MEYRICK AND ASSOCIATES

Key Performance Indicators for the Dalrymple Bay Coal Terminal

Prepared for

The Queensland Competition Authority

Draft
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1. INTRODUCTION

1.1 Background

As part of its review of DBCT Management's draft access undertaking, the Queensland Competition Authority would like to develop a set of key performance indicators relating to service quality at DBCT. The Authority has developed a draft set of KPIs that are based on those used at various coal terminals, and commissioned Meyrick and Associates to review, comment on and extend these.

The draft indicators that have so far been developed by QCA are:

a) Demurrage costs (clause 10.3(3), DBCT Management's draft access undertaking

b) The average net costs (after taking into account any discounts or rebates available to access holders) across all access holders of transporting coal from rail loading points at mine sites to DBCT for handling, over any period of three consecutive months (clause 10.4(a)(4), DBCT Management draft access undertaking)

c) The time capacity is reduced because of a breakdown

d) Average unloading times for trains

e) Average loading times for vessels by category of vessel and

f) Average vessel waiting time.

Among these, QCA is particularly keen to retain indicators covering demurrage costs and average rail net costs. QCA's reasoning for the inclusion of these is that they are believed to be triggers for capacity expansion as expressed in Clause 10.3 of the DBCT Managements' draft access undertaking.

1.2 Report outline

This paper begins by establishing a set of principles that we believe should underpin the choice of performance indicators. It then goes on to discuss and recommend a series of performance indicators, why they should be included, and how they could be calculated. Comments on the relevance and integrity of the performance indicators that have been suggested by QCA are made as an integrated part of the discussion on the indicators that we have recommended. The final section of the report contains a concise summary table, which lists:

- The service dimension to be monitored
- The reason that we believe that service dimension should be included in the KPIs
- A recommended KPI for measuring performance on that service dimension
- A short discussion of (where necessary) how the inputs to the KPI should be measured, and comments (where appropriate) or the ease with which the measure can be calculated.

2. PRINCIPLES ADOPTED

2.1 Relevance

QCA's intention is to establish performance measures that relate to service quality at DBCT. We have interpreted this to mean the quality of service delivered to coal owners. By virtue of the fact that one of the functions carried out by DBCT is ship loading, the companies that buy the coal and the ships that carry the coal are also the recipients of services provided by DBCT.

The services that are recommended include train scheduling, inloading the coal from trains into the terminal, storing and assembling the coal for shipment and then loading the coal onto ships. Also included are DBCT's management of terminal infrastructure capacity and its management of its relationship with its customers. The first of these is fundamental to DBCT's ability to provide any service to the coal owners and their customers, and if the second is ineffectively managed and DBCT's customers are dissatisfied, gaining the cooperation from them that is necessary to meet other service demands will be very difficult.

All of the indicators we discuss relate to the measurement of aspects of performance that may be relevant to coal owners in negotiations with DBCT, or which impact on coal owners or their customers in ways that are not fully internalized in DBCT's pricing.

2.2 Credibility

The measures used to define service performance need to be credible and at least in principle auditable by an independent third party.

2.3 Encourage performance improvement

This principle follows from the previous one. Their key purpose should not be for 'failing' or 'passing' DBCT but they should be an information tool for supporting ongoing communication firstly between DBCT and Access Holders and further afield between DBCT and other key stakeholders such as Queensland Rail and QCA.

2.4 Fostering supply chain effectiveness

As with many other supply chain situations, the success of the coal terminal and the coal mines are very interdependent. This point was recognised by the BIE when it made the following comment about coal terminal performance:

Coal transport and handling is a highly integrated process from the mine site to the customer and has been described as a moving stockpile. Decisions relating to where coal is stockpiled at the mine site or at the port terminal, the size of ship and frequency of service will all involve balancing the needs of users and the mining, transport and port service companies. Bottlenecks which may occur in one part of the transport chain, (eg as a result of a train derailment) will have a deleterious impact on the performance of other parts of the chain such as the port's coal terminal. Similarly, efficiencies achieved in one part of the transport chain will tend to lift the performance of other parts of the chain.[1]

This high degree of integration and interdependence means that DBCT's performance effectiveness is strongly mediated by the management of factors that are controlled by other parties and in particular by the coal owners or Queensland Rail.

This means that in interpreting performance indicators these limitations need to be kept in mind. But it also leads us to the view that it is useful to include in the KPIs aspects of performance which are not necessarily primarily under its control if:

- The aspect of performance has consequences for DBCT's performance, and in particular for its effective operating capacity
- DBCT has the ability by working collaboratively with others in the chain to influence the particular dimension of performance and
- DBCT can conveniently monitor and report on the relevant KPI.

2.5 Include relational factors

As well as considering measures that can be easily quantified in physical terms, it is also important to consider a range of qualitative relational factors, such as responsiveness, flexibility, interpersonal reliability and ease of transaction. These factors are given considerable prominence in the Draft Access Undertaking, are likely to be valued by DBCT's customers, and if ignored can ultimately have financial implications for both parties.

2.6 Inexpensive to administer

Performance measures are only useful as tools for monitoring and communicating achievement, and encouraging performance improvement if the information that is required can be gathered without imposing an undue burden on administrative resources and systems. As far as possible, it should be possible to derive the information that is required for assessing actual performance against indicators that could be expected to form part of DBCT's internal monitoring processes, or that could be readily computed from data that would be readily available to DBCT.

[1] Bureau of Industry Economics, Waterfront 1995 International Benchmarking, page 92.

3. PERFORMANCE DIMENSIONS AND PROPOSED MEASURES

3.1 Train Handling

The Draft KPIs provided by QCA include the measurement of this dimension.

The proposed measure is average unloading times for trains. While this captures the impact of the service dimension on rail operating costs, it may be better to use a KPI that internalizes possible variations in the average payload per train. Our preferred measure for this service dimension is tonnes of coal discharger per hour.

3.2 Train Scheduling

The coordination of train scheduling with ship arrivals is a crucial factor affecting the overall efficiency of the coal supply chain. Errors in these schedules result in train queuing and can create conflicts between inloading and outloading capacity at the terminal. This in turn reduces the ability of the mines to provide coal supplies in time for waiting vessels.

As suggested by Prime in the 2002 Master Plan, DBCT does have some limited influence on these schedules: "Although at the end of the coal chain, DBCT can impact the capacity of other links of the chain through the role it has assumed in ordering and managing trains to provide specific coal to meet ships as they enter the system."[2] But, this role is not mandated by any contractual authority over Queensland Rail and so, as is pointed out in the 2002 Master Plan, "there is no recourse when QR-CFS does not perform as requested. At the same time, there is no requirement for QR-CFS to provide schedule coordination, either."[3]

It is evident from the 2002 Master Plan that DBCT tracks this aspect of rail performance closely: "DBCT maintains extensive operating statistics on the operation of the terminal. Rail performance in terms of trains ordered, scheduled and received is tracked weekly."[5]

We suggest that the following KPI be adopted for this service dimension:

- *The percentage of trains arriving within an hour of DBCT's scheduled arrival time*

The choice of the 'window' has been based on the fact that DBCT places particular emphasis on the arrival of trains at the terminal within schedule windows in its performance tracking:

"The importance of trains arriving at the terminal within schedule windows cannot be overstated. Arrival outside the terminal window can create terminal conflict between inloading and outloading and force the terminal operator to re-prioritise which system will take priority. The resulting rearranging of yard machines adds to non-productive time and further threatens maximum throughput."[7]

[2] Prime Infrastructure Master Plan 2002, Section 10.1.5
[3] Ibid, Section 10.2.4
[5] Ibid, Section 10.2.3
[7] Ibid 10.2.3

Finally, we understand that one of the ways that DBCT is attempting to improve operational scheduling by using planning and scheduling software to provide coal owners with information on 90-day and 12-day horizons about approximate train movements, optimal coal placement in the stockyard, usage of the stockyard equipment and ship loading sequences. In addition, the software enables DBCT to fine-tune operational schedules on a day to day basis to reflect disruptions and minor changes caused by equipment breakdowns or early or late arrival of trains.

It is therefore very likely that information for tracking the measures that we have recommended, including the one related to user investment, is almost certainly already being gathered.[9]

3.3 Capacity Utilisation

Determining appropriate terminal capacity is a central concern of the owners of Dalrymple Bay Coal Terminal. It is also a critical driver of the coal transportation and handling costs and is pivotal to the value of the service that is provided by the terminal. It should therefore be reflected as one of the performance indicators.

Inadequate capacity can result in an unacceptable level of ship queuing, which in turn can lead to ships passing on the resultant demurrage costs to coal owners in the form of lower coal prices. The Draft Access Undertaking also commits DBCT to adding additional capacity under certain circumstances to ensure that additional demand does not lead to deterioration in service quality to existing users.

But, as is pointed out in the Productivity Commission Inquiry Report, The Australian Black Coal Industry[10] the existence of a shipping queue and demurrage cost per se are not necessarily indicators of inadequate terminal capacity. On the contrary some degree of queuing can be seen as desirable.

"Having regard to the capital costs of the port and the desire for increased throughput of tonnage over the asset base, (a small level of demurrage charge per tonne) may deliver the best overall costs to port users". [11]

Coal owners have an interest in ensuring that installed capacity is adequate but not excessive because additional terminal costs will ultimately be passed on to the coal operator. We suggest that this is best captured through a KPI that reflects the ration of the terminal throughput to the gross operating capacity of the terminal.

Gross operating capacity describes the capacity of the terminal to efficiently handle the "actual and reasonably anticipated future growth of demand for the use of the terminal by access holders and access seekers", and is expressed in terms of *tonnes of coal per contract year as a measure of adequate capacity.* [12] It corresponds closely to, and serves an appropriate measure of, the 'optimal throughput capacity' discussed in clause 10.1 (a) of the Draft Access Undertaking.

[9] CSIRO, Managing Terminal Operations, http://www.cmis.csiro.au/OR/dbct/operations.htm, October 18, 2002
[10] Productivity Commission, The Australian Black Coal Industry Inquiry Report, February 1999, Chapter 8, the Coal Waterfront
[11] Ibid, page 236.
[12] DAU, Clause 10.2 (a)

We understand that inloading performance is currently the binding constraint on terminal performance, and this is expected to continue to be the case for some time, inloading capacity ('optimal inloading capacity') is equivalent to gross operating capacity.

Gross operating capacity is not the nameplate capacity of installed machinery: it is an estimate of the capacity that could be achieved if all systems operated as planned, and includes allowances for unavoidable capacity reductions due to factors such as scheduled equipment maintenance, and loss of time at the start and end of each train loading operation.

This appears to us a reasonable metric for monitoring installed capacity.

Clause 10.1(a) of the Draft Access Undertaking proposes that the optimal throughput capacity of the terminal would be set in consultation with the parties and if necessary with the assistance of an independent expert.

We agree with this proposal but suggest that DBCT's proposal in the same clause to review this figure "from time to time" needs to be solidified into a defined frequency. We think that this could be at least once a year and when there is likely to be a change in throughput large enough to affect necessary capacity.

3.4 Operational Effectiveness

By operational effectiveness, we mean the extent to which the terminal is able in practice to deliver the gross operating capacity.

A fundamental element of any service contract, information on service continuity is also valuable for users and other stakeholders to feel confident that the service supplier is managing effectively, and to understand the causal factors contributing to overall throughput and service quality. A range of factors, including problems with train scheduling or unexpected equipment downtime may reduce the actual available capacity.

The draft KPIs proposed by QCA include 'time capacity is reduced because of a breakdown' which is one way of measuring the gap between theoretical capacity and the capacity actually available. It is well known that the collapse of the Reclaimer I in February this year had a very significant affect on the terminal's throughput.

It would not be unreasonable to pursue this approach. If it is adopted, it may be worth considering also the inclusion of a measure of the time equipment is out of service for routine maintenance. The effective management of scheduled maintenance is entirely within the terminal operator's control, and given its importance in enabling the terminal to approach its gross operating capacity, it is an appropriate lead indicator of DBCT Management's efforts to ensure sustained service quality and reliability. There are two ways in which this indicator may be important:

- If time spent on maintenance – both scheduled and unscheduled – results in a loss of operational capacity greater than that assumed in calculating gross operational capacity, then it could suggest that either inefficient terminal equipment or inefficient maintenance management is contributing to inefficient terminal operations; or

- If DBCT is spending significantly less than the time assumed in calculating gross operational capacity on scheduled maintenance over an extended period of time – say a year or more – then this would reflect inadequate attention to equipment maintenance, and possible future problems in achieving optimal operational capacity.

This performance indicator could be expressed as:

Number of hours spent on maintenance as a proportion of total available terminal hours.

It is likely that DBCT Management already gathers data on utilisation levels and operational time lost to maintenance and is likely to include it in its own performance reporting to its shareholders. To extend the communication of information on scheduled maintenance downtime to coal owners and other relevant stakeholders should therefore not impose any significant additional administrative burden.

We have however two reservations about this approach:

- Assessing precisely when capacity is lost due to equipment breakdown may become complex if other factors influencing effective capacity (for instance, failure of trains to adhere to schedules) are operative simultaneously; and
- Distinguishing clearly between scheduled maintenance and breakdown time is not always easy (for instance, if a breakdown occurs close to a scheduled maintenance event and the opportunity is take to undertake scheduled maintenance at that time).

Neither of these problems is insurmountable. However, they did lead us to consider whether a different approach might be preferable, and in particular whether it may be preferable to use a broader measure of effective delivery of installed capacity. We understand that DBCT already uses Net Operating Capacity as a broad measure of this dimension, and that this measure will captures the effect of equipment breakdown, as well as other factors reducing effective capacity.

We recommend as a measure of operational effectiveness.

NOC as a proportion of gross operating capacity

If necessary, an independent expert review of the manner in which DBCT calculates Net Operating Capacity could be undertaken.

This KPI should be reported separately for each month of the reporting period, rather than as an annual average.

3.5 Stockyard management

Terminal space at DBCT is divided between two major functions:

- Stockpiling of coal produced by the mines but not yet required for shipment; and

- Assembly of coal for immediate shipment.

Reduction of terminal storage will have cost implications for coal owners. For DBCT's preference to also be in the interests of the coal owners the benefits in terms of improvements in coal handling throughput including time spent on ship loading must be equal to or greater than the costs resulting from having to stockpile greater volumes of coal at their own sites rather than at the coal terminal.

We therefore believe it would be fruitful to monitor developments in DBCT's stockyard management. Two options for an appropriate KPI are:

- *the storage capacity available (measured as million tonnes)*

This option is attractive because it focuses on the matter that is of concern to owners (the quantity of coal that can be stored) and incorporates the effect of possible DBCT management decisions that will increase storage capacity without necessarily increasing storage area (e.g. allowing high stacking of coal); and

- *the terminal area available for storage*

This option is attractive because is relates directly to the current contractual obligations and is more directly and readily measured.

On balance, we believe that the former is preferable.

3.6 Ship loading performance

Average loading times for vessels by category of vessel is included in the list of performance indictors suggested by QCA.

The time spent loading ships affects both terminal costs per tonne and the productivity of shipping, and hence the costs of the sea freight or demurrage. It is therefore appropriate and important that this aspect of terminal performance be monitored.

However, in our view it would be preferable to measure this performance aspect in terms of tonnes loaded per hour at berth rather than simply the time spent at berth. This would ensure that changes in the average quantity of tonne loaded did not distort the measure.

While classifying ship loading times by ship size, as suggested by QCA, would reduce this effect, would not eliminate it. However, even if our preferred option is adopted, it would be useful to incorporate the original idea of segregating the measure by ship class, since loading rates for large ships can be significantly higher than those for smaller ships.

Our preferred KPI for measuring this performance dimensions is therefore:

- *Ship loading time, measured in tonnes per hour at berth, segregated by category of vessel*

3.7 Ship waiting time

Ship waiting time is included in the list of indicators suggested by QCA.

Ship waiting time affects the costs of the shipping leg, often though not necessarily entirely through the demurrage charges. It also serves as an alternative indicator that the capacity of the terminal is being approached.

In order to clearly separate this indicator from the 'ship loading performance' indicator discussed in the previous section, we recommend that this KPI be measured as the average time between first arrival of the ship in port and the time at which the ship comes to berth.

This is not a perfect indicator, as ships will often slow steam to save fuel if it is known that there is congestion at the port. This tendency is however usually limited because of the first-in first-out protocols employed in most bulk ports.

The draft indicators suggested by QCA includes demurrage costs. Demurrage costs will very largely be driven by ship waiting times. (The expected time at berth will usually be factored into the charter party).

We are conscious of the fact the DAU requires DBCT Management to add capacity where necessary to meet the bona fide needs of new users or increased volumes for existing users in such a way that there be no increase in demurrage costs or the average net costs across all access holders of transporting coal from mine to port over any three consecutive months. In order to ensure that this requirement is met, it may be necessary for the Authority to request DBCT Management to report on demurrage costs.

We do not however believe that demurrage costs form a suitable service quality KPI. There are three reasons for this. Firstly, the time spent by a ship in port can result from factors that are outside of the control of the coal terminal. One of these factors is delay in the transportation of the coal by rail from the mine to the coal terminal. This is a point that is rightly argued by DBCT in its draft master plan report:

> *In practice, demurrage is not a robust indicator that NOC is being tested by throughput, as demurrage can be the result of any number of delays in the supply chain beyond the control of DBCT. In the case of PWCS, the rail capacity is the constraint, not so much the terminal capacity.*[19]

Secondly, and in our view much more importantly, the amount of demurrage actually paid by a ship is dependent on the particular contractual arrangements that are struck by the coal buyer with the shipping carrier. These arrangements are likely to vary from one buyer to another, and are in principle confidential to the contracting parties. Unless there are contractual agreements of which we are unaware under which DBCT bears responsibility for meeting some or all of these costs, DBCT would not normally be privy to these contracts, and therefore not in a position to monitor actual demurrage costs. (DBCT could of course estimate demurrage costs on the basis of a general knowledge of typical charter party arrangements and vessel wait times, but it is then questionable whether it would be better to rely on DBCT estimates or produce independent estimates of demurrage costs).

Thirdly, and also importantly, demurrage charges are an imperfect reflection of the impact of terminal performance on ship costs. Typically, charter parties include in the basic freight rate an allowance for the expected time in port: demurrage becomes payable when the time in port exceeds expectations. If terminal performance is chronically poor, or congestion is endemic, it is possible that contractual arrangements will adjust to these realities by adjusting the time allowed for the port call in the contract. This will have the effect of increasing the basic freight rate, but decreasing demurrage payments.

[19] Ibid, page 88

3.8 Relationship management

One of the principles that we suggest should underpin the choice and management of performance indicators for DBCT is that of balancing the needs of both the terminal manager and the coal owners. The interdependent nature of each party's needs makes satisfying this principle an essential prerequisite for ensuring the long-term sustainability of the contractual arrangements between the parties. This in turn suggests that one of the important elements of DBCT's service delivery is their attention to their relationship with the coal owners.

This is not unique to the coal terminal. In 1992 Peter Morris' Warehouse to Wharf report commented on "the need for more effective coordination and interaction between transport chain participants", and in 2002, a policy statement by the Department of Transport and Regional Services reinforces the importance of relationships between suppliers and customers:

> *"The essence of best practice logistics chain management is the constant assessment of business practices to ensure firms have adequate information and communication systems and strong and supportive relationships with suppliers and customers. It is not surprising that firms achieving best practice have the right people with the right skills capable of managing—and constantly improving—these systems and relationships."*[20]

The specific undertakings contained in the Draft Access Undertaking recognize the importance of effective communications and information-sharing in this respect. The DAU proposes good faith consultation with coal producers "not less than twice yearly" on the following issues:

> *"Current capacity and throughput*
>
> *Constraints on current capacity including impact on demurrage and user transport costs*
>
> *Future contracts/forecasts that may impact on terminal capacity;*
>
> *Significant issues relevant to terminal capacity; and*
>
> *Timing and nature of next capacity expansion and impact on current capacity requirements, pricing and Master Plan."*[21]

Fulfilment of these provisions will require that:

- Coal owners are given adequate notice of the meetings – with say about a month's notice
- Coal owners believe that all of the significant issues in a way that demonstrates DBCT's intention of building trust between the parties
- Coal owners believe that DBCT accommodates their financial and operational interests as far as is reasonably possible
- Information about performance successes and shortfalls is provided to coal owners at least twice yearly and they believe that the information is clear, accurate and comprehensive.

[20] Freight Logistics In Australia, *An Agenda for Action,* May 2002
[21] Dalrymple Bay Coal Terminal Limited, Draft Access Undertaking, clause 10.3

It would be possible to capture the more clearly defined, process elements of theses provisions simply be reporting dates of meeting and invitations to meeting. But effective monitoring requires some assurance that DBCT is not simply going through the motions, but is engaged in a genuine process of consultation. We suggest that could best be achieved through an annual survey (preferably independently administered) used to produce a customer satisfaction index. Many port organisations now deploy such devices.

3.9 Net costs to coal users

Among the list of performance indictors suggested by QCA, changes in net costs from rail loading points at mine sites to the terminal is one of the two measures that the regulator is keen to include.

There is no doubt that this measure is of considerable importance to coal owners. Nor is there any doubt that QBCT coal handling performance can affect these costs.

QCA's interest in this parameter is reinforced by clause 10.4(a)(4) of the DAU. This clause makes reference to this in the context of a requirement to add capacity, requiring that DBCT should where necessary add capacity to meet the *bona fide* needs of new users or increased volumes for existing users in such a way that there be no increase in (among other things):

> *"The average net costs (after taking into account any discounts or rebates available to Access Holders) across all Access Holders of transporting coal from rail loading points at mine sites to the Terminal for Handling over any period of three consecutive months, attributable to delays caused solely by the provision of Coal Handling Services in respect of the additional volume."*

As with demurrage costs, in order to ensure that this requirement is met it may be necessary for the Authority to request DBCT Management to report on average net costs of transporting coal from rail loading points to the terminal. However, we have not recommended the inclusion of this measure in our list of service quality KPIs.

We have concerns about the practicality of using average net costs as an ongoing measure of terminal performance. It is appears to us doubtful that DBCT would under normal circumstances be privy to or in a position to gain access to the commercially sensitive information on line haulage costs that would be held by each of the coal owners: this would be needed for a calculation of average net costs. In accordance with the guiding principle enunciated in Section 2.6, we believe that would be preferable to rely on indicators based on data directly available to DBCT.

We have therefore not included this measure amongst the proposed key performance indicators.

4. SUMMARY OF PROPOSED INDICATORS

Performance dimension	Reason for inclusion	Proposed KPI	Explanation	Measurement Issues
1. Train handling	Train handling performance affects the productivity of the rail operator and hence rail freight charges to coal exporters	Gross train loading rate	The KPI defines the rate at which trains are loaded expressed in tonnes per gross train-hour. Gross hour means the total time in terminal (departure time – arrival time). This should be the appropriate metric to provide an indicator of impact of terminal performance on rail productivity.	Tonnes discharged from rail will be readily available as will time of arrival and departure of trains. We do not anticipate that there will be any practical difficulties with this measure.

Performance dimension	Reason for inclusion	Proposed KPI	Explanation	Measurement Issues
2. Supply chain coordination	Irregularity and deviations from schedule reduce terminal efficiency but may also increase linehaul and off-site storage costs	% of on-time arrivals	Percentage of on-time arrivals would be measured as the proportion of trains that arrive within a predefined interval of their scheduled arrival time. In the Master Plan, DBCT make references to the % of trains that arrive within 1 hour of schedule, which suggests that this is a meaningful interval. On-time arrival could therefore be defined as within one-hour of scheduled arrival time,	Measurement of this indicator is straightforward. There may be some need to define precisely what is meant by 'scheduled arrival time'. However, it is clear from the Master Plan that DBCT closely monitors this aspect and has reported performance in the terms proposed for the KPI. As the main issue is consistency, adopted whatever definition used by DBCT for these purposes should be acceptable.

Performance dimension	Reason for inclusion	Proposed KPI	Explanation	Measurement Issues
3. Capacity utilisation	To monitor the extent to which installed capacity is utilised, in order to provide a reasonable basis for both current users and potential access seekers in negotiations with DBCT, especially where these may imply capacity expansions.	Capacity utilisation ratio	This would be measured as the ratio of tonnes of coal throughput to Gross Operating Capacity (GOC). GOC is the capacity that would be realized if all operations went according to plan – that is, it is the throughput under optimal conditions, but making a realistic allowance for scheduled equipment maintenance, lost time at the start and end of each train load, and the distribution of workload between equipment of different nameplate capacity.	In principle measuring GOC could be contentious, but in the master plan DBCT present a simple formula for estimating this which is transparent and driven by simple parameters. We would recommend simply continuing to use this formula for the present, with a periodical independent review of the continued appropriateness of the formula by an independent expert (as has been suggested by DBCT)

Performance dimension	Reason for inclusion	Proposed KPI	Explanation	Measurement Issues
4. Operational Effectiveness	To provide an indicator of extent to which promised capacity is delivered.	Ratio of net operating capacity to gross operating capacity	Operational effectiveness refers to the extent to which the terminal is able in practice to deliver the gross operating capacity. As this measure should be independent of the absolute value of capacity at any time, it is best expressed as the ratio of actual (net) operating capacity to the capacity that would be available if all went according to plan (gross operating capacity)	Net operating capacity takes into account events, including breakdowns, that impact on the throughput that could in fact be achieved in any given period. In principle this could be very complex to measure. But DBCT employs this measure for internal management purposes, so a requirement to report the measure would not impose any significant additional costs. If necessary, an independent opinion on DBCT's measurement process could be undertaken.

Performance dimension	Reason for inclusion	Proposed KPI	Explanation	Measurement Issues
5. Stockyard management	By increasing are assigned to cargo assembly and reducing storage area, stockyard management may increase operational efficiency, but this will impose a cost on users who will need to store more coal at the mine site or adjust production practices to move closer to JIT delivery.	Storage capacity (tonnes). Alternative Average terminal area available for storage (m^2)	The storage capacity can be estimated as a function of the average area devoted to storage and the allowable stockpile height. An alternative, but in our view inferior, measure (which would be simpler to measure directly) is the average area available for storage.	Storage area is part of contractual agreement between DBCT and users. We understand that allocation of storage area is actively monitored by DBCT. However, what ultimately matters to exporters is the amount of coal that they can store at the terminal, so storage capacity is the preferred measure. Storage capacity can be increased (at some cost to the terminal operator in terms of dust control) by allowing greater stockpile height. It is not clear whether actual storage capacity is currently monitored, but there should be no major difficulty doing so.

Performance dimension	Reason for inclusion	Proposed KPI	Explanation	Measurement Issues
6. Shiploading performance	The rate at which ships are loaded affects both terminal costs per tonne and the productivity of shipping, and hence the costs of the sea freight or demurrage.	Gross ship-loading rate	This KPI defines the rate at which ships are loaded expressed in tonne per gross ship-hour at berth. Gross time at berth (departure time – arrival time) should be the appropriate metric to provide an indicator of impact of terminal performance on ship productivity and hence shipping costs.	Tonnes loaded onto ships will be readily available as will time of arrival and departure at berth. There should be no practical difficulty in constructing this measure.
7. Ship waiting time	Ship waiting time affects the costs of the shipping leg, often though not necessarily entirely through the demurrage charges. It also serves as an alternative indicator that the capacity of the terminal is being approached.	Average ship delay in port	Average ship delay would be measured as the average time between first arrival in port and time of coming to berth.	The proposed KPI should be easy to measure and serve as a basis for providing reasonable estimates of demurrage costs when required.

Performance dimension	Reason for inclusion	Proposed KPI	Explanation	Measurement Issues
8. Relationship management	Maintenance of a high degree of collaboration in the supply chance is essential for high quality terminal performance, and there is a strong commitment to consultation in the Draft Access Agreement.	Customer satisfaction index	The customer satisfaction index would be a composite measure of customer responses to a set of questions on various dimensions of service quality. (It is not possible to be more precise than this until the survey instrument is designed).	If this indicator is included it will require a specifically designed and administered survey of customer satisfaction, which would focus on the quality and integrity of consultative processes. Many port organisations undertake such surveys routinely, and often they are independently designed and administered.