



PRE-APPROVAL OF NEW FACILITIES INVESTMENT

66/11 kV Medical Centre Zone Substation expansion and voltage conversion of distribution network

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safe reliable efficient

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1 EXECUTIVE SUMMARY

A major augmentation proposal for the construction of a new 66/11 kV 'Medical Centre' zone substation at Sir Charles Gairdner Hospital ("SCGH") and associated works to upgrade the

secondary system to 11 kV was submitted to the Economic Regulation Authority (the Authority) under section 9.15 of the Electricity Networks Access Code 2004 (the Code) on 25th March 2008 for assessment against the regulatory test. This submission included a summary of Western Power's evaluation of eight alternative options to increase the power supply capacity to the Medical Centre and surrounding substations to meet the forecast demand.

On 15th April 2008, the Authority published the "Determination on the Regulatory Test for 66/11kV 'Medical Centre' zone substation at Sir Charles Gairdner Hospital ("SCGH") and associated works to upgrade the secondary system" in which the Authority concurred with Western Power that the proposed major augmentation was the only viable option after considering all reasonable alternative options for meeting demands for electricity services and addressing constraints in the electricity system. The Authority's determination was that the regulatory test under Chapter 9 of the Code was waived.

This submission to the Authority is being made under section 6.71 of the Code to request the Authority to determine that the new facilities investment test, as set out in section 6.52 of the Code, when applied to the proposed major augmentation is fully satisfied for the distribution works, and partially satisfied for the new substation works, such that the new facilities may be added to Western Power's capital base. If the new facilities investment can not be added to the capital base, Western Power can not earn an economically efficient return on the investment and it would consequently be unlikely for the project to proceed. The project is required to provide expanded electricity services to the hospital, but is expected to lead to an inherently more reliable supply to both SCGH and other customers in the surrounding areas.

2 BACKGROUND

The State Government plans to rationalise Perth's health facilities over the next decade or more and in particular expand SCGH into a major hospital to service the northern and central metropolitan area.

To achieve the proposed expansion to SCGH it is necessary to upgrade the electricity supply to provide sufficient additional capacity. The delivery date for this project (substation and line/cable work) is October 2010. An optimistic expected completion date for the distribution network conversion is December 2013.

Without the SCGH expansion plans, general load growth in the surrounding areas is forecast to trigger the need for the Medical Centre zone substation to be upgraded by 2020.

The main drivers for this project are:

- Shortfall in capacity to meet forecast load growth at SCGH through its development to a major hospital for the Perth Metropolitan area;
- Shortfall in capacity at the University Substation to meet the forecast load growth at the University of Western Australia;
- A need to upgrade distribution system architecture in the surrounding areas from 6.6 kV to 11 kV to meet the increase in general consumer demand.

The scope of work includes a 66 kV line and cable work to form the incoming supply to the new substation. Where cable is used, a 132 kV rating will be specified to facilitate a future voltage conversion of the substation to 132 kV if and when required.

The substation will include two 33 MVA transformers with provision for a third transformer to be installed when required to meet further load growth. The 66 kV switchgear will be of GIS construction and rated for 132 kV operation. This is to reduce the land requirement for the

substation and to minimise future disruption if a voltage conversion is required. Switchgear to accommodate three transformers and three lines needs to be installed as part of the initial project.

Sections of 11 kV indoor switchboards will also be provided to allow the conversion of the Western Power-owned distribution network voltage from 6.6 kV to 11 kV.

The capital cost of the project is \$28.4M including \$25.8M for the new substation and cable works, and \$2.6M for the distribution voltage conversion. The customer's allocated contribution is \$12.25M including an upfront capital contribution payment of \$9.7M. The customer's contribution equates to paying the advancement cost for bringing the project forward to 2010.

3 OPTIONS

The options that have been analysed for this project are outlined in the major augmentation proposal, "Regulatory Test for 66/11 kV 'Medical Centre' zone substation at Sir Charles Gairdner Hospital ("SCGH") and associated works to upgrade the secondary system", submitted to the Authority on 25th March 2008. Only the feasible option for constructing a new Medical Centre Substation will be discussed further in this submission.

The new substation will be of a 66/11 kV design with two 33 MVA transformers and two incoming lines initially, with provision for a third transformer and a third line at some later date.

The existing Medical Centre substation will need to remain operational for approximately 3 years after the commissioning of the new substation, to allow sufficient time for the hospital to transfer their load to the new substation while keeping disruptions to a minimum. This time frame will also allow Western Power to convert their distribution network from 6.6 kV to 11 kV.

After all loads have been transferred onto the 11 kV network, the existing 66/6.6 kV substation will need to be decommissioned and the site "rehabilitated" to vacant land.

This is likely to occur about 3 years after the commissioning of the new substation and will involve, among other things, the removal and disposal of the existing plant.

This option meets the long term needs of SCGH and also allows improvements to the Western Power infrastructure in the surrounding area. The new assets are expected to have a lower probability of failure (and require less maintenance initially) than the existing equipment, which has been in operation since approximately 1960. This is expected to lead to an inherently more reliable supply to both SCGH and other customers.

4 NEW FACILITIES INVESTMENT TEST

The electricity Networks Access Code 2004 specifies the following in relation to investment in new facilities:

New Facilities Investment Test

6.52 *New facilities investment* may be added to the *capital base* 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*.

In this submission, clause 6.52 (a) and (b) of the new facilities investment test (NFIT) will be analysed separately.

4.1 NFIT Clause 6.52 (a)

After evaluating 7 alternative options, Western Power and the Authority concluded that the only feasible solution that will provide the required capacity to support both the load growth due to the expansion to the QEII Medical Centre and for the surrounding areas is the establishment of a new 66/11 kV Medical Centre substation (with some associated minor works). This was determined on the basis of Western Power's major augmentation proposal as published on the 15th April 2008.

It is Western Power's interpretation that if the regulatory test has been satisfied or waived, then the best option has already been determined having regard to all reasonable alternative options. If an option is the only feasible option, then that option should also be considered to meet the requirements of clause 6.52 (a) of the new facilities investment test.

4.2 NFIT Clause 6.52 (b)

4.2.1 Transmission Works

The new Medical Centre substation only partially meets the NFIT criteria for clause 6.52 (b). The upgrade of the Medical Centre substation is required by 2020 for Western Power to meet general load growth for customers in the surrounding areas. A project at this time in the future would then meet the new facilities investment criteria of clause 6.52 (b)(iii), being necessary to maintain the safety and reliability of supply for customers in the vicinity of the Medical Centre Substation.

- (iii) the *new facility* is necessary to maintain the safety or reliability of the *covered network* or its ability to provide contracted *covered services*.

However, SCGH require the upgrade by 2010 to meet their expansion of the QEII Medical Centre. Therefore the \$25.8M capital cost for the new substation less a portion allocated to SCGH for advancing the work will meet NFIT clause 6.52 (b)(iii).

Comparison between advancement cost calculations or cost sharing methods based on the relative peak loads between the hospital and other consumers, both equate to an allocation to SCGH of \$12.25M, of which \$9.7M will be charged as an upfront payment and \$2.55M will be recovered via ongoing tariff revenue over the next 15 years.

In summary, of the \$25.8M required for the transmission substation and line works, \$13.55M is necessary to maintain safety and reliability of supply for customers in the vicinity of the Medical Centre Substation and thus meets NFIT clause 6.52 (b)(iii). \$9.7M does not meet NFIT and will be paid upfront by SCGH, and \$2.55M will be recovered as ongoing incremental revenue for the new substation and thus meets NFIT clause 6.52 (b)(i)(A).

4.2.2 Distribution Works

The \$2.6M distribution works component provides improved reliability and the ability to provide covered services to customers in areas supported by the Medical Centre substation, Nedlands substation and University of Western Australia substation. The 6.6 kV network can not support expected load growth over the next decade for these areas and works have already begun to upgrade Nedlands substation to 11 kV. With the Medical Centre also on the 11 kV network, load can be transferred between the three substations mentioned above, supporting load growth and maintaining the reliability of supply for customers in these areas.

Some of the benefits of the new medical centre substation and the associated distribution voltage conversion project include:

- The distribution line losses will be lower at 11 kV compared to 6.6 kV (for a given power demand). This will be beneficial to the environment.
- Other major network reinforcements such as a new 66/11 kV zone substation at the University of Western Australia can be deferred by at least five years. The University substation project is expected to be very complex and of high capital cost due to tight space constraints. Thus, the savings from deferring the work are expected to be significant. For example, deferring a \$20M substation by 5 years will lead to savings of about \$3.5M in net present value terms.
- An 11 kV distribution network can supply higher loads than 6.6 kV. This provides the capacity for higher revenue return as load growth occurs over time.
- The higher distribution voltage provides less operational constraints than 6.6 kV (due to higher network capacity).
- The plant at the new substation will provide an inherently more reliable supply than the existing aging plant. The probability of plant failure is reduced.

Therefore, the distribution component of this project is considered to meet the second part of the New Facilities Investment Test clause 6.52 (b)(iii).

5 CONCLUSION

This submission to the Authority is being made under section 6.71 of the Code to request the Authority to make a determination regarding the *new facilities investment test* as set out in section 6.52 of the Code when applied to the proposed *major augmentation* being a 66/11 kV 'Medical Centre' zone substation at Sir Charles Gairdner Hospital ("SCGH") and associated works to upgrade the distribution system.

The proposed new facility has previously been determined by the Authority to be the only viable option for the intentions of the Regulatory Test under Chapter 9 of the Code.

Before making the economic commitment required by this project, Western Power is seeking the Authority's' determination with respect to the *new facilities investment test* prior to committing to the project such that the *new facilities investment* may be added to Western Power's *capital base*. To meet the forecast load growth for SCGH the project is required to be commissioned by October 2010, and to meet the required construction schedule Western Power hopes to commit to an Interconnection Works Contract by October 2008.

In summary the proposed *new facility* meets the requirements of section 6.52 (a) and 6.52 (b)(iii) of the Code in respect of the forecast cost for the project if it had been completed by 2020. Western Power respectfully requests that the Authority determine that the *new facilities investment test* is satisfied for the distribution component of works amounting to \$2.6M as per clause 6.52 (b)(iii), and also for the new substation works components to the value of \$16.1M of which \$13.55M is justified under clause 6.52 (b)(iii) and \$2.55M under clause 6.52 (b)(i)(A). The remaining cost of the project does not meet the NFIT, and as such a capital contribution of \$9.7M will be sought from the customer.