets of the Blackwater network. This is borne out in statements such as:

... having made major investments in expanding the capacity of the electric network with customer and QCA endorsement, QRNN now faces the prospect of uncertainty as to the means by which this investment will be recovered (QR Network Submission page 5)

and

... these amendments will not address the fundamental pricing problem – namely, that QRNN needs to recover the cost of its investment in below rail electrification assets (QR Network Submission section 3.7 page 45)

QR Network and others have re-stated concerns regarding asset stranding. In particular the concerns raised are:

- whether the “tipping point” has been reached in Blackwater where increasing AT₅ tariffs will result in an effective stranding of the electric infrastructure as users choose to move to diesel traction; and
- whether QR Network’s reliance on the Coal Rail Infrastructure Master Plan (CRIMP) to undertake the Blackwater electrification investment should allow it to recover these costs.

The Access Undertaking includes clauses (notably Schedule A clause 1.4) related to asset stranding. The present situation should be considered in the context of these clauses. Given QR Networks DAAU provides for material changes to cost recovery it prima facie implies that from QR Network’s viewpoint a “tipping point” is a realistic possibility and that there is potential that “*regulated prices on an unoptimised asset would result in further demand decline*” (Schedule A clause 1.4 (b)). Further to this issue, Asciano notes that the September 2012 QR Network Revenue Adjustment submission to the QCA describes that the Blackwater system recorded an over recovery of the AT₅ component (electric gross tonne kilometres were 8% above the regulatory forecast.) Given this recent over recovery Asciano believes that factors other than a tipping point may be the driving QR Networks DAAU submission.

Asciano does not believe that the CRIMP process allows QR Network to avoid any optimisation test, so while consideration of CRIMP issues may be relevant to some extent they are unlikely to change the outcome of any optimisation test.

In relation to the CRIMP process Asciano understands that the Coal Rail Infrastructure Master Plan stated (QR Network Access Coal Rail Infrastructure Master Plan 2007 page 91)

The electrification decision is contingent upon the resolution of the following commercial dilemmas:

- 1. QR Network Access should not further electrify the network if it cannot be sure that the operator(s) will use electric traction thereon*
- 2. The operators should not buy only electric locomotives if they cannot be sure the coal network will be fully electrified*

Thus the issue of further Blackwater electrification was recognised as being problematic by QR Network in 2007 and it seems that the position was that further electrification should not occur if operators had the option of using diesel traction. The current DAAU seems to be an attempt by QR Network to meet the criteria in point 1 of the quote above after the event.

Solutions

Asciano notes that in submissions some stakeholders provided potential solutions to the issues identified in the DAAU process.

The QR Network (QR Network submission section 3.7 page 45) recognises that using the AT_2 incremental capacity charge and AT_2 congestion multiplier may be part of a solution but that they do not address QR Network's fundamental concern of cost recovery of electrification assets. Asciano supports an increased use of the congestion multiplier as this process will in affect require less efficient trains to pay a higher access charge regardless of whether they are diesel traction or electric traction. This approach sends an appropriate price signal as trains which incur increased costs to the system are required to pay a higher access charge.

The QR Network expert Sapere also proposes a solution at attachment D of the QR network submission. This solution focuses on reducing the AT_5 tariff to promote electric traction. The Sapere proposal effectively reduces prices for electric traction users, with the price reduction being funded by diesel traction users. Asciano opposes this pricing approach as it is economically inefficient as prices are cost reflective. Asciano believes that an electric traction pricing approach which reduces prices for electric traction users, with the price reduction being funded by future electric traction users, meets the efficiency criteria and removes any diesel to electric cross subsidy.

A detailed response by CEG to the Sapere report and its proposed solution is contained in Attachment 2 of this submission.

ATTACHMENT 2 – PAPER BY CEG – COMMENT ON EXPERTS REPORTS PREPARED FOR QR NATIONAL AND QR NETWORK



COMPETITION
ECONOMISTS
GROUP

Recovery of QR Network Electric Investments

A REPORT FOR ASCIANO

November 2012

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A Report for Asciano



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1 Introduction and Summary

1. I have been asked by Asciano to review the economic logic of three expert reports prepared for QR Network in support of the pricing proposal contained in its *Electric Traction Draft Amending Access Undertaking* (“DAAU”). These reports are:
 - a report by Sapere Research Group: *Cost Recovery Options for Electric Infrastructure - Discussion Paper to QR Network*, 25 September 2012 (hereafter: the “Sapere report”);
 - a report by Ergas, Robson and Owen, *Economic Aspects of Electric Traction Charges, Paper prepared for QR National*, September 2012 (hereafter: the “Ergas report”); and
 - a report by NERA Economic Consulting: *Economic Aspects of the QCA’s Draft Decision on QRNN’s DAAU, QR National Network*, 25 September 2012 (hereafter: the “NERA report”).
2. The remaining structure of this report is as follows.
3. Section 2 discusses the circumstances in which full economic cost recovery can, and cannot, be achieved without a cross-subsidy. This builds on the analysis in section 3.2.3 of my April report, in which I explained why, given the nature of the ‘problem’ described by QR Network, the ‘first best’ solution was not a cross-subsidy but, rather, a more back-ended profile of cost recovery from electric customers.
4. In section 2 I explain why the only basis for imposing a cross-subsidy is if the original investment is *ex post* inefficient (i.e., the present value of future willingness to pay for electric traction is less than the present value of all costs incurred in providing it). I argue that:
 - if that is indeed the reason that QR National and its advisors are proposing a cross-subsidy, then this should be made explicit, because it has a bearing on the assessment of the proposal. For example, much of the analysis in my report is only relevant if the investment was *ex post* efficiently incurred; and
 - if, on the other hand, QR National and its advisors believe the investment to be *ex post* efficient – which I understand is the case – then, rather than forcing diesel customers to subsidise the costs of electric traction, they should instead be proposing a different profile of cost recovery from electric traction customers.
5. In section 3 I apply the general principles set out in section 2 to the analysis and conclusions set out in the Sapere report. I demonstrate that Sapere’s methodology for estimating the size of the cross-subsidy required only gives rise to a positive estimate if the investment is *ex post* inefficient. If the investment is *ex post* efficient then the

Sapere methodology for estimating the cross subsidy would estimate a zero cross-subsidy required.

6. In section 4 I critique various contentions advanced in the NERA and Ergas reports, where they seek to establish that a cross-subsidy is required to address market failures said to arise from strategic behaviour and/or coordination failure. I show that, in all cases, the assertions are predicated on assumptions that bear no resemblance to the operation of traction services in the Blackwater system, or require one to believe that the parties in question will act in ways that are contrary to their own self interests. I illustrate that, when more sensible assumptions are employed, the conclusions contained in these reports are reversed.
7. Section 5 summarises my principal conclusions.

2 Pricing an Efficient Investment

8. Before providing specific comments on the expert reports, it is useful to describe the difference between the efficient pricing of:
 - an efficiently incurred sunk investment; and
 - an inefficiently incurred sunk investment.
9. This distinction is blurred in all three expert reports. However, it is potentially relevant to the way in which QCA deals with the alleged problem; namely, the difficulty QR Network's contends that it has recovering the cost of its investment in electric infrastructure in the Blackwater system. It is therefore important to maintain a crisp distinction between these two different sets of circumstances.
10. For that reason, in what follows I discuss different implications for access pricing depending on whether the investment has been efficiently incurred or not based on economic principles. Unless otherwise specified, when I refer to the efficiency of an investment I am referring to *ex post* efficiency, not *ex ante* efficiency, the distinction being:
 - *Ex ante* efficiency refers to a situation where, at the time a decision was made, the best available information suggested that the net present value of benefits associated with the investment exceeded the net benefits available from not proceeding (or, strictly speaking, with any other option).
 - *Ex post* efficiency refers to a situation where, once the investment has been made, these *ex ante* expectations are realised, i.e., the actual circumstances are consistent with those forecast. This requires, at a minimum, that the investment has a higher present value of benefits than of costs – including sunk costs.¹
11. If a sunk investment is (*ex post*) efficient then, by definition, the present value of what customers are willing to pay for using the service provided by means of that investment will exceed the total costs of providing it – including recovery of any sunk costs. In other words, an efficient investment can 'pay for itself', including its sunk costs, without having to source funds from customers buying other products or services. It is financially viable without a cross-subsidy – at any stage in the asset's life. All that is required is that prices (cost recovery) follow a time profile that is consistent with the time profile of demand for the service.

¹ This is a minimum requirement because, even if it is true, the investment may not have been efficiently incurred. This may be the case, for example, if the present value of benefits less expenditures would have been maximised by a later investment rather than an earlier investment.

12. Attempting to recover more than customers are willing to pay in any given year can drive down utilisation and make an *ex post* efficient investment fail. However, the solution to this problem is to better allocate cost recovery through time – not to impose a cross-subsidy.
13. If a sunk investment is *ex post* inefficient, then the present value of what customers are prepared to pay for using the asset will be less than the total cost of providing it – including sunk costs. In these circumstances, there is no time profile of cost recovery that will illicit sufficient demand to fully pay for the assets. The only way that the costs associated with the investment can be recovered is if funds are found from elsewhere, i.e., through a cross-subsidy. This is a defining, uncontroversial characteristic of *ex post* inefficient investments. If a cross-subsidy is needed to provide a commercial return, this shows that, with the benefit of hindsight, it was not prudent to make the investment in the first place.
14. It follows that, unless QR Network’s investment in electrification of Blackwater is *ex post* inefficient, there must be some profile of cost recovery under which QR Networks can recover all of its costs – including its sunk costs – from the users of that infrastructure, without smearing those costs across other categories of users. For example, if the investment is *ex post* efficient, it is conceivable that QR Network might nonetheless be struggling to recover its costs if the initial prices it is charging its electric customers are too high and this is limiting demand.
15. Indeed, it is common for utilisation of a new infrastructure asset to be relatively low in the period immediately following its completion. The orthodox solution to this problem is to keep prices for that new infrastructure relatively low at first, and to ramp up recovery over time as demand increases. Put another way, it is common to ‘back-end’ the recovery of costs of efficient investments. In this way, the recovery of sunk costs can initially be modest (perhaps zero), but grows over time as utilisation increases.
16. The mere fact that an asset is not initially able to recover, say, straight line depreciation of its sunk investments is not a justification for imposing a cross-subsidy – certainly not until alternative cost recovery profiles have been considered. Of course, there is a limit to the extent to which a business can back-end a recovery profile by reducing prices in the early years of an asset’s life. Specifically, the lowest level of cost recovery in the first years of the investment’s life that is also consistent with it having been efficiently incurred is:

$$\begin{array}{l} \text{Lowest initial cost recovery} \\ \text{consistent with an efficiently} \\ \text{incurred sunk investment} \end{array} = \begin{array}{l} \text{Time value of} \\ \text{money on sunk} \\ \text{investment} \end{array} + \begin{array}{l} \text{O\&M costs associated with} \\ \text{maintaining the service} \\ \text{potential of that asset} \end{array}$$

17. In its simplest terms, this involves setting initial prices so as to only recover short-run operating and interest costs, without any return of (depreciation) or on the asset. If a business sets its prices at this level and *still* cannot attract enough

customers to allow the sunk cost to be recovered over the life of the asset then, the investment either should not have been made (with the benefit of hindsight), or should have been made at a different time or in different circumstances.²

18. If we accept the fact an investment has been made and is now sunk then, from this narrow perspective, the price that will best promote allocative efficiency is equal to the asset's running costs. This is because some investments, once sunk, are unavoidable and the only imposts that can be avoided are the running/maintenance expenses. In this sense, if we send a price signal to users based solely on the avoidable running/maintenance costs of the asset, then this gives customers the signal to use that asset if they value it more than the (avoidable) costs of making it available to them.
19. Of course, pricing on the basis of avoidable costs leaves sunk costs unrecovered and these costs must be borne by some party. If they are borne by users of other services through a cross-subsidy then the effect is to raise the margin above marginal cost paid by these users (i.e., to damage allocative efficiency in the consumption of those services).
20. It is this latter concept of efficiency that the expert reports I have been asked to review have focussed on, i.e., efficient outcomes given that the sunk cost have already been incurred (efficiently or otherwise). Those reports deal with a perceived problem that recovering the sunk assets from customers may lead to the asset not being used (the so-called 'allocative efficiency' problem). However, in so doing, they do not appear to appreciate (or simply do not acknowledge) that:
 - if the sunk asset was *ex post* efficiently incurred the 'first-best' solution to the problem does not involve imposing a cross-subsidy. Imposing a cross-subsidy just increases the margin above avoidable costs paid by users of the other services funding the subsidy. Rather, the logical step is to change the profile of cost recovery, so that low initial prices attract high utilisation and cost recovery of the sunk asset (from electric customers) is back-ended;
 - if the above solution is not possible then this implies that the investment was not *ex post* efficiently incurred – which would raise other questions about what/whether a cross-subsidy was appropriate to fund it.
21. I note that neither QR Network nor its advisors appear to suggest that the investment in electrification was inefficient. If anything, they suggest the opposite. It is certainly not explicitly identified as the motivation for the pricing proposal. For this reason, in this report I have limited my opinion to whether a cross-subsidy is

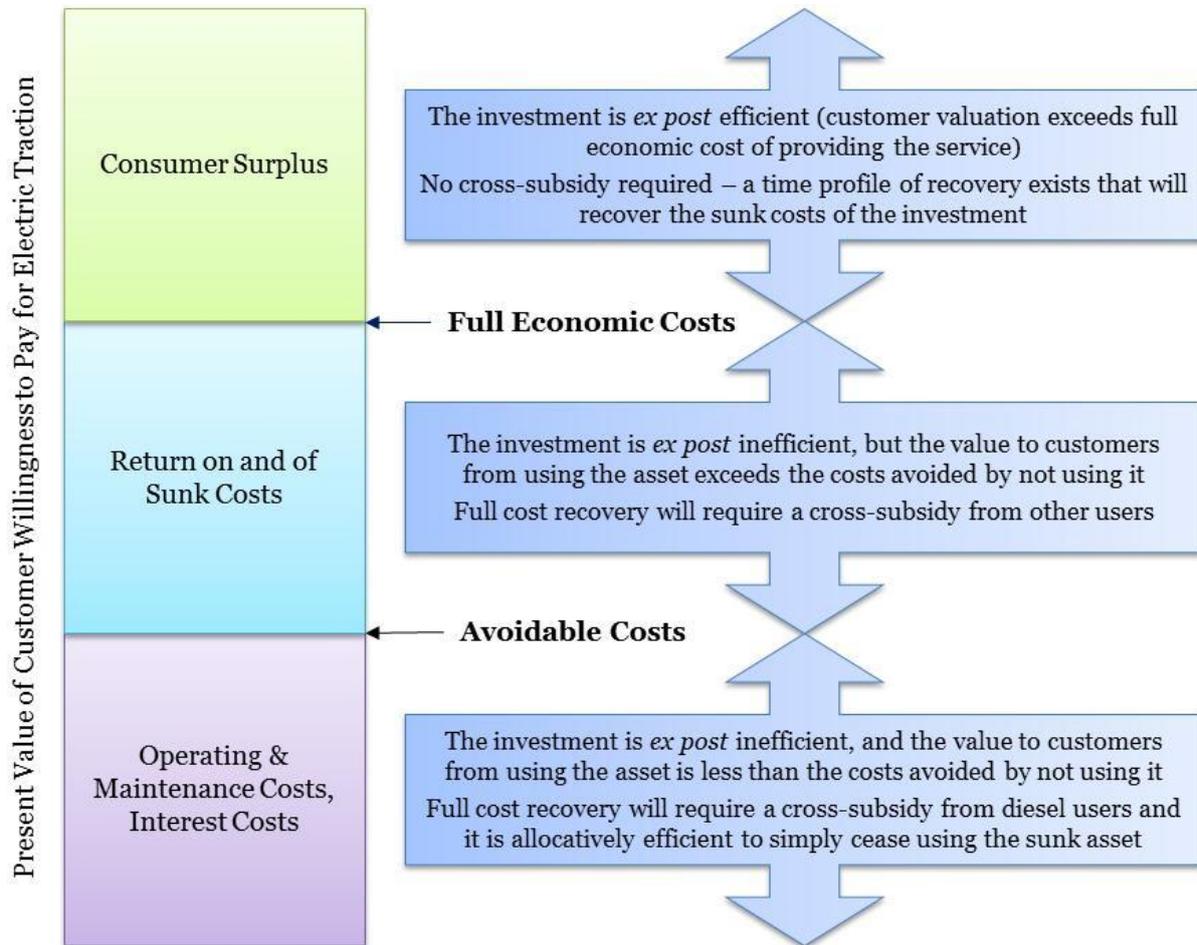
² The reason that an efficiently incurred investment must be able to recover at least the above costs in its earliest years is that, if customers are unwilling to pay even this for the service, then it would have been more efficient to delay the introduction of the service until customers were willing to pay these costs. Doing so would avoid the time value of money and the operating and maintenance costs on the asset in those years.

appropriate, assuming that the investment was efficiently incurred (which is how QR Network and its advisors appear to view the electrification).

22. As a result, I express no opinion on whether a cross-subsidy is appropriate if the investment has been (*ex post*) inefficiently incurred. Unless or until it is agreed that this is the case there is, in my view, no need to consider which parties should bear the cost of this *ex post* inefficiency. I note that such questions would raise a myriad of issues that I have not been asked to address in this report.
23. With that qualification, for the reasons I set out in my earlier report, I remain of the view that there is no sound economic reason to force diesel users to cross subsidise the prices paid by customers of electric traction. The orthodox solution to low initial utilisation is to reduce the prices paid by electric traction customers to stimulate demand, and to then recover a greater proportion of the sunk costs later in the asset's life, i.e., by back-ending the recovery profile.
24. This achieves the same basic objective – lowering the price of electric traction to boost up-take – but in a way that does not entail the potential distortionary effects of a cross-subsidy. Even if there is some uncertainty about whether the investment has been efficiently incurred, a more back-loaded profile of cost recovery should be implemented first. A cross-subsidy should only be considered, if at all, when it becomes apparent that there is no future profile of cost recovery that will fully recover the sunk value of the electric assets.³
25. The various possibilities are summarised in the below graphic.

³ QR Network has not established that is the case and, even if it did, this gives rise to a raft of other considerations that it has not canvassed in its submissions or the supporting expert reports, including whether it should be permitted to recover the costs of that inefficient investment (as noted above, I have also not considered these matters).

Figure 1: Summary of Possible Scenarios



Source: CEG analysis. Note that it should not be inferred that, in the blue and green portions of the valuation, it is efficient to have 100% electric utilisation. Rather, in these portions of the graphic, it is simply not efficient to decommission the electric assets.

26. I consider that it is important to frame the consideration of the pertinent issues with the above analysis in mind. There appears to be some conflation of these concepts in QR Network’s submissions and in the three expert report reports I have been asked to review. The arguments are presented as:

- a presumption that it is efficient to *use* the assets⁴ (with the inference but not the clear statement that this means that it was efficient to *build* them in the first place); and

⁴ QR Network’s cost benefit analysis does not include the sunk costs of electrification. This is consistent with the test being whether it is efficient to use the assets once built – not whether it was efficient to build the assets. I also note that the inclusion of break costs with Powerlink as a cost of not using the assets results in a ‘transfer’ being included the cost benefit analysis (CBA). In other words, the CBA is not estimating whether continuing to use the assets is economically efficient from the perspective of society but, rather from the perspective of QR Network. This is because the value received by Queensland

- a presumption that ‘average cost pricing’ will prevent the efficient use of the assets. Importantly, a conspicuous shortcoming in each of the three expert reports that I have examined is that this presumption is not combined with any consideration:
 - of altering the time profile of cost recovery as an alternative to enforcing a cross-subsidy (i.e., it may be that the alleged inefficient utilisation is a symptom of a problem with the time profile of average cost pricing, rather than average cost pricing itself); and
 - if cost recovery is not possible with a more back-ended revenue profile, what that finding implies about the efficiency of the initial investment.
- 27. The inability (or unwillingness) of the authors to consider ‘solutions’ beyond the cross-subsidisation strategy proposed by QR Network means that, in my opinion, their respective endorsements of that proposal carry much less significance than if they had contemplated alternative cost recovery profiles
- 28. If, as I understand is the case, QR Network believes that its investment was (*ex post*) efficiently incurred then its proposed pricing solution is targeted at solving the wrong problem. If there is sufficient present value of demand for the service to recover its costs through time then the focus should be on identifying the time profile of prices (cost recovery) that matches this demand. In my opinion, any proponent of a cross-subsidy should be required to articulate why a cross-subsidy is a better solution.

citizens, the ultimate owners of Powerlink, from break costs is excluded from the ‘benefits’ side of the CBA, but the costs of paying those costs are included in the ‘costs’ side of that calculus

3 Sapere Report

29. The Sapere report is generally clear and the analysis is presented in a transparent fashion with the various assumptions articulated explicitly in most cases. However, the instructions that Sapere was asked to comply with artificially limit the scope of the solutions that it was required to consider. For example, it was instructed to assume:⁵

“...that the point had already been reached by UT3 where a full cost recovering level of AT5 would make electric traction uncompetitive with diesel traction. The tipping point in diesel penetration has already been reached. If nothing is done to rectify the situation then electric traction, which has the potential to be the least cost supply option, could be driven out of the market.”

30. Sapere does not define what is meant by ‘full cost recovery of AT5’ in these instructions. They could be interpreted to mean either:
- a. that there is no profile for cost recovery that is capable of fully recovering the cost of the electric assets; or
 - b. that an (artificial) regulatory definition of full cost recovery (involving straight line depreciation of the sunk assets) results in a profile of cost recovery that gives rise to a ‘tipping point’.
31. If the former is the correct interpretation then, in effect, Sapere is being asked to assume that the initial investment was inefficiently made. If that is the case, then the only way that QR Network can recover 100% of its investment costs is through a cross-subsidy from non-electric users. However as I noted above, if the investment was inefficiently incurred this raises a host of other considerations that have not been broached in any detail throughout the consultation upon the DAAU.
32. If the second is the correct interpretation then, for the reasons I set out in section two, the problem is the profile of cost recovery imposed by regulation. This can (and should) be addressed by a different, more back-ended profile of cost recovery. There is no need to force non-electric customers to subsidise the prices paid by electric customers and doing so risks imposing unnecessary distortions.
33. Throughout *most* of its report Sapere appears to have assumed that a cross-subsidy is required to achieve full cost recovery and that full cost recovery in this situation is desirable (recall that this is an altogether separate question). There is nothing necessarily wrong with this chain of logic, per se. However, as I noted above, the analysis suffers nonetheless from its artificially narrow scope.

⁵ Sapere report, p.2.

34. However, in one paragraph of its report, Sapere introduces the concept that the problem preventing full cost recovery is not a general unwillingness of customers to pay the full economic costs, but rather, *historical mispricing of access to the overhead power system*. I reproduce the this paragraph and the two preceding paragraphs below.⁶

*These developments have created a potential cost recovery problem for QR Network's recent investments in the Blackwater electric infrastructure. AT5 is the only currently available tariff element with which to recover the investment cost. Diesel train operators have indicated a reluctance to contribute **to the maintenance** of the overhead power system (AT5) because they do not **currently** use the electric infrastructure. At current levels of diesel penetration in Blackwater, the cost recovery burden on remaining electric traction users is heavy and growing: where a fixed cost is distributed across a potentially increasingly narrow usage base.*

*I am instructed to assume that the point had already been reached by UT3 where **a full cost recovering level of AT5** would make electric traction uncompetitive with diesel traction. The tipping point in diesel penetration has already been reached. If nothing is done to rectify the situation then electric traction, which has the potential to be the least cost supply option, could be driven out of the market.*

It is important to recognise that this problem has come about through the low utilisation of electric traction in Blackwater in the context of significant capital investment, which has come about through matters of historical mispricing of access to the overhead power system and not any fundamental superiority of diesel to electric traction. (Emphasis added)

35. This description of the 'problem' is problematic. Sapere starts by stating that the problem exists due to diesel train operators being unwilling to contribute to the 'maintenance' of the electric infrastructure. That cannot be correct because:
- if it were only the maintenance costs associated with the electric infrastructure that were at issue, then those costs would be avoidable upon decommissioning the electric assets; and
 - if prices set to reflect only maintenance costs were unable to attract sufficient customers, then the efficient outcome is to do precisely that – decommission the assets to avoid incurring those costs.
36. I expect that what Sapere really means by 'maintenance' is maintenance *plus* recovery of a return on and of sunk costs – this seems to be consistent with the

⁶ Sapere report, p.2.

reference to ‘significant capital investment’ in the last paragraph of the quote. Sapere seems to be saying that – for the purposes of this part of its report – the investment was efficient, contending that ‘historical mispricing of access to the overhead power systems’ (presumably too high a level of initial cost recovery) is preventing QR Network from recovering its costs, and is therefore the source of the problem.

37. However, if this is the case then then the orthodox solution is to change the profile of cost recovery (as I suggested above and in section 3.2.3 of my previous report),⁷ not to impose a cross-subsidy. It is not clear why, having identified ‘regulatory mispricing’ as the problem that Sapere does not propose ‘fixing that pricing’ as the obvious solution, e.g., through recalibrating the profile of cost recovery. Instead, in the remainder of its report, Sapere assumes that current and future demand for the assets’ services cannot meet the full cost (including sunk costs) of providing the services.
38. Consistent with this, Sapere proposes a solution that:
- permanently reduces prices for electric customers – creating a funding shortfall in net present value (NPV) terms; and
 - finances the shortfall in present value costs by imposing a charge on all mines (whether their coal is carried on electric trains or not).
39. This means that coal mines that rely on diesel trains to transport coal are subsidising coal mines that rely on electric trains for their transport needs.⁸

⁷ CEG, *QR Proposed Electrics Undertaking Pricing*, A report for Asciano, April 2012.

⁸ Sapere contends that this can conceivably be interpreted as not being a cross-subsidy on the grounds that, even if those coal mines do not use electric trains now, they have the option to use them in the future. However, it acknowledges that there is no basis for believing that the value of this ‘option’ would reflect the charge imposed.

In my opinion, this contention is flawed. Even if no electric infrastructure had been built by QR Network, miners would still have the option of funding the construction of those assets in the future. It is not necessary to build and fund an asset today in order to have the option of using it in the future – the asset can be built and funded at a later date. If the asset is built earlier to serve a subset of customers, then it is this subset that benefits during this initial period – not the customers not using it.

Having said that, if a disproportionate amount of the sunk costs associated with the investment are recovered in the early years when only this subset of customers is using the asset, then this may reduce prices in later years when more customers have started using the infrastructure. –In this circumstance, customers that do not use the asset now can benefit from the ‘option’ of using it in later years at prices that are artificially low due to the ‘front-loaded’ recovery from early users. However, consistent with the principles I set out in section two, this can and should be solved by smoothing out the time profile of cost recovery from electric customers by making sure that future users pay a proportionate share of the recovery of sunk costs. Instead, Sapere’s solution is to inappropriately force all miners to pay for the electric assets now – regardless of whether they are currently using them, or will ever use them.

40. A similar, but cross-subsidy free, solution is:
- to temporarily reduce prices for electric customers – creating a NPV funding shortfall; and
 - to ensure present value cost recovery by allowing future prices for electric customers to increase by a sufficiently compensating amount
41. This is very similar to Sapere’s solution, but achieves the objective of allowing a high level of electric utilisation to evolve without enforcing cross-subsidisation between users of electric and diesel trains. Provided that the investment is *ex post* efficient there is no reason to think that this would not work.
42. Of course, if the problem is that the initial investment was inefficiently incurred then, even if zero prices are offered initially for electric usage, any attempt to precipitate full cost recovery in the future (including recovery of foregone returns on investment) will not succeed because customers will simply switch to diesel traction at that later date.
43. In this scenario the problem is not insufficient early take-up of electric haulage. Rather, the problem is that there is no future profile of cost recovery that will not drive customers back to diesel, because the benefits of electrification are less than the avoidable and sunk costs incurred in providing it.

3.1 Sapere Worked Example

44. The worked example in section 4 of the Sapere report can assist in illustrating the above points. That example assumes:
- i. that the total (post expansion) cost of electrified assets (including a return on and of sunk assets) is the equivalent \$30m pa; and
 - ii. that if the maximum feasible utilisation of the electric assets was achieved the unit price would be \$1.20/’000 gtk. This is the \$30m pa costs of the electric assets divided by the total haulage on the network (25bn gtk) – i.e., the price if 100% of the tonnes carried were hauled by electric locomotives;
 - iii. at this price only 15bn gtk pa will be hauled by electric locomotives – such that only \$18m pa will be recovered on the electric tariff. The remaining 10bn gtk will continue to be hauled using diesel; and
 - iv. the remaining \$12m pa (\$30m-\$18m) will be recovered in lump sum annuities charged directly to all miners (irrespective of their usage of the electric assets).
45. It is the third assumption here that is most instructive. It states that, even if the price is set consistent with 100% utilisation of the electric assets the actual utilisation rate will be 60%. This means that, even when the assets are priced at the

lowest possible level associated with full cost recovery, the demand for the assets is insufficient to recover total costs.

46. If this is the case then the problem is neither a ‘regulatory pricing problem’,⁹ nor a ‘coordination problem’¹⁰ nor a ‘strategic conduct problem’.¹¹ The only explanation for the lack of utilisation at these prices is that the investment was not efficient. If not enough customers value the services sufficiently highly to pay for them, even when prices are set to reflect the hypothetical scenario in which every customer is assumed to procure the service then, in retrospect, the asset should not have been built.
47. If the investment was *ex post* efficient then Sapere would not need the fourth step (the cross-subsidy) because implementing the third step (full utilisation pricing) would be sufficient to bring about demand consistent with full utilisation. The sunk costs could then be recovered later in the asset’s life once demand had increased.
48. I also note that the Sapere example applies a simplifying assumption that there is only one ‘full utilisation’ price (\$1.20/’000 egtk) and that this is applied in all future years. In reality, there are many full utilisation prices in any given year - each consistent with a different profile of recovery of sunk costs across future years.
49. For example, imagine the \$30m pa cost in Sapere’s example is made up of \$15m related to recovery of sunk costs and \$15m related to recovery of other costs. One possible initial price, associated with zero initial recovery of sunk costs, would be \$0.60/’000 egtk. This price would need to rise overtime to settle at a level above \$1.20 if the present value of total revenues was to be the same.

⁹ The regulator has set unit prices at the lowest conceivable level (associated with 100% utilisation). This is lower than the level associated with actual utilisation. This cannot be the cause of the lack of demand.

¹⁰ There is no failure to coordinate leading to prices higher than those associated with 100% utilisation, because prices have been set at the level consistent with that level of demand.

¹¹ There is no ‘strategic conduct’ leading to prices higher than those associated with 100% utilisation, because prices have been set at the level consistent with that level of usage.

4 The NERA and Ergas Reports

50. Many of the points that I have made hitherto apply equally to the NERA and Ergas reports. Neither report provides any clear explanation of the ‘problem’ they perceive to be preventing full utilisation of the electric infrastructure. In consequence, they give no consideration whatsoever to any potential ‘solution’ other than that advocated by QR Network including, most notably, changing the time-profile of cost recovery.
51. Like the Sapere report, because the NERA and Ergas reports do not contemplate solutions other than the proposed cross-subsidy, the analysis they contain offers no real insight into the merits of QR Network’s proposal. However, unlike the Sapere report, NERA and Ergas et al also contend that if QR Network’s pricing proposal is not implemented:
- diesel users may engage in strategic conduct aimed at increasing the costs of users of electric traction; or
 - a coordination failure will lead to inefficiently low utilisation of the electric assets.
52. It is the supposed potential for these factors as the source of the ‘problem’ that I deal with here. I deal first with the NERA report, since the analysis contained therein can assist in highlighting shortcomings in the material presented in the Ergas report.

4.1 NERA Report

53. NERA correctly identifies the fact that any analysis of strategic behaviour must focus on miners. It is miners who sign contracts with train operators and they ultimately have the power to specify a traction technology if they believe it is likely to involve lower costs. Their incentives are therefore relevant to any assessment of the potential for strategic conduct.
54. The NERA report contends that miners could act strategically to raise other miners’ costs:¹²

These coordination difficulties are exacerbated by the incentives mining firms and train operators may have to increase their rivals’ costs. For example, by opting out of electric traction, miners using diesel traction are able to increase the proportion of costs that will be borne by their electricity-using rivals.

¹² NERA report, p.15.

55. The above two sentences represent the entirety of NERA’s analysis of this alleged strategy. In my opinion, this perfunctory exposition does not articulate a coherent form of strategic conduct. The most obvious problem with the postulated behaviour is that just because a firm may be able to increase the costs that will be borne by some competitors does not, in and of itself, provide it with an incentive to do so – particularly if it imposes additional costs on its own business.
56. Firms are motivated by profits, and will only have an incentive to act in ways that raises their rivals’ costs if doing so is advantageous to their own bottom lines. In this particular instance, in order for the conduct contemplated by NERA to have an impact upon the protagonist’s profits, that behaviour would need to affect the price of coal. This would require a chain of events along the following lines:
- a individual miner (or perhaps a group of miners acting collectively) acts strategically to raise other miners’ costs (in part by raising its own); and
 - as a result, the price of coal in the downstream market increases (by more than the protagonists’ unit costs) and the protagonist benefits from higher profits.
57. However, the notion that raising the costs of electric traction in Blackwater could have a material effect on the price of coal in the world market is rather far-fetched. The Blackwater system accounts for a relatively small proportion of total Australian coal exports, an even smaller slice of global consumption and is likely to be ‘infra-marginal’ in nature. Any impact on the cost of electric traction in the Blackwater system is therefore unlikely to have a discernible effect on the world price.
58. In the highly unlikely event that it did, it would have to increase the world price by more than it raised the protagonists’ costs. In light of the fact that the protagonist’s costs will be determined by diesel costs (as the alleged strategic conduct is running diesel trains) and, given that the other miners can also switch to diesel trains, it is simply untenable that the impact on the world price could be more than the impact on the protagonist’s costs. This is true even under the extreme assumption that costs in the Blackwater system determine the world price.
59. Of course, if Blackwater costs do not determine world prices then the protagonists will have higher costs and the same revenues – leading to lower profits. That is, the ‘strategic’ action would be self-defeating.
60. NERA also considers strategic action by an access seeker¹³ as opposed to a miner. NERA’s analysis of an access seeker acting ‘strategically’ in a manner that raises *all* miners’ costs (e.g., by preventing the uptake of the most efficient traction technology) is similarly conspicuous in its brevity. If one accepts that the world coal price is not going to increase by the increase in the costs of rail haulage in Blackwater, then the net effect of this conduct would be that all miners lose, i.e.,

¹³ An access seeker that, if it is Pacific National, I understand, has a market share of only around 20%.

costs are higher across the board but prices are not commensurately higher (and the far more likely outcome is that coal prices do not increase at all).

61. This begs the question: given that Pacific National (or any other new access seeker) would need to contract with at least some miners to execute such a strategy, why would any miner agree to do so? Why would a miner agree to engage in conduct that would only hurt its business and every other industry participant? The NERA report simply states that:¹⁴

Similarly, train operators purchasing electric locomotives for use over a 30 year period leave themselves open to the risk that electric traction may become more expensive and hence less attractive. This prospect is exacerbated by the incentives of train operators to increase their rivals' costs. A train operator may be able to increase the use of diesel trains by purchasing these trains. As a result, mining firms would be more likely to choose diesel traction which may lead to the stranding of electric locomotives.

62. This passage does not provide nearly enough analysis to establish a bona-fide problem, and makes no attempt to provide any answers to the fundamental questions I posed above. The repeated use of the word 'may' in the paragraph also serves to reinforce the conclusion that the outcomes being postulated are purely speculative.
63. In my opinion, the proposition that any mining firm would be complicit in raising its own costs borders on the absurd. Nonetheless, the paragraph appears to repeatedly contemplate parties engaging in precisely this type of self-injurious behaviour. For example:
- the penultimate sentence appears to suggest that a train operator might buy a diesel train despite it being common knowledge that electric traction will be lower cost – that is on its face illogical; and
 - the last sentence suggests that, once the train operator has bought the diesel trains, a mining firm will 'be more likely to choose diesel traction' – but if electric traction is lower cost, then why would the mining firm not specify this cheaper alternative? A profit maximising business does not agree to pay higher prices if that can be avoided. If the miners will not pay higher prices for an inferior technology, how would the train operator gain from buying the inferior technology?
64. Moreover, if a train operator purchased diesel trains and then refused to offer anything else, a mining firm is unlikely simply to acquiesce to that ultimatum. It

¹⁴ NERA report, p.16.

would presumably obtain electric traction from another operator – and at a lower cost if electric traction is the cheaper technology.

65. In fact, in order for the access seeker behaving strategically to sell the (allegedly) less efficient diesel traction technology they would presumably have to offer a price that was below not only their own (higher) cost but below the cost of the most efficient electric traction, i.e., it would be consciously forsaking the higher profits that it could otherwise make and, potentially, incurring losses. The NERA report provides no explanation as to why the competitive dynamic of rail operators in the Blackwater system would differ from those described by me.
66. The above is true even if electric traction requires scale to be lower cost than diesel. If that is the case, then all an ‘electric-only’ operator has to do to attain that cost advantage is to set prices on the basis of those lower costs. Those low prices should attract patronage and, as utilisation increases and scale economies are obtained, lower costs will be realised. In other words, prices can be set in such a way that achieving lower costs becomes a ‘self-fulfilling prophecy’. It follows that if diesel traction is truly higher cost, then buying diesel trains bestows a cost *advantage* on electric traction operators, not the opposite.
67. Finally, the NERA report includes a discussion of behaviour that is described as ‘strategic’ in nature, but which is more accurately characterised as a reaction to poor price signals. What NERA describes is a thoroughly unremarkable problem that often affects infrastructure providers in the years immediately following a new lumpy investment:¹⁵

Furthermore, by not committing to electric traction now, a mining firm is able to avoid the potentially higher short-term costs imposed by the AT5 tariff, when total tonnage carried by electric traction is lower, and opt into electric traction later once the future AT5 tariff has fallen. Such an approach effectively allows a miner to ‘free-ride’ by forcing other users to incur a greater proportion of the capital costs of electric traction in the early years.

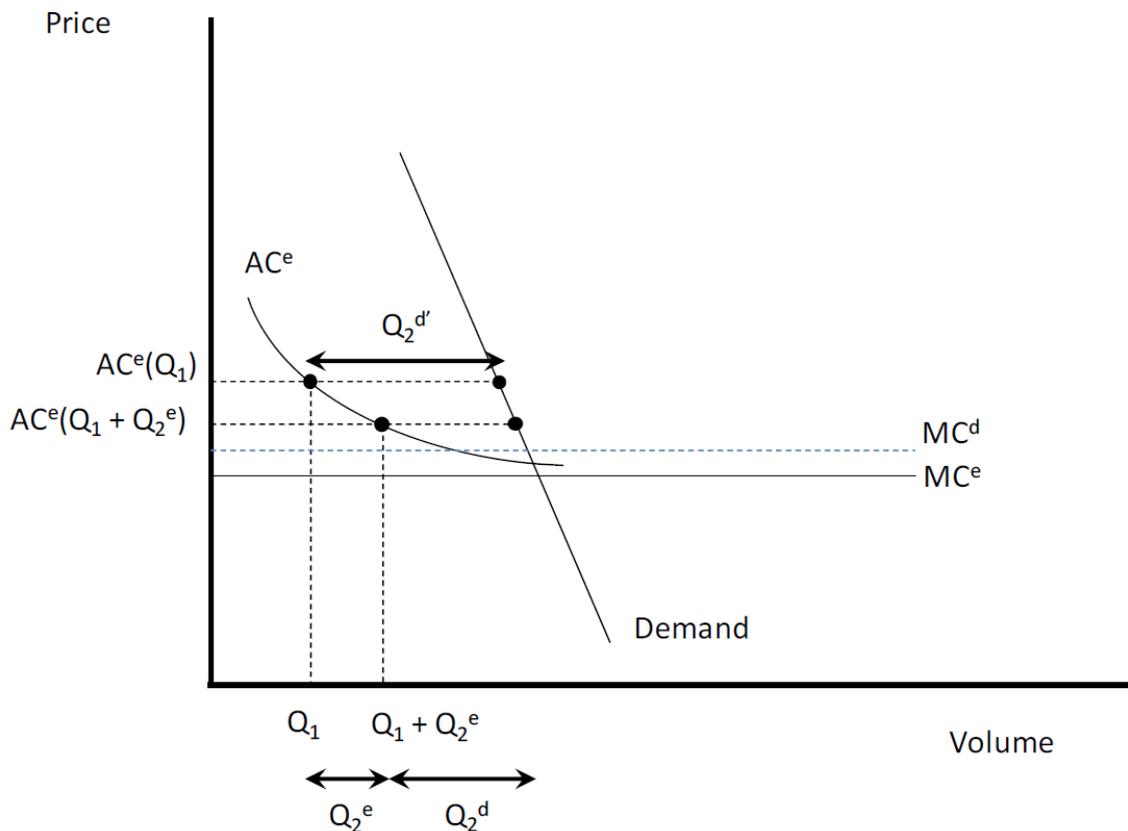
68. The problem described here is plausible; but it is not strategic conduct. Rather, it is the familiar phenomenon I have described in several places in this report in which users are discouraged from using infrastructure in the early years of an asset’s life because the price for it is set too high. If this problem exists, it is caused because the time profile of cost recovery attempts to recoup too much of the initial sunk costs in the early years of the assets’ lives. It is not accurate to characterise the ‘problem’ as strategic conduct or the ‘solution’ as a cross-subsidy. . Rather, as I explained above, the more principled approach to addressing any such issue is to change the time profile of cost recovery so that it is more back-loaded.

¹⁵ NERA report, p. 16.

4.2 Ergas Report

69. The Ergas report provides a stylised model that purports to demonstrate that strategic behaviour by an access seeker is possible. The example centres around the cost and demand diagram on page 4 of the report (which is not labelled, but which I will refer to as Figure 2 and which I reproduce below).

Figure 2: Figure on page 4 of the Ergas Report



70. This figure illustrates a declining average cost curve for electric traction (AC^e), which is the by-product of the fixed costs associated with the electric overhead assets at that level of capacity and range of volumes. . The average cost of electric assets asymptotes to the marginal cost of electric traction (MC^e) as the fixed costs of the electric overhead assets are spread over a larger number of users. It is not specified in the above figure, but there are no fixed costs for diesel traction, and so the average cost of diesel traction is equal to the marginal costs of diesel traction ($MC^d=AC^d$). This example is set up so that the most efficient choice of technology is 100% electric traction. This is because the point where the demand curve intersects with AC^e is below (lower cost) the point where it intersects with AC^d (which is the same as MC^d). In other words, the superior efficiency of electric traction is an *assumption* of the model.

71. The market is assumed initially to be in a position that is not the most efficient outcome (based on the aforementioned assumption that electric traction is more efficient). Specifically, Firm 1 (the smallest firm) provides all of its services using electric traction – this is the amount Q_1 in Figure 2. The other (materially larger) Firm 2 provides some of its services using electric traction (Q_2^e) and some of its services using diesel traction (Q_2^d).¹⁶
72. Next, it is assumed in the Ergas report that the market price for traction services is determined by the average costs of electric traction. However, no explanation is offered for why the market price is set by the costs of electric traction and not the cost of diesel. Specifically, no explanation is provided for why the higher average cost technology sets the market price?
73. Perhaps one is meant to assume that the regulator in the example is setting the minimum market price based on the higher average cost technology.¹⁷ Regardless of what was intended, this remains a critical, unexplained assumption that does not withstand scrutiny, since:
- The regulator plays no role in regulating the market price for traction services – it only regulates the monopoly input infrastructure services. Moreover, if a regulator was hypothetically to set a regulated price in the downstream market, it is hardly likely to determine a *minimum* price based on the highest cost technology – that would be perverse.
 - If Ergas et al are not assuming a minimum *regulated* price, but are instead suggesting that the *market* price will be determined by the highest average cost technology, this is equally inconsistent with orthodox economic principles. The customers of traction services are large and sophisticated and would, one

¹⁶ Ergas report, paragraph 15.

¹⁷ See Ergas report, paragraphs 17 and 18. Notably, the Ergas report does not state explicitly that the market price is assumed to always be equal to the average cost of electric traction. However, that is the implication of the first and second sentences in paragraph 17:

“The price of electric is regulated, and is set equal to average cost. At this price, total residual demand is supplied by firm 2 using diesel...”

The first sentence involves an unusual assumption since, as I noted above, the market price of electric traction is not regulated – only the price of the below-rail infrastructure, which is only one input into the above-rail price. The second sentence then says, in effect, that this is the market price and that any diesel traction supplied in the market also receives this price.

Subsequently, paragraph 19 talks about the regulated price (in the traction services market) increasing due to rising electric traction prices.

The net effect of this series of propositions and assumptions is that the model assumes that the market price for both forms of traction is equal to the average cost of electric traction.

presumes, not agree to pay a market price that reflected the highest cost technology.

74. Relying on the implausible assumption that the market price is always based on electric costs, even though diesel costs are lower, Ergas et.al conclude that Firm 1 makes zero economic profits on its sales of electric traction. Similarly, Firm 2 makes zero economic profits on its sales of Q_2^e of electric traction but makes excess profits on its sales of diesel services – the quantity Q_2^d .¹⁸
75. Next, it is assumed that Firm 2 acts strategically by choosing not to use electric traction at all. Firm 1 continues to use electric traction and, *because the Ergas model assumes market prices are based on the average cost of electric traction*, those prices increase from $AC^e(Q_1 + Q_2^e)$ to $AC^e(Q_1)$.¹⁹ This aspect of the analysis exhibits analogous shortcomings to the steps preceding it, including:
 - No explanation is provided for why market prices continue to reflect the now much higher cost electric technology rather than the significantly lower cost diesel technology.
 - No explanation is provided for why Firm 1 does not switch to diesel trains to take advantage of the comparatively lower costs of supply – doing so would be more profitable.
76. Indeed, the optimal action by Firm 1 would also be to ‘act strategically’ and switch all but one of its trains to diesel. This would result in a ‘sky high’ market price (which is assumed to be the electric average cost – which would now be based on recovering 100% of fixed costs from one train) and, thus, large profit would accrue to Firm 1’s diesel trains. In my view, this demonstrates the illogicality of the model put forward. Both firms find it ‘strategic’ to supply mostly diesel not because they are damaging the other one – only because they are taking advantage of what can best be described as a modelling ‘loophole’ which allows market prices to be divorced from the lowest cost technology.
77. The end result in the Ergas model is that Firm 2, having ceased electric sales, now earns higher profits on its sales of diesel traction, which is said to create the incentive for it to strategically cease supplying electric traction.^{20 21}

¹⁸ Ergas report, paragraph 18.

¹⁹ Ergas report, paragraph 19.

²⁰ Ergas report, paragraphs 20-24.

²¹ I note that paragraph 16 of the Ergas report states that the example starts with diesel marginal costs being above electric marginal costs purely for illustration and that the ‘problem’ would be exacerbated the marginal cost of diesel traction was lower than electric costs at this inception point. That cannot possibly be correct. If the marginal costs of diesel traction were lower than the marginal cost of electric traction, then diesel would clearly be the more efficient technology. Why would it be a market failure for

78. Based on the results of this model the Ergas report states that:²²

In short, the QCA errs in suggesting decentralised choice under average cost pricing will result in efficient technology choice. Rather, average cost pricing is not only likely to give rise to the usual choice distortion (in which equilibrium may occur at either a low-cost or a high-cost outcome) but will also create strategic incentives that distort choice further. With a small number of participants in the downstream market, those distortions are more likely.

79. In my view this conclusion is groundless. It is the creature of a series of assumptions that bear no resemblance to the way that markets actually work. The market price for traction would not be set based on the highest cost technology. Equally, if a regulator had jurisdiction and was inclined to set a regulated price, it would not specify a *minimum* price based on the more expensive product. It is equally unreasonable to assume that at least one firm (Firm 1 in the model) will always choose to operate the highest cost electric technology.
80. It is only because of these implausible assumptions that the model predicts that Firm 2 will have an incentive to raise the costs of the more expensive technology even further by engaging in the postulated conduct. If more sensible assumptions are employed that incentive, unsurprisingly, disappears.
81. Specifically, if I instead take the economically orthodox approach and assume that the lowest cost technology (which is widely available to all competitors) sets the price then, initially, the market price is based on the cost of diesel (not electric) traction, since it has the lower average cost (which is also equal to its marginal cost due to the absence of fixed costs in this model). It follows that, to begin with, both Firm 1 and Firm 2 are losing money on their sales of electric traction. Another way of thinking about this is that miners are (quite understandably) insisting that they pay for their traction services based on the lowest cost technology available.
82. Of course, this is not a sustainable situation because the firms cannot make losses on their electric sales in perpetuity, i.e., it represents ‘disequilibrium’. There are only two plausible long-term equilibrium outcomes in which both Firm 1 and Firm 2 are making zero economic profits (i.e., covering their marginal costs and a risk-adjusted return on capital, and no more): 100% diesel supply or 100% electric supply. Assuming no coordination failure (discussed below), the market will end up at 100% electric traction. This is because all parties - including the miners – will look at Figure 1 and conclude that the lowest potential cost technology is electric

a technology with lower marginal costs and lower (zero) fixed costs to succeed? That is precisely the outcome that one would hope to observe in a well-functioning market.

²² Ergas report, paragraph 25.

traction. Recognising this inevitability, Firm 2 will convert its diesel fleet to electric traction (potentially at the insistence of its customers).

83. Firm 2 has no interest in converting its fleet to 100% diesel traction because, if it does this and somehow successfully transitions its final customers from electric to diesel, Firm 1 will follow suit and the end result will still be zero economic profits. This is what happens when it is assumed the downstream market is workably competitive and market participants face normal market forces. The dynamics assumed to be at work in the Ergas report and that result in the continued use of the highest cost technology represent a stark departure from this orthodox model of workable competition.
84. There are therefore no benefits to Firm 2 from acting ‘strategically’ and shifting its electric customers to diesel. Moreover, if its final customers are sophisticated and can understand the cost curves in Figure 2, they can be expected to demand 100% electric traction because, based on the parameters in the model, this will reduce their costs. If Firm 2 pursued this course of action nonetheless, it would run the risk of its customers demanding that it desist or, worse, switching their business to Firm 1.

4.3 Coordination Failure

85. In the previous section I explained why there is no scope for strategic conduct to bring about market failure in the Ergas model once more reasonable assumptions are adopted. However, it is conceivable – at least as a matter of principle – that the market may not reach that point as a result of a coordination failure.
86. This could happen if, say, Firm 2 did not replace its initial diesel traction (Q_2^d) with electric traction because it was afraid that, at the same time it was moving to 100% electric traction, Firm 1 would, for some reason, think that it was actually doing the opposite (i.e., replacing the quantity Q_2^e with diesel traction) and act upon that mistaken belief (by replacing electric trains with diesel trains). Anticipating this error on the part of its competitor, Firm 2²³ might therefore choose to replace electric traction with diesel traction.
87. However, the prospect of this type of coordination failure arising in this particular context seems extremely remote, given the market participants and the nature of the product in question. The market is characterised by two large competitors, a small number of mining customers, long procurement times for traction choices and a limited number of train suppliers. It is hard to imagine that a firm could switch its traction technology without the other learning about it in short order. It is therefore

²³ If Firm 1 wrongly believed that Firm 2 was replacing electric trains with diesel trains and itself replaced electric with diesel, while Firm 2 actually did the opposite, then Firm 2 would be left with the highest cost technology.

highly unlikely that coordination failures would preclude the most efficient technology from being adopted.

88. Indeed, when the Ergas report postulates coordination failure it does so in a context that is completely divorced from the circumstances of the Blackwater network.²⁴ It implicitly assumes that there are so many agents whose decisions must be coordinated that efficient outcomes can be stymied. In this hypothetical market, the globally efficient local equilibrium is not necessarily achieved because the individual players cannot coordinate their conduct so as to achieve it.
89. It is correct that, in a market that exhibited these particular characteristics, including a large number of players whose conduct must be coordinated, that such an outcome is conceivable. However, as I noted earlier, the Blackwater system bears little resemblance to the circumstances assumed in the Ergas report and this phenomena is simply not a plausible explanation for the less than 100% take-up of electric traction. In my opinion, it is implausible to suggest that the small number of sophisticated buyers and sellers in the Blackwater system could have been privy to a coordination failure of this kind.
90. Consider, for a moment the role of QR Network in its capacity as the monopoly infrastructure provider. How would it rationally respond to the situation contemplated in Figure 2 above if there was a real risk that, through coordination failure, it would end up with its electric assets stranded? The answer is simple. It would set the price for electric traction services ‘as if’ there was 100% utilisation by electric trains.
91. At this price, an access seeker will have a lower marginal cost and a lower average cost if it chooses electric traction rather than diesel traction. Any access seeker who did not choose electric traction would end up with higher costs than its competitors. No rational access seeker would choose diesel traction in these circumstances.
92. In other words, if there really was the potential for coordination failures, QR Network could solve that problem itself simply by pricing electric traction ‘as if’ there was high utilisation. There is, again, no need to impose a cross-subsidy on diesel customers to address any nascent coordination problems. Moreover, if, as I suggest is appropriate, QR Network is given the flexibility to set prices in such a manner that ‘back-loads’ the recovery of sunk costs, then it has additional flexibility in promoting take-up than that described in Figure 2.²⁵

²⁴ Ergas report, section III.

²⁵ Figure 2 has no temporal dimension. It can be thought of as a full description of costs where there are fixed annual costs that are incurred each year in order to ensure the service is provided. In reality, fixed costs will often be associated with assets that have lives of many decades. Consequently, there are many possible profiles of prices that recover average costs over time.

93. This pricing flexibility is, in my view, all that is required to achieve high levels of electric traction utilisation if the cost relationships set out in Figure 2 do truly reflect the actual market circumstances (i.e., if, in a present value sense, the average cost of electric traction is lower than the average cost of diesel at high utilisation).
94. On the other hand, if Figure 2 is inaccurate and, electric traction is, even at high levels of utilisation, more costly than diesel traction then QR Network may not be able to fully recover its costs over the life of the investment (at least not without a cross-subsidy). However, that has nothing to do with strategic conduct or coordination failures. It simply reflects the fact that the diesel technology is lower cost and the investment in electric infrastructure was inefficient – at least with the benefit of hindsight.

5 Conclusion

95. If electrification in the Blackwater system was *ex post* efficiently incurred, then the rationale for the cross-subsidy that QR Network proposes in its DAAU would fall away. If the investment is *ex post* efficient then, by definition, there must be a time-profile of prices that enables those costs to be recovered over the life of the assets.
96. If attempting to recover material amounts of QR Network's sunk investment in the initial years of electrification is preventing efficient utilisation, the answer is not to impose a cross-subsidy with its attendant distortions. Rather, the 'first best' solution to this unremarkable problem will generally be to change the recovery profile, e.g., by back-loading the recovery of sunk costs. This more principled alternative is not explored in any of the three reports that I have reviewed. In my opinion, this artificially limits the scope of those analyses and, in effect, renders the conclusions moot since attention has been directed at answering the wrong question.
97. The NERA and Ergas reports also suggest that a cross-subsidy may be required to address market failures said to arise from strategic behaviour and/or coordination failure. However, these contentions rest on implausible assumptions that do not represent the actual conditions in the Blackwater system, or require one to believe that the parties in question will act in ways that are contrary to their own self interests. When more sensible assumptions are employed, the conclusions contained in these reports are reversed.
98. However, if full cost recovery is not possible because the investment is *ex post* inefficient (i.e., there simply is not the demand for electric traction at any price profile capable of recovering sunk costs) then this raises myriad other issues that I do not address in this report.