

DEMAND MANAGEMENT SCREENING TEST

Engadine Zone Development

Current Supply Arrangements

Engadine Zone substation consists of two 19MVA transformers and one 10MVA transformer supplied by Port Hacking STS. The system under consideration consists of four 11kV feeders (3, 13, 14 and 15) which supply the areas of Woronora Heights and Yarrawarrah.

The licence conditions require that a feeder's load does not exceed 80% of its maximum rated load under normal system conditions. This feeder system is designed so that if any one feeder experiences an outage, the loads on that feeder can be picked up by either of the other two interconnected feeders. This should be achieved with a maximum of 3-5 switching operations as stipulated in the licence requirement that 11kV customer interruptions in urban areas with a population of greater than 5000 should be less than 4 hours.

Supply Capacity and Demand Forecast

Feeders 3 & 13 are currently forecast to exceed 80% of their maximum rated load under normal system conditions. Feeders 14 and 15 are expected to exceed their maximum rated load during outage conditions.

Presently, peak demand on the feeders occurs during winter, and according to the load profiles, consists primarily of residential loads. The peak demand is forecast to grow by 0.3% during winter and 1.9% during summer. The relevant rating and winter load details are outlined below:

Scenario	Pickup Feeder	Limiting Section	Capacity of Limiting Section (A)	Winter Load forecast (MVA)				
				2010	2011	2012	2013	2014
Normal State on Feeder 3	n/a	Feeder 3 Trunk	6.2	6.4	6.4	6.4	6.4	6.5
Normal State on Feeder 13	n/a	Feeder 13 Trunk	7.1	7.1	7.1	7.1	7.1	7.1
Outage on feeder 3 trunk	Feeders 14 & 15	Feeder 15 Trunk	7.2	9.2	9.3	9.3	9.3	9.4
Outage on feeder 13 trunk	Feeders 14 & 10	Feeder 10 Trunk	7.6	10.9	11.0	11.0	11.0	11.1
Outage on feeder 14 trunk	Feeder 13	Feeder 13 Trunk	7.1	10.9	11.0	11.0	11.0	11.1
Outage on feeder 15 trunk	Feeder 3	Feeder 13 Trunk	6.4	10.1	10.1	10.1	10.2	10.2

This table shows that for the described scenarios, the forecasted load will cause the listed feeders to exceed their relevant maximum rating.

Supply Strategy Option

The supply strategy option is to lay a 3.4km cable from Engadine substation to relieve overloaded feeders, coupled with other cable and OH works including the re-conductoring of OH mains, Control Point installations and open point changes.

The planning estimate for this project is \$5.4m. The expected project completion date is June 2011. A decision on this investment is needed as soon as possible.

Required Demand Management Characteristics

Assuming a best case for the demand reduction needed, a reduction of 7.6 MVA by winter 2011 would allow the investment to be deferred by 1 year. This represents 18% of the total load on the relevant feeders. The demand reductions would need to occur in specific locations to ensure demand is within capacity at the limiting sections for all relevant outage scenarios.

This analysis assumes that a demand reduction that resolves one outage scenario is located in a section of the feeder that would also be effective in resolving other scenarios. If the demand reduction could not be achieved in these optimal locations, the total demand reduction needed would be larger.

The savings from a 1 year deferral would be \$420,000, or \$55/kVA.

Due to the low winter load growth of 0.3%, further deferral only requires 23kVA per year of demand reduction. This allows the possibility for this project to be deferred beyond the planning horizon. A reduction of 8MVA would effectively defer the project indefinitely, allowing the entire \$5.4M investment to be saved. In this case the saving would be equivalent to almost \$700/kVA

While the savings for a short term deferral would be low in terms of \$/kVA, a small additional load reduction would enable a much larger benefit.

The demand reduction requirement is very large in absolute terms and as a proportion of total demand on the feeders. The timeframe for a decision is short and as noted the demand reduction required is for a best case scenario.

It is therefore not considered reasonable to expect that this investment could be cost effectively deferred via demand management options.

Recommendation

Based on this analysis it is not considered reasonable to expect that it would be cost-effective to postpone the proposed supply-side solution by implementing demand management strategies.