Final Determination on the New Facilities Investment Test for Transmission Works to Supply the Binningup Desalination Plant

Submitted by Western Power

2 March 2011

Economic Regulation Authority
WESTERN AUSTRALIA

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FINAL DETERMINATION

1. On 12 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 transmission works to supply electricity to the Binningup Desalination Plant ("**proposed transmission works**"), meets the new facilities investment test. The proposed transmission works are estimated to cost $52.63 million and involve the installation of a second 330/132 kV transformer at Kemerton Terminal and construction of a 132 kV transmission line to connect the desalination plant.

2. The proposed transmission works were the subject of an application made to the Authority in October 2009 for the Authority to waive the requirements for the application of the regulatory test under Chapter 9 of the Access Code.[2] The Authority subsequently waived the requirements for the regulatory test on the basis that the nature of the funding of the proposed transmission works would not cause a net cost to those who generate, transport and consume electricity in Western Power's covered network and any interconnected system.[3] The new facilities investment test is a separate test under the Access Code that requires a separate determination by the Authority.

3. For the new facilities investment test to be satisfied, the new facilities investment must not exceed the amount that would be invested by a service provider efficiently minimising costs and must satisfy at least one of the following conditions:

   - the investment generates enough revenue to cover the investment costs (the "incremental revenue" condition); or
   - the investment provides a net benefit to justify higher network tariffs (the "net benefits" condition); or
   - the investment is necessary to maintain the safety or reliability of the network or its ability to provide network services (the "safety and reliability" condition).

4. 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 12 November 2010, with a closing date for submissions of 26 November 2010. As part of this consultation, the Authority prepared an issues paper to assist interested parties in understanding the new facilities investment test

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[1] Western Power, 1 October 2010, Approval of New Facilities Investment: Installation of a second 330/132kV transformer at Kemerton Terminal and construction of a 132kV transmission line to supply Binningup Desalination Plant (hereafter referred to as "**new facilities investment test application**").

[2] Western Power, 7 October 2009, Request for Wavier of Regulatory Test: Installation of a second 330/132 kV transformer at Kemerton terminal and construction of a 132 kV transmission line to supply Binningup Desalination Plant.

[3] Economic Regulation Authority, 4 January 2010, Determination on an Application from Western Power to Waive the Regulatory Test for New Transmission Works to Supply the Binningup Desalination Plant.

and Western Power's new facilities investment test application.[4] No submissions were received.

5. On 21 December 2010, the Authority issued a Draft Determination to not approve Western Power's new facilities investment test application on the basis that Western Power's total forecast of new facilities investment (i.e. $52.63 million) exceeds the amount that would be invested by a service provider efficiently minimising costs.[5] The Authority estimated the efficient amount to be $50.53 million.

6. The Authority invited submissions on the Draft Determination until 21 January 2011. The only submission received was from Western Power.[6]

7. After consideration of Western Power's new facilities investment application, its subsequent submission and independent advice from the Authority's technical advisor, the Authority's Final Determination is to not approve Western Power's new facilities investment test application. Specifically, the Authority has determined that the total forecast of new facilities investment exceeds the amount that would be invested by a service provider efficiently minimising costs. The Authority estimates the efficient amount to be $50.53 million.

8. On the basis of the Authority's estimated efficient cost of $50.53 million, the Authority has determined that an amount of up to $29.2 million may satisfy the new facilities investment for reason of meeting the conditions of incremental revenue and safety and reliability.

REASONS

Test for Adding New Facilities Investment to the Capital Base

9. 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 adding *[sic]* to the capital base if:
>
> (i) it has been, or is expected to be, the subject of a contribution; and

[4] Economic Regulation Authority, 12 November 2010, Issues Paper: New Facilities Investment Test Application for Transmission Works to Supply the Binningup Desalination Plant Submitted by Western Power.

[5] Economic Regulation Authority, 21 December 2010, Draft Determination on the New Facilities Investment Test Application for Transmission Works to Supply the Binningup Desalination Plant.

[6] Western Power, 28 January 2011, Response to the Draft Determination on the New Facilities Investment Test Application for Transmission Works to Supply the Binningup Desalination Plant. The Authority received Western Power's submission after the closing date for submissions of 21 January 2011 and has accepted the submission as a late submission pursuant to section A7.21 of the Access Code.

(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.

10. 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.[7]

The New Facilities Investment Test

11. 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

[7] 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.

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.

12. 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).

13. 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 Pre-Approval Application

14. Western Power's proposed transmission works are required to connect the Water Corporation's second desalination plant in Binningup, approximately 50 km north of Bunbury.

15. The proposed transmission works include the installation of a second 330/132 kV transformer and construction of a 132 kV switchyard at Kemerton Terminal, and construction of a 10 km 132 kV transmission line to connect the Binningup Desalination Plant. The forecast capital cost for the proposed transmission works is $52.63 million; comprising four distinct components of work.

Component of Works	Estimated Cost
(1) Binningup 132kV substation works (with the assets identified as connection assets)	$3.30 million
(2) Binningup substation to Kemerton Terminal 132kV transmission line (with the assets identified as connection assets)	$16.53 million
(3) Kemerton Terminal connection of the 132kV transmission line (with the assets identified as connection assets)	$1.50 million
(4) Kemerton Terminal works including installation of a second 330/132 kV transformer and construction of a 132 kV switchyard (with the assets identified as shared network assets)	$31.30 million
TOTAL	**$52.63 million**

16. Western Power's new facilities investment test application is for the Authority to determine that an amount of $31.3 million satisfies the test of section 6.51A of the Access Code, by virtue of satisfying the new facilities investment test. Western Power has determined this amount based on the cost of the Kemerton Terminal works as the other three components of work relate to customer connection assets.

Assessment Against the New Facilities Investment Test

17. The Authority considered Western Power's application under each part of the new facilities investment test as set out below.

Efficiency Test

Authority's Draft Determination

18. In assessing whether the proposed transmission works met the efficiency test of section 6.52(a) of the Access Code, the Authority gave consideration to the choice of project, the design standard and whether the forecast costs for the project were minimised.

19. On the choice of project, the Authority accepted that satisfaction of the regulatory test (through the Authority's determination to waive the requirements for the application of the regulatory test) was adequate demonstration that the proposed transmission works represented an efficient choice of project.

20. On the matter of design standard, the Authority was not satisfied that Western Power had provided sufficient evidence to demonstrate the design and cost efficiencies associated with its approach to using standard 490 MVA rated transformers for 330 kV terminal stations in situations where the load requirements could be met with a lower rated (250MVA or 350 MVA) transformer. Without further substantiation of the efficiency benefits associated with such an approach, the Authority believed it would be premature for it to make an assessment as to the appropriateness of Western Power's design standards for the purposes of the new facilities investment test. The Authority considered that such efficiency benefits could be demonstrated through, for example, a cost benefit analysis that validates the dynamic efficiency of the approach to the particular design and/or design standard. Taking these matters into account, the Authority considered that potential cost efficiencies of up to $2.1 million could be achieved for the proposed transmission works with respect to design standards.

21. With respect to whether the forecast costs for the project were minimised, the Authority considered that Western Power has adequate delivery processes and procedures in place, which should facilitate an investment that does not exceed an amount that would be invested by a service provider efficiently minimising costs. In particular, the Authority noted that Western Power will use preferred supplier contracts and competitive tender mechanisms to deliver over half the total value of the investment. The Authority accepted that such delivery mechanisms, if periodically reviewed and maintained to reflect current market conditions, are consistent with minimising costs and are likely to result in efficient investment costs.

22. On the basis of information provided by Western Power and technical advice, the Authority considered that Western Power's total forecast cost of $52.63 million exceeded the amount that would be invested by a service provider efficiently minimising costs and hence did not meet the requirements of the efficiency test of section 6.52(a) of the Access Code. On the basis of the information provided by Western Power and technical advice, the Authority considered that a cost that would be consistent with the requirement of the efficiency test would be in the order of $50.53 million as indicated in the table below.

Amount invested by a service provider efficiently minimising costs ($ million)	Western Power's Assessment	Authority's Draft Decision
(1) Binningup 132kV substation works	3.30	3.30
(2) Binningup 132kV transmission line	16.53	16.53
(3) Kemerton Terminal connection	1.50	1.50
(4) Kemerton Terminal works	31.30	29.20
TOTAL	**52.63**	**50.53**

Western Power's Further Submission to the Authority

23. In its further submission to the Authority Western Power has responded to the Authority's considerations and determination on the efficiency test. In particular, Western Power has provided additional information to justify its choice of transformer rating (490 MVA). This information includes independent advice from NERA Economic Consulting (**NERA**), which seeks to "quantify additional benefits particular to Kemerton that can justify the choice of transformer rating on its own merits".[8] With respect to this independent advice, Western Power indicates that:

- NERA has used Real Options Analysis (**ROA**) as the basis to quantify benefits, which allows for the systematic consideration of key uncertainties, and captures the value provided by integrating the ability to adapt long-term network investment plans over time as circumstances change; and
- NERA's analysis concludes that the 490 MVA alternative has the lowest net present cost once future uncertainties, investment decisions and reduced service costs are explicitly incorporated into the analysis.[9]

24. In addition, Western Power's submission provides additional comments on the determination of an asset write-down amount (inefficient costs) and planning horizon.[10]

- Western Power is of the view that an appropriate determination of efficient cost is the present value of the long-run cost of future investments required to maintain the safety and reliability of the network, not the actual upfront cost of only the initial investment. Western Power considers that the write-down amount of any investment deemed not to meet the efficiency test should be based on net present cost rather than the full upfront cost differential so as to not unreasonably penalise the service provider.
- Western Power notes that the Authority's technical consultant has suggested that an appropriate planning horizon for transmission assets is ten years whereas Western Power is of the view that the planning horizon for transmission assets should be 20 years or more in some circumstances.

[8] Western Power submission of 28 January 2011, page 5 and Appendix 1.

[9] Western Power submission of 28 January 2011, page 6.

[10] Western Power submission of 28 January 2011, page 7.

Final Determination of the Authority

25. In making its final determination on whether the proposed transmission works meets the efficiency test of section 6.52(a) of the Access Code, the Authority has considered Western Power's further submission and additional advice from the Authority's technical advisor.

26. In its new facilities investment test application Western Power stated that:

> "A net present cost analysis specifically for this site suggests that it may be a lower long run cost to install a 250 MVA or 350 MVA transformer. However that analysis demonstrates that the cost difference is less than 10% between the options, which does not provide sufficient justification to introduce a different size transformer from the standard 490 MVA unit that is in service in all other terminal stations[11]."

27. As outlined in paragraph 20 above, the Authority was not satisfied that Western Power had provided sufficient evidence to demonstrate the design and cost efficiencies associated with its approach to using standard 490 MVA rated transformers for 330 kV terminal stations in situations where the load requirements could be met with a lower rated (250MVA or 350 MVA) transformer. Without further substantiation of the efficiency benefits associated with such an approach, the Authority believed it would be premature for it to make an assessment as to the appropriateness of Western Power's design standards for the purposes of the new facilities investment test. The Authority considered that such efficiency benefits could be demonstrated through, for example, a cost benefit analysis that validates the dynamic efficiency of the approach to the particular design and/or design standard.

28. In its further submission[12], Western Power makes no mention of the benefits of standardisation and instead has provided a report commissioned from NERA which sets out a new net present cost (**NPC**) analysis using a different methodology from that used in the new facilities investment test application, Real Options Analysis. Western Power submits that, based on NERA's analysis, the 490 MVA alternative has the lowest NPC once future uncertainties, future investment decisions and reduced service costs are explicitly incorporated in the analysis[13].

29. Western Power has not provided any information in relation to the underlying assumptions made in the analysis and very little information is provided in NERA's report in relation to the outputs of the analysis. Furthermore, NERA qualifies its report stating:

> "As a consequence of the short timeframe, our study has been based entirely on the information provided to us by Western Power. This has included having access to a number of relevant documents, supplemented by opportunities to discuss the materials provided to us through a series of teleconferences with representatives of

[11] Western Power, 1 October 2010, Approval of New Faciliites Investment: Installation of a second 330/132kV transformer at Kemerton Terminal and construction of a 132kV transmission line to supply Binningup Desalination Plant, page 12.

[12] Western Power, 28 January 2011, Response to the Draft Determination on the New Facilities Investment Test Application for Transmission Works to Supply the Binningup Desalination Plant.

[13] Western Power, 28 January 2011, page 6.

> Western Power. We have not conducted any independent assessment of the facts or data provided to us and forming the information set for our analysis[14]."

30. The further submission from Western Power does not address the concerns of the Authority raised in its draft determination in relation to substantiating the design and cost efficiencies associated with its approach to using standard 490 MVA rated transformers for 330 kV terminal stations in situations where the load requirements could be met with a lower rated transformer. The Authority acknowledges that there may be benefits in standardisation of components, for example, lower supplier costs. However, in the absence of sufficient evidence from Western Power to demonstrate this, the Authority is not able form an opinion.

31. The Authority notes Western Power's submission which uses ROA to revise the net present cost analysis previously provided in the Western Power new facilities investment test application. The Authority's technical advisor has reviewed Western Power's submission. Whilst recognising that such a method attempts to address uncertainty when used appropriately, it relies on a large number of inputs, which in turn require a significant number of assumptions to be made. Use of such an approach would require robust assumptions supported by rigorous evidence and analysis in order for the Authority to place any weight on it. As Western Power has not provided sufficient details of the inputs or evidence to support any assumptions made, the Authority is not able to satisfy itself that the analysis is robust and, therefore, cannot place any reliance on it and is not convinced by the approach taken.

32. Western Power submits that an appropriate determination of efficient cost is the present value of the long-run cost of future investment, not the actual upfront cost of only the initial investment. The Authority agrees that comparisons of the present value of long run costs of future investments are an appropriate tool for identifying the most efficient option. However, the Authority disagrees with Western Power's view that the write-down amount of any investment deemed not to meet the efficiency test should be based on net present cost rather than the full upfront cost differential. The Authority considers the relevant amount of efficient capital expenditure to be added to the capital base is the forecast capital expenditure, not the net present value of that forecast and, conversely, the relevant amount of non efficient expenditure to be excluded from the capital base is the forecast amount, not the net present value of the forecast. The Authority notes that under section 6.57 of the Code, if only part of any new facilities investment satisfies the new facilities investment test, that part ("recoverable portion") may be added to the capital base. The remaining portion may be treated as "speculative investment" under section 6.58 of the Code and under section 6.60 any part of the speculative investment amount which satisfies the new facilities investment test at a later time may be added to the capital base.

33. The Authority's technical advisor agrees with Western Power's view that the planning horizon for transmission assets should be 20 years or more in some circumstances. The statement Western Power refers in the draft determination regarding a planning horizon of ten years relates to transformer assets, not transmission assets. Furthermore, the comment by the Authority's technical advisor was made in the context of Western Power using a 50 year demand forecast to justify the use of 490 MVA transformers.

[14] Western Power, 28 January 2011, Appendix 1 page 2.

Safety and Reliability Test

Authority's Draft Determination

34. The Authority considered Western Power's assertion that the capacity of the existing network, in the Bunbury load area, would be exceeded with natural load growth by the summer period in 2013/14.[15] Western Power contended that network upgrades to the Kemerton Terminal at that time would meet the safety and reliability test because the upgrades would be necessary to maintain the safety and reliability of supply. The requirement to upgrade the Kemerton Terminal was brought forward to 2011, however, as a result of the load and timing requirements of the customer (Water Corporation).

35. The Authority accepted Western Power's assessment that network upgrades to the Kemerton Terminal would be required in 2013/14 (in the absence of the desalination plant) and would at this time meet the safety and reliability test as the upgrades would be necessary to maintain the safety and reliability of supply to the Bunbury load area.

36. The Authority examined Western Power's assessment of the cost incurred in bringing forward the upgrades to Kemerton Terminal from 2013 to 2011 (i.e. $6 million), and hence the amount of new facilities investment to satisfy the safety and reliability test (i.e. the remaining cost of $25.3 million). The Authority was satisfied that Western Power's calculation of the "brought forward costs" was reasonable. However, consistent with the Authority's decision regarding an amount that would be invested by a service provider efficiently minimising costs (refer paragraph 22), the Authority recalculated the cost incurred in bringing forward the Kemerton Terminal upgrade from 2013 to 2011, and hence the amount of new facilities investment that might satisfy the safety and reliability test. On the basis of an estimated efficient cost of $29.2 million for the Kemerton Terminal works and using Western Power's calculation method, the Authority determined the brought forward cost to be $5.6 million and hence determined the amount that may satisfy the safety and reliability test to be $23.6 million.

Western Power's Further Submission to the Authority

37. Western Power's further submission to the Authority does not provide any additional information with respect to the safety and reliability test.

Final Determination of the Authority

38. Having regard to the Authority's final determination with respect to the amount that would be invested by a service provider efficiently minimising costs (refer paragraph 22) and that no additional information has been provided by Western Power to the Authority with respect to the safety and reliability test, the Authority has decided to maintain its draft determination position. That is, on the basis of an estimated efficient cost of $29.2 million for the Kemerton Terminal works and using Western Power's brought forward calculation method, the Authority has determined

[15] Western Power, New facilities investment test application, Attachment 1: pages 5 – 7.

the brought forward cost to be $5.6 million and hence has determined the amount that may satisfy the safety and reliability test to be $23.6 million.

Incremental Revenue Test

Authority's Draft Determination

39. The Authority considered Western Power's claim that the incremental revenue that would arise from the connection of the desalination plant would be sufficient to cover the expenditure which does not meet the safety and reliability test (i.e. the brought forward cost of $6 million discussed in paragraph 36 above).

40. Having regard to the expected life of network transmission assets and expected operating life of a desalination plant, the Authority considered that it would be reasonable to consider the incremental revenue over a longer period than 15 years. The Authority noted, however, in this instance that there was sufficient incremental revenue over a 15 year period to cover the $6 million expenditure to upgrade the Kemerton Terminal, which does not meet the safety and reliability test (i.e. the "brought forward cost"). Increasing the period over which the incremental revenue is calculated would, in this instance, have no impact on the outcome of the incremental revenue test.

41. As a result of determining that the efficient cost of the proposed transmission works was less than the amount submitted by Western Power (refer paragraph 22), the Authority recalculated the brought forward costs for the Kemerton Terminal upgrade to be $5.6 million, which is lower than the brought forward costs contained in Western Power's new facilities investment test application. Reducing the brought forward costs, in this instance, increased the margin by which the incremental revenue test is satisfied (i.e. a shorter period of time is needed to recover the brought forward costs).

Western Power's Further Submission to the Authority

42. Western Power's further submission to the Authority does not provide any additional information with respect to the incremental revenue test.

Final Determination of the Authority

43. Having regard to the Authority's final determination with respect to the amount that would be invested by a service provider efficiently minimising costs (refer paragraph 22) and that no additional information has been provided by Western Power to the Authority with respect to the incremental revenue test, the Authority has decided to maintain its draft determination position. That is, on the basis of an estimated efficient cost of $29.2 million for the Kemerton Terminal works, the Authority has recalculated the brought forward costs for the Kemerton Terminal upgrade to be $5.6 million, which is lower than the brought forward costs contained in Western Power's new facilities investment test application. Reducing the brought forward costs, in this instance, increases the margin by which the incremental revenue test is satisfied (i.e. a shorter period of time is needed to recover the brought forward costs).

Net Benefits Test

Authority's Draft Determination

44. As Western Power did 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 did not give consideration to this matter in its draft determination.

Western Power's Further Submission to the Authority

45. Western Power's further submission to the Authority does not provide any additional information with respect to the net benefits test.

Final Determination of the Authority

46. Given that no additional information has been provided by Western Power to the Authority with respect to the net benefits test, the Authority has decided to maintain its draft determination position. That is, the Authority has not given consideration to this matter.

Total Satisfying the New Facilities Investment Test

47. For the new facilities investment test to be satisfied, the new facilities investment must satisfy the efficiency test (section 6.52(a) of the Access Code) and one or more of the other tests specified in section 6.52(b) of the Access Code (i.e. the incremental revenue test, net benefits test or safety and reliability test).

48. On the basis of the above considerations, the Authority has determined that an amount of up to $29.2 million may satisfy the new facilities investment test, as indicated in the table below. The Authority will review this matter again when undertaking its assessment of the third access arrangement and will take account of any new information at that time.

Amount Satisfying the New Facilities Investment Test	**Western Power's Application**	**Authority's Draft Determination**	**Authority's Final Determination**
Section 6.52(a) – *"Efficiency Test"*	**$52.63 million**	**$50.53 million**	**$50.53 million**
Section 6.52(b) – Other Tests			
"Incremental Revenue Test" (section 6.52(b)(i)A)	$6 million	$5.6 million	$5.6 million
"Net Benefits Test" (section 6.52(b)(ii))	Not relied on in assessment	Not assessed	Not assessed
"Safety and Reliability Test" (section 6.52(b)(iii))	$25.3 million	$23.6 million	$23.6 million
Sub-total of Other Tests	**$31.3 million**	**$29.2 million**	**$29.2 million**
TOTAL	**$31.3 million**	**$29.2 million**	**$29.2 million**