Issues Paper on the Regulatory Test for a 330 kV Transmission Line and Associated Works in the Mid-West Region of Western Australia

Submitted by Western Power

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Economic Regulation Authority
WESTERN AUSTRALIA

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INTRODUCTION

1. On 5 October 2007, Western Power submitted to the Economic Regulation Authority ("**Authority**") a major augmentation proposal under section 9.15 of the *Electricity Networks Access Code 2004* ("**Access Code**").[1] The major augmentation proposal comprises information required to be provided by Western Power in respect of the regulatory test under chapter 9 of the Access Code, for a single augmentation of the South West Integrated Network ("**SWIN**"): a 330 kV transmission line and associated works in the Mid-West region of Western Australia ("**proposed transmission line**").

2. As part of its assessment of the major augmentation proposal, the Authority is undertaking consultation with interested parties as provided for under section 9.19 of the Access Code. The Authority has prepared this issues paper on the major augmentation proposal to assist interested parties in understanding Western Power's proposal, the Authority's intended approach to assessment of the proposal and some of the major issues to be addressed in determining whether the regulatory test is satisfied.

3. The remainder of this issues paper addresses the following matters:

   - the requirements for the regulatory test under section 9 of the Access Code;
   - the need for, and stated objectives of, Western Power's proposed transmission line;
   - the adequacy of consultation undertaken by Western Power;
   - the identification of "alternative options" to the proposed transmission line in overcoming constraints in the electricity system; and
   - the assessment of the relative net benefits of Western Power's proposed transmission line and alternative options.

THE REGULATORY TEST

4. Chapter 9 of the Access Code establishes the regulatory test that is applied to proposals for major augmentations of a covered network.

5. In general terms, the regulatory test is intended to prevent a service provider from committing to a major augmentation of a network until it has been determined that the requirements of the regulatory test have been satisfied. The purpose of the regulatory test is to determine whether a proposed augmentation to an electricity transmission and/or distribution network is the best way of overcoming constraints in the wider electricity system, taking into account alternative means of overcoming the constraints such as alternative network investments, investment in generation or management of electricity demand.

[1] Western Power, 2 October 2007, Submission to the Economic Regulation Authority Major Augmentation Proposal 330 kV Transmission Line and Associated Works in the Mid-West Region of Western Australia.

6. The regulatory test is required only for "major augmentations", defined in Chapter 1 of the Access Code:

> "major augmentation" means an augmentation for which the new facilities investment for the shared assets:
>
> (a) exceeds $5 million (CPI adjusted), where the network assets comprising the augmentation are, or are to be, part of a distribution system; and
>
> (b) exceeds $15 million (CPI adjusted), where the network assets comprising the augmentation are, or are to be, part of:
>
> (i) a transmission system;
>
> (ii) both a distribution system and a transmission system.

7. Under section 9.2 of the Access Code, a service provider must not commit to a major augmentation before the Authority determines, or is deemed to determine, that the regulatory test is satisfied.

8. The process of the regulatory test commences with submission by a service provider to the Authority of a "major augmentation proposal". This may occur either:

- under section 9.10 of the Access Code, with the major augmentation proposal submitted as part of a proposed access arrangement, and the Authority's determination of whether the regulatory test is satisfied forming part of the Authority's decision on the proposed access arrangement; or
- under section 9.15 of the Access Code, with a major augmentation proposal submitted other than as part of a proposed access arrangement and the Authority's determination on whether the regulatory test is satisfied being a determination separate from the approval proposal for a proposed access arrangement.

9. The major augmentation proposal that is the subject of this Issues Paper has been submitted under the second of these two processes.

10. Section 9.16 of the Access Code establishes the requirements for a major augmentation proposal submitted to the Authority other than as part of a proposed access arrangement:

> 9.16 A major augmentation proposal submitted under section 9.15:
>
> (a) must describe in detail each major augmentation to which the major augmentation proposal relates; and
>
> (b) must state that, in the service provider's view, each proposed major augmentation maximises the net benefit after considering alternative options; and
>
> (c) must demonstrate that the service provider has conducted a consultation process in respect of each proposed major augmentation which:
>
> (i) included public consultation under Appendix 7; and
>
> (ii) gave all interested persons a reasonable opportunity to state their views and to propose alternative options to the proposed major augmentations, and that the service provider had regard to those views and alternative options; and

(iii) involved the service provider giving reasonable consideration to any information obtained under sections 9.16(c)(i) and 9.16(c)(ii) when forming its view under section 9.16(b);

and

(d) must comply with the current requirements published under section 9.17.

(e) may include a request that the Authority give prior approval under section 6.72 in respect of the new facilities investment for one or more proposed major augmentations.

11. "Alternative options" and "net benefit", referred to in section 9.16(b), are defined under Chapter 1 of the Code:

> "alternative options", in relation to a major augmentation, means alternatives to part or all of the major augmentation, including demand-side management and generation solutions (such as distributed generation), either instead of or in combination with network augmentation.
>
> …
>
> "net benefit" means a net benefit (measured in present value terms to the extent possible) to those who generate, transport and consume electricity in (as the case may be):
>
> (a) the covered network; or
>
> (b) the covered network and any interconnected system.

12. For a major augmentation proposal submitted to the Authority other than as part of a proposed access arrangement, the requirements for the regulatory test to be satisfied are set out in section 9.20 of the Access Code:

> 9.20 The test in this section 9.20 is satisfied if the Authority is satisfied that:
>
> (a) the service provider's statement under section 9.16(b) is defensible; and
>
> (b) the service provider has applied the regulatory test properly to each proposed major augmentation:
>
> (i) using reasonable market development scenarios which incorporate varying levels of demand growth at relevant places; and
>
> (ii) using reasonable timings, and testing alternative timings, for project commissioning dates and construction timetables for the major augmentation and for alternative options;
>
> and
>
> (c) the consultation process conducted by the service provider meets the criteria in section 9.16(c).

13. Section 9.18 of the Access Code establishes the time frames for a determination by the Authority on whether the regulatory test is satisfied or not satisfied:

> 9.18 The Authority must is respect of a major augmentation proposal submitted under section 9.15 make and publish a determination whether the test in section 9.20 is satisfied or not satisfied, and must do so:
>
> (a) if the Authority has consulted the public under section 9.19 – within 45 business days; and
>
> (b) otherwise – within 25 business days,
>
> after receiving the augmentation proposal.

14. The Authority is undertaking public consultation as part of the process of the regulatory test and, in accordance with the requirements of section 9.19, is required to publish a determination by 7 December 2007.

15. The role of the Authority is to consider the information provided by a service provider in the major augmentation proposal and to determine whether the regulatory test set out in section 9.20 of the Access Code is satisfied. Section 9.21 of the Access Code places the onus on the service provider to demonstrate that the regulatory test is satisfied.

> 9.21 If the Authority is unable to determine whether the test set out in section 9.20 is satisfied or is not satisfied because the service provider has not provided adequate information (despite the Authority having notified the service provider of this fact and given the service provider a reasonable opportunity, having regard to the time periods specified in section 9.18, to provide adequate information), then the Authority may determine that the test in section 9.20 is not satisfied.

16. The Authority's role ends with the determination of whether the regulatory test is satisfied or not satisfied. If the latter determination is made, the Authority does not have a role to remedy any deficiency in the major augmentation proposal or to make any determination on the alternative option that may maximise net benefits.

17. If the Authority has not made a determination within the time limits under section 9.18 of the Access Code, the Authority is deemed, under section 9.22 of the Access Code, to have determined that the regulatory test is satisfied.

THE PROPOSED TRANSMISSION LINE

Reasons for Proposed Augmentation

Demand Forecasts

18. In its major augmentation proposal, Western Power presents three forecasts of peak load for the region that Western Power refers to as the North Country Region, as follows.[2]

- "Low forecast", based on a historical trend in load growth (natural load growth) plus small block loads that have already been approved by Western Power. This forecast is for an approximately linear increase in peak load from about 130 MW in 2007 to 195 MW in 2016.
- "Central forecast", being the low forecast plus "diversified prospective loads" with a probability weighting. This forecast is indicated to include probability weighted loads of 300 MW of new block loads and 900 MW of new generation (600 MW of gas and coal generation and 300 MW of wind generation) with increases in peak load from 130 MW in 2007 to 315 MW in 2012 and 335 MW in 2016.

[2] Western Power Proposal, pp. 6, 7.

- "High forecast", being low forecast plus 100 per cent of prospective loads, with increases in peak load from 130 MW in 2007 to 430 MW in 2012 and 475 MW in 2016

Objective in Network Augmentation

19. Western Power indicates that augmentation of the transmission network in the Mid-West region is required to overcome network constraints and maintain system reliability in the face of forecast increases in load in the region and to meet demands for connection of generation. The North Country Region is indicated to have a supply capacity of approximately 155 MW, which is expected to be exceeded by peak demand at sometime during the period 2008 to 2010, depending upon the demand forecast considered.[3]

20. The system constraints indicated by Western Power comprise:[4]

- constraints on import of energy into the region from the South-West, with forecasts of loads indicating a risk of load shedding and power supply disruptions during periods of peak summer demand from 2010/11 onwards; and
- a lack of transmission capacity to connect new generation between Pinjar and Eneabba, with significant forecast demand for connection from existing proposals for wind-farm, coal-fired and gas-fired generation.

21. Western Power also indicates that the need for network augmentation arises from uncertainty after October 2009 in the availability of existing local generation (from Mungarra Power Station and Geraldton Gas Turbine) that currently supplies energy and system support.[5]

Submissions are invited from interested parties on Western Power's forecasts of electricity demand and assessment of emerging constraints in the transmission network of the Mid-West region.

Proposed Transmission Line

22. Western Power's preferred option for network augmentation is construction of a 330 kV double-circuit transmission line between Pinjar and Geraldton together with:

- a new 330/132kV terminal station at Moonyoonooka;
- a new 330 kV Circuit at Neerabup; and
- a new 132kV line circuit at Pinjar.

[3] Western Power Proposal, p. 8.

[4] Western Power Proposal, pp 4 – 6.

[5] Western Power Proposal, p. 8.

23. Western Power intends to construct the proposed transmission line in the corridor of an existing 132kV transmission line between Pinjar, Regans Ford, Cataby and Eneabba, and on a new corridor between Eneabba and Geraldton.[6]

24. Western Power has claimed the following benefits from the proposed transmission line:[7]

- ability to accommodate natural load growth in the region;
- increase in transmission capacity to support forecast load growth in the region;
- increase in transmission capacity to enable connection of customers (new loads and generation);
- improvements in reliability of power supply to all customers in the region;
- ability to connect new wind farms;
- ability to connect new base generation located north of Perth;
- facilitation of entry of lower cost generation in the region;
- opportunity to retire old and inefficient gas turbines at Geraldton and Mungarra; and
- reduction in transmission losses.

PUBLIC CONSULTATION UNDERTAKEN BY WESTERN POWER

Requirements of the Access Code

25. The requirements for Western Power to undertake public consultation on the major augmentation proposal are set out in section 9.16(c) of the Code:

> 9.16 A major augmentation proposal submitted under section 9.15:
>
> …
>
> (c) must demonstrate that the service provider has conducted a consultation process in respect of each proposed major augmentation which:
>
> (i) included public consultation under Appendix 7; and
>
> (ii) gave all interested persons a reasonable opportunity to state their views and to propose alternative options to the proposed major augmentations, and that the service provider had regard to those views and alternative options; and
>
> (iii) involved the service provider giving reasonable consideration to any information obtained under sections 9.16(c)(i) and 9.16(c)(ii) when forming its view under section 9.16(b);
>
> …

[6] Western Power Proposal, p. 11.

[7] Western Power Proposal, p. 13.

26. Appendix 7 of the Access Code establishes the following requirements on Western Power in undertaking consultation on the major augmentation proposal:

- publication of an invitation for submissions (section A7.6);
- specification of the length of time allowed for the making of submissions that mus be at least 10 business days and no greater than 20 business days (sections 7.7 and 7.9); and
- publication of submissions (section 7.20).

27. Appendix 7 would also allow, but not require, Western Power to:

- produce and publish an issues paper examining the issues relating to the major augmentation proposal (section 7.4);
- consider any submissions made after the time for making that submission has expired (section 7.21).

Consultation Undertaken by Western Power

28. In its major augmentation proposal, Western Power indicates that its consultation process involved:

- publication on 22 March 2007 of an "Invitation for Submissions" and the "CRA evaluation report" on the web sites of both Western Power and the Authority;
- conduct, on 4 April 2007 of a public forum at the Perth Town Hall;
- advertising in *The Western Australian* and local newspapers on various dates between 20 March 2007 and 12 April 2007 of the opportunity to make submissions, including advertisements on three occasions in *The West Australian* (21 and 28 March and 11 April 2007);
- issuing on 23 March 2007 of a media release; and
- providing for submissions to be received by 18 April 2007.

29. Western Power's invitation for submissions included an information paper on the proposed transmission line.[8] This information paper provided general information on:

- the existing transmission network in the Mid-West region;
- the reasons for the proposed transmission line, described mainly in terms of constraints on the existing transmission system, forecast load growth in the region;
- a description of the proposed transmission line and a description of alternative options to the proposed transmission line that were examined by Western Power; and
- a summary of reasons why the proposed transmission line is the preferred option.

[8] Reproduced in Attachment 4 of the Western Power's Major Augmentation Proposal.

Issues for Consideration by the Authority

30. As part of its determination on Western Power's major augmentation proposal, the Authority is required to determine whether it is satisfied that Western Power has undertaken consultation in accordance with the requirements of section 9.16(c) of the Access Code, in particular:

- whether Western Power undertook consultation in accordance with the generic guidelines for consultation under Appendix 7 of the Access Code;
- whether Western Power gave all interested parties a reasonable opportunity to state their views and to propose alternative options to the proposed major augmentation;
- whether Western Power has had regard to the views and alternative options put forward by interested parties; and
- whether Western Power has given reasonable consideration to information obtained from interested parties through the consultation process.

31. The consultation programme undertaken by Western Power appears to comply with the specific requirements for the process and time periods for consultation as set out in Appendix 7 of the Access Code.

32. The Authority will give further consideration, however, to whether the consultation programme meets the general requirement of section 9.16(c)(ii) of the Access Code to give all interested persons a reasonable opportunity to state their views and to propose alternative options to the proposed transmission line.

33. The Authority has received several unsolicited submissions from parties expressing the view that Western Power has given insufficient attention to the effects of the proposed transmission line (or more particularly the proposed route of the transmission line) on agricultural land use, particularly along the route of the proposed new corridor between Eneabba and Geraldton.[9] This matter has also been raised in the Western Australian Parliament as a grievance presented on behalf of farmers and landowners.[10]

34. While none of these parties made submissions to Western Power in response to Western Power's specific invitation for submissions on the regulatory test of the proposed transmission line, the parties make general claims that Western Power has not engaged in sufficient consultation with landholders potentially affected by the proposed transmission line to enable the landholders to indicate costs that would be incurred as a result of the proposed route. In particular, it is claimed that Western Power did not provide sufficient information on the proposed route of the transmission line to enable landowners to ascertain that preference is being given to an indirect route through privately owned agricultural land rather than a more direct route through Crown land, and the reasons for Western Power's selection of the indirect route.

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[9] Letter from Gary Snook MLA to the Economic Regulation Authority, 14 August 2007; Letter from the Western Australian Farmers Federation to the Economic Regulation Authority, 3 September 2007; Letter from DC and BD Brindal to the Economic Regulation Authority, 13 August 2007; Presented submission from the Midwest Power Line Action Group, 17 August 2007. This correspondence has been published on the Authority's web site.

[10] Hansard, Legislative Assembly Thursday 27 September 2007 pp 5948 – 5950.

35. The major augmentation proposal submitted by Western Power may not satisfy the regulatory test if Western Power did not take reasonable steps to advise landowners potentially affected by the proposed transmission line of relevant matters on which the landowners (and any other interested parties) may have desired to make submissions.

> Submissions are invited from interested parties on whether Western Power gave all interested parties a reasonable opportunity to state their views on the major augmentation proposal.

IDENTIFICATION OF ALTERNATIVE OPTIONS

Requirements of the Access Code

36. Under section 9.16(b) of the Access Code, Western Power is required to have considered alternative options to the proposed transmission line.

37. "Alternative options" is defined under Chapter 1 of the Code:

> "alternative options", in relation to a major augmentation, means alternatives to part or all of the major augmentation, including demand-side management and generation solutions (such as distributed generation), either instead of or in combination with network augmentation.

38. The Authority has addressed as separate matters whether Western Power has identified all relevant alternative options to the proposed transmission line and Western Power's assessment of the alternative options identified in its major augmentation proposal. This section of the issues paper addresses the former of these two matters.

Alternative Options Identified by Western Power

39. In its major augmentation proposal, Western Power indicates that it considered 12 alternative options, including the proposed transmission line and a "do-nothing" option, with some "sub-options" also considered. These are described as follows.[11]

- Transmission solutions
  - Option 1 (the proposed transmission line) – a double circuit 330kV line constructed between Perth and Geraldton by November 2010 and with one side initially energised at 132 kV.

[11] There are different descriptions of the alternative options in different sections of the Western Power Proposal. These descriptions are taken from Attachment 1 of the Western Power Proposal (Internal Report) and Attachment 2 (report by CRA International dated 30 March 2007).

Option 1A – a staged construction of the 330kV transmission line with the Eneabba-Geraldton section constructed by 2010 and the Pinjar-Eneabba section constructed by 2014.

Option 1B – a staged construction of the 330kV transmission line with the Eneabba-Geraldton section constructed by 2010 and initially energised at 132kV and the Pinjar-Eneabba section constructed by 2011.

Option 1C – the 330kV transmission line as per Option 1, but delayed by one year to November 2011.

- Option 2 – a 132 kV line from Eneabba to Geraldton constructed by November 2010, with retention of generation capacity and with the 330kV line (as in Option 1) deferred until November 2014.

  Option 2A – a variation of Option 2 with a double circuit 132kV line between Eneabba and Geraldton.

- Option 3 – 132 kV lines from Eneabba to Three Springs, and Mungarra to Rangeway Substation with the 330 kV line (as for Option 1) deferred until Nov 2014.

- Option 4 – reinforcement of the existing network using lines of 132kV and construction in increments by 2010, 2015, 2021 and 2025.

- Option 5 – a single 220 kV line between Perth and Geraldton constructed by November 2010 and with retention of existing generation capacity.

- Option 6 – an option identical to Option 1 but with line towers designed for 500 kV lines (initially insulated and operated at 330 kV).

- Option 7 – a direct current line from Perth to Geraldton.

- Option 8 – do nothing.

- Generation solutions:

  - Option 9 – addition of generation at Mungarra Power Station;

  - Option 10 – addition of generation at Dongara;

  - Option 11 – permanent “islanding” of the Mid-West region from the SWIS at Three Springs.

- Other solutions:

  - Option 12 – demand management to reduce peak demand.

Western Power’s Consultation

40. Western Power has indicated in its major augmentation proposal that two parties made submissions identifying and/or supporting alternative options to the proposed transmission line. Other submissions are indicated as supporting Western Power’s proposed transmission line.

41. Western Power indicates that Eneabba Gas Limited made a submission in support of minimal transmission reinforcements and suggesting that new customers can be supplied from either self generation or generation within an islanded grid. In

response to this submission, Western Power states that the options described by Eneabba Gas Limited are similar to the options examined by Western Power that involve reinforcement of 132kV transmission lines and deferral of construction of the proposed transmission line until November 2014 (Options 2 and 3), and the option of the islanded network (Option 11).

42. Western Power indicates that Transfield Services made a submission in support of consideration of alternative options of:

- establishing Three Springs as the regional electricity hub, rather than Geraldton, with analysis of alternative options recognising the potential for mining load east of Three Springs;
- more non-network and generation options;
- creation of an islanded network.

43. In response to the submission from Transfield Services, Western Power states that:

- the option of terminating the 330kV line at Three Springs was not considered as the proposal for 330kV transmission line to Geraldton was determined to provide the greatest net benefit when considering a probability weighted assessment for each new load or generation connection;
- non-network and generation options have been considered but additional generation or network support contracts will not result in an increase to overall network capacity and, therefore, these options cannot be used to defer network reinforcement; and
- the option of operating an islanded network is one of the alternative options assessed by Western Power.

Issues for Consideration by the Authority

44. In its determination on the major augmentation proposal, the Authority will give consideration to whether Western Power has identified all relevant alternative options to the proposed transmission line.

45. The Access Code does not provide guidance on the specification of alternative options other than to indicate, in the definition of alternative options, that these would include:

- alternatives to part or all of the proposed major augmentation; and
- include demand-side management and generation solutions, either instead of or in combination with network augmentation.

46. Attention has been given by the ACCC to the specification of alternative options in the regulatory test under the National Electricity Code.[12] In defining alternative options, the regulatory test specified under the National Electricity Code distinguishes between augmentations undertaken for the purposes of “reliability benefits” and “market benefits”.

[12] Australian Competition and Consumer Commission, August 2004, Decision: Review of the Regulatory Test for Network Augmentations, pp. 34 – 55.

47. Augmentations undertaken for reliability benefits are augmentations undertaken to allow a transmission network service provider to meet minimum network performance standards in the provision of transmission services. For these augmentations, the regulatory test under the National Electricity Rules specifies that an alternative option is:[13]

- a genuine alternative to the option being assessed, in that it:
  - has a clearly identifiable proponent, and
  - would allow the transmission network service provider to meet minimum network performance standards in the provision of transmission services; and
- a practical alternative to the option being assessed in that it is technically feasible.

48. Augmentations undertaken for market benefits are augmentations that are undertaken to provide benefits to parties that produce, distribute or consume electricity, where these benefits are measured by the economic concept of an increase in economic surplus (producer surplus plus consumer surplus). For these augmentations, the regulatory test under the National Electricity Rules specifies that:[14]

- an alternative option should be a genuine alternative to the option being assessed, in that it:
  - delivers similar outcomes to those delivered by the option being assessed, and
  - becomes operational in a similar timeframe to the option being assessed; and
- an alternative option should be a practical alternative to the option being assessed in that it is:
  - technically feasible, and
  - commercially feasible, which is demonstrated by determining whether an objective operator, acting rationally according to the economic criteria prescribed by the regulatory test, would be prepared to construct or provide the alternative option; and
- the existence of a genuine proponent for the alternative option should be taken into account when determining practicality, however, absence of such a proponent will not exclude a project from being an alternative option for the purposes of the regulatory test.

49. Western Power's proposed transmission line is in the nature of an augmentation that would be considered under the regulatory test of the National Electricity Rules to be an augmentation undertaken to provide both reliability benefits (maintenance of reliability of transmission services in the face of forecast increases in loads) and

[13] Australian Energy Regulator, August 2005, Compendium of Electricity Transmission regulatory Guidelines, pp. 32, 33.

[14] Australian Energy Regulator, August 2005, Compendium of Electricity Transmission regulatory Guidelines, p. 33.

market benefits (providing for connection of new generation and for importing and exporting energy into and out of the Mid-West region). If the regulatory test under the National Electricity Rules were to be used as a guide, the alternative options considered by Western Power should include options that would enable Western Power to meet performance requirements in the provision of transmissions services, provide similar market benefits, have clearly identifiable proponents (where the options comprise something other than a network augmentation), and that are technically and commercially feasible.

50. Submissions made as part of Western Power's consultation programme suggested additional alternative options that have not been explicitly addressed by Western Power.

51. Energy Visions Pty Ltd and Sky Farming Pty Ltd identified an option of constructing a transmission line with capacity of 1000 MW to enable additional wind-energy generation in the Mid-West region (presumably referring to capacity for 1000MW of generation). Western Power has indicated that these suggested options are addressed by the identified alternative option (Option 7) of constructing the 330kV line with towers for a 500kV line.

52. Eneabba Power identified the option of limited reinforcement of the 132kV lines and islanding of the Mid-West network. Western Power has given consideration to both reinforcement of the 132kV lines and islanding of the Mid-West network as options to the proposed transmission line (Options 2, 3 and 11).

53. Transfield Services identified the option of termination of the 330kV line at Three Springs, addressing a perceived potential for Three Springs to become the load centre for the region. Western Power has not considered this as an alternative option for reason that probability-weighted forecasts of energy demand indicate a load centre at Geraldton rather than Three Springs.

54. As an additional matter, the unsolicited submissions received from agricultural landholders and their representatives (refer to paragraph 33, above) set out contentions that there may be alternative routes for the proposed transmission line – in particular, shorter and more direct routes through predominantly crown land rather than the proposed route through agricultural land – that may involve a materially lower cost for the transmission line and avoid imposing costs on landholders through the disruption of agricultural activities. Western Power has not identified alternative options comprising different routes for the proposed transmission line.

55. The Access Code does not provide clear guidance in determining a point at which a different configuration of a network augmentation may be considered to comprise an alternative option within the context of the regulatory test, and this may ultimately be a matter of judgement. There are a number of factors of potential relevance in making such a judgement.

56. First, the regulatory test may be undertaken for a major augmentation proposal before there is a final design of the augmentation and before other regulatory approvals (such as environmental and planning approvals) are obtained. As a consequence, it is possible that the ultimate design and cost of a proposed augmentation (including configuration and route) will differ in some respects from the design and cost considered for the purposes of the regulatory test, and these differences may include differences in the route of a proposed transmission line.

57. Secondly, in addition to the regulatory test, a network augmentation will be subject to the new facilities investment test under section 6.52 of the Access Code. Under the new facilities investment test, the amount of new facilities investment (made in respect of an augmentation) that may be added to the capital base of the network and recovered through regulated network tariffs is limited to "the amount that would be invested by a service provider efficiently minimising costs". The test of whether a network augmentation has been constructed at an efficient cost is therefore a test performed as part of the new facilities investment test and need not necessarily be examined as part of the regulatory test. The matter of relevance to the regulatory test is whether the costs of the proposed network augmentation and alternative options have been reasonably estimated and there are no errors of estimation that are of sufficient magnitude to affect the relativity of net benefits of the proposed augmentation and alternative options.

58. Thirdly, the regulatory test involves a comparison of a proposed augmentation with alternative options on the basis of the net benefits of each. Under the definition of net benefits in the Access Code, "net benefits" are determined from the costs and benefits to parties that generate, transport and consume electricity in the covered network. This implies that the relevant costs and benefits taken into account in calculation of net benefits are costs and benefits that are incurred by these parties *in their capacities as generators, transporters or consumers of electricity*. Costs such as the environmental impacts of a transmission line or impacts on farming activities, are relevant in the assessment of net benefits under the regulatory test only to the extent that they constitute an explicit cost to the network service provider such as, for example, costs to a network service provider of environmental remediation or payment of compensation to affected farmers.

59. Taking the above matters into account, it may be appropriate to consider an alternative route for the proposed transmission line as an alternative option if the alternative route is likely to have materially different costs and benefits to generators, transporters or consumers of electricity.

Submissions are invited from interested parties on:

- whether Western Power has identified a relevant set of alternative options to the proposed transmission line;
- whether Western Power has given reasonable consideration to alternative options proposed by interested parties in submissions made as part of Western Power's consultation process; and
- whether Western Power should give attention to alternative routes of a 330kV transmission line as alternative options on the basis that alternative routes may have materially different costs and benefits, taking into account both construction costs and costs that may be payable in compensation to affected landowners.

ASSESSMENT OF NET BENEFITS OF ALTERNATIVE OPTIONS

Western Power Submission

60. Western Power has assessed alternative options by:

- identifying a set of potential alternative options (as described in the previous section of this issues paper);
- assessing whether the potential alterative options are technically feasible and meet the objectives for the electricity system, and reducing this set by eliminating some alternative options as infeasible; and
- comparing the net benefits of the feasible set of alternative options by a comparison of the present value of costs of each option and a qualitative consideration of differences in benefits.

61. Western Power's reasons given for eliminating some of the potential alternative options from consideration are as follows:[15]

- elimination of the single circuit 132kV line options (with deferral of the 330kV line till November 2015) (Options 2 and 3) on the basis that these options are infeasible in the absence of assurance that the Mungarra Power Station would be available after October 2009, and that these options do not satisfy a technical requirement to maintain services on the network during an N-1 contingency (a failure of an individual element of the electricity system);
- elimination of the do-nothing option (Option 8) as it fails to address system security and reliability requirements under current and forecast loads;
- elimination of the generation options (Options 9 and 10) on the basis that these options are not technically feasible because of synchronous stability and a failure to satisfy the Technical Rules for the transmission network;
- elimination of the generation and islanding option (Option 11) on the basis of the additional generation requirements for the islanded system (spinning reserve capacity and stand-by generation capacity), an inability to meet stability requirements with substantial wind generation and a loss of market opportunities for new wind generation in the Mid-West (export of energy south) and generation in the South West (export of energy north); and
- elimination of demand management (Option 12) on the basis of an expectation that there would be insufficient demand management possible to defer the augmentation of transmission capacity.

62. Western Power compared the remaining alternative options by means of a cost-effectiveness analysis and a "rank ordering" of the options. This involved a comparison of the alternative options by comparison of the present value of the cost of each (with a real discount rate of 6.6 per cent). No quantification of benefits was undertaken although qualitative differences in benefits are described. A summary

[15] Western Power Proposal, Attachment 1 (Internal Report) and Attachment 2 (report by CRA International).

is provided in Table 1 of differences in the present value of costs from the cost of the proposed transmission line and the qualitative differences in benefits.

63. Western Power concludes from its analysis that the comparison of costs of alternative options indicates that the proposed transmission line is the least-cost option for energy demand in the Mid-West region. One variation of the proposed transmission line (Option 1A – staged construction with completion by 2014) had a lower present value of costs than Western power's preferred option (completion by 2010); however, Western Power concluded that this lower value was offset by benefits of the proposed transmission line (described in quantitative terms) of a lower level of unserved energy and earlier provision for connection of new generation in the region

64. Western Power and its consultants undertook sensitivity analyses of the rank ordering approach with different values of the discount rate between 4 per cent and 9 per cent in a cost analysis in real terms, and between 7.03 and 10.05 percent in a cost analysis in nominal terms. The use of different discount rates and a real or nominal analysis did not alter the rank ordering of the proposed transmission line and alternative options.

Table 1 Differences in costs and benefits of alternative options from the proposed transmission line

Alternative Option	Difference in cost	Difference in benefits
Option 1A: Staged construction of the 330kV transmission line with an Eneabba-Geraldton section constructed by 2010 and Pinjar Eneabba section constructed by 2014	- $8.8 million (- 3%)	Does not support connection of new generation until 2015 and will have higher unserved energy due to less spare capacity.
Option 1B: Staged construction of the 330kV transmission line with an Eneabba-Geraldton section constructed by 2010 and initially energised at 132kV and a Pinjar Eneabba section constructed by 2011	+ $15.8 million (+ 5.4%)	
Option 1C: 330kV transmission line as per Option 1, but delayed by one year to November 2011	+ $7.5 million (+2.6%)	Inability to meet forecast peak load in 2010/11.
Option 2a: double circuit 132kV line from Eneabba to Geraldton constructed by November 2010, with retention of generation capacity and with the 330kV line (as in Option 1) deferred until November 2014	+ $37.1 million (+ 12.7%)	Does not support large block loads and connection of new generation before 2016.
Option 4: reinforcement of the existing network using lines of 132kV.	+ $59.9 million (+ 20.5%)	Does not support large block loads and connection of new generation. Higher transmission losses than a 330kV line, less improvement to system stability and greater requirement for reactive support.
Option 5: single 220 kV line between Perth and Geraldton constructed by November 2010.	+ $157.5 million (+ 53.8%)	Lower capacity than a 330kV line and less improvement to system stability.
Option 6: 330kV line (as per Option 1) but with line towers designed for 500 kV lines	+ $47.5 million (+ 16.2%)	Possible benefits in lower energy losses of a 500kV line and ability to meet substantially higher transfer requirements, but these are indicated to be second order or largely redundant.
Option 7: Direct current line from Perth to Geraldton	+ $147 million (+ 50.4%)	

Source: Western Power, 2 October 2007, Submission to the Economic Regulation Authority Major Augmentation Proposal 330 kV Transmission Line and Associated Works in the Mid-West Region of Western Australia, Attachment 1 (Internal Report), Attachment 2 (report by CRA International).

Issues for Consideration by the Authority

65. In its determination on the major augmentation proposal, the Authority will give consideration to whether Western Power has assessed alternative options in accordance with the requirements of the Access Code. The relevant test under the

Access Code is whether the Authority is satisfied that Western Power has appropriately determined the net benefits of the alternative options and, ultimately, whether the Authority considers that Western Power has made a defensible statement that the proposed major augmentation maximises the net benefit after considering alternative options. If the Authority determines that this test is not satisfied, it is not the role of the Authority itself to remedy any deficiency in the assessment of net benefits or to reach its own conclusion on the alternative option that would maximise the net benefit.

66. The matters that the Authority will take into account are set out below.

Demand Forecasts

67. Western Power has considered alternative scenarios of energy demand for the Mid West region based on long term trends in load growth and a probabilistic analysis of prospective new block loads (described in paragraph 18 of this Issues Paper).

68. The Authority will consider whether the forecasting methods adopted by Western Power are consistent with good industry practice and form an appropriate basis for the consideration of alternative options for increasing capacity of the electricity system in the Mid-West region.

> Submissions are invited from interested parties on whether the forecasting methods adopted by Western Power are consistent with good industry practice and form an appropriate basis for the consideration of alternative options for increasing capacity of the electricity system in the Mid-West region.

Feasibility analysis of alternative options

69. Western Power's consideration of the technical feasibility of alternative options is based first on a technical analysis of whether alternative options will meet requirements for the transmission system under the Technical Rules and will meet the forecast demand for the Mid-West region.

70. The Authority will consider whether Western Power's technical analysis of alternative options is reasonable and robust and whether Western Power has adequately justified the elimination of certain alternative options for reasons of technical infeasibility or the provision of insufficient capacity to meet demand.

> Submissions are invited from interested parties on whether Western Power's feasibility analysis of alternative options is reasonable and robust and whether Western Power has adequately justified the elimination of certain alternative options for reasons of technical infeasibility or the provision of insufficient capacity to meet demand.

Approach to Analysis of Net Benefits

71. Western Power has compared the proposed transmission line and alternative options on the basis only of costs using a cost-effectiveness analysis.

72. In consideration of Western Power's assessment of net benefits, the Authority will give consideration to two principal matters:

- whether the cost-effectiveness analysis adopted by Western Power is appropriate; and
- in applying the cost-effectiveness analysis, Western Power has used rigorous and robust cost estimates for the proposed transmission line and alternative options.

73. Western Power's comparison of the net benefits of alternative options on the basis of only a comparison of costs carries the implicit assumption that the alternative options do not vary in their benefits. This approach is consistent with the requirements of the regulatory test under the National Electricity Rules in circumstances where a network augmentation is proposed for reliability benefits and both a proposed augmentation and alternative options are determined to meet particular reliability objectives. This implicit assumption of similar benefits may not, however, hold for the alternative options identified by Western Power that may potentially vary in market benefits to the electricity system of the South West, most particularly though differences in potential for connection of new generation in the Mid-West region and potential effects on competition amongst generators. A consideration of benefits as well as costs of the alternative options would identify these differences in benefits.

74. One of the matters that the Authority will therefore consider is whether the quantification of benefits of the alternative options – particularly the market benefits associated with opportunities for connection of generation – would be likely to affect the rank ordering of alternative options presented by Western Power.

Submissions are invited from interested parties on:

- whether the "cost-effectiveness" and "rank-ordering" approach applied by Western Power in the assessment of net benefits of alternative options is appropriate; and
- whether a more rigorous consideration and quantification of the benefits of alternative options may alter the relative net benefits of the proposed transmission line and alternative options.

75. Western Power has claimed confidentiality over the cost estimates for the proposed transmission line and alternative options. As such, there will be limited opportunity for interested parties to scrutinise and make submissions on the cost estimates. The Authority will, however, examine these costs estimates and reach a view on whether the estimates are rigorous and reasonable.

76. One matter that the Authority will address in consideration of cost estimates is whether all relevant costs have been taken into account. In this regard, the unsolicited submissions received from agricultural landholders and their

representatives (refer to paragraph 33, above) indicate that there may be a substantial additional cost for the proposed transmission line and some of the alternative options, due to construction over a longer and more indirect route over private land, and due to the value of compensation that may be payable to owners of agricultural land that would be traversed by the transmission line corridor. An initial review of Western Power's cost estimates indicates that the cost estimates may not include allowance for these costs.

77. The Authority is aware that Western Power is currently considering matters of compensation through a working group with affected landowners, but that any costs of compensation have not as yet been determined nor included in the assessment of the relative costs of the proposed transmission line and alternative options.

Submissions are invited from interested parties on the additional cost of the longer route proposed by Western Power.

Submissions are also invited from interested parties on the outcomes or potential outcomes of deliberations on the amounts of compensation that may be payable to owners and/or occupiers of land traversed by proposed transmission line corridors and whether any such costs may be of sufficient magnitude to affect the relative net benefits of the proposed transmission line and alternative options.