

Demand Management Investigation Report

Nelson Bay, Williamtown Stockton Zones & RAAF Base

Executive Summary

EnergyAustralia carried out an investigation of Demand Management (DM) options in the Williamtown 33kV network in 2009. The aim was to determine if there were cost effective demand management measures that could defer the need for a new 33kV feeder between Tomago STS and Williamtown zone substation, while maintaining network performance at the required level through the 2011/12 summer and beyond.

The investigation identified no cost effective options that would enable the proposed feeder project to be deferred.

DM Requirement

A DM Screening Test was completed on the 7th November 2008, (refer Appendix "C") which identified the worst case scenario for the system supplying Williamtown 33kV busbar as the loading on Feeder 10, with an outage on Feeder 7. In order to maintain necessary loading levels on the 33kV system, a total reduction of load of 2.7MVA would be required by summer 2011/12. This could be achieved at any of the relevant zone substations (Williamtown, Stockton, Nelson Bay and the RAAF). The saving from a one year deferral of the project would be \$360,000 (\$133/kVA).

During the course of this investigation and discussions with major customers, it was evident that the load on the network may increase. These included a potential 2MVA increase at the new British Aerospace (BAS) facility extensions at Williamtown and up to 8 MVA for the recently announced Newcastle Airport Upgrade.

Demand Management Investigation

A decision was required relatively quickly, and the screening test results did not suggest a DM alternative was highly likely, so a truncated investigation process was employed. We:

- performed a desk top analysis and visited the top 10 customers on the 33kV network (Refer Appendix "A") and the major customers fed from Stockton and Nelson Bay Zones (refer Appendix "B"), and
- revisited the DM Investigation performed in 2003 and again in 2007, to identify if any key DM measures were, or could be, implemented to meet our deadline.

Demand Management Options and Analysis

Three plausible options were identified for investigation and analysis.

Power Factor Correction (PFC)

Where customers load's exhibit poor power factor, peak demands on the network are higher than they would otherwise be. A PFC program was finished in 2007/2008 and all major customers have installed PFC equipment, which are working as intended. There was only a small opportunity to target smaller customers in this area.

Relocatable Generators

Energy Australia has used relocatable diesel generators to provide temporary load reductions in our areas. This option was analysed in the Screening Test and found to be uneconomic.

Customers' Standby Generators

Three customers have emergency generators of various sizes, designed for emergency standby use only. They are not configured for synchronisation to run in parallel with our network supply, so we explored associated costs tabulated below, to allow synchronisation.

Name	Available kVA	Estimated Cost to EA	\$/kVA
Newcastle Airport Terminal HQ	275	\$130,000	\$473
NSW Fisheries @ Taylor's Beach	350	\$130,000	\$371
Tomaree Hospital	250	\$130,000	\$520
	975	\$450,000	\$465

Summary

In total, we identified a possible 975kVA at a cost of \$450,000. This is only 36% of the required quantity and the estimated cost is in excess of the potential saving.

Conclusion

The investigation did not identify sufficient demand reduction options to enable a deferral. Even those that were identified did not meet the economic criteria.

APPENDIX "A"**Top Ten 33 kV Customers – Williamtown Zone**

	Name & Address
1	British Aerospace (BAS) Airport Drive Williamtown 2318
2	Sand mining off Oakdale Rd Nelson Bay Rd Salt Ash 2318
3	Airport terminal Supply No.1 Newcastle airport 2318
4	RAAF base 4128 213 Ferodale Rd Medowie 2318
5	Airport terminal Supply No. 3 Newcastle airport 2318
6	Pump station No. 10 hunter water Medowie 2318
7	Airport terminal Supply No.2 Newcastle airport 2318
8	RAAF lot 1 Nelson Bay Rd Williamtown 2318
9	Bull " N" Bush motel Ferodale Rd Medowie 2318
10	Metro Service Station 86 Nelson Bay Rd Williamtown 2318

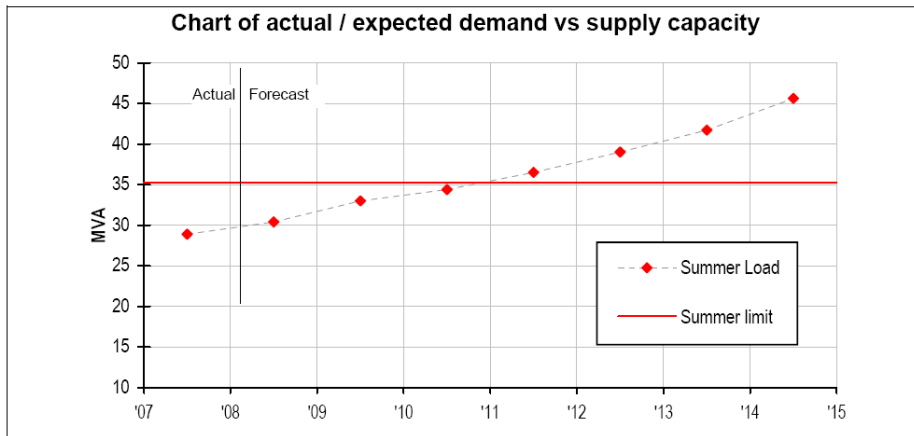
APPENDIX “B”**Top Five Customers – Nelson Bay Zone 33/11kV**

	Name & Address
1	Nelson Bay RSL
2	Tomaree Hospital Shoal Bay
3	NSW Fisheries Dept of Primary Industry Taylor’s Beach
4	Bolder Bay Sewage Treatment Works
5	Soldiers Point Bowling Club

Top Five Customers – Stockton Zone 33/11kV

	Name & Address
1	Stockton Hospital
2	Stockton Presbyterian School
3	Stockton RSL
4	Bayway Retirement Village
5	Stockton Caravan Park

the design limit for feeder 10 in the worse case scenario is shown on the chart below. Summer 2011/2012 sees the forecast load 1.3MVA above the design planning limit, rising to 10.4MVA above the limit in 2014/15.



Supply Strategy Option

The preferred supply side option is to construct a new 33kV feeder between Tomago STS and Williamtown zone substation. The estimated cost is \$5.0m, with commissioning proposed in 2011.

A decision on this investment must be made by March 2009.

Required Demand Management Characteristics

For the worst case scenario considered in this analysis (ie an outage of feeder 7), feeders 10 carries approximately 50% of the total load supplied on this 33kV system. Therefore, any load reductions at the relevant zone substations (Williamtown, Stockton, Nelson Bay and the RAAF) will need to be approximately double the reduction required on 33kV feeder 10.

The DM requirement according to location is therefore summarised in the table below:

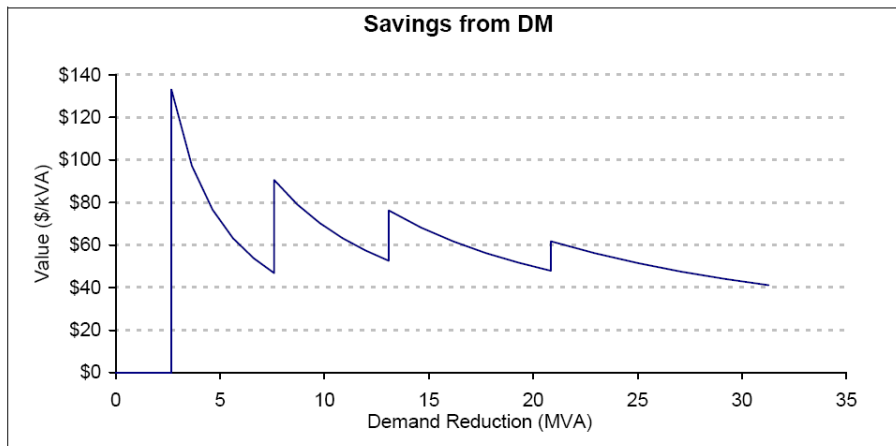
Location	2011/12	2012/13	2013/14	2014/15
33kV feeder 10	1.3	3.8	6.5	10.4
Zone substations	2.7	7.6	13.1	20.9

If 2.7MVA of demand reduction could be achieved by summer 2011/12, then the proposed supply side investment could be deferred by one year. This represents 3% of total demand on the relevant zone substations.

The savings from this deferral is \$360,000, or \$133/kVA, which is moderate.

If 7.6MVA of demand reduction could be achieved, then the proposed supply side investment could be deferred by two years. The savings from this deferral is \$690,000, or \$91/kVA, which is low.

As underlying demand is forecast to continue to grow, longer deferrals would require additional reductions.



Infrastructure is in place for up to 7MVA of relocatable diesel generators at Nelson Bay zone substation in summer 2010/11.

Based on previous projects and current information we have estimated the cost of continuing to use relocatable generators at Nelson Bay. To reinstall 3MVA of relocatable diesel generators at Nelson Bay zone substation for summer 2011/12 would cost approximately \$500,000, which is of the same order of magnitude as the savings from the first year deferral.

To reinstall 7.6 MVA of relocatable diesel generators at Nelson Bay zone substation for summer 2012/13 would cost approximately \$1.1M. So in order to achieve a two year deferral using relocatable generators the total cost would be \$1.6M, which is significantly higher than the savings from the two year deferral

The size of the demand management requirement is moderate in absolute terms, however it is small when compared with the total demand on this 33kV network. The relative value is low to moderate. The amount of time available for investigation is adequate.

On balance it is considered reasonable that this project might be deferred with demand management.

Recommendation

Based on this analysis it is considered reasonable to expect that it may be cost-effective to postpone the proposed supply-side solution by implementing demand management strategies. A demand management investigation will be undertaken.