Avoiding Load Shedding using a “Virtual” Power Station

Avoid stage 1 and 2 load shedding through customer participation
South Africa can expect three more years of load shedding.

MINISTER OF PUBLIC ENTERPRISES, LYNNE BROWN
4 MAY 2015

Source: Business Tech,
http://businesstech.co.za/news/general/87266/load-shedding-to-last-3-more-years/
Load shedding would not be necessary if an additional 3 000 MW could be fed to the national grid.

ESKOM CEO, BRIAN MOLEFE

Demand vs Supply and the Virtual Power Station

**DEMAND SIDE**

- Generation
- Demand – Load

**SUPPLY SIDE**

- Unit 1
- Unit 2
- Generation
- Negawatt Generator
Typical Eskom Reserve Deployment Order

**Stage 4**
- Load Shedding and Curtailment (Stage 3)
- Load Shedding and Curtailment (Stages 1 & 2)
- Curtailment (Stage 0)

**Reserve Market**

**Pre-Emergency**
- Demand Response – Customer Generation (high rate)
- Open Cycle Gas Turbines
- Interruptible Load Agreements 1
- Interruptible Load Agreements 2
- Demand Response – Customer Self Generation

**Operating**
- Automatic Gen Control (AGC)
- Demand Response – Instantaneous DMP
- Demand Response – Supplemental DMP

Source: Eskom IDM
To assist with managing demand, Eskom calls upon municipalities and large industry to reduce load during emergency periods, according to a defined set of rules. Intended to support legislative and regulatory requirements when defining the roles of the various stakeholders. It is essentially a national code of practice for emergency load reduction and load restoration.
Load Curtailment under Emergency Conditions

Load Shedding avoided through 10% to 20% load reduction

10% to 20% Load Reduction
VPS Components

Inclusion of all sectors in the VPS mix
VPS COMMUNICATIONS / TECHNOLOGY

COMMUNICATIONS

• SMS
• E-mails
• VOIP telephone system
• Web services messages
• GPRS
• Direct Radio/Electronic signals
• Social media etc.

SUPPORT TECHNOLOGY

• Smart Meter system interfacing
• Load Management including Ripple Control
• Customer Control Units
• SCADA Systems etc.
VPS Components

The 4 primary components of a typical VPS platform:

- Load Curtailment Monitoring and Reporting
- Load Curtailment Dispatching
- Load Curtailment Planning and Optimising
- Load Curtailment Options (MIX)
The System Operator informs the Municipal Operations Desk of the emergency.

1. The VPS Operations team dispatches the load curtailment customers for the emergency by SMS, e-mail or automatically if the technology is available.

2. The VPS Operations team collects the metering data and measures and reports on the customers load curtailment.

*The VPS Operations Desk makes load curtailment easy to manage.*
## VPS DR Performance Report

### LOAD CURTAILMENT

<table>
<thead>
<tr>
<th>DATE OF EVENT</th>
<th>START TIME OF EVENT</th>
<th>STOP TIME OF EVENT</th>
<th>ASSISTANCE REQUESTED (MW)</th>
<th>PERFORMANCE MARGIN</th>
<th>TOTAL ENERGY SHED (MWh)</th>
<th>TOTAL LOAD REDUCTION (MW)</th>
<th>PERFORMANCE PERCENTAGE</th>
<th>PERFORMANCE RATING</th>
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<tbody>
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<td>17:00</td>
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<td>24.189</td>
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<td>26.84%</td>
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<td>19:00</td>
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<td>21.125</td>
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<td>22:00</td>
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<td>26.88%</td>
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<td><strong>TOTALS</strong></td>
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<td><strong>606.667</strong></td>
<td><strong>59.08%</strong></td>
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</table>

**NOTES:**

1) Please refer to the individual event performance reports for further information.

**VPS CONTACT DETAILS:**

<table>
<thead>
<tr>
<th>Contact Person 1</th>
<th>Contact Person 2</th>
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</thead>
<tbody>
<tr>
<td>Telephone: 000 000 0000</td>
<td>Telephone: 000 000 0000</td>
</tr>
<tr>
<td>Cell: 9 999 999 999</td>
<td>Cell: 9 999 999 999</td>
</tr>
</tbody>
</table>
Baselines may be temperature sensitive

Scaled CBL is recommended
Conclusion

• Load Shedding is likely to continue for at least another 3 years

• Adopting a curtailment strategy based on NRS 048-9 can avoid stage 1 and stage 2 load shedding

• Customer participation can achieve 10% to 20% load reduction

• A Virtual Power Station (Demand Response) approach enables effective management of the curtailment program
Thank you.