UTILITY LOAD MANAGER

AMEU Convention

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27 October 2010
• In 2001 Eskom planned for our current and future supply and demand needs – Government was informed.

• In 2005 Eskom fast tracked the build program, when the IPP strategy failed.

• In 2007 load shedding inevitable due to supply and demand constraints.

• Supply and demand constraints will persist with current network constraints
BACKGROUND

• **Eskom reduced loads within their control** – Mining and Industry load reduction by 10%.
  
  – Loads within Eskom’s control:
    
    • Large Power Users (LPUs).
    
    • 120,000 residential customers (LSM 5 to 10).
    
    • 3.5 million Prepaid customers.

• **Residential load shedding** was introduced through municipalities.

• **Eskom accelerated DSM**, the National DSM programs.
Basic Demonstration Of the Utility Load Manager (ULM)

Consumption data (updated every 2.5 min)

Load limit set by control centre

Limits can be set depending on need 5A, 10A, 20A, ...

Behavior Change

Scalability

Control

Flexibility

Eskom
# Limiting Threshold

<table>
<thead>
<tr>
<th>Application</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerator with freezer</td>
<td>550</td>
</tr>
<tr>
<td>Computer</td>
<td>120</td>
</tr>
<tr>
<td>Lighting: energy saving lamp [X5 CFL’s]</td>
<td>55</td>
</tr>
<tr>
<td>M-net decoder</td>
<td>28</td>
</tr>
<tr>
<td>Television 70 cm colour</td>
<td>100</td>
</tr>
<tr>
<td>Video recorder</td>
<td>35</td>
</tr>
<tr>
<td>DVD Player</td>
<td>14</td>
</tr>
<tr>
<td>Home security and electric fence</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total Usage</strong></td>
<td><strong>1002</strong></td>
</tr>
</tbody>
</table>
ULM COMPLIANCE

• The ULM system has passed the requisite tests at SANS (NETFA):
  • **Endurance** tests (over 10,000 operation cycles)
  • **Impulse**
  • **Short circuit** (10kA)
  • **surge tests**
• The ULM system conforms to metering requirements:
  • Consumption data can be used as credible billing data.
  • TOU capability
• The ULM fully complies with the amendment to the Electricity act that was gazetted on 18 July 2008.
• SABS accreditation
Product Manufacture
Product test and assembly
Product Development and Testing
Installation of ULM
Final Field Installation

Original installation

ULM installed
Final Field Installation
Final Field Installation
The graph provides a view of the load limiting console during a load limiting period. The information on this console is updated every 2½ minutes. The console display includes the scheduled limits as well as a graphical representation historically of the power that has been saved.
Tuesday 27 October

Limit Imposed: 18h00 – 20h00 @ 2 kW per house

Demand settles to a point below the limit after 10 - 15min
Increase in demand at end of limiting

Average savings from 158 customers during limiting: 165 kW
Extrapolate to Eskom’s residential customer base of 120 000 customers: 125 MW
Thursday 28 October

Limit Imposed: 18h00 – 20h00 @ 3 kW per house step to 1.1 kW per house

Average savings during limiting – Step 1: 165 kW (148 customers)
Extrapolate to Eskom customer base of 120 000 customers: 134 MW

Average savings during limiting – Step 2: 165 kW (148 Customers)
Extrapolate to Eskom customer base of 120 000 customers: 134 MW
Friday 28 October

Limit Imposed: 10h00 – 13h00 @ 2 kW per house

Average savings during limiting: 135 kW (139 Customers)

Extrapolate to Eskom customer base of 120 000 customers: 116 MW
IMPACT AND BENEFIT

- No black-outs or load shedding
- Restore Customer confidence
- Revenue management and protection
- Direct control over local network and systems
- Buffer for Generation new Build
  - 20 MW power reduction just from pilot
  - 6750 MW available with National implementation (1.5 Power stations)
- Buffer for system Ops reserve margin 3-5 % - 18-20%
  - Planned outages
  - Less unplanned outages
IMPACT AND BENEFIT

Distribution

• Revenue management and protection
• On line real time energy balancing
• No meter reading
• Accurate real time Billing data
• T0U provision
• On line network fault detection
  – Real time reading
  – Alarming
  – Gps coordinated
  – Unique notification/messaging
• Load profile per household can be available on web
Thank you