CitiPower

Regulatory Investment Test for Distribution - Draft Project Assessment Report: Dock Area Zone Substation

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1 Summary

This draft project assessment report for Docks Area Zone Substation (DA ZSS) has been prepared by CitiPower Pty (**CitiPower**) in accordance with the Regulatory Investment Test for Distribution (**RIT-D**) and the National Electricity Rules (**the Rules**)[1].

In August 2018, CitiPower published a notice of its determination that there are no credible non-network options to address the 'identified need' at DA ZSS. Following the publication of that notice, this document is CitiPower's draft project assessment report in accordance with clause 5.17.4(p) of the Rules.

The identified need is to maintain reliable supply of electricity to DA customers following the decommissioning by 2021 of West Melbourne Terminal Station (WMTS) 22 kV assets, which are owned and operated by AusNet Services. As such, the identified need is for 'reliability corrective action', which means that a preferred option may have a negative net economic benefit (that is, a net economic cost) and still satisfy the RIT-D[2].

CitiPower has a program across its network to upgrade the 22 kV sub-transmission network to 66 kV because:

- many of the ageing 22 kV assets, including transformers and indoor switchboards are in poor condition; and
- some of the zone substations have secondary voltages of 6.6 kV, which limits network flexibility, imposes technical limitations and is inconsistent with the present 11 kV standard that applies in the CBD and inner suburbs.

AusNet Services' WMTS redevelopment project is focused on rebuilding WMTS to address safety and reliability issues associated with station assets that are ageing and in poor condition. Through joint planning, CitiPower and AusNet Services identified cost savings of $33 million by coordinating and integrating the distribution and transmission works. Specifically, decommissioning the entire WMTS 22 kV network removes the need for AusNet Services to invest in any replacement 220/22 kV transformers and replacement 22 kV network equipment at WMTS. The AER scrutinised the joint planning analysis in CitiPower's 2016-20 regulatory determination and found that it was robust under a wide range of sensitivity analyses[3].

AusNet Services' WMTS works will include converting the existing 22 kV bus to 66 kV, so that supply to the new DA ZSS will be at 66 kV only. In the context of the broader WMTS redevelopment (which is scheduled to be completed by the end of 2021), our preferred option for addressing the asset condition and risk issues at DA ZSS is to:

- replace the existing 3 x 10/13.5 MVA 22/11 kV transformers with 2 x 20/27 MVA 66/11 kV transformers
- maintain a reliable supply to customers throughout the construction period.

The above specifications are consistent with our company-wide design standards, which provide benefits in terms of lower costs, reduced risk and improved operational flexibility. As an alternative design, we also considered a single transformer zone substation option, but this option was rejected because it would expose our customers to unacceptable reliability risks.

The estimated total direct capital cost of the project is $21.4 million (undiscounted). The target date for completion of this project is 2021.

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1 Version 109 of the Rules, clause 5.17.4.

2 National Electricity Rules, clause 5.17.1(b).

3 Australian Energy Regulator, Final Decision, CitiPower distribution determination 2016 to 2020 Attachment 6 – Capital expenditure, pages 45 and 46.

In addition to considering the preferred network option (Option 1), we also considered three other network options, which involved establishing supply to DA ZSS from one of the following alternative sources to WMTS:

- Option 2 - A 22kV sub-transmission supply from Richmond Terminal Station
- Option 3 - A 22kV supply from Jemena
- Option 4 - A VicRail switching station.

For the reasons presented in this draft project assessment report, each of Options 2, 3 and 4 was assessed as not being feasible. In addition, there are no feasible non-network options for the following reasons, which were set out in CitiPower's determination notice under clause 5.17.4(c) of the Rules:

- DA ZSS cannot be retired without compromising the reliability of supply for those customers currently served by that zone substation.
- There is no opportunity to reduce the required assets and associated works at DA ZSS by partially reducing peak load through demand management.
- An embedded generation option would not be cost effective.

Option 1 is therefore the only credible option for addressing the identified need and is therefore the preferred option. As the identified need is a reliability corrective action, the preferred option satisfies the RIT-D even though the net economic benefit is negative. CitiPower is the proponent for the preferred option.

Submissions on this draft project assessment report are now invited, and should be lodged by 15th of February 2019. Submissions, or any questions regarding this report should be directed to:

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2 Background

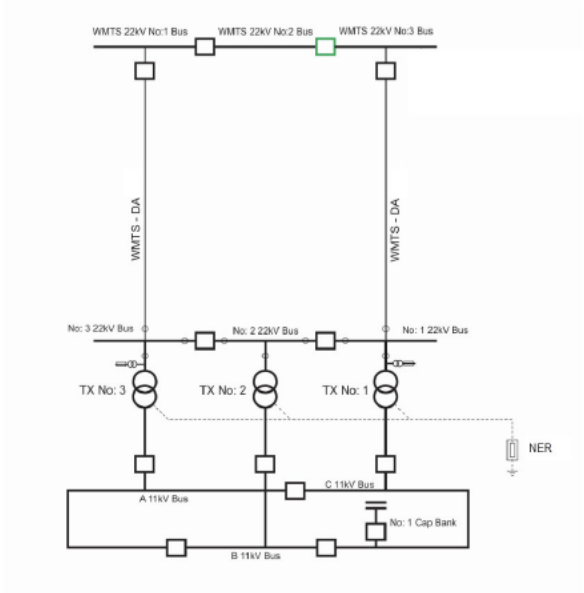
2.1 DA zone substation configuration

The DA ZSS was commissioned in 1971. No major upgrades have been completed at the substation since its commissioning.

DA ZSS has a summer N-1 rating of 29.2 MVA. It consists of three 10/13.5MVA transformers operating at 22/11kV. The zone substation supplies the Docklands and North Melbourne areas.

Figure 2.1 below shows a single line diagram of the current arrangements at DA ZSS.

Figure 2.1: DA zone substation single line diagram

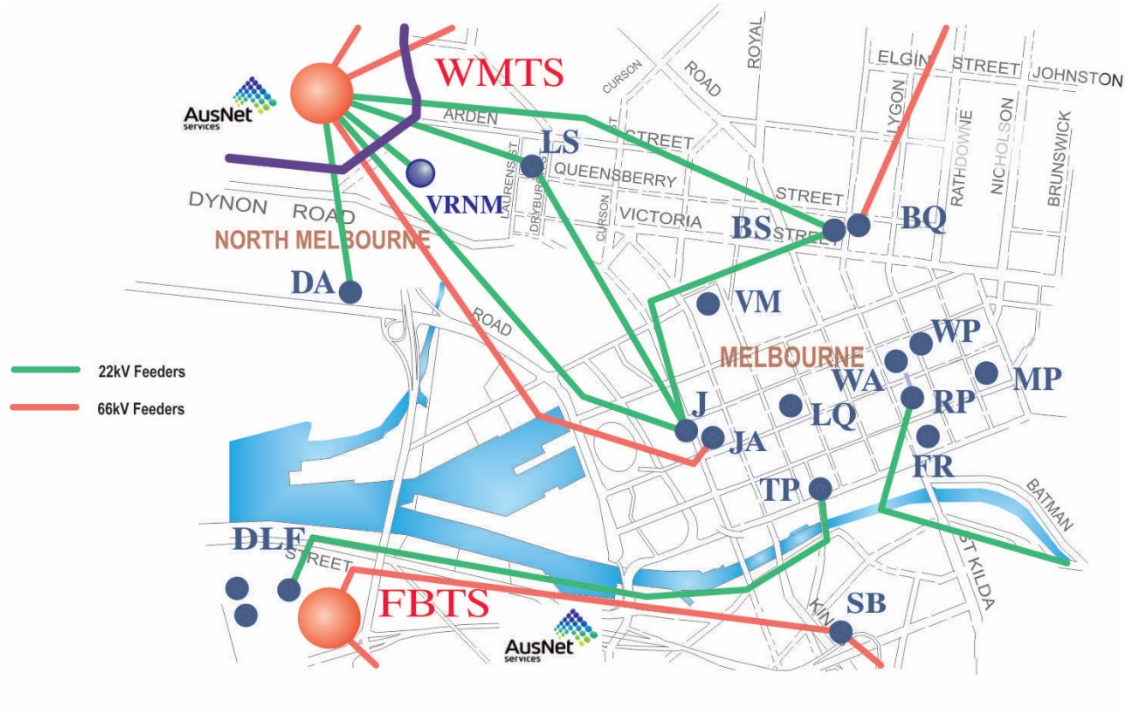


As shown in the above figure, DA ZSS currently consists of the following primary plant:

- 3 x 10/13.5 MVA 22/11 kV transformers
- 3 x 11 kV buses
- 16 x 11 kV feeders.

CitiPower's 22 kV sub-transmission network, which is supplied from the West Melbourne Terminal Station (WMTS) 22 kV System, includes zone substations at Bouverie Street (BS), Dock Area (DA), Spencer St (J) Laurens Street (LS) and a supply to Vic Rail (VR). The figure below shows the current WMTS 22 kV network.

Figure 2.2: Current WMTS 22 kV Network



CitiPower has a program across its network to replace the 22 kV sub-transmission network with a 66 kV sub-transmission network. This program is required because:

- many of the ageing 22 kV assets, including transformers and indoor switchboards are in poor condition; and
- some of the zone substations have secondary voltages of 6.6 kV, which limits network flexibility, imposes technical limitations and is inconsistent with the present 11 kV standard that applies in the CBD and inner suburbs.

In addition to the works required on CitiPower's 22 kV network, AusNet Services' WMTS redevelopment project is focused on rebuilding WMTS to address safety and reliability issues associated with station assets that are ageing and in poor condition. As explained in section 3.3 of this report, through joint planning, CitiPower and AusNet Services identified an opportunity to coordinate and integrate the distribution and transmission works to minimise the overall costs of the combined projects.

2.2 Forecast demand

The load at DA ZSS is dominated by commercial customers, which include:

- Swanson Dock
- Channel 7
- Marvel Stadium
- Pacific National Melbourne Freight Terminal
- Citywide Waste Management

CitiPower's on-going engagement with customers indicates that maintaining current levels of reliability is a key customer requirement. As discussed later in this report, an option to address the issues at DA ZSS can only be regarded as credible if, as a minimum, it maintains current reliability performance.

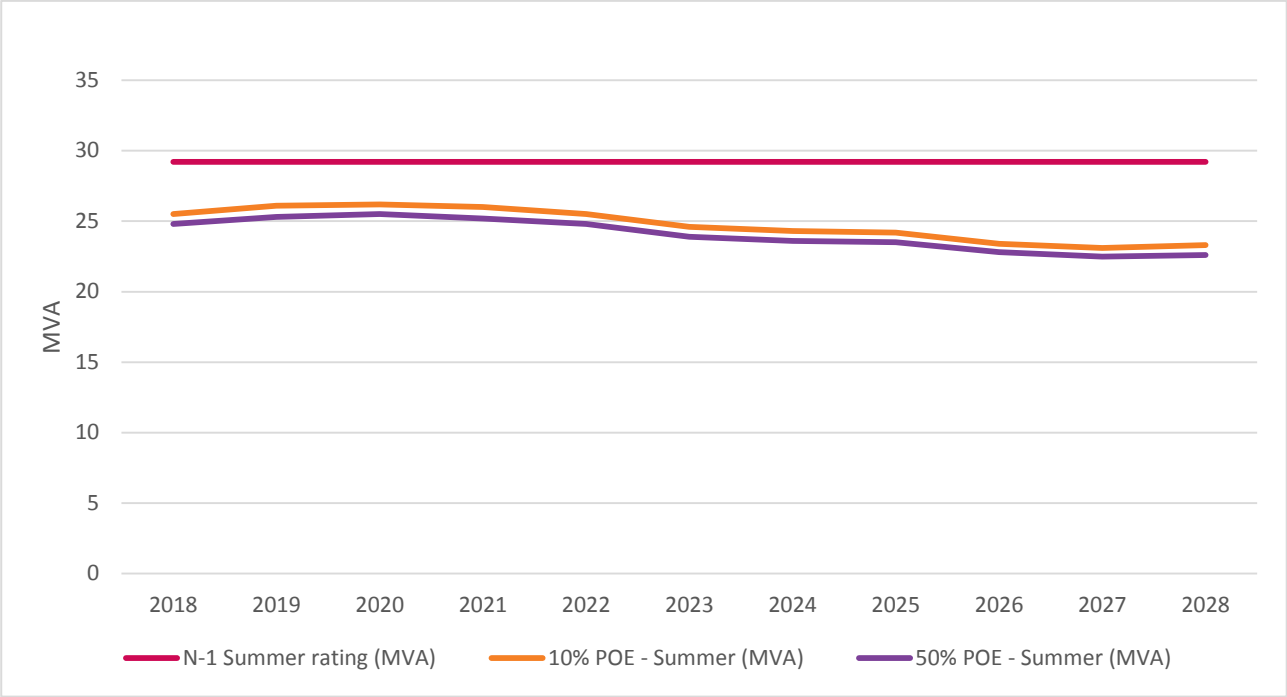
The table below shows the forecast summer and winter peak demands at DA ZSS over the next 10 years.

Table 1: DA ZSS summer and winter peak demand forecasts in MW and MVA

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
50% POE Summer (MW)	22.7	23.1	23.3	23.1	22.7	22.0	21.7	21.6	21.0	20.7	20.9
50% POE Winter (MW)	23.1	23.4	23.7	23.3	23.4	23.3	23.6	23.4	23.8	23.9	24.7
50% POE Summer (MVA)	24.8	25.3	25.5	25.2	24.8	23.9	23.6	23.5	22.8	22.5	22.6
50% POE Winter (MVA)	24.9	25.2	25.5	25.1	25.2	25.0	25.4	25.2	25.7	25.8	26.7
10% POE Summer (MW)	23.3	23.7	23.9	23.7	23.3	22.5	22.3	22.2	21.5	21.3	21.4
10% POE Winter (MW)	23.9	24.2	24.4	24.0	24.1	24.0	24.4	24.2	24.6	24.6	25.5
10% POE Summer (MVA)	25.5	26.1	26.2	26.0	25.5	24.6	24.3	24.2	23.4	23.1	23.3
10% POE Winter (MVA)	25.7	26.1	26.4	25.9	26.1	25.9	26.3	26.1	26.5	26.6	27.6

Table 1 shows that maximum demands (in MVA) are forecast to be slightly higher in winter than in summer, however, the zone substation's rating is lower in summer due to higher ambient temperatures. Given these considerations, Figure 2.3 below shows the forecast demand for summer at DA ZSS, along with the zone substation's summer rating. The figure shows that summer peak demand is expected to increase slightly over the two years to 2020, and to then decline at an average rate of approximately 1.4% over the following 8 years. The forecast peak demand remains within the zone substation's summer N-1 rating over the forecast period.

Figure 2.3: DA zone substation summer forecast demand (in MVA)



2.3 Load transfer capacity to adjacent zone substations

The load transfer capability from DA ZSS totals 8 MVA. At any given time, actual available transfer capability is dependent on network operating conditions and the availability of spare capacity at adjacent zone substations.

3 Description of the identified need

3.1 Defining the identified need

The identified need is to maintain reliable supply of electricity to DA customers following the decommissioning of WMTS 22 kV assets by AusNet Services.

Load is not forecast to exceed the zone substation's summer N-1 rating of 29.2 MVA in the next 10 years and there is no load at risk at the substation today. However, as already noted, CitiPower has a program across its network to upgrade the 22 kV sub-transmission network to 66 kV to address issues associated with aging assets, and to improve the operational flexibility of the network.

The transformers and circuit breakers at DA ZSS were commissioned in 1971. These assets are now approaching the end of their economic life and are in poor condition. This leads to an increasing probability of asset failure which results in:

- deteriorating reliability performance, exposing customers to increased risk of supply interruption and higher costs
- deteriorating safety performance, putting at risk the health and wellbeing of our customers and staff
- increased risk of plant damage and environmental harm caused by asset failure, and
- increasing operating and maintenance costs.

While the issues associated with aging assets would need to be addressed at DA ZSS over the next 5 to 10 years, AusNet Services' WMTS redevelopment project has accelerated the timing. The WMTS redevelopment project, which has been approved by the AER, will decommission AusNet Services'22 kV assets that currently supply DA ZSS. Consequently, the 'identified need' is to maintain supply of electricity to DA customers following the decommissioning of WMTS 22 kV assets.

We regard the identified need as for 'reliability corrective action', because action is required for the purpose of meeting:

- section 98 of the Electricity Safety Act[4]; and
- clauses 3.1 and 5.2 of the Victorian Electricity Distribution Code[5].

Section 3.2 below provides an overview of our approach to assessing asset condition and risk. Section 3.3 explains how our joint planning with AusNet Services has enabled the coordination and optimisation of distribution and transmission works associated with the decommissioning of WMTS 22 kV, to minimise the total cost of those works.

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[4] Under section 98 of the Electricity Industry Safety Act, CitiPower (as a major electricity company) must design, construct, operate, maintain and decommission its supply network to minimise as far as practicable:
- the hazards and risks to the safety of any person arising from the supply network; and
- the hazards and risks of damage to the property of any person arising from the supply network.

[5] Clause 3.1 of the Victorian Electricity Distribution Code requires us to manage our assets in accordance with the principles of good asset management. Under this provision, we must, among other things, develop and implement plans for the management of our assets to minimise the risks associated with the failure or reduced performance of assets. Under clause 5.2, we are required to use best endeavours to meet customers' reasonable expectations of supply reliability.

3.2 Our approach to assessing asset condition and risk

CitiPower applies the Condition Based Risk Management (CBRM) methodology to certain plant-based asset classes, namely transformers and HV circuit breakers. The CBRM model is an asset risk assessment algorithm that considers a range of inputs including:

- asset condition assessment data, such as transformer oil condition;
- environmental factors, such as whether the assets are located indoors or outdoors, or coastal areas; and
- operating factors, such as the load utilisation, frequency of use and load profiles that the asset is supplying.

These factors are combined to produce a Health Index for each asset in a range from 0 to 10, where 0 is a new asset and 10 represents end of life. The Health Index provides a means of comparing similar assets in terms of their probability of failure.

CitiPower closely monitors assets with a Health Index in the range 5 to 7 to determine options for intervention, including replacement or retirement, in the context of energy at risk. Interventions are evaluated and planned when asset Health Index exceeds 5.5 and intervention is prioritised when asset Health Index exceeds 7.

A Health Index profile gives an immediate appreciation of the condition of all assets in a group and an understanding of the future condition of the assets.

As part of the CBRM process, the consequence of failure of the asset is also calculated. The consequence of failure consists of four elements:

- network performance;
- safety;
- financial; and
- environment.

The risk is calculated by combining the probability and consequence of asset failure. CBRM is used to calculate how the risk is likely to change in future years. In this way, the CBRM analysis provides:

- a preliminary indication of the likely optimal replacement time of an asset; and
- a foundation or starting point for further detailed economic assessment to determine the optimal timing of intervention action.

As already noted, the assets at DA ZSS are aged and in poor condition. Our latest CBRM analysis indicates that the optimal time to replace the deteriorating 22 kV circuit breakers at DA ZSS would be in 2027, while the aging transformers should be replaced by 2028. However, as explained in the next section, the optimal timing of asset replacement at DA ZSS is dictated by AusNet Services' WMTS redevelopment project and the requirements of the western distributor road project.

3.3 Joint planning with AusNet Services

In 2015, CitiPower and AusNet Services undertook a joint planning exercise to identify opportunities to integrate AusNet Services' WMTS redevelopment project and CitiPower's program to upgrade its 22 kV sub-transmission network to 66 kV.

The transformers, circuit breakers, switchboards and associated equipment in the AusNet Services WMTS 220/22 kV switchyard[6] and CitiPower's 22 kV sub-transmission network supplied from WMTS are ageing and in poor condition. As assets approach their end-of-life, there is an increasing risk of failure which results in:

- deteriorating reliability performance, exposing customers to increased risk of supply interruption and higher costs
- deteriorating safety performance, putting at risk the health and wellbeing of our customers and staff
- increased risk of plant damage and environmental harm caused by asset failure
- increasing operating and maintenance costs.

While these issues need to be addressed, it was also recognised that there may be an opportunity to integrate and optimise the transmission and distribution works. Two options were considered:

- Option 1: Rebuild the WMTS 22 kV assets and under a business-as-usual approach, replace / refurbish the ageing CitiPower 22 kV zone substations.
- Option 2: Transfer five zone substations from WMTS 22 kV supply to 66 kV.

The analysis found that Option 2 would deliver total savings of $31.8 million compared to the alternative option of replacing the existing ageing assets on a like-for-like basis. The AER accepted the results of the joint planning exercise in its subsequent revenue determination for AusNet Services and its regulatory determination for CitiPower. The AER undertook extensive sensitivity testing in approving CitiPower's proposed expenditure. The AER stated[7]:

> *We tested the sensitivity of CitiPower's net present value analysis under several counterfactual scenarios:*
>
> - *using a higher discount rate (leading to greater discounting of future cash flows)*
> - *assuming that like-for-like replacement would take place five years later than presented by CitiPower (resulting in the savings from the avoided like-for-like costs being more heavily discounted)*
> - *reducing the business as usual cost of like-for-like asset replacement by 20 per cent*
> - *delaying transmission replacement timing by five years (and holding distribution costs to the timing submitted by CitiPower), and*
> - *delaying distribution replacement timing by five years (and holding transmission costs to the timing submitted by CitiPower.*
>
> *The augmentation (reconfiguration) option remained the lowest cost option under each of these scenarios. Based on this testing, we are satisfied that the augmentation option represents the lowest cost option to customers. That is, the cost of augmentation is lower than the avoided cost of replacing the assets on a like-for-like basis over time.*

The network issues at DA ZSS were considered as part of the joint planning exercise. At that time, the expectation under the business-as-usual approach (Option 1) was that DA would remain as it is until 2025 when the first transformer is scheduled for replacement, with the remaining two transformers replaced in 2029 and

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6 It is noted that in its Draft Decision (page 32) for SP AusNet's 2014–15 to 2016–17 revenue cap, the AER agreed that given the age and condition of the WMTS transmission system assets, the station needs to be rebuilt.

7 Australian Energy Regulator, Final Decision, CitiPower distribution determination 2016 to 2020 Attachment 6 – Capital expenditure, pages 45 and 46.

2034. However, as explained above, co-ordination of AusNet Services' work to retire the aging WMTS 22 kV assets and Citipower's program to upgrade its 22 kV sub-transmission network to 66 kV will deliver significant savings. Accordingly, completion of the asset replacement work at DA ZSS has been brought forward to 2021, to coincide with AusNet Services' planned completion of its WMTS redevelopment project in 2021[8].

The urgency for the completion of the DA component of the works is reinforced by interactions with the Victorian Government's West Gate Tunnel Project. This major infrastructure project involves road works in close proximity to the DA ZSS, which require CitiPower to accelerate the works at that zone substation. CitiPower is currently discussing safety and logistical issues with the project contractor.

[8] See AusNet Services' 2018 Asset Renewal Plan at http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/VAPR/2018/AusNet-Services-asset-renewal-plan-2018.pdf.

4 Description of options

4.1 Network options

Table 4.1 provides a description of the network options that we considered in order to address the identified need.

Table 4.1 Network options

Option	Description
Business as usual	This option involves retaining the existing supply arrangements at DA ZSS and replacing the aged assets on a BAU basis. This option is not feasible as the existing 22 kV supply will cease following the WMTS redevelopment which is scheduled for completion in 2021.
Option 1. Upgrade DA ZSS to 66 kV	The scope of work includes: • replace the existing 3 x 10/13.5 MVA 22/11 kV transformers with 2 x 20/27 MVA 66/11 kV transformers • maintain a reliable supply to customers throughout the construction period. This option aligns with CitiPower's strategy to upgrade the 22kV sub-transmission network to 66 kV. The estimated total direct capital cost of this option is $21.4 million (undiscounted). The target date for completion of the project is 2021.
Options 2, 3 and 4. Establish alternative 22 kV supply	We considered several options for providing an alternative 22 kV supply and retaining the existing assets at DA ZSS. However, none of these options were feasible for the reasons set out in section 4.3.

Source: CitiPower

As indicated in the table above, Option 1 is the only credible network option. The project specification for this option is consistent with our company-wide design standards, which provide benefits in terms of lower costs, reduced risk and improved operational flexibility. As an alternative design, we also considered a single transformer zone substation option, but this was rejected because it would expose our customers to unacceptable reliability risks.

4.2 Non-network options

In August 2018, CitiPower published a notice of its determination that there are no credible non-network options to the proposed works for DA ZSS, in accordance with clause 5.17.4(d) of the Rules. The notice explained that there are no credible non-network options for the following reasons:

- DA ZSS cannot be retired without compromising the reliability of supply for those customers currently served by that zone substation.
- There is no opportunity to reduce the required assets and associated works at DA ZSS by partially reducing peak load through demand management.
- An embedded generation option would not be cost effective.

Our reasons are based on a consideration of the following characteristics of the supply arrangements at DA ZSS:

- Significant industrial and commercial loads are currently served by DA ZSS.
- The industrial and commercial customers currently served by DA ZSS have high expectations regarding the reliability of electricity supply.

- There are no economic options to transfer load from DA ZSS to an adjacent station or stations.
- There would be an unacceptable reduction in supply reliability if the proposed number of transformers at DA ZSS were reduced from two to one.
- The costs of embedded generation options exceed the cost of the preferred network option, and there is, in any event, limited availability of land for implementing a local generation option.

In considering the feasibility of generation options, CitiPower prepared an indicative estimate of the cost of a hypothetical stand-alone gas-fired generator that would provide a level of supply reliability comparable to the preferred network option. It was found that the estimated annualised capital cost of a stand-alone generation option would be approximately $3.1 million per annum compared to an estimated $1.8 million per annum for the preferred network option. As detailed in section 5.3, the updated estimate of the annualised capital cost of the preferred option is now lower than our initial estimate, which confirms that the generation option would not be economic.

No submissions were received in relation to CitiPower's notice under clause 5.17.4(d) of the Rules. For the purpose of this report, CitiPower reaffirms its conclusion that there are no non-network alternatives to address the identified need at DA ZSS.

4.3 Other network options considered but rejected

Table 4.2 below describes the other network options that CitiPower considered, but rejected because they were either technically or economically infeasible.

Table 4.2 Other network options considered but rejected

Option	Reasons for option not being feasible
Option 2: Obtain a 22kV supply from Richmond Terminal Station	This option involves running approximately 9 km of new cables across rivers/creeks and the CBD. The indicative estimated cost of this option is approximately $27 million, which is uneconomic.
Option 3: Obtain a 22kV supply from Jemena	This option involves running approximately 8 km of new cables across the Maribyrnong river, as well as the installation of a new transformer at ZSS NT, and sub-transmission and zone substation 22 kV bus works. The indicative estimated cost of this option is approximately $25 million, which is uneconomic.
Option 4: Obtain supply from a VicRail switching station	The site that would be used to accommodate the necessary 22 kV assets is not currently available to CitiPower, so this option is not viable.

Source: CitiPower

5 Economic assessment

5.1 Options to be subject to economic assessment

As explained in Chapter 4, Option 1 is the only credible option. This option involves upgrading DA ZSS so that it is capable of taking supply from WMTS at 66 kV, by replacing the existing 3 x 10/13.5 MVA 22/11 kV transformers with 2 x 20/27 MVA 66/11 kV transformers.

In addition to accommodating the new supply arrangements from WMTS, Option 1 will also maintain a reliable supply to customers throughout the construction period, consistent with our obligations to meet our customers' reasonable expectations of supply reliability[9].

The alternative options were found not to be feasible for the following reasons:

- The 'business as usual' option is not credible as the current 22 kV supply from WMTS will no longer be available following AusNet Services' redevelopment of WMTS which is scheduled for completion in 2021.
- Three other potential network options were not feasible because they would fail to maintain current levels of reliability; or could not be constructed in the required timeframes; or would be prohibitively expensive.
- There are no feasible non-network options, for the reasons outlined in section 4.2.

As Option 1 is the only credible option, it is appropriate to provide a much more limited economic assessment than would otherwise be the case. The remainder of this chapter provides that assessment in accordance with the requirements of the RIT-D.

5.2 Market benefits

The AER's Regulatory Test Guidelines explain that the RIT-D proponent is required to consider each class of market benefit, although it is not required to quantify the market benefit in the following circumstances[10]:

> *While a RIT-D proponent must consider each class of market benefit specified under cl. 5.17.1(c)(4) of the NER, a RIT-D proponent is not obligated to quantify the benefits that it considers to be immaterial or will not alter the selection of the preferred option. Likewise, a RIT-D proponent is not obligated to quantify market benefits for reliability driven projects.*

As already noted, the identified need in this draft project assessment report is for 'reliability corrective action' or a 'reliability driven project'. In accordance with the guidance set out above, therefore, we are not required to quantify the market benefits.

In accordance with the RIT-D[11], the table below explains how we have considered each of the market benefits in clause 5.17.1(c)(4) for the credible option, being Option 1. This information is required in order to comply with the RIT-D Guidelines, but it does not ultimately affect the economic assessment.

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9 Victorian Electricity Distribution Code, clause 5.2.

10 Australian Energy Regulator, Regulatory investment test for distribution application guidelines, 18 September 2017, page 32.

11 Australian Energy Regulator, Regulatory investment test for distribution, 23 August 2013, paragraph 4.

Table 5.1: Consideration of market benefits

Market benefit	Consideration of this market benefit
(i) changes in voluntary load curtailment	The credible option will not cause any changes in voluntary load curtailment.
(ii) changes in involuntary load shedding and customer interruptions caused by network outages, using a reasonable forecast of the value of electricity to customers;	The credible option is expected to reduce network outages compared to a 'do nothing' option. This improvement reflects the reduced risk of asset failure by replacing and upgrading aged assets. However, the identified need is driven by new supply arrangements at WMTS, rather than the benefit of reduced load shedding.
(iii) changes in costs for parties, other than the RIT-D proponent, due to differences in: (A) the timing of new plant; (B) capital costs; and (C) the operating and maintenance costs;	As explained in section 3.3, the joint planning arrangements with AusNet Services identified savings by integrating CitiPower's program to upgrade its 22kV network with AusNet Services' proposed works for WMTS.
(iv) differences in the timing of expenditure	The credible option is not expected to have any impact on the timing of other expenditure.
(v) changes in load transfer capacity and the capacity of Embedded Generators to take up load;	The credible option is not expected to affect load transfer capacity or the capacity of embedded generators to take up load.
(vi) any additional option value (where this value has not already been included in the other classes of market benefits) gained or foregone from implementing the credible option with respect to the likely future investment needs of the National Electricity Market;	The credible option is not expected to affect the option value associated with future investment needs. As already explained, CitiPower and AusNet Services have optimised the WMTS and 22kV upgrade projects to deliver a significant saving compared to other options.
(vii) changes in electrical energy losses	The credible option is not expected to materially affect electrical energy losses.
(viii) any other class of market benefit determined to be relevant by the AER	The credible option is not expected to provide any other class of market benefit.

Source: CitiPower

5.3 Net economic benefit

In identifying the preferred option, the objective is to maximise net economic benefit. The Rules state that a preferred option may have a negative net economic benefit (that is, a net economic cost) where the identified need is for 'reliability corrective action'[12]. As explained in section 3.1, in relation to the proposed works at DA

[12] Clause 5.17.1(b)

ZSS the identified need is for 'reliability corrective action', because action is required for the purpose of meeting the requirements of:

- section 98 of the Electricity Safety Act[13]
- clauses 3.1 and 5.2 of the Victorian Electricity Distribution Code[14].

The table below shows the total present value costs and the annualised costs of the credible option, calculated by applying a discount rate of 4 per cent pre-tax[15], and central (that is, most likely) forecasts of direct capital expenditure and whole-of-life operating expenditure.

Table 5.2 Present value costs of the credible option ($ million in 2018)

	Total present value cost	**Annualised cost**
Direct capital expenditure	19.89	0.96
Operating expenditure	1.57	0.09
Total	**21.46**	**1.05**

Source: CitiPower

Table 5.4 shows that the credible option has a total cost of $21.46 million in present value terms, and an annualised total whole-of-life cost of $1.05 million.

5.4 Key assumptions and variables

We note that the forecast total cost of the credible option is based on a number of assumptions and variables, including:

- forecast capital and operating costs;
- the timing of the proposed works;
- the discount rate applied; and
- the final design of the DA ZSS, which may be affected by the Victorian Government's West Gate Tunnel Project.

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13 Under section 98 of the Electricity Industry Safety Act, CitiPower (as a major electricity company) must design, construct, operate, maintain and decommission its supply network to minimise as far as practicable:
• the hazards and risks to the safety of any person arising from the supply network; and
• the hazards and risks of damage to the property of any person arising from the supply network.

14 Clause 3.1 of the Victorian Electricity Distribution Code requires us to manage our assets in accordance with the principles of good asset management. Under this provision, we must, among other things, develop and implement plans for the management of our assets to minimise the risks associated with the failure or reduced performance of assets. Under clause 5.2, we are required to use best endeavours to meet customers' reasonable expectations of supply reliability.

15 Paragraphs 16 and 17 of the RIT-D state: "The present value calculations must use a commercial discount rate appropriate for the analysis of a private enterprise investment in the electricity sector. The discount rate used must be consistent with the cash flows that the RIT-D proponent is discounting. The lower boundary should be the regulated cost of capital". We have adopted 4 per cent, which is a reasonable estimate of the regulated cost of capital.

In relation to the latter point, the Victorian Government's West Gate Tunnel Project involves road works in close proximity to the DA ZSS. Any modifications to our proposed project scope will be driven by a desire to optimise both projects, having regard to cost and safety considerations. As such, any revised project scope will also satisfy the requirements of the RIT-D, providing that electricity customers are not worse off as a result of any scope changes.

5.5 Scenarios and sensitivity testing

While the variables and assumptions may affect the final costs of Option 1, they will not affect its ranking as it is the only credible option. In addition, the timing or scope of Option 1 is not sensitive to plausible variations in the forecast demand at DA ZSS.

Given these observations, no purpose is served in conducting scenario or sensitivity analysis. In reaching this conclusion, CitiPower notes that the Rules include a principle that the RIT-D should not require a level of analysis that is disproportionate to the scale and likely impact of each of the credible options being considered[16].

5.6 Selection of preferred option

As Option 1 - Upgrade the DA ZSS to 66 kV - is the only credible option and addresses an identified need for 'reliability corrective action', it is selected as the preferred option. The timing of the project is driven by AusNet Services' WMTS redevelopment project and the requirements of the western distributor road project. The expected construction timetable and commissioning date is set out below:

- 2019 - Completion of detailed design
- 2020 - Commencement of construction
- 2021 - Completion of construction and commissioning of the new zone substation.

5.7 Satisfaction of RIT-D

For the reasons outlined in this Draft Project Assessment report, we consider that Option 1 - Upgrade the DA ZSS to 66 kV - satisfies the RIT-D. CitiPower is the proponent for this project.

[16] Clause 5.17.1(c)(2)

6 Checklist of regulatory compliance

Table 6.1 lists the sections of this report that contain the information required by clause 5.17.4(j) of the Rules.

Table 6.1 Regulatory compliance checklist

Rules clause	Requirement	Section of this report
5.17.4(j)(1)	Description of the identified need for the investment	Section 3
5.17.4(j)(2)	The assumptions used in identifying the identified need (including, in the case of proposed reliability corrective action, reasons that the RIT-D proponent considers reliability corrective action is necessary)	Sections 3 and 5.3
5.17.4(j)(3)	If applicable, a summary of, and commentary on, the submissions on the non-network options report	n/a
5.17.4(j)(4)	Description of each credible option assessed	Section 4
5.17.4(j)(5)	Where a Distribution Network Service Provider has quantified market benefits in accordance with clause 5.17.1(d), a quantification of each applicable market benefit for each credible option	n/a
5.17.4(j)(6)	A quantification of each applicable cost for each credible option, including a breakdown of operating and capital expenditure	Section 5.2
5.17.4(j)(7)	A detailed description of the methodologies used in quantifying each class of cost and market benefit	Section 5
5.17.4(j)(8)	Where relevant, the reasons why the RIT-D proponent has determined that a class or classes of market benefits or costs do not apply to a credible option	Not relevant
5.17.4(j)(9)	The results of a net present value analysis of each credible option and accompanying explanatory statements regarding the results	Section 5.2
5.17.4(j)(10)	The identification of the proposed preferred option	Section 4.1
5.17.4(j)(11)	For the proposed preferred option, the RIT-D proponent must provide:	
	• details of the technical characteristics;	Table 4.1
	• the estimated construction timetable and commissioning date (where relevant);	Section 5.5
	• the indicative capital and operating cost (where relevant);	Table 5.4
	• a statement and accompanying detailed analysis that the proposed preferred option satisfies the regulatory investment test for distribution; and	Section 5.6
	• if the proposed preferred option is for reliability corrective action and that option has a proponent, the name of the proponent	Section 5.6
5.17.4(j)(12)	Contact details for a suitably qualified staff member of the RIT-D proponent to whom queries on the draft report may be directed	Section 1