Prepared for

Queensland Competition Authority

Subject

Assessing three options to allocate common costs - Draft

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4 April 2016

UniQuest Project No: C02622

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1. THE TASK

I have been engaged by the Queensland Competition Authority to assess how three proposed options to allocate the costs that are common to coal and non-coal traffic in the Queensland Rail's (QR) West Moreton network compare in terms of economic efficiency. I have also been asked to respond to the Synergies report on this matter, which was appended to QR's March 2016 submission.[1]

The capacity of West Moreton network is estimated with reference to the number of weekly train services (that is, train paths). QR's West Moreton network capacity is estimated at 112 train paths. West Moreton network is a mixed traffic system used by coal traffics and non-coal traffics.

While the system had historically been capacity constrained (with very limited spare capacity), there has been a substantial decline in traffic in recent years, including a reduction in coal traffic following the closure of the Wilkie Creek mine. There is currently around 40 percent spare capacity on the network. In particular, QR forecasts that only 66 out of the 112 train paths will be used through to 2020; 63 coal trains that will pay the reference tariff and three non-coal trains which are subsidised by the government, such as passenger trains and those used for the transport of grains and cattle.

The issue under consideration is the allocation of QR's forward looking common network costs (maintenance, forecast capex and operating costs) that will be recovered from the coal traffic via the reference tariff. There are three key issues that complicate the allocation.

First, while traffic in the network is mixed, the reference tariff only applies to coal with the tariff for non-coal services reflecting other market forces, such as competition from trucking services, and non-market constraints, such as subsidies from the government. Second, there has been a limit to the number of train paths that can be contracted to transport coal. I have been instructed to consider that coal traffic cannot contract more than 80 paths on the West Moreton network (ex. Toowoomba) and this '80 paths constraint' will apply during the term of the 2015 DAU. Third, the constraint reflects non-market objectives, associated with the use of the network for the transport of agricultural products, passengers, and to minimise the impact on urban train timetables and traffic. These key features, along with the existing spare capacity in the network, imply that QR may not be able to recover common or even service-specific costs from non-coal

[1] Synergies (2016), 'Queensland Rail's Cost Allocation Methodology: A Review.'

services and, in turn, this brings additional complexity to the determination of efficient reference tariffs for coal traffic.

The three different options for allocating forward looking common cost can be described succinctly as follows:

1. QR proposes an allocation of common costs based on coal's share of forecast paths (that is, 63/66 of the paths), which implies that approximately 95% of the common costs will be recovered from coal traffic. (**The QR Proposal.**)

2. Miners (and, in particular, New Hope and Yancoal) propose common costs be allocated based on coal's share of system capacity, which in the context above implies 63/112 of the paths or approximately 56% of the common costs to be recovered from coal traffic. (**The Miners' proposal.**)

3. The QCA's draft decision capped the allocation to reflect contracting restrictions for coal services in the West Moreton network, and I have been instructed to consider the restriction of '80 paths' (**The QCA draft decision approach.**). That is, as per the QCA draft decision approach, 80/112 of the paths or approximately 71% of forward looking common costs will be recovered through the reference tariff.

I note that, as indicated above, determining an appropriate allocation of common costs, especially in the context of a mixed traffic network subject to market and non-market constraints, is a complex and multi-faceted problem including elements of regulatory economics and public sector pricing. However, my task is more limited in scope and it consists of preparing a short paper that only assesses the three options described above in terms of their impact on efficiency. In order to do so, Section 2 briefly outlines two general approaches that are typically used to allocate common costs in a regulatory context and the economic principles underpinning such approaches. Section 3 assesses the three options. Section 4 responds to Synergies' (2016) report and Section 5 summarises my personal view.

2. REGULATORY ECONOMICS APPROACHES TO ALLOCATING COMMON COSTS

The allocation of commons costs in the case of a monopolist that offers more than one service is *'the source of the most muddled, lengthy and unsatisfactory proceedings in regulatory history.'* (Brown and Sibley, 1986, p. 44).[2] The reason is that while in general prices need to be set for each service offered by the regulated firm, there is no clear cost-related way to allocate common costs to a single service.

There are two broad approaches that are widely used in the allocation of common costs in the context of the regulation of monopoly businesses. One approach, which involves determining minimum and maximum prices based on the notions of incremental and standalone costs,[3] is derived from economic theory. Under this approach, common costs are allocated to particular services in a way that the resulting price lies between the incremental cost and the standalone cost and, when the regulated firm is subject to an overall break-even constraint, this price is subsidy-free. For example, in the case where the regulated firm produces two services (1 and 2), if Service 1 passes the incremental cost test (that is, revenue for service 1 is greater than or equal to its incremental cost), then Service 2 passes the stand-alone cost test (that is, revenue for Service 2 is less than or equal to its standalone cost) under the break-even constraint. That is, one service does not subsidise or is being subsidised by another service.

The second approach, known as fully distributed costs (FDC), is widely used by regulators, and allocates common costs based on an arbitrary rule such as relative shares of output, revenue or attributable costs. As discussed below, this approach is not without some economic merit.

In practice, there are many variations from these two approaches, which typically combine features that are based on economic theory and those that are arbitrary and designed to fulfil particular objectives or to avoid particular outcomes. For example, the UK's telecommunications regulator, Ofcom, set prices for mobile voice call termination based on incremental costs plus a mark-up[4], which was proportional to each operator's identified avoidable costs and calculated so that common costs were fully recovered.[5] It is beyond the scope of this paper to review the

[2] Brown, S. J. and D. S. Sibley (1986), *The theory of public utility pricing*, Cambridge University Press.
[3] The incremental cost, in this context, is the additional cost that a multi-product firm faces as a result of providing that product in addition to its other products. The standalone cost is the cost of producing only one service. If there are common costs, then pricing a product at its standalone cost will include a 100% of the allocation of the common cost to that product, while pricing at the incremental cost will allocate 0% of the common costs to that product.
[4] See Ofcom (2004), *Wholesale Mobile Voice Call Termination*, Statement, June 1st. Available at http://stakeholders.ofcom.org.uk/binaries/consultations/mobile_call_termination/statement/Statement_on_Wholesale_Mobi1.pdf.
[5] The alternative of using mark-ups based on the Ramsey-Boiteux principle (see below) would result in distributional inequalities according to Ofcom. In particular, in Ofcom's assessment, high termination charges would be paid by

wealth of regulatory precedents on the allocation of common cost. Instead, I briefly review the two approaches discussed above with a view to framing my assessment of the three options put forward to allocate the common costs that will be recovered from the coal traffic via the reference tariff.

The standard reference for the discussion of subsidy-free prices is Faulhaber (1975)[6]. He developed a cooperative game theoretical framework to examine the problem of allocating common costs. The relevant equilibrium notion is the Core; a set of allocations that cannot be blocked by any subset of the agents involved. If an allocation of common costs is in the core, then no agent (either individually or a member of a coalition) would profit by deviating from it. Faulhaber then shows that a monopolist that is constrained to break-even, and sets prices between incremental and standalone costs, induces an allocation of common costs that is in the core. This result is also often associated with the notion that a subsidy-free price prevents entry by less efficient operators.[7]

As should be clear, there are potentially many subsidy-free prices that satisfy the incremental cost and standalone cost tests. The most appropriate price then will depend on the objective of the regulator. For example, if the objective is to promote static efficiency only, then prices based on Ramsey principles may be appropriate. When a monopolist operates in two markets, Ramsey-Boiteux pricing[8] is associated with outcomes that yield the least amount of distortion while allowing the firm to break-even, which includes a return on capital and depreciation.

Ramsey-Boiteux prices are efficient, in a second-best sense,[9] because they account for the impact that increasing prices above marginal cost, which is needed to recover common, fixed costs, has on demand. This may be important to the extent that the demand for some services may be more responsive to changes in prices than the demand for other services. Therefore, in order to recover the common costs the most efficient way, subject to a break-even constraint, it

those without a mobile phone, which include a significant proportion of elderly and low-income consumers, with adverse distributional consequences.

[6] Faulhaber, G. R. (1975), 'Cross-Subsidization: Pricing in Public Enterprises', *American Economic Review* 65, pp. 966-977.

[7] That is, if prices are subsidy-free, an entrant cannot profitably undercut the incumbent operator for some of its products unless it can produce at a lower cost. See Baumol, W., J. Panzar and R. Willig (1982), *Contestable Markets and the Theory of Industry Structure*, Harcout Brace Jovanovitch.

[8] The Ramsey pricing or inverse elasticity rule sets prices such that the mark-up of price over marginal cost varies inversely with the price elasticity of demand for different customer groups or market segments. The consumers with the highest elasticity pay the lowest price. See Ramsey, F., (1927), 'A Contribution to the Theory of Taxation', *Economic Journal* 37, pp. 47-61, and Boiteux, M., (1971), 'On the Management of Public Monopolies Subject to Budgetary Constraints,' *Journal of Economic Theory* 3, pp. 219-240. With fixed costs, the first-best approach of setting prices equal to marginal cost does not satisfy the firm's break-even constraint.

[9] For the theory of second best, see Lipsey, R. G. and Lancaster, K. (1956), 'The general theory of second best,' *The Review of Economic Studies* 24(1), pp. 11-32.

is optimal to increase the prices of those services with a relatively elastic demand less than the prices of those services that are not as responsive to price changes.

There are many reasons why Ramsey-Boiteux pricing is not often used in practice to allocate common costs. First, such prices are not strictly cost-based. The only way that common costs enter in the calculation of Ramsey-Boiteux prices is in setting the level of contributions that the services collectively must generate. Second, elasticities and marginal costs are not known and the existence of asymmetric information means that regulated companies may have an incentive to mis-report expected demand and costs.[10] Third, for the logic to apply, the regulator must be able to set prices for the different services, which is clearly not the case for the West Moreton network as the regulated tariff only applies to coal traffic. Fourth, Ramsey-Boiteux prices may also not be subsidy-free and may lead to inefficient bypass.[11]

Ramsey-Boiteux prices can also lead to distributional issues, with different users' contributions being seen as unequitable or unfair. The example of the regulation of mobile termination charges by the UK's Ofcom, cited above, is an example where distributional considerations played a role. In the context of the West Moreton network, applying the Ramsey-Boiteux logic might also lead to outcomes that may seem to favour one set of users over another. This possibility is illustrated by Synergies (2016, p. 23-24):

"By way of example, if allocating 100% of the costs to coal and 0% to non-coal had no effect on demand for coal services, but increased non-coal services by 1 train path per week, there would be unambiguous improvements in efficiency."

Regulators often have to confront these distributional issues as their objectives go beyond the pursuit of static economic efficiency. The QCA, for example, is required to explicitly consider, in addition to static and dynamic efficiency, the legitimate business interests of the owner or operator of the service, the public interest, the interests of persons who may seek access to the service, and the effect of excluding existing assets for pricing purposes. Distributional issues arise, for example, when the business interest of the owner or operator of the service conflicts with that of access seekers.

[10] Menezes, F., (2014), 'Incentive Regulation', *Uniquest report prepared for the Queensland Competition Authority*.
[11] See Church, J. and R. Ware (2000), *Industrial Organisation: A Strategic Approach*, McGraw-Hill, pp. 798-799. For conditions under which Ramsey-Boiteux prices are subsidy free, see Baumol, Bailey and Willig (1977), 'Weak Invisible Hand Theorems on the Sustainability of Multiproduct Natural Monopoly,' *American Economic Review* 67(3), pp. 350-365.

In addition to these distributional issues, there is another fundamental reason why the Ramsey-Boiteux logic is unlikely to be used to support such extreme allocations of common costs. I will focus on the 100% allocation of forward looking common costs to coal traffic as an example. Such allocation would imply that, in the absence of coal traffic, the regulated monopolist would not be able to offer non-coal services as it would be unable to recover total costs. Thus, a 100% allocation of common costs to coal traffic can be seen as consistent with a world where QR would only provide coal services and would not provide non-coal services. Under this scenario, the network would likely have been designed differently, to serve only coal traffic, and leading possibly to different (lower) fixed cost levels. This suggests that such extreme allocation of common costs would be inconsistent with the current network configuration.

These limitations suggest that Ramsey-Boiteux analysis is unlikely to determine the actual magnitudes of regulated prices. However, the Ramsey-Boiteux principle is often used to defend the legitimacy of the appropriateness of the use of discriminatory prices. Synergies (2016, p. 20), for example, describes the approach of allowing the regulated monopolist to charge different prices from different users, with prices set between incremental and stand-alone costs, as the 'constrained price methodology'[12] that is applied to rail access:

"This provides that Queensland Rail may set different prices for different services on its railway in order to maximise the commercially viable use of capacity while meeting, in aggregate, the costs of providing the service, provided that prices remain within the following outer limits:

- *Prices should not exceed the costs of providing access to a user or group of users on a stand-alone basis; and*
- *Prices should not fall below the incremental costs of providing access to a user or group of users.).*"

The key difficulty with the argument that pricing flexibility, combined with the requirement for prices to be subsidy-free, is welfare maximising is explained by Joskow (2007):

'...the structure, though not the level, of the Ramsey-Boiteux prices is the same as the prices that would be charged by an unregulated monopoly with an opportunity to engage in third-degree price discrimination.'[13]

[12] This terminology ("constrained market pricing (CMP) principles") was introduced by the US Interstate Commerce Commission in 1985, to refer to an approach where prices could be discriminatory but had to be bounded above by stand-alone costs and below by incremental costs. See, NERA (2001), 'Regulatory Approaches to Cost Allocation, A Report Prepared for Office of the Rail Regulator UK,' p. 5, available at http://orr.gov.uk/__data/assets/pdf_file/0014/3038/nera_costalloc.pdf.

[13] P. Joskow, 'Regulation of Natural Monopolies' (2007), in *Handbook of Law and Economics*, Volume 2, Chapter 16, pp. 1227-1348 , Edited by A.M. Polinsky and S. Shavell, Elsevier.

That is, the argument that allowing pricing flexibility enhances efficiency, based on the Ramsey-Boiteux principles, may simply be an ex-post justification for the practices of price-discriminating monopolists.[14] Thus, any presumed advantages of a CMP principle approach over other approaches, including arbitrary approaches, ought to be empirically tested.

The brief discussion above suggests that the CMP principles, which have been widely used in assessing approaches adopted by the regulated firm, are not prescriptive in nature. That is, while they are useful to assess whether they are satisfied by a particular approach proposed by a regulated firm, they cannot be used to calculate a specific allocation of common costs. In other words, there will be a number of allocations that may satisfy these principles.

Moreover, in some instances, regulators need to be prescriptive and determine a specific allocation of common costs. This is indeed the case at hand, where the QCA needs to approve a reference tariff which will reflect, among other factors, an allocation of costs that are common to coal and non-coal traffic. In this context, it is relevant to examine the argument behind FDC approaches to cost allocations.

As explained in Section 1, FDC pricing consists of approaches to allocating common costs to services that are based on a seemly arbitrary matter such as quantity, revenue or attributable costs. In the case of the West Moreton network, the three options allocate common costs as different functions of the number of train paths.

Under an FDC approach, the allocation of common costs is part of the determination of regulated prices, which are set so that each service just covers its fully distributed cost (common and service-specific). It should be clear that this type of approach, just as approaches based on Ramsey-Boiteux pricing, is subject to the extent of regulation problem; it assumes that the prices of all services are regulated. As explained above, this is not the case for the West Moreton network, where there is significant spare capacity, coal tariff pays the regulated tariff but it is constrained to 80 train paths, and non-coal traffic does not pay the regulated tariff and is subject to both market and non-market constraints.

While FDC approaches are often regarded as not being based on economically meaningful criteria, this is not an entirely accurate characterisation. Indeed, If the firm's joint cost function is

available at http://web.mit.edu/ceepr/www/publications/workingpapers/2005-008.pdf.

[14] See, for example, W. J. Baumol and J. G. Sidak (1994). *Toward Competition in Local Telephony*, MIT Press, p. 39.

additive separable (so each service has its own incremental cost and there are common, fixed costs), then FDC-based prices are subsidy-free. Moreover, an FDC approach that allocates common costs as a share of attributable costs can be shown, under some circumstances, to have an axiomatic foundation and, therefore, may not be arbitrary as it is often considered.[15]

It can also be said that any allocation of common costs can be seen as treating fixed costs as variable and attributable to a particular service; by assigning x% of common costs to service y, it is possible to think of service y as being provided by a different network with possibly lower fixed costs (for example, amounting to x% of the common costs of the existing network). Synergies (2016, p. 28) makes this point in the context of the cost allocation rule proposed by the QCA:

'….it effectively treats common future costs as if, in the long run, they are fully variable according to installed paths.'

More broadly, one can think of all of the three proposed allocation rules under consideration – or any allocation of common costs including those that are implicitly determined when regulated tariffs are set according to CMP principles – as treating common costs as if, in the long run, the network could be redesigned in a way that each service would stand on its own and face no common costs.[16] Interestingly, an alternative approach to the allocation of common costs, which was used by the UK telecommunications regulator in the context of mobile termination, is to take a very long term view of costs so that most fixed costs become variable and captured by the long run incremental cost of each service. This reduces the quantum of fixed, common costs that need to be allocated. [17]

[15] See, for example, Brown and Sibley (1986), op. cit., pp. 44-59.
[16] In particular, it would be unlikely that such redesigned network would have significant spare capacity.
[17] Synergies (2016, Section 3) discusses a categorisation of costs that classifies some forward looking common costs as coal fixed costs.

3. ASSESSING THE THREE OPTIONS

The discussion in Section 2 above established that the two standard approaches to allocating common costs, those based on CMP principles (including Ramsey-Boiteux type efficiency considerations) and FDC approaches, have advantages and disadvantages. Indeed, there is no generally acknowledged single correct method to make such an allocation.

The theoretical justifications for allocating a greater share of common costs to operators with greater ability to pay, in the context where price regulation does not extend to all services provided by the monopolist, can also be used to underpin the pricing structure chosen by an unregulated monopolist with the objective of maximising its profits rather than total welfare. It is therefore not obvious that the theoretical benefits of Ramsey-Boiteux pricing are relevant in this context. While subsidy-free prices may be desirable, there is no clear way to select the most efficient of those prices.

Moreover, in the context at hand, the allocation of common costs needs to be prescriptive rather than implicit as in the case of the application of the CMP principles. FDC approaches do provide a prescriptive, transparent way to allocate common costs in determining regulated prices. While there may be some economic merit to FDC, it also subject to the issue of the extent of regulation in the context at hand. The reason is that only the coal traffic is subject to a regulated tariff and an FDC approach cannot ensure that QR will recover all fixed, common costs when there is spare capacity and the non-regulated market is subject to both market and non-market constraints.

The three options under consideration are closer to FDC and represent a practical, rather than based on economic theory, approach to allocating common costs with a view to determining the regulated tariff for coal traffic. Given the lack of an economic theoretical basis, there is no a-priori reason for any of the options to be preferred, from the viewpoint of a welfare-maximising regulator, to others. Instead, each proposal needs to be assessed on its merits. Below I focus on how the three options impact on various aspects of economic efficiency.

As noted in Section 1, the three options differ in the percentage of common forward looking costs that QR will be allowed to recover from coal traffic, ranging from 95% under the QR's proposal, to 69% under the QCA draft decision approach and 56% under the Miners' proposal. As highlighted by Synergies (2016, p. 24), given the expected usage of the network, it is unlikely that QR will be able to '*fully recover the QCA's accepted efficient forward looking costs of providing the service'* except under the QR's proposal.

However, it is not clear that allowing QR to recover practically all its common costs from coal traffic through the regulated tariff aids long-run efficiency. This suggests that in the absence of coal traffic, QR would not be able to provide non-coal services. This in turn implies that in a world where QR were not constrained to offer non-coal services, it would not do so as it could not recover its costs. In this world, QR would only provide coal services and the network configuration might have been different, possibly involving different, lower forward looking efficient fixed costs. Such a network might have led to different investment decisions by coal miners.

As discussed above, all three options, or any allocation of common costs, treat common costs as if they are variable in the long run and the QR proposal can be interpreted as if it were possible to run coal services with fixed costs that amount to 95% of the current common costs. There is no particular reason to say that 95% is the appropriate fraction, rather than 56% or 69%, as under the other two options.

I now turn to the likely impact of the different options on static efficiency. As explained in Section 2, it is not clear that the notion of allocating common costs based on ability to pay, as per the Ramsey-Boiteux rule, is appropriate to justify allocating a high share of common costs to coal traffic.

Thus, the logic that overall efficiency (that is, taking into account of the impact on both coal and non-coal traffics) is aided by allocating a higher fraction of the common costs to coal traffic is not necessarily correct. Instead, determining optimal prices, which maximise societal welfare, is a complicated problem that requires the analysis of market and non-market constraints.

In the absence of some general guidance about the impact of the allocation on overall efficiency, I focus exclusively on the impact of the different allocation of the utilisation of the network by coal traffic. In this case, clearly, the higher the allocation of common costs to coal traffic, the higher is the likely demand reduction.

Summing up, the arguments above suggest that there is no perfect way to allocate common costs. QR's proposal allows it the best chance to recover forward looking common costs, to the extent that this is desirable, but it has the highest likely adverse impact on the demand for coal transport. Conversely, the Miners' proposal implies that QR is unlikely to recover its efficient forward looking common costs, but it has the lowest adverse impact on the demand for coal transport.

The QCA draft decision approach lies between the two other options and it aims to balance the various criteria it has to satisfy under the QCA Act.[18] However, as I explain next, the QCA draft decision approach can also be supported on efficiency grounds. In order to do so, I turn to a feature of the regulatory environment that has not been explored so far: the fact that there is uncertainty about future demand and network utilisation. As a general principle, a regulated firm facing uncertain future demand may have an option to delay investment. Under these circumstances, if it is socially efficient not to delay investment, then the regulated price ought to incorporate a reward for the firm giving up its option to delay investment.[19]

I now apply this principle to the case at hand. Under the QCA draft decision approach, at the predicted coal utilisation of 63 paths per week, each service would be making a contribution of approximately 1.3 (or 80/63) times the costs allocated to each of the 80 paths. A possible interpretation of the QCA draft decision approach in this context is that each service is required to pay for an option to contract capacity up to 80 paths a week.

In this context, the Miners' proposal prices this option at zero. This may not lead to efficient outcomes in the context of a regulated firm making investment decisions under demand uncertainty. Similarly, QR's proposal can be seen as pricing an option that would allow miners to use up to 112 paths a week – and they would be paying 112/63, or approximately 1.8 times the cost allocated to each of the 112 path for this option. Under this interpretation, miners would be paying for an option that they cannot exercise given the 80 path constraint.

Looking at the allocation of common cost as pricing an option to use capacity beyond expected usage suggests that the 80/112 rule in the QCA draft decision approach may provide a superior approach to both the Miners' and QR's proposals.

The QCA also proposes to change the allocation of common costs if the 80 path constraint is reached and if QR makes available, on an ad-hoc basis, extra capacity to coal services. The QCA's proposal is to allocate 1/112 of the common costs to any such path that is taken up by miners.[20] This rule, together with the QCA's draft decision approach on the allocation of forward looking common costs, provides strong incentives for QR to make additional paths available. Such incentives are weaker under QR's proposal.

[18] See QCA (2014), Draft Decision on Queensland Rail's 2015 Draft access Undertaking, pp. 140-146.
[19] See Camacho, Fernando T. and Menezes, Flavio M. (2009), 'Access pricing and investment: a real options approach,' *Journal of Regulatory Economics* 36 (2), pp. 107-126.
[20] See QCA Draft Decision, pages 196-200.

4. THE SYNERGIES REPORT

Synergies (2016) makes several comments about the approach to allocate common costs described in the QCA draft decision. I was asked to focus exclusively on the rule that allocates fixed, common costs to coal traffic based on the capacity that is available for contracting.

There is much to agree with Synergies (2016). For example, as expounded in Section 2 above, I agree that '*there is no simple allocation rule based on gtk or train paths alone, that would result in the efficient allocation of these shared costs to each of the services.'* (Synergies, p. 4). Here I focus instead on Synergies (2016) key conclusion about the approach to allocate common costs contained in the QCA draft decision:

'...this approach will have significant negative consequences on efficient incentives for the operation of, use of and investment in the rail network, to the extent that Synergies considers that the allocation rule is inconsistent with achieving the objectives of the Act.' (Synergies, 2016, p. 5).

Synergies (2016) bases this conclusion on a number of reasons. I will examine each reason in the same order presented in their report but limit my analysis to regulatory economics issues.

First, Synergies (2016, p5) argues that that the QCA draft decision approach '*does not recognise the nature of cost drivers in an industry that exhibits a decreasing marginal cost such as rail infrastructure, as it effectively treats common future costs as if, in the long term, they are fully variable according to installed paths.'* I assume that Synergies refers to decreasing unit or average cost rather than marginal cost. Indeed, as explained in Section 2, the QCA draft decision approach effectively treats common costs as if they were variable in the long-run. However, any allocation of common costs, including the allocation proposed by QR and any allocation that is implicitly determined under a CMP approach, has this property. Thus, while the observation is in my view correct, it is not a reason for favouring QR's proposal over the QCA draft decision approach or any other option.

Second, Synergies (2016, p.5) points out that the approach contained in the QCA draft decision *'… does not reflect the principles of economic theory in relation to setting efficient prices in a declining cost business, and the requirement that must be met to ensure cross subsidies do not occur.'* Again I presume that Synergies means decreasing average or unit costs rather than declining total costs. More importantly, as discussed in Section 2, there is no unambiguous rationale for advocating a CMP approach under the circumstances at hand, where QR operates

in a segment that is subject to a regulated tariff, and in other segment that is subject to a number of market and non-market constraints.

Moreover, it is unclear why Synergies claims that the approach proposed in the QCA draft decision would not result in subsidy-free prices. The underling logic of the analysis of subsidy-free prices expounded above is that of a regulator that assesses prices set by a regulated firm across different markets and the firm is subject to a break-even constraint. That is, the stand-alone and incremental tests are related only if the regulated firm is subject to a break-even constraint. [21] In the case of the West Moreton network, however, the QCA only sets the reference tariff for coal traffic and there is no break-even constraint across all markets. In this instance, coal tariffs that cover the incremental costs of providing coal services are subsidy-free[22] independently of whether or not QR is able to recover from non-coal traffic the fraction of efficient forward looking common costs not assigned to coal traffic.

Third, Synergies (2016, p5) is concerned that '*given only 3 of the allocated 35 non-coal paths are used by non-coal services, with the remaining paths unused, this effectively allows Queensland Rail no prospect of recovering the QCA's assessed efficient common costs of providing the infrastructure from the users of the service.'* Of course, it is correct that under both the QCA draft decision approach and under the Miners' proposal, QR seems unlikely to be able to recover the efficient forward looking common costs. However, this is not per se an argument for allowing QR to recover 95% of its common costs from coal traffic. Ultimately, the QCA will need to balance the various objectives defined in the QCA act.

Finally, Synergies (2016, p.5) argues that the QCA draft decision allocation *' prevents efficient signals being given to Queensland Rail in relation to the future maintenance and renewal of the infrastructure that is essential for the ongoing provision of coal services, as it will not have a business case that anticipates full recovery of these future costs.'* While this may be correct, a logical consequence, given that these are common costs, is that there would be implications as well for the ongoing provision of non-coal services. Putting it differently, this is an argument for QR to be able to recover its efficient forward looking common costs but not an argument for QR being able to recover 95% of these costs exclusively from coal traffic.

[21] To illustrate why the use of the two tests for subsidy-free prices no longer holds when the break-even constraint is not binding, consider a monopolist that earns positive economic profits overall in the two market segments where it operates. In this instance, it is possible that it earns more revenue than its stand-alone costs in market 1, so that it fails the stand-alone test, but it could earn sufficient revenue in market 2 to cover the incremental costs in that market. Thus, market 2 is not being subsidised despite the stand-alone test for market 1 having failed.
[22] This assumes that the common costs will have to be incurred for QR to be able to provide non-coal services. As discussed before, if non-coal services were not required, then the network would likely have been designed differently and its optimal configuration would likely be different and involve different forward looking efficient costs.

5. CONCLUSION

I have established above that the two standard approaches to allocating common costs, those based on CMP principles (including Ramsey-Boiteux type efficiency considerations) and FDC approaches, have advantages and disadvantages. More broadly, there is no generally acknowledged single correct method to make such an allocation.

This is particularly the case in the context of the West Moreton network, where QR operates in a segment that is subject to a regulated tariff, and in other segment that is subject to a number of market and non-market constraints. Under these circumstances, neither CMP principles nor FDC approaches can guarantee that the regulated firm recovers its efficient forward looking costs in a way to maximise societal welfare.

Importantly, CMP approaches are not sufficiently prescriptive and instead specific rules are often used to allocate common costs when a regulated tariff needs to be set, which is the case of the West Moreton network. To this effect, I assessed three options for allocating efficient forward looking common costs.

QR's proposal allows it the best chance to recover forward looking common costs, but it has the highest likely adverse impact on the demand for coal transport. Conversely, under the Miners' proposal, it is unlikely that QR will be able to recover its efficient forward looking common costs of providing both coal and non-coal services, but it has the lowest adverse impact on the demand for coal transport. The QCA draft decision approach lies between the two other options and it aims to balance the various criteria it has to satisfy under the QCA Act.

However, I have provided an additional rationale for supporting the approach in the QCA draft decision. Looking at the allocation of common cost as pricing an option to use capacity beyond expected usage suggests that that the 80/112 rule as per the QCA draft decision approach may be superior to both QR's and the Miners' proposals. Seeing in this context, the Miners' proposal prices this option at zero. Similarly, the QR's proposal can be seen as pricing an option that would allow miners to use up to 112 paths a week. Under this interpretation, miners would be paying for an option that they cannot exercise given the 80-path constraint.