

Draft Determination on the New Facilities Investment Test Application for the Connection of Collgar Windfarm

Submitted by Western Power

1 March 2011

Economic Regulation Authority



WESTERN AUSTRALIA

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For further information, contact:

Economic Regulation Authority
Perth, Western Australia
Phone: (08) 9213 1900

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DRAFT DETERMINATION

1. On 25 October 2010, the Economic Regulation Authority (**Authority**) received a new facilities investment test application from Western Power submitted under section 6.71(b) of the *Electricity Networks Access Code 2004* (**Access Code**).¹ The application is for the Authority to determine that forecast new facilities investment proposed by Western Power, for the connection of the Collgar Windfarm to the South West Interconnected Network (**SWIN**), meets the new facilities investment test. The proposed works are estimated to cost \$21.7 million and involve the construction of Collgar Terminal Substation and associated works for the connection of the wind farm.
2. In making a determination on a new facilities investment test application, the Authority is required to consult with the public in accordance with the consultation requirements of Appendix 7 of the Access Code. The Authority issued an invitation for submissions on 13 December 2010, with a closing date for submissions of 29 December 2010. As part of this consultation, the Authority prepared an issues paper to assist interested parties in understanding the new facilities investment test and Western Power's new facilities investment test application.² No submissions were received.
3. Western Power's pre-approval application is for a total amount of forecast new facilities investment for the proposed works of \$21.7 million. Western Power submits that an amount of \$13.9 million meets the test of section 6.51A of the Access Code, by virtue of satisfying the new facilities investment test of section 6.52 of the Access Code. The remaining expenditure relates to dedicated customer connection assets and will be financed by a capital contribution from the customer (Collgar Windfarm).
4. After consideration of Western Power's new facilities investment test application and independent advice from the Authority's technical advisor,³ the Authority's draft determination is to not approve Western Power's application.

¹ Western Power, 11 October 2010, Approval of New Facilities Investment: Construction of Collgar Terminal Substation and associated works for the connection of Collgar Windfarm (hereafter referred to as "**new facilities investment test application**").

² Economic Regulation Authority, 13 December 2010, Issues Paper: New Facilities Investment Test Application for Connection of Collgar Windfarm Submitted by Western Power.

³ Geoff Brown & Associates Ltd.

REASONS

5. The reasons for this draft determination address the following matters:
- the test of section 6.51A of the Access Code for adding new facilities investment to the capital base;
 - the structure and elements of the new facilities investment test under section 6.52 of the Access Code;
 - details of Western Power's proposed transmission works; and
 - the assessment of the proposed transmission works against the requirements of the test of section 6.51A of the Access Code, including the new facilities investment test under section 6.52 of the Access Code.

Test for adding New Facilities Investment to the Capital Base

6. Section 6.51A of the Access Code establishes a test that must be satisfied for an amount of new facilities investment to be added to the capital base.

6.51A New facilities investment may be added to the capital base if:

- (a) it satisfies the new facilities investment test; or
- (b) the Authority otherwise approves it being added *[sic]* to the capital base if:
 - (i) it has been, or is expected to be, the subject of a contribution; and
 - (ii) it meets the requirements of section 6.52(a); and
 - (iii) the access arrangement contains a mechanism designed to ensure that there is no double recovery of costs as a result of the addition.

7. Sections 6.71 and 6.72 of the Access Code allow a service provider to seek a determination that either an actual amount, or forecast amount, of new facilities investment meets the test of section 6.51A.

6.71 A service provider may at any time apply to the Authority for the Authority to determine whether:

- (a) actual new facilities investment made by the service provider meets the test in section 6.51A; or
- (b) forecast new facilities investment proposed by the service provider is forecast to meet the test in section 6.51A.

- 6.72 If an application is made to the Authority under section 6.71, then subject to section 6.75 the Authority must make and publish a determination (subject to conditions as the Authority may consider appropriate) within a reasonable time.⁴

The New Facilities Investment Test

8. Section 6.52 of the Access Code sets out the new facilities investment test.

6.52 New facilities investment satisfies the new facilities investment test if:

- (a) the new facilities investment does not exceed the amount that would be invested by a service provider efficiently minimising costs, having regard, without limitation, to:
- (i) whether the new facility exhibits economies of scale or scope and the increments in which capacity can be added; and
 - (ii) whether the lowest sustainable cost of providing the covered services forecast to be sold over a reasonable period may require the installation of a new facility with capacity sufficient to meet the forecast sales;

and

- (b) one or more of the following conditions is satisfied:

- (i) either:
- A. the anticipated incremental revenue for the new facility is expected to at least recover the new facilities investment; or
 - B. if a modified test has been approved under section 6.53 and the new facilities investment is below the test application threshold - the modified test is satisfied;

or

- (ii) the new facility provides a net benefit in the covered network over a reasonable period of time that justifies the approval of higher reference tariffs; or
- (iii) the new facility is necessary to maintain the safety or reliability of the covered network or its ability to provide contracted covered services.

9. For convenience, the elements of the new facilities investment test are referred to below as the “efficiency test” (section 6.52(a) of the Access Code), “incremental revenue test” (section 6.52(b)(i)A of the Access Code), “net benefits test” (section 6.52(b)(ii) of the Access Code) and “safety and reliability test” (section 6.52(b)(iii) of the Access Code).

⁴ Section 6.75 of the Access Code indicates that the Authority must make a determination if the actual or forecast amount of new facilities investment is equal to or greater than \$15 million (CPI adjusted); otherwise the Authority may make a determination.

10. For the new facilities investment test to be satisfied, the new facilities investment must satisfy the efficiency test and one or more of the incremental revenue test, net benefits test, or safety and reliability test.

Western Power's Proposed Transmission Works

11. Western Power's proposed works are required to connect the Collgar Windfarm, which is located adjacent to the Merredin-Yilgarn 220 kV transmission line approximately 25 km east of Merredin Terminal, to the SWIN.
12. The proposed works consist of the construction of Collgar Terminal Substation and associated works for the connection of Collgar Windfarm. The forecast capital cost for the proposed works is \$21.7 million, inclusive of a \$2.1 million risk allowance. This cost comprises six distinct components of work.

Component of Works	Estimated Cost
(1) Construction of two dedicated circuit breaker bays and associated works for connection of the Collgar Windfarm	\$5.9 million
(2) PLC Communication works	\$1.1 million
(3) Runback scheme	\$0.8 million
(4) Cut-in to the Eastern Goldfields 220 kV transmission line	\$1.0 million
(5) Construction of two circuit breaker bays and associated works	\$11.8 million
(6) Upgrade of the existing protection scheme on the Eastern Goldfields 220 kV transmission line	\$1.1 million
Total cost of augmentation	\$21.7 million

Assessment against the New Facilities Investment Test

13. Western Power submits that \$13.9 million of the estimated total capital cost for the proposed works (i.e. \$21.7 million) satisfies the new facilities investment test.
14. In applying the new facilities investment test to the proposed works, Western Power has given separate consideration to two elements of the new facilities investment test:
- the "efficiency test" under section 6.52(a) of the Access Code; and
 - the "incremental revenue test" under section 6.52(b)(i)A of the Access Code.

Efficiency Test

Western Power's Assessment

15. Western Power submits that to satisfy the efficiency test of section 6.52(a) of the Access Code it must demonstrate that:
- the most appropriate option has been selected to meet the requirements associated with reasonable forecasts of growth of covered services;
 - the design and design standards are appropriate; and

- the delivery cost of the new facility is efficient.⁵
16. Western Power indicates that the criteria it has used to demonstrate that the most appropriate option has been selected include:
 - compliance with the Technical Rules;
 - customer requirements; and
 - the potential for load growth and its impact on Collgar Windfarm's operations as well as other users.⁶
 17. Western Power considers that the reasoning underlying the first two criteria (i.e. Technical Rules compliance and customer requirements) is self evident and does not require further elaboration. In relation to the third criterion, Western Power notes that, at the time of writing, although there were no other applicants in the applications queue requiring connection in the immediate vicinity of the Collgar Windfarm, there is the potential for further load growth in the Eastern Goldfields. Therefore, Western Power considers it prudent to allow for a voltage upgrade to the existing Eastern Goldfields transmission line when designing the connection for Collgar Windfarm. The proposed works to connect the Collgar Windfarm to the SWIN allows for this voltage upgrade.
 18. Western Power submits that the chosen design in relation to the shared assets delivers the lowest cost over the long term compared with other designs compliant with the Technical Rules.⁷
 19. Western Power indicates that it has ensured efficient delivery and value for money is obtained by using a strategy consistent with Western Power's balanced portfolio framework. A summary of the delivery mechanisms to be used is set out below in paragraph 21.
 20. Collgar Windfarm is carrying out the earthworks for the new terminal as it will be undertaking the entire wind farm civil works simultaneously so has a greater capability to deal with any granite breaking and to utilise economies of scale.
 21. Western Power has also identified in its delivery strategy a risk component of \$2.1 million.

Delivery Mechanism	Value	Percentage
Competitive tender	\$8.4 million	38%
Preferred plant supplier contract	\$4.3 million	20%
Western Power internal resource	\$5.4 million	25%
Earth works outsourced to Collgar Windfarm	\$1.5 million	7%
Risk Allowance	\$2.1 million	10%
TOTAL	\$21.7 million	100%

⁵ Western Power, New facilities investment test application, pages 11 -12.

⁶ Western Power, New facilities investment test application, page 12.

⁷ Western Power, New facilities investment test application, page 12.

22. On the basis of the above assessments, Western Power submits that the total forecast cost of the proposed works meets the efficiency test of section 6.52(a) of the Access Code.

Considerations of the Authority

23. In assessing whether the proposed transmission works meets the efficiency test of section 6.52(a) of the Access Code, the Authority has given consideration to the choice of project, the design standard and whether the forecast costs for the project are minimised.

Choice of project

24. Technical advice to the Authority notes that Western Power considered three options for the connection of the wind farm to the grid. Two of these options involved the construction of a new transmission line (either a single circuit 220 kV or double circuit 132 kV line) to connect the wind farm to the grid at Merredin terminal station. The third option, the construction of a new terminal station at Collgar, was selected on the basis of cost. The Authority's technical advisor concurs with this on the basis that transmission lines are expensive and that a connection at Merredin would not mitigate any potential technical issues.
25. The Authority's technical advisor notes that the primary factor influencing the cost of the new terminal station is the number of circuit breakers to be installed. Western Power considered three and four circuit breaker options and selected a four breaker circuit alternative on the basis that the Collgar wind farm requested (and was prepared to pay for) a duplicated grid connection. The Authority's technical advisor considers this choice to be appropriate.
26. Taking account of Western Power's submission and advice from the Authority's technical advisor, the Authority is satisfied that the proposed works represent an efficient choice of project.

Design standards

27. The Authority's technical advisor considers that, subject to the issues noted below, the design of the project appears reasonable and the use of assets rated at 330 kV is appropriate.
28. However, the Authority's technical advisor notes the potential impact on network performance as a result of connecting a large power station in the middle of a relatively weak interconnection. The Authority's advisor notes this impact could be positive or negative and considers that Western Power should be particularly wary of negative impacts in the case of wind farms, where the real power output is dependent on wind strength and therefore characterised by large and unpredictable variations. Connection of the wind farm without adequately simulating its impact on the operation of the power system under both steady state and dynamic conditions creates a risk. Western Power may find it has to meet unforeseen mitigation costs if unexpected network operating characteristics resulting from the connection give rise to complaints from existing users.
29. The Authority's technical advisor notes that the proposed works includes replacement of the line protection between Merredin, Yilgarn and West Kalgoorlie terminal stations and a runback scheme that will limit the output of the wind farm in situations where the 132 kV line between Merredin and Northam is overloaded.

The Authority's technical advisor agrees these measures are needed to deal with system stability but notes that Western Power does not appear to have completed all the dynamic studies needed to quantify any potential stability issues resulting from the connection, so there remains a residual risk that some existing users will be adversely affected by the wind farm connection. The Authority's technical advisor considers that the dynamic system studies should have been completed prior to submission of the new facilities investment test application.

30. Taking account of Western Power's submission and advice from the Authority's technical advisor, the Authority, whilst recognising that the design of the project appears to be reasonable, notes there are potential concerns regarding the impact of connecting the wind farm on system stability and other users, and considers the dynamic system studies need to be completed before the Authority can make a determination as to whether the design standards are efficient.

Minimising project costs

31. On the minimisation of project costs, the Authority considers that this could be demonstrated in various ways, including:
- demonstrating the consistency of unit rates of construction with historical unit rates for the covered network and unit rates of similar works in other networks, taking into account trends in productivity improvements and underlying costs; and/or
 - demonstrating that the procedures for construction planning, contracting and cost control are consistent with minimising costs.
32. Technical advice to the Authority⁸ indicates that Western Power has not demonstrated that its estimated project cost is sufficiently accurate to be used as a basis for NFIT pre-approval. The total cost of the project, including both shared network and connection assets of \$21.7 million has been derived from:
- a cost estimate of \$14.5 million prepared in December 2008; and
 - a variation of \$7.2 million to reflect scope changes since the original cost estimate was prepared as well as cost increases over the intervening two year period.
33. The Authority's technical advisor notes that the 2008 cost estimate was at the level of accuracy required by the Western Power Board for business case submission and is supported by a Project Definition Document and a cost estimate report. However, no information has been provided to support the variation in costs. As the variation component represents more than a third of the total cost estimate, the Authority's technical advisor does not consider that Western Power has provided sufficient information to determine whether the cost estimate is reasonable.
34. Taking account of the concerns raised by the Authority's technical advisor regarding the lack of information to support Western Power's cost estimates and also the fact that Western Power has included a \$2.1 million risk allowance (i.e. 10% of the total forecast) in its application, the Authority is not able, at this stage, to satisfy itself that the forecast costs are efficient. The Authority would require the cost estimates for a

⁸ Geoff Brown & Associates Ltd, 9 February 2011, Memorandum: Collgar Wind Farm Connection NFIT Pre-approval Application Review.

new facilities investment application to be at least the level of accuracy required by the Western Power Board in order to make a determination.

Amount satisfying the efficiency test

35. Taking the above considerations into account, i.e.
- a lack of information supporting a third of the estimated cost;
 - the inclusion of a large risk allowance; and
 - system studies in relation to network stability are still being finalised,

the Authority is unable to determine whether the proposed costs do not exceed the amount that would be invested by a service provider efficiently minimising costs and hence has determined that the Western Power's new facilities investment test application does not meet the requirement of the efficiency test of section 6.52(a) of the Access Code. The Authority also considers that the costs relating to the communication component should be classified as a shared asset for the reasons given by the Authority's technical advisor.

Incremental Revenue Test

Western Power's Assessment

36. Western Power relies on the incremental revenue test to demonstrate that the new facilities investment relating to shared assets satisfies section 6.52 (b) of the new facilities investment test.
37. Western Power has calculated the net present value of the incremental revenue that will arise from the connection of the Collgar Windfarm over a 15 year period. In its calculation, Western Power has estimated tariff revenue to be \$2,178,750 per annum and has assumed flat real network access prices from the date of commissioning and a real discount rate of 6.76%.
38. Western Power submits that the incremental revenue will be sufficient to cover the shared cost of the proposed works (i.e. the shared assets at \$13.9 million) and consequently the incremental revenue test is satisfied.⁹

Considerations of the Authority

39. The Authority has considered Western Power's claim that the incremental revenue that will arise from the connection of Collgar Windfarm will be sufficient to cover the shared cost of the proposed works (i.e. the shared assets at \$13.9 million).
40. Advice from the Authority's technical advisor notes that Western Power has used a discounted cash flow model to determine whether the incremental revenue test is satisfied, and that this model relies on the following parameters:
- an estimated capital cost for the shared works of \$13.9 million;

⁹ Western Power, New facilities investment test application, page 14.

- a discount rate of 6.76%, which is the real pre-tax weighted average cost of capital used in Western Power's access arrangement for the first access arrangement period;
 - an annual maintenance cost of 2.46% of the capital cost of the works to connect Collgar Windfarm;
 - a 15 year analysis timeframe; and
 - annual revenue from the customer (Collgar Windfarm) of \$2,178,750.
41. The technical advice to the Authority is:
- there is no rationale for using the pre-tax weighted average cost of capital used in Western Power's access arrangement for the first access arrangement period when all other cost and revenue inputs have been updated to current levels; and
 - the reservations about the cost estimate outlined in paragraph 33 affect the calculation as potentially the amount of capital expenditure required to be met by incremental revenue will change.
42. The Authority has set out its considerations regarding the reasonableness of the forecast costs against the requirements of the efficiency test in paragraph 35 above.
43. The Authority considers the discount rate used by Western Power is incorrect and it should have used a discount rate consistent with the cost of capital determined for the current access arrangement, i.e. 7.98 per cent. An adjustment for this reduces incremental revenue by \$1.2 million.
44. The Authority has also identified that Western Power has included goods and service tax (GST) in its calculation of annual revenue. Western Power has confirmed this was an unintentional error. The Authority has recalculated incremental revenue to exclude GST. Adjusting Western Power's calculation to remove the error reduces incremental revenue by \$1.9 million.
45. The Authority observes that Western Power has, in its incremental revenue calculation, only given consideration to the incremental revenue to be recovered over a 15 year period. As the expected life of network transmission assets and wind farm is likely to be considerably longer than this, the Authority considers that it would be reasonable to consider the incremental revenue over a longer period than 15 years. The Authority notes this would increase the amount of incremental revenue. For example, increasing the period to 25 years would increase incremental revenue by \$3.5 million.
46. After taking account of the issues outlined above, the Authority considers it is likely that any reductions in incremental revenue as a result of adjustments to reflect the current discount rate and removal of GST from the calculation would most likely be offset by using a more appropriate time period such as 25 years. Therefore, subject to any uncertainties regarding the efficient cost of the investment as discussed in paragraph 35, the incremental revenue from the connection of Collgar Windfarm is likely to be sufficient to cover the expenditure relating to shared assets required to connect the wind farm.

Safety and Reliability Test

Western Power's Assessment

47. Western Power submits that the proposed works to connect the Collgar Windfarm are not required for safety and reliability reasons except for the upgrade of the existing protection scheme on the Eastern Goldfields 220kV transmission line. The benefit associated with the protection upgrade works has not been separately quantified.

Considerations of the Authority

48. As Western Power does not rely on the safety and reliability test to demonstrate that an amount of the total forecast cost of the proposed works satisfies section 6.52(b) of the new facilities investment test, and in light of no public submissions, the Authority has not given consideration to this matter.

Net Benefits Test

Western Power's Assessment

49. Western Power does not rely on the net benefits test in its assessment of whether the proposed transmission works satisfies the new facilities investment test. In particular, Western Power considers that the proposed investment does not provide any quantifiable net benefit to network users at this point in time as the investment is to provide for the connection of a single customer and would not be required otherwise.¹⁰

Considerations of the Authority

50. As Western Power does not rely on the net benefits test to demonstrate that an amount of the total forecast cost of the proposed transmission works satisfies section 6.52(b) of the new facilities investment test, and in light of no public submissions, the Authority has not given consideration to this matter.

¹⁰ Western Power, New facilities investment test application, page 13.