2010 FIFA World Cup ~ South Africa
Stadium electricity supplies

Presented on behalf of 2010 ESI Forum
By
TR Edmondson & Dr C Carter-Brown
2010 FIFA World Cup –
2010 ESI Forum

• Jointly formed by AMEU and Eskom in 2007
• Information sharing and collaboration to ensure reliability of supply for 2010 FWC.
2010 FIFA World Cup – Background

- **Stadiums**: The 10 stadiums in 9 Host Cities at which the matches will be played.
- **Base camps**: Each of the 32 teams will have a “base camp”, and are expected to arrive at base camp up to 2 months prior to the start of the tournament. Base camps could be located anywhere in South Africa.
- **Training venues**: Each Stadium has up to two training venues within the Host Cities.
- **Fan parks**: FIFA fan parks will be located in Host Cities.
2010 FIFA World Cup –
Background

- **Public viewing venues**: Non-FIFA accredited viewing venues that will be set up by municipalities and private enterprise.

- **FIFA hotels**: Hotels at which FIFA will establish their local offices and operations centre.

- **Media centres**: Journalists will be hosted at the International Broadcast Centre which will form the hub for broadcasting and reporting.

- **Supporters**: The accommodation, tourism and transport needs of visitors.
2010 FIFA World Cup – Overview of Stadium Power Requirements

Domestic/Stadium Power

Technical Power

Overlay/precinct Power
2010 FIFA World Cup – Domestic/Stadia Power

Pitch Lighting:

- Host City is responsible for pitch lighting.
- Stringent lighting quality requirements.
- Available and functioning 100% during a match.
- Zero switch time tolerance. i.e. switching between electrical supplies must have no impact on the pitch lighting.
- Recommendation - Uninterruptable power supply (UPS) to ensure that any anomaly (Dips, surges etc) on the network (grid or generator) has no influence on the pitch lighting.
- Generators or alternate power supply capable of sustaining the pitch lighting for a minimum of three (3) hours.
- Maintenance and refuelling are the responsibility of the Host City.
Stadium building power:

Stadium building power is the required supply within the stadium to power appliances, facilities and lighting within the stadium i.e. General stand lighting, administration offices and suites.

- Backup power requirement in the event of a power failure is limited to that of the Occupational health and safety act (OHSACT)
- This power excludes any broadcast or media provisioning.
- Configuration of the MV power supply is at the discretion of the Host City and is recommended to have minimum n-1 redundancy.
2010 FIFA World Cup – Domestic/Stadia Power

Summary:

- Supply from Grid, provided by the **Host City**
- Two sources of power supply (N-1)
- Public grid backed up by generators supplied by the Host City
- 100% Pitch Lighting available (Zero Tolerance)
- OHSACT
2010 FIFA World Cup –
Technical Power
This is power for the broadcasting and television requirements
• NO HOST CITY INVOLVEMENT. This is the responsibility of the LOC.
• NO GRID SUPPLY*. Islanded from the grid power supply. Supply is provided via diesel generators supplied by the LOC.
• Covers all broadcasting mediums.
• Total of three 500kVA generators each capable of taking the full load. Two generators run in parallel with the third being a backup. A forth generator will be required for the venue hosting the final game.
• Zero supply switching tolerance.
* Grid supply may be requested for the local media site offices
Summary:

- Generators only
- Twin packs run load shared as 0 switch time tolerated
- Also referred to as Broadcast Power.
- Power that is required for the match to be televised continuously
- May require a small supply during non-match periods
2010 FIFA World Cup –
Overlay/Precinct Power
Area immediately surrounding the stadium including ticketing offices, hospitality, accreditation etc

• Host City responsible to supply a medium voltage (11kV) point/s of supply. For 2010 there may be as many as four required per stadium and the number and location of these bulk supply points will be stadium dependent.

• The requested capacity for the confederations cup was around 2MVA. 2010 is expected to require greater capacity.

• The LOC will install and operate the temporary MV/LV distribution network linking the MV bulk supply point with the individual loads.

• The LOC will install and operate backup diesel generation for the overlay supply.

• Approximate 1 minute switch time tolerance between grid supply and backup supply.
2010 FIFA World Cup – Overlay/Precinct Power

Summary:

- Supply primarily from Grid, provided by the **Host City**
- Potentially multiple points of supply at 11kV
- 2009 FIFA CONFEDERATION CUP requirements 2MVA
- 2010 FIFA WORLD CUP requirement expected to be 2 to 3 times greater
- Backed up generators and reticulation to be supplied by DoE/LOC Appointed Contractors
- Switch time tolerated (approximately 1 minute)
2010 FIFA World Cup – Stadia

• Soccer City
  – Grid supply from multiple firm Sub Stations
  – 4x 500kVA and 1x 630kVA installed generators to supply backup power for both Pitch lighting and OHSACT requirements.
  – Five UPS systems ensuring “clean power” to the five pitch lighting sections within the stadium
  – UPS has a 30 Minute capacity

Source: City Power Johannesburg
2010 FIFA World Cup –
Stadia

• Nelson Mandela Stadium
  – Grid supply from firm Sub Station (Mount Rd S/S 22/66kV)
  – Backup supply from a Gas Turbine.
  – Four rotary UPS systems ensuring “clean power” at each of the stadiums four internal Sub Stations

  – Source: Carl Hempal – NMBM
2010 FIFA World Cup –
Stadia

- Free State Stadium
  - Primary power for the stadium during the event will be Generator power (2x1250kVA)
  - Backup supply from firm grid supply
  - Configured to run in parallel during the event

Source: Leon Kritzinger – CENTLEC (Pty) Ltd
### 2010 FIFA World Cup – Other focus areas

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Grid Supplies</th>
<th>Generators - Host City (Backup)</th>
<th>Generators – Venue Owner</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Official FIFA Fan Parks:</td>
<td>City/Eskom</td>
<td>OHSACT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Viewing Areas:</td>
<td>City/Eskom</td>
<td>OHSACT</td>
<td></td>
<td>Not FIFA Official site</td>
</tr>
<tr>
<td>FIFA Official Offices</td>
<td>City/Eskom</td>
<td></td>
<td>OHSACT</td>
<td>City Responsibility</td>
</tr>
<tr>
<td>Training Venues</td>
<td>City/Eskom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Media Centre's</td>
<td>City/Eskom</td>
<td></td>
<td>OHSACT</td>
<td></td>
</tr>
<tr>
<td>Base Camps</td>
<td>City/Eskom</td>
<td></td>
<td>OHSACT</td>
<td></td>
</tr>
<tr>
<td>Hotels, B&amp;B’s etc</td>
<td>City/Eskom</td>
<td></td>
<td>OHSACT</td>
<td></td>
</tr>
<tr>
<td>Transport</td>
<td>City/Eskom</td>
<td></td>
<td></td>
<td>Rail, Air and Road</td>
</tr>
</tbody>
</table>

- Heightened response from the local electrical supplier
- Prioritising of faults in relation to the potential impact of fans/customers
2010 FIFA World Cup – Points to Note for Stadiums

- FIFA Exclusive use period is 15 business days before first game at stadium and 5 Business days after last game at stadium. - electricity readiness needs to mirror this.
- Heightened response and restoration has to be in place effective +/-2 weeks prior to event.
- Require personnel on site at key supply points from match day - 1.
- Fuel supplies and spares to be sent to site at least 48 hours before match and if used replaced within 24 hours.

— Source: Arup Consulting
2010 FIFA World Cup –
Acknowledgements

- Arup Consulting
- 2010 ESI Members
- 2010 Task Team Members

• Note:
  - The information presented has been collated from various sources and may change in the lead up to the 2010 FWC