

DEMAND MANAGEMENT SCREENING TEST

Southern Zetland Zone Development

Current Supply Arrangements

Zetland zone substation consists of four 132/11kV transformers rated at 37.5MVA each. Parts of Zetland, Beaconsfield and Rosebery are supplied by Zetland zone via the 11kV feeders 31, 32, 33, 15, 14, and 25. These feeders are the subject of this document.

The feeders are interconnected in such a way that if any one feeder experiences an outage, the load on that feeder can be picked up by the adjacent interconnected feeders.

The licence conditions require that a feeder's load does not exceed 80% of its maximum rated load under normal system conditions. When an outage on a feeder occurs, it must be picked up by the adjacent feeders with a maximum of 3-5 switching operations and without exceeding the maximum rated load (100%) of the adjacent feeders. These conditions are stipulated in the licence requirement that 11kV customer interruptions in urban areas with a population greater than 5,000 people should be less than 4 hours.

Supply Capacity and Demand Forecast

The load on the relevant feeders is a mix of commercial, residential and industrial load with peak demand occurring during summer. The rate of growth in the area is 2% during summer.

Summary for Normal Conditions:

Scenario	Pickup Feeder	Limiting Feeder	Capacity Limit (MVA)	Forecasted Summer Load (MVA)				
				Sum 10/11	Sum 11/12	Sum 12/13	Sum 13/14	Sum 14/15
Normal Condition on:								
Feeder 31	n/a	n/a	4.9	4.8	4.9	5.0	5.1	5.2
Feeder 32	n/a	n/a	5.2	5.1	5.2	5.4	5.5	5.6
Feeder 33	n/a	n/a	5.2	4.8	4.9	5.0	5.1	5.2

Summary for Outage Conditions:

Scenario	Pickup Feeder	Limiting Feeder	Capacity Limit (MVA)	Forecasted Summer Load (MVA)				
				Sum 10/11	Sum 11/12	Sum 12/13	Sum 13/14	Sum 14/15
Outage On:								
Feeder 14	33 & 15	33	5.2	5.6	5.7	5.9	6.0	6.1
Feeder 31	15 & (7)*	15	4.8	4.8	5.2	5.6	6.1	6.5
Feeder 31	15 & (7)*	(7)*	5.4	5.6	5.7	5.8	6.0	6.1
Feeder 32	14 & 38	14	5.4	6.7	6.9	7.1	7.2	7.4
Feeder 33	14	14	5.4	6.3	6.5	6.7	6.8	7.0

*Denotes Green Square zone substation feeder 7.

The feeders 31, 32, and 33 are currently identified as exceeding 80% of their maximum rated load. Furthermore if an outage occurs on feeder 14, 31, 32 or 33, its load cannot be picked up by the adjacent feeders without exceeding their maximum rated load.

The best case for demand reduction required is described in the table below:

Reduction Required (MVA)	Feeder 31	Feeder 32	Feeder 33	Feeders 31, 15 or Green Square Feeder 7	Feeders 14, 32 or 38	Feeders 33 or 14	Total
Summer 12/13	1.1	1.2	0.8	0.0	0.4	0.4	3.9
Summer 13/14	1.2	1.3	0.9	0.2	0.4	0.4	4.4
Summer 14/15	1.4	1.4	1.1	0.5	0.5	0.5	5.4

Supply Strategy Option

The preferred supply side option involves upgrading the limiting sections of feeders 14, 15, 31, & 33, as well as forming new feeder interconnections and altering existing ones.

The planning estimate for this project is \$6M. The expect date of completion is Oct. 2012. A decision on this investment is required by 27 Aug 2010.

Required Demand Management Characteristics

Assuming the best case for demand reduction needed, 3.9MVA of demand reduction is required by summer 2012/13 to enable a 1 year deferral. The potential savings for a 1 year deferral is \$0.47M which works out to be \$121/kVA.

To enable a 2 year deferral, 4.5 MVA of demand reduction is required by summer 2013/2014. A 2 year deferral has the potential for \$0.91M in savings which equates to \$202/kVA.

For a 3 year deferral, a 5.3MVA reduction in demand is required by summer 2014/2015. The potential savings for a 3year deferral is \$1.32M which equates to \$250/kVA.

The demand reductions would need to occur in specific locations to ensure the limiting sections were subject to the demand reduction.

The demand reduction is large in absolute terms and represents a significant proportion of the overall load on the feeders. The total savings are low to moderate and represent moderate value in terms of \$/kVA. This, coupled with the extremely short time frame for DM options to be uncovered it is not reasonable to justify further investigation.

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.