

DEMAND MANAGEMENT SCREENING TEST

Empire Bay 66/11kV Zone Substation

Current Supply Arrangements

The Empire Bay load area is currently supplied by 11kV feeders supplied from Avoca, Erina and Woy Woy zone substations.

The system under consideration consists of Avoca Zone feeders 2, 8 and 18, Woy Woy feeder 5, 6 and 14 and Erina Zone feeder 1.

The feeders provide the majority of the alternate interconnections for each other. In the event of an outage of the critical section of any one of these feeders, the majority of the load would be picked up by the remaining feeders in the group.

This system is to be designed so that each feeder has switchable interconnection to adjacent feeders enabling restoration for an unplanned network element failure in less than 4 hours, as stipulated in the licence requirement for 11kV customer interruptions in urban areas (ie a population greater than 5,000 people).

The 11kV feeders supply the following geographical areas; Horsfield Bay, Phegans Bay, Davistown, Empire Bay, Daleys Point, Killcare, Kincumber South, Bensville, Picketts Valley, Saratoga, Yattalunga and Green Point.

Supply Capacity and Demand Forecast

The load growth at the relevant zones is listed below.

Zone Substation	Winter Load Growth	Summer Load Growth
Woy Woy	1.7%	4%
Erina	3.4%	4%
Avoca	1%	1%

The load is forecast to exceed the design criteria in both summer and winter, although winter is the critical season for this system, with peak demands higher in the evening. The load in this area is predominately residential.

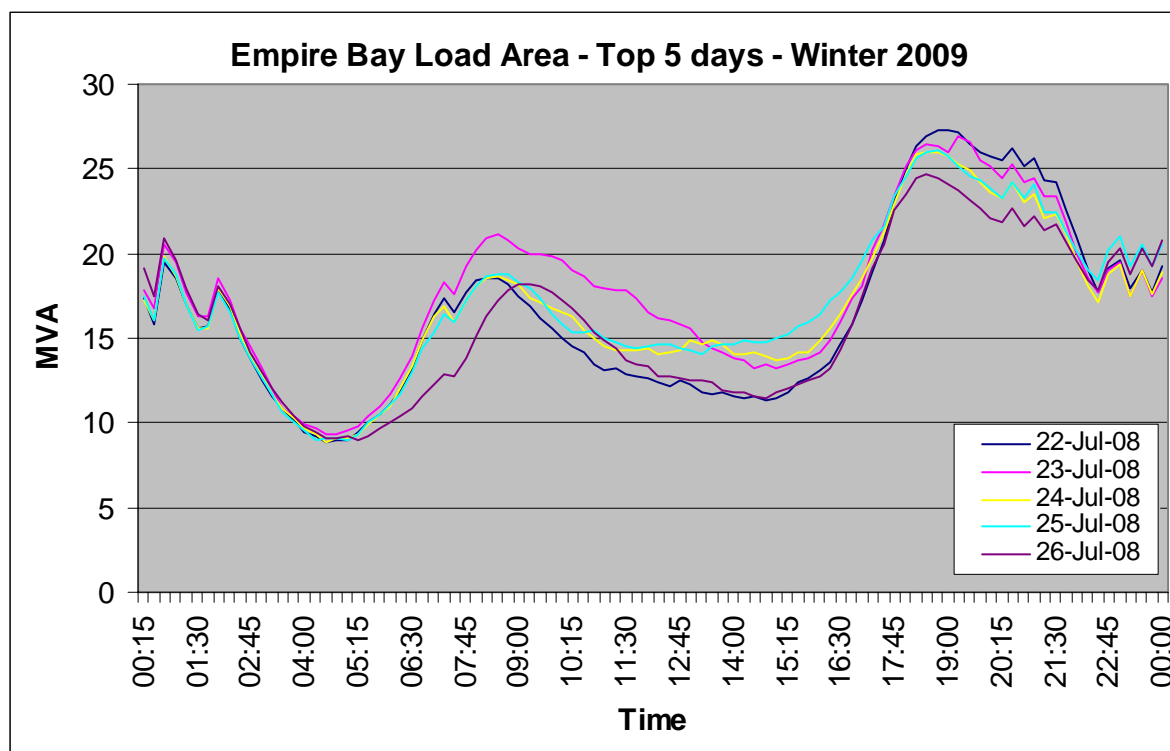
The load currently exceeds the relevant design criteria. We forecast that the worst case normal state loading for winter 2012 is described in the table below.

Zone Substation	11kV Feeder	Rating of critical section (MVA)	80% of rating of critical section (MVA)	Loading (MVA)	Loading above 80% rating (MVA)
Avoca	Feeder 2	6	4.8	6.4	1.54
	Feeder 8	5.5	4.4	3.4	
	Feeder 18	6.7	5.36	6.8	1.45
Erina	Feeder 1	6.9	5.52	7.6	2.1
Woy Woy	Feeder 5	7.6	6.08	3.2	
	Feeder 6	4.5	3.6	5.8	2.15
	Feeder 14	7.6	6.08	6.4	0.27

A more detailed consideration of all emergency switching scenarios has estimated that a total of up to 14MVA of demand reductions would be required on the 11kV system in various specific locations to ensure that the current 11kV supply system could meet the relevant planning design criteria for all cases in winter 2012.

In addition there are also several feeder sections where voltage drop levels do not meet the recommended limit of 6% under normal state conditions, and are considerably more onerous under emergency switching scenarios.

The following graph shows the load profile for the 5 days with the highest peak demands in the Empire Bay load area.



Supply Strategy Option

The proposed supply side option is to build a new Empire Bay zone substation.

The cost of this project is estimated at \$49.6m. The proposed commissioning by March 2012, and to meet this date a decision on this investment must be made by August 2009.

Required Demand Management Characteristics

If demand could be reduced by 14 MVA by winter 2012, the proposed investment could be deferred by 1 year. The demand reductions would need to occur in specific locations to ensure that capacity limits were not exceeded for the relevant emergency scenarios. This is 40% of the total demand on these feeders. The savings from this deferral is \$3.26m, or \$233/kVA, which is moderate.

As demand is forecast to grow in the area, longer deferral values would require higher demand reductions.

This is a residential area, and the reduction is required during winter evenings. One potentially available option may be relocatable diesel generators. The estimated cost of deploying relocatable generators to cater for the 14MVA requirement for the first year is \$3.86m. This is higher than the total savings generated by a one year deferral. Even if this option were potentially cost effective, it is likely to be very difficult to deploy such a large capacity of diesel generators across the numerous locations that would be necessary to ensure the demand on the 11kV feeder system was within capacity limits for all emergency switching scenarios.

The demand requirement is very high in absolute terms and in proportion to the total demand on the relevant feeders. The savings from a deferral are moderate for the first year. The timeframe before an investment decision must be made is short.

On balance, it is not considered reasonable to expect that the project could be cost effectively deferred by implementing demand management options.

Recommendation

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