

Final Determination on the New Facilities Investment Test for a 66/11 kV Medical Centre Zone Substation Expansion and Voltage Conversion of the Distribution Network

Submitted by Western Power

19 February 2009

Economic Regulation Authority



WESTERN AUSTRALIA

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FINAL DETERMINATION

1. On 7 August 2008, Western Power submitted to the Economic Regulation Authority (“**Authority**”) an application (“**pre-approval application**”) under section 6.71 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 a 66/11 kV zone substation and associated distribution works at Sir Charles Gairdner Hospital (“**proposed substation**”) meets the test under section 6.51A of the Access Code for adding new facilities investment to the capital base.²
2. The proposed substation was the subject of an application made to the Authority in March 2008 for the Authority to waive the requirements of the regulatory test under Chapter 9 of the Access Code.³ The Authority subsequently waived the requirements of the regulatory test on the basis that it was satisfied that there were no viable alternative options to the proposed substation, and that the nature of the funding of the proposed substation would not cause a net cost to those who generate, transport and consume electricity in the covered network and any interconnected system.⁴ The test under section 6.51A is a separate test under the Access Code, requiring a separate determination by the Authority.
3. In making a determination on the pre-approval application, the Authority is required to consult with the public in accordance with the requirements of Appendix 7 of the Access Code. The Authority issued an invitation for submissions on 26 September 2008, with a closing date for submissions of 13 October 2008. As part of this consultation, the Authority prepared an issues paper⁵ to assist interested parties in understanding the new facilities investment test and Western Power’s pre-approval application. Two submissions were received in response to this invitation, including a supplementary submission from Western Power (“**supplementary submission**”)⁶ addressing matters raised in the Authority’s Issues Paper.

¹ Western Power, 5 August 2008, Submission to the Economic Regulation Authority Pre-Approval of New Facilities Investment 66/11 kV Medical Centre Substation expansion and voltage conversion of distribution network (hereafter cited as the “**pre-approval application**”).

² At the time that Western Power submitted its pre-approval application, section 6.71 of the Access Code referred to a determination of whether proposed new facilities investment satisfies the new facilities investment test under section 6.52 of the Access Code. Amendments to the Access Code gazetted on 22 October 2008 have resulted in section 6.71 now referring to a broader test under section 6.51A. This Draft Determination has been prepared as if Western Power’s pre-approval application has been made under the Access Code as amended.

³ Western Power, 24 March 2008, Submission to the Economic Regulation Authority Request for Waiver of Regulatory Test 66/11 kV Medical Centre Zone Substation expansion and voltage conversion of distribution network (hereafter cited as the “**request for waiver**”).

⁴ Economic Regulation Authority, 15 April 2008, Determination on an Application from Western Power to Waive the Regulatory Test for a 66/11 kV Medical Centre Zone Substation Expansion and Voltage Conversion of the Distribution Network.

⁵ Economic Regulation Authority, 26 September 2008, Issues Paper on the New Facilities Investment Test for a 66/11 kV Medical Centre Zone Substation Expansion and Voltage Conversion of the Distribution Network.

⁶ Western Power, 21 October 2008, Public Submission to the Economic Regulation Authority Response to Issues Paper, published by the ERA dated 26 September 2008, for the 66/11kV Medical Centre Zone

4. On 11 December 2008, the Authority issued a Draft Determination to not approve Western Power's pre-approval application.⁷ The reason for this Draft Determination was that Western Power's forecast new facilities investment of \$28.4 million was determined to exceed the amount that would satisfy the test of section 6.52(a) of the Access Code (i.e. the amount that would be invested by a service provider efficiently minimising costs). The Authority's assessment also indicated that a greater amount of new facilities investment than claimed by Western Power may be considered to satisfy elements of the new facilities investment test. To the extent that this greater amount is able to be added to the capital base, this will affect the amount of a capital contribution that Western Power can charge.
5. The Authority invited submissions on the Draft Determination with a closing date for submissions of 7 January 2009. The submissions received are available from the Authority's web site,⁸ including a further submission from Western Power ("**further submission**"). In its further submission, Western Power submits that the amount of forecast new facilities investment satisfying the efficiency test (section 6.52(a) of the Access Code) for the proposed substation should be determined at \$28.4 million.⁹ Western Power did not comment further on its original application that the Authority determine that an amount of \$18.7 million meets the test of section 6.51A of the Access Code, for addition to the capital base, by virtue of satisfying the new facilities investment test of section 6.52 of the Access Code.
6. After consideration of Western Power's pre-approval application and subsequent submissions, submissions received in response to the Authority's Draft Determination and further independent advice from the Authority's technical advisor,¹⁰ the Authority's Final Determination is to not approve the application by Western Power.

REASONS

7. The Authority's Final Determination to not approve the application by Western Power is for the reason that Western Power's forecast new facilities investment of \$28.4 million exceeds the amount that would satisfy the efficiency test of section 6.52(a) of the Access Code.
8. The reasons for this Final 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;

Substation expansion and voltage conversion of the distribution network (hereafter cited as the "**supplementary submission**").

⁷ Economic Regulation Authority, 11 December 2008, Draft Determination on the New Facilities Investment Test for a 66/11 kV Medical Centre Zone Substation Expansion and Voltage Conversion of the Distribution Network.

⁸ http://www.era.wa.gov.au/3/717/48/6611kv_medical_.pm

⁹ Western Power, 7 January 2009, Submission to the Economic Regulation Authority Comments on the ERA's Draft Determination for the 132/11 kV Medical Centre Zone Substation (hereafter cited as the "**further submission**"), p. 11.

¹⁰ Geoff Brown and Associates, February 2009, New Facilities investment Test - Medical Centre Substation. Available from: http://www.era.wa.gov.au/3/717/48/6611kv_medical_.pm

- details of the proposed substation; and
- the assessment of the proposed substation investment 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

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
 - (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.

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
 - 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 conditional tests (or elements) of the new facilities investment test are referred to below as the “efficiency test” (section 6.52(a)), “incremental revenue test” (section 6.52(b)(i)A), “net benefits test” (section 6.52(b)(ii)) and “safety and reliability test” (section 6.52(b)(iii)).
- 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. The proposed substation comprises a 66/11 kV zone substation to be located at Sir Charles Gairdner Hospital (“**medical centre**”) and associated distribution works that include line and cable work to establish incoming supply to the substation and voltage conversion of the secondary distribution network from 6.6 kV to 11 kV.¹¹
- 15. Western Power indicates that the main drivers for the proposed substation are:
 - a shortfall in capacity to meet forecast load growth at the medical centre as it undergoes major expansion;
 - a shortfall in capacity at the university substation to meet the forecast load growth at the University of Western Australia; and
 - a need to upgrade the distribution system in surrounding areas from 6.6 kV to 11 kV to meet the increase in general consumer demand.¹²
- 16. Western Power further indicates that the substation would need to be upgraded by 2020 even without load growth at the medical centre. The upgrade in 2020 would form part of Western Power’s broader plan to convert the distribution network in Perth’s western suburbs area to 11 kV as part of its voltage conversion programme.¹³

¹¹ Pre-approval application, pp. 3, 4.

¹² Pre-approval application, p. 3.

¹³ Pre-approval application, p. 3; Supplementary submission, pp. 4, 5; Further submission, pp. 6, 12.

17. Western Power indicates that the forecast capital cost of the proposed substation is \$28.4 million.¹⁴ This cost includes \$25.8 million for the new substation and cable works (transmission works), and \$2.6 million for the distribution voltage conversion (distribution works).
18. In its supplementary submission Western Power provides a further breakdown of the transmission works as follows:¹⁵

Transmission Works	\$25.8 million
<i>66 kV substation work</i>	<i>\$16.41 million</i>
<i>Western Power 11 kV substation work</i>	<i>\$2.39 million</i>
<i>Decommissioning and removal of old medical substation</i>	<i>\$0.93 million</i>
<i>Line work (stages 1 and 2)</i>	<i>\$4.47 million</i>
<i>Environment and land management</i>	<i>\$1.29 million</i>
<i>Project management</i>	<i>\$0.29 million</i>
Distribution Works	\$2.6 million
<i>Distribution voltage conversion</i>	<i>\$2.6 million</i>
Total Works	\$28.4 million

19. Western Power's pre-approval application is for the Authority to determine that an amount of \$18.7 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 entire \$2.6 million of distribution works and an amount of \$16.1 million of the \$25.8 million of transmission works satisfying the new facilities investment test.

Assessment Against the New Facilities Investment Test

20. The Authority has considered the pre-approval application under each part of the new facilities investment test as set out below.

Efficiency Test

Authority's Draft Determination

21. In assessing whether the proposed substation met the efficiency test of section 6.52(a) of the Access Code, the Authority gave consideration to the issues of both the choice of project, and technical efficiency (whether the costs are minimised for the particular project).

¹⁴ Pre-approval application, p. 4.

¹⁵ Supplementary submission, p. 4.

22. On the choice of project, the Authority accepted that satisfaction of the regulatory test (through the Authority's determination to waive the application of the regulatory test) was adequate demonstration that the proposed substation represented an efficient choice of project.
23. On technical efficiency, the Authority was not satisfied that the design of the proposed substation was consistent with technical efficiency for the project. On the basis of the information available at the time, the Authority considered that the design was inconsistent with a service provider efficiently minimising costs in several respects.
- First, Western Power proposed the use of 132 kV switchgear and cables even though the substation would operate at 66 kV, for reason that the 132 kV equipment would enable the substation to be upgraded to 132 kV in the future and that 66 kV switchgear was not available with a sufficient fault rating. However, on the basis of technical advice, the Authority determined that Western Power has not demonstrated that upgrading the substation to 132 kV was sufficiently planned to justify the material additional expense of 132 kV equipment, and that 66 kV switchgear was available with the required fault rating.
 - Secondly, Western Power proposed to utilise three incoming lines and three transformers. On the basis of technical advice, the Authority determined that this was not justified by the forecast load for the substation, and that the necessary capability of the substation could be achieved with two incoming lines and two transformers, with the design enabling a third line and transformer to be added at a later time if necessary.
 - Thirdly, the Authority determined that Western Power's forecast cost for environment and land management activities, while reasonable for a green field site, could be excessive given that the proposed substation would be located adjacent to the existing substation and within an area that was already developed, and that environmental impact assessments and approvals could be limited in extent, or unnecessary.
24. Taking these matters into account, the Authority determined that potential cost efficiencies are able to be achieved for the proposed substation as indicated in Table 1.

Table 1 Draft Determination: Potential cost efficiencies achievable by Western Power

	\$ million
Total project cost estimated by Western Power	28.37
Cost saving by reduction in switchgear rating to 66kV	(0.54)
Cost saving by reduction of switchgear configuration to a two-line two-transformer configuration	(0.97)
Reduction in cost allowance for environment and land management	(1.00)
Revised project cost	25.86

25. The Authority determined that Western Power's total forecast cost of \$28.4 million exceeded the amount that would be invested by a service provider efficiently minimising costs and therefore did not meet the requirement of section 6.52(a) of the Access Code.
26. On the basis of the information available at the time of the draft determination, the Authority determined that a cost that would be consistent with the requirement of section 6.52(a) is in the order of \$25.9 million.

Western Power's Further Submission

27. In its further submission, Western Power contends that the forecast total cost of \$28.37 million, as originally proposed in its pre-approval application, is consistent with a service provider efficiently minimising costs.
28. In response to the potential cost efficiencies identified by the Authority in its Draft Determination, Western Power addresses the use of 132 kV switchgear and cables; the choice of switchgear configuration; and the allowance made for environment and land management activities.

Switchgear and Cables

29. Western Power acknowledges potential cost savings in the use of 66 kV switchgear and cables but contends that "there are adequate grounds for the choice of 132 kV equipment" in that it is standard practice for the company to use 132 kV equipment for expansion or development of the 66 kV network; and that it is considered imprudent to install 66 kV equipment when the incremental cost of using 132 kV equipment is generally not significant in the context of whole-of-project costs and other benefits resulting from the standardisation of equipment.¹⁶
30. For switchgear, Western Power indicates that it has obtained confirmation from a supplier of gas insulated switchgear that 66 kV equipment at the rating suited to the medical centre is available.¹⁷
31. Western Power indicates that there is a cost saving of around 10 per cent when using 66 kV switchgear rather than 132 kV switchgear. Western Power submits that, based on the original proposal for the substation using seven circuits (three lines, three transformers and one bus section switch), at a cost of \$557,000 per circuit, the total installed cost of 132 kV single bus gas insulated switchgear is \$3.9 million. The potential cost saving using 66 kV equipment instead of 132 kV equipment is therefore in the order of \$390,000. However, Western Power further submits (as discussed below, see paragraph 39) that it will only be purchasing the four required circuits for the initial stage of the proposed substation, resulting in a total installed cost of \$2.23 million and a corresponding potential cost saving of \$223,000.¹⁸

¹⁶ Further submission, pp. 7- 9.

¹⁷ Further submission, p. 8.

¹⁸ See footnote 25.

32. On the cost of cables, Western Power submits that:

- The original cost estimate for cable circuit work was based on Western Power's standard designs that use single core 132 kV rated cable with a conductor size of 2000 mm², with cable cost estimates obtained in January 2007 at \$408 per metre. The total cost of the cable circuit (including cable transition structures, termination poles and line construction) was estimated at \$3.03 million, of which \$0.98 million was attributed to 132 kV cable.
- Western Power has since undertaken 66 kV cable cost comparisons, using December 2008 cost data from its cable supplier, which suggests that there is a material cost saving of 17 per cent for 66 kV cable over 132 kV cable. When applied this reduces the cost of the cable component to \$0.81 million, reducing the overall total cost of cable circuit work to \$2.86 million, representing an overall cost reduction of 5.6 per cent (or \$0.17 million).¹⁹

33. Notwithstanding the potential cost savings identified by Western Power of the order of \$0.39 million, by reducing cable ratings (a potential cost saving of \$0.17 million) and switchgear ratings (a potential cost saving of \$0.22 million) from 132 kV to 66 kV, Western Power contends that it is prudent to install 132 kV equipment.

34. Western Power submits that the standardisation of equipment is strategically important to any electricity utility and that there are long term benefits in a number of areas, including:

- better prices through the purchase of high volumes of equipment/materials;
- reduced lead times to obtain equipment/materials from manufacturers by ordering high volume stock;
- lower costs to the utility resulting from fewer stocked inventory items and standardised operations and maintenance activities; and
- consideration given to future expansion and upgrade planning, such as voltage changes.²⁰

35. Western Power has not quantified these benefits.

36. Western Power also submits that the supplier of gas insulated switchgear confirmed that most customers in the same circumstances normally purchase 132 kV equipment.²¹

Switchgear Configuration

37. The proposed substation utilises three incoming lines and three transformers. Western Power submits that it had originally intended to install two lines, two transformers and one bus section, with a provision for future expansion to a third line and transformer circuit. Western Power determined to purchase and install all identified equipment as part of the initial installation to ensure that it does not

¹⁹ Further submission, p. 8.

²⁰ Further submission, p. 7.

²¹ Further submission, p. 8.

encounter problems of equipment compatibility in future expansions of the substation.²²

38. Western Power further indicates that, subsequent to the original cost estimate for the proposed substation, it has undertaken additional research into the configuration of gas insulated switchgear substations to determine the appropriateness of a single bus arrangement and whether the early purchase and installation of future circuits is financially and technically sound.
39. Western Power states that its research findings have shown that there are alternative busbar configurations that can facilitate further expansions and that the configuration now recommended for gas insulated switchgear substations is the “ring bus”. As a result, Western Power proposes that it will only purchase the equipment necessary to meet the needs of initial substation developments, and that future expansions will occur as and when required.²³ For the proposed substation, Western Power submits that it will only purchase sufficient equipment for two line circuits and two transformers.

Environment and Land Management Activities

40. Western Power submits that the forecast costs of environment and land management activities are based on best estimates of what is expected to occur and depending on the circumstances at the time of construction, the costs are likely to be different.²⁴ Western Power indicates the larger cost estimate items as follows.
 - Construction of noise enclosures at \$350,000 to \$450,000.
 - Mitigation or relocation of existing services (e.g. water, communications) at \$200,000 to \$300,000.
 - Earth potential rise and low frequency induction (EPR/LFI) study at \$40,000.
 - Soil remediation at \$100,000 to \$200,000.
 - Labour costs for community liaison activities at \$11,000.
 - Centre line survey at \$10,000.
 - Landscaping at \$10,000 (up to \$85,000 may be required if visual screening and landscaping is required).
 - Vegetation clearing at \$10,000.
 - Newspaper advertising at \$25,000.

Public Submissions

41. Submissions on the Draft Determination were received from Alinta Sales Pty Ltd and the Western Australian Department of Health, North Metropolitan Area Health Service (“**NMAHS**”). Both of these submissions address the efficiency test of section 6.52(a) of the Access Code.

²² Further submission, pp. 9, 10.

²³ Further submission, p. 9.

²⁴ Further submission, pp. 10, 11.

42. Alinta Sales supports the Authority's Draft Determination that the efficient project cost for the proposed substation is less than Western Power's forecast cost by almost nine per cent, and that a substantially greater proportion of the efficient project cost satisfies the new facilities investment test.
43. NMAHS submits that Western Power has not provided sufficient information to enable the technical efficiency of the project to be appropriately assessed and that Western Power should provide a detailed cost estimate showing the basis upon which the project cost (of \$28.4 million) has been determined.
44. In response to the advice of the Authority's technical advisor on Western Power's decision to use gas insulated switchgear to accommodate restricted land availability at the hospital site, NMAHS confirms in its submission that there are constraints on land availability at the hospital site. NMAHS also indicates that the land upon which the proposed substation is to be located is vested within a Trust under the *Queen Elizabeth II Medical Centre Act 1966* and that no formal agreement has been reached on the leasing of that land to Western Power, which could be on commercial terms, rather than a peppercorn rental.

Final Determination of the Authority

45. In making its final determination on whether the proposed substation meets the efficiency test of section 6.52(a) of the Access Code, the Authority has considered Western Power's further submission, comments from interested parties, and additional advice from the Authority's technical advisor.
46. The Authority considers that Western Power's total forecast cost of \$28.4 million exceeds the amount that would be invested by a service provider efficiently minimising costs and therefore does not meet the requirement of section 6.52(a) of the Access Code. The Authority considers that the amount that would meet the requirement of section 6.52(a) is in the order of \$25.5 million. Reasons for the Authority taking this view are as follows.
47. First, the Authority considers that cost savings in the order of \$0.56 million could be realised from the reduction in equipment rating from 132 kV to 66 kV.
 - Western Power has estimated a potential cost saving in the order of \$0.39 million by reducing the switchgear rating from 132 kV to 66 kV (a cost saving of \$0.22 million, based on the purchase of four required circuits only) and reducing the cable rating for required cable circuit work from 132 kV to 66 kV (a cost saving of \$0.17 million).
 - Additional information was provided by Western Power to the Authority's technical advisor following a request to clarify the estimated cost of the gas insulated switchgear component of the proposed substation. This information indicates that the potential cost saving from a reduction in switchgear rating is \$0.31 million (rather than \$0.22 million as claimed by Western Power) and a reduction in cable rating is \$0.25 million (rather than \$0.17 million).²⁵

²⁵ Western Power, 2 February 2009, Response to final questions on the application for pre-approval of NFIT for the Medical Centre substation (in response to questions posed by Geoff Brown and Associates on 27 January 2009).

48. Secondly, Western Power has indicated in its further submission that it now intends to construct the proposed substation using only sufficient equipment for two line circuits and two transformers. Advice to the Authority is that cost savings of \$2.3 million can be realised from this reduction in switchgear configuration.²⁶
49. Contrary to the Draft Determination and taking into account the additional information provided by Western Power, the Authority accepts that the forecast of costs for environment and land management activities meet the efficiency test.
50. The Authority has determined that the potential cost efficiencies able to be achieved for the proposed substation are as indicated in Table 2.

Table 2 Potential cost efficiencies achievable by Western Power (\$ million)

	Authority's Draft Determination	Authority's Final Determination
Total project cost estimated by Western Power	28.37	28.37
Cost saving by reduction in switchgear/cable rating to 66kV	(0.54)	(0.56)
Cost saving by reduction of switchgear configuration to a two-line two-transformer configuration	(0.97)	(2.30)
Reduction in cost allowance for environment and land management	(1.00)	0
Revised project cost	25.86	25.51

51. The Authority has not considered in detail the standardisation benefits claimed by Western Power to justify the use of 132 kV cables and switchgear as any quantification of such benefits has not been provided. The Authority observes that if standardisation benefits of the type stated by Western Power were to exist, such benefits would accrue to Western Power as the service provider, and hence any associated capital cost should be directly attributed to Western Power. In addition, the Authority notes that while Western Power states that it is standard practice for it to use 132 kV equipment for expansion or development of the 66 kV network, there is no formal long term plan for the entire 66 kV network to be converted to 132 kV. From the information available, it appears that Western Power will be undertaking a review of the 66 kV system, which will form part of a long term strategic development plan to be developed for the transmission network.
52. On the basis of the evidence provided by Western Power it would be premature for the Authority to make an assessment on the inclusion of 132 kV rated equipment within the proposed substation for the purposes of the new facilities investment test.

Western Power confirms that the amount of \$3.9m was the original cost estimate for GIS switchgear based on 2006 prices. A revised estimate of \$5.4m was used in its submission, hence the revised cost estimate for GIS switchgear using a four circuit arrangement, instead of seven circuits, is \$3.1m. In addition, Western Power confirms that its forecast of \$28.37m was current as of March 2008.

²⁶ Geoff Brown and Associates, February 2009, New Facilities investment Test - Medical Centre Substation.

Incremental Revenue Test

Authority's Draft Determination

53. The Authority examined Western Power's calculation of incremental revenue of \$2.55 million and observed that Western Power only gave consideration to the incremental revenue to be recovered over a 15 year period, which was a substantially shorter period than the expected life of the substation assets, which were in the order of 50 years.
54. Based on the information available and assuming that revenue beyond 15 years was the same as expected by Western Power for year 15, the present value of incremental revenue over longer periods was determined by the Authority to be \$3.92 million for a 25 year period; and \$5.11 million for a 50 year period.
55. The Authority considered that it is reasonable to consider incremental revenue over a longer period than that undertaken by Western Power, given the likelihood that the medical centre would continue to operate for many decades.

Western Power's Further Submission

56. Western Power acknowledges in its further submission that the incremental revenue to be considered under section 6.52(b)(i)A of the new facilities investment test does not have any defined time period over which the anticipated incremental revenue should be assessed.
57. Western Power submits that the model capital contributions policy in the Access Code and the approved capital contributions policy of the access arrangement provide guidance on a reasonable period over which to determine incremental revenue.²⁷ Western Power further submits that any alternative interpretation would make the calculation of capital contributions "practically impossible" as the time period to which the calculation is applied would be a matter of dispute in most cases.
58. For these reasons, Western Power considers that a time period of 15 years, consistent with the capital contributions policy, is appropriate for calculation of incremental revenue.

Public Submissions

59. The submission received from NMAHS in response to the Authority's Draft Determination addresses the incremental revenue test of section 6.52(b)(i)A of the Access Code.
60. NMAHS submits that Western Power's calculation of incremental revenue does not take into consideration any real increases in network prices above that of inflation. NMAHS believes this to be a reasonable assumption, given the historical evidence of tariff increases and significant proposed increases in annual tariffs for the next access arrangement period. In addition, NMAHS notes that Western Power's incremental revenue calculation is based on the 2007/08 annual tariff, rather than

²⁷ Further submission, p. 11.

the 2008/09 annual tariff; and NMAHS supports the Authority's conclusion that it is reasonable to consider incremental revenue over a longer period than that undertaken by Western Power.

61. Taking these matters into consideration, NMAHS calculate the present value of the incremental revenue to be obtained from the hospital to be \$14.6 million²⁸ and is of the opinion that Western Power's calculation of incremental revenue should be adjusted to:
 - incorporate a reasonable estimate of real price growth, including any future tariff increases that are able to be forecast;
 - utilise the current annual tariff (currently 2008/09 at \$49.62/kVA); and
 - assess the incremental revenue over a reasonable period, being the independently assessed life of the assets.

Final Determination of the Authority

62. The Authority has considered Western Power's reasoning for the calculation of incremental revenue over a 15 year period and NMAHS' submission addressing the incremental revenue test of section 6.52(b)(i)A of the Access Code.
63. On the matter of the period of time used to calculate incremental revenue for the purposes of the new facilities investment test under section 6.52 of the Access Code, the Authority considers that the period of time should not be restricted to a maximum of 15 years when the economic life of the assets in question are reasonably expected to be in service beyond a 15 year period. The Authority accepts that this creates a potential conflict with Western Power's capital contributions policy. However, application of the new facilities investment test must be guided by the Code objective of efficiency in investment in the network, which supports consideration of the incremental revenue over the foreseeable economic life of the assets.
64. The Authority therefore maintains that it is reasonable to consider incremental revenue over an expected 50 year life of the substation assets.
65. On the submission of NMAHS that the calculation of incremental revenue should take into account forecasts of real increases in network prices, the Authority considers that it is not reasonably possible to forecast real changes in prices for the economic life of the assets. Moreover, taking into account real increases in network tariffs would also require, for consistency, taking into account forecast real increases in relevant costs, such as costs of operation and maintenance of the substation, which is equally difficult. For the purposes of applying the incremental revenue test, the Authority accepts Western Power's position that it is appropriate to determine incremental revenue on the basis of 2007/08 tariffs, consistent with the timing of the forecast of costs for the project.

²⁸ NMAHS' incremental revenue calculation incorporates real growth in revenue of 3% per annum; and does not include the significant annual tariff increases proposed by Western Power for the next access arrangement period.

66. Taking these matters into account, the Authority maintains that an appropriate amount of incremental revenue to be considered under the incremental revenue test of section 6.52(b)(i)A of the Access Code is \$5.11 million.

Net Benefits Test

Authority's Draft Determination

67. Western Power did not rely on the net benefits test of section 6.52(b)(ii) of the Access Code to support its claim in the pre-approval application that \$18.7 million of the total new facilities investment in the proposed substation meets the new facilities investment test. Western Power indicated, however, that certain benefits would arise as a result of the \$2.6 million investment in distribution works, including lower line losses, higher load supplies, fewer operational constraints, a more reliable supply, and potential deferral of other major network reinforcement, particularly deferral of investment in the nearby university substation.
68. The Authority determined that these benefits should be taken into account under the net benefits test and considered that these benefits should be valued at circa \$3.5 million, based on an assumed deferral by five years of investment in the university substation.

Western Power's Further Submission

69. Western Power acknowledges in its further submission that it did consider in its pre-approval application a number of benefits that would arise from the proposed works.
70. Western Power contends that any net benefits, particularly in deferral of investment in the university substation, are uncertain and should not be taken into account in the new facilities investment test assessment.²⁹

Public Submissions

71. NMAHS' submission in response to the Authority's Draft Determination addresses the net benefits test of section 6.52(b)(ii) of the Access Code. In its submission, NMAHS supports the Authority's determination that the net benefits stated by Western Power would fall within the scope of the net benefits to be considered under section 6.52(b)(ii).
72. NMAHS further submits that after reviewing Western Power's calculations in relation to the incremental revenue test and safety and reliability test, it has concerns regarding the accuracy of other estimates proposed by Western Power, including the estimate of \$3.5 million in cost savings associated with a deferral of investment in the university substation. As such, NMAHS submits that all benefits should be independently verified and the present value of such benefits independently determined.

²⁹ Further submission, p. 11.

Final Determination of the Authority

73. The Authority considers that Western Power has not given sufficient attention to assessing and quantifying the potential benefits of the proposed substation for network users and electricity consumers in the area of the substation and more widely in the electricity network. The Authority considers that the net benefits of investments that reinforce an electricity network are often substantial and can have considerable bearing on the new facilities investment test.
74. The Authority accepts Western Power's submission that some benefits within the scope of the net benefits test are uncertain and contingent upon future growth in energy demand and on other investments, but does not accept that this uncertainty obviates the requirement for a full and proper assessment of these benefits. The Authority considers that the pre-approval application is deficient in this respect.
75. With limited information available for this Final Determination, the Authority considers it reasonable to consider that the proposed substation will have network benefits and that a reasonable estimate of the magnitude of these benefits is to consider the potential deferral of investment in the university substation, at a value of \$3.5 million.
76. The Authority maintains the position taken in the Draft Determination that the amount of \$2.6 million of investment in the distribution network satisfies the safety and reliability test.

Safety and Reliability Test

Authority's Draft Determination

77. In its assessment of investment in the proposed substation against the requirements of the safety and reliability test, Western Power separately considered the transmission works and distribution works of the proposed substation.
78. For the transmission works, Western Power contends that, in the absence of the requirements of the medical centre, replacement and upgrade of the existing substation is required by 2020 for the replacement of ageing equipment and to meet general load growth in the area of the western suburbs. Western Power contends that this upgrade, when it becomes necessary, would meet the safety and reliability test, as the upgrade would be necessary to maintain the safety and reliability of supply for customers in the vicinity of the substation. The requirement for the upgrade in 2010 is brought about by increased energy demand from the hospital expansion. As the additional demand from the hospital causes the investment to be brought forward in time, Western Power contends the amount that meets the safety and reliability test is the total cost of the investment adjusted for the time value of money in bringing the expenditure forward from 2020 to 2010.
79. The total forecast new facilities investment for the transmission works is \$25.8 million. Western Power contends that, of this, \$13.55 million meets the safety and reliability test under section 6.52(b)(iii) of the Access Code, which is approximately equal to the total value of \$25.8 million discounted over 10 years at a real discount rate of 6.76 per cent to a present value in 2010.
80. In the Draft Determination, the Authority observed that the assumed date of 2020 for replacement and upgrade of the substation, in the absence of the requirements

of the medical centre, is inconsistent with standard assumptions of economic lives of the transformers at the substation and with requirements of an existing asset management plan to replace the transformers in 2015/16. The Authority applied the latter date (2015/16) in the calculation of an amount satisfying the safety and reliability test, applying the same method as Western Power and deriving a value of \$16.3 million as the amount satisfying the test.

81. For the distribution works, Western Power submits that the \$2.6 million of works provides, among other benefits, improved reliability and the ability to provide covered services to customers in areas supported by the medical centre substation, Nedlands substation and university substation. Western Power further submits that the existing 6.6 kV network cannot support expected load growth over the next decade for these areas, and that work has commenced to upgrade the Nedlands substation to 11 kV. By upgrading the distribution network to 11 kV load can be transferred between all three substations to support load growth and maintain safety and reliability of supply for customers in these areas.
82. The Authority accepted the stated network benefits of the \$2.6 million investment in distribution works, but determined that these benefits were better considered as net benefits within the scope of the net benefits test of section 6.52(b)(ii) of the Access Code, as discussed above.

Western Power's Further Submission

83. Western Power reiterates the position taken in its pre-approval application that it is best to assume replacement and upgrade investment in the substation occurring in 2020 in the absence of the requirements of the medical centre.
84. In support of this position, Western Power submits that the asset management plan indicating replacement in 2015/16 has been reviewed and that the assumption of replacement in 2020 would be enabled by asset management activities.
85. Western Power further submits that an assumption of replacement in 2015/16 would be inconsistent with its plans for conversion of the distribution network in the western suburbs area to 11 kV in 2020 and not earlier, with which replacement of the substation would be coincident.³⁰

Public Submissions

86. The submission received from NMAHS in response to the Authority's Draft Determination addresses the safety and reliability test of section 6.52(b)(iii) of the Access Code.
87. NMAHS submits that it has significant concerns with the model used by Western Power to determine the amount satisfying the safety and reliability test and hence the 'brought forward cost' attributed to the hospital. In particular, the model does not include any real term increases in capital costs, which is considered to be reasonable given historical cost escalation. NMAHS submits that Western Power's calculation should be adjusted to:

³⁰ Further submission, p. 12.

- appropriately incorporate a reasonable estimate of real capital cost escalation (at three per cent per annum); and
 - appropriately consider the age of the existing substation assets and a replacement plan to replace the assets by 2015/16 (in accordance with the Authority's Draft Determination).
88. Taking the above matters into consideration, NMAHS calculate a 'brought forward cost' of \$0.5 million that is attributed to the hospital and submits that the remaining cost of the efficient substation works (as determined by the Authority in its Draft Determination), of \$25.4 million, satisfies the safety and reliability test.

Final Determination of the Authority

89. While Western Power has submitted additional information in support of an assumption that, in the absence of the requirements of the medical centre, the replacement of the substation would occur in 2020, the Authority maintains the view that the better assumption is to assume replacement of the substation in 2015/16.
90. The Authority accepts technical advice that extending the use of the existing substation beyond 2015/16 would come at a cost of increased risk of failure, notwithstanding asset management and maintenance activities.³¹ As the medical centre substation currently supplies a critical hospital load, the Authority considers that a conservative assumption of asset life and replacement date be considered and that an assumed replacement date of 2015/16 is reasonable and prudent.
91. The Authority does not consider it reasonable to take into account real increases in forecasts of costs in applying the new facilities investment test, as submitted by NMAHS. In particular, the Authority does not accept that there is any justification to assume an increase in the real cost of asset construction over the period 2010 to 2020.
92. Taking the above matters into account, the Authority maintains the position taken in the Draft Determination that an amount of \$16.3 million satisfies the safety and reliability test.

Total Satisfying the New Facilities Investment Test

93. On the basis of the above consideration of the elements of the new facilities investment test, and given the information available, the Authority's final determination is that an amount of \$24.9 million may satisfy the new facilities investment test (Table 3). As noted in the Authority's Draft Determination this value may be higher given a range of unquantified benefits cited by Western Power that the Authority considers to fall within the scope of net benefits under section 6.52(b)(ii) of the Access Code.

³¹ Geoff Brown and Associates, February 2009, New Facilities investment Test - Medical Centre Substation.

Table 3 Assessment of amounts of new facilities investment satisfying the new facilities investment test (\$ million)*

	Western Power's Application	Authority's Draft Determination	Authority's Final Determination
Section 6.52(a) – efficiency test	28.37	25.86	25.51
Section 6.52(b) – ‘other tests’			
Incremental revenue test (section 6.52(b)(i)A)	2.55	Up to 5.11	5.11
Net benefits test (section 6.52(b)(ii))	0	Circa 3.5	3.5
Safety and reliability test (section 6.52(b)(iii))	16.15	16.32	16.32
Sub-total of Section 6.52(b)	18.7	Up to 24.9	24.9
Total satisfying the new facilities investment test	18.7	Up to 24.9	24.9

* For the new facilities investment test to be satisfied, the new facilities investment must satisfy the efficiency test (section 6.52(a)) and one or more of the ‘other tests’ in section 6.52(b) of the Access Code.

94. The Authority considers that a greater amount of new facilities investment than claimed by Western Power is considered to satisfy section 6.52(b) of new facilities investment test, which will affect the amount of a capital contribution that Western Power can charge.
95. The Authority notes that the amount of any contribution charged in respect of the forecast new facilities investment for the proposed substation is a matter to be determined in accordance with the Access Code, which states that a contributions policy must not require a user to make a contribution in respect of any part of new facilities investment that meets the new facilities investment test.³²
96. Given the provisions of the Access Code, and based on the amounts of new facilities investment determined by the Authority to satisfy the efficiency and other tests, as per Table 3, the maximum contribution that can be charged by Western Power in this instance is \$0.61 million. Should the actual new facilities investment undertaken by Western Power be less than the amount determined by the Authority to satisfy the new facilities investment test (that is, less than \$24.9 million), no contribution would be able to be charged by Western Power, as the entire amount of new facilities investment, in this instance, would satisfy the new facilities investment test.

³² Section 5.14 of the Access Code.