

ESI PREPAREDNESS FOR THE 2010 FIFA SOCCER WORLD CUP

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1. Introduction

In the winter of 2010 the eyes of the world will be focused on South Africa for the FIFA Soccer World Cup (SWC). South Africa and the African continent will be showcased. Millions of viewers will tune in to matches, the broadcast of which will be critically dependent on the provision of uninterrupted high quality electrical power. Electrical supply problems that disrupt matches or broadcasts will reflect poorly on the entire Electrical Supply Industry (ESI), South Africa and Africa. Furthermore the load associated with an estimated 300 000 to 500 000 foreign visitors may cause problems in local distribution networks.

2. 2010 load and the electrical supply chain

The main electrical loads associated with the 2010 SWC include:

- **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 Southern Africa, including neighbouring countries.
- **Training venues:** Before each match (typically 5 days beforehand) teams will move from their base camps to the training venues within the Host Cities (4 training venues per Host City).
- **Fan parks:** FIFA fan parks are expected to be located in Host Cities and other cities, including cities outside of South Africa.
- **FIFA hotels:** Hotels at which FIFA will establish their local offices and command 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.

In relation to the South African peak demand, the magnitude of the additional electrical load is

expected to be relatively small. Complexity and risk arise due to the uncertain nature of this load, including its location. Certain loads, such as stadium lighting and broadcasting, have onerous power quality requirements. A momentary interruption or voltage dip could disrupt broadcast to millions of viewers.

Figure 1 illustrates the key 2010 related loads and the electrical supply chain. The following should be noted:

- All stadium supplies are located within Host City municipal supply areas. As municipal generation is limited, the Host Cities are dependent on Eskom for supply. Host Cities may be supplied via Eskom Distribution, or directly from the Eskom Transmission network at e.g. 275kV.
- The internal stadium distribution networks supply individual loads such as stadium lighting.
- Other loads situated in South Africa such as base camps, training venues, fan parks, FIFA hotels, media centres and supporter accommodation, tourism and transport will fall in both Eskom and municipal supply areas.

A problem in the supply chain (Eskom Generation, Eskom Transmission, Eskom Distribution, Municipal distribution or stadium distribution) will reflect poorly on the entire ESI, South Africa and Africa.

It is critical that all role players in the ESI work together to minimise risks and optimise approaches. Role players include:

- Eskom.
- Host Cities and municipalities.
- Owners of the 2010 event stadiums.
- 2010 Local Organising Committee (LOC).
- Association of Municipal Electrical Undertakers (AMEU).
- Department of Mineral and Energy (DME).
- National Energy Regulator of South Africa (NERSA).
- South African Local Government Association (SALGA)

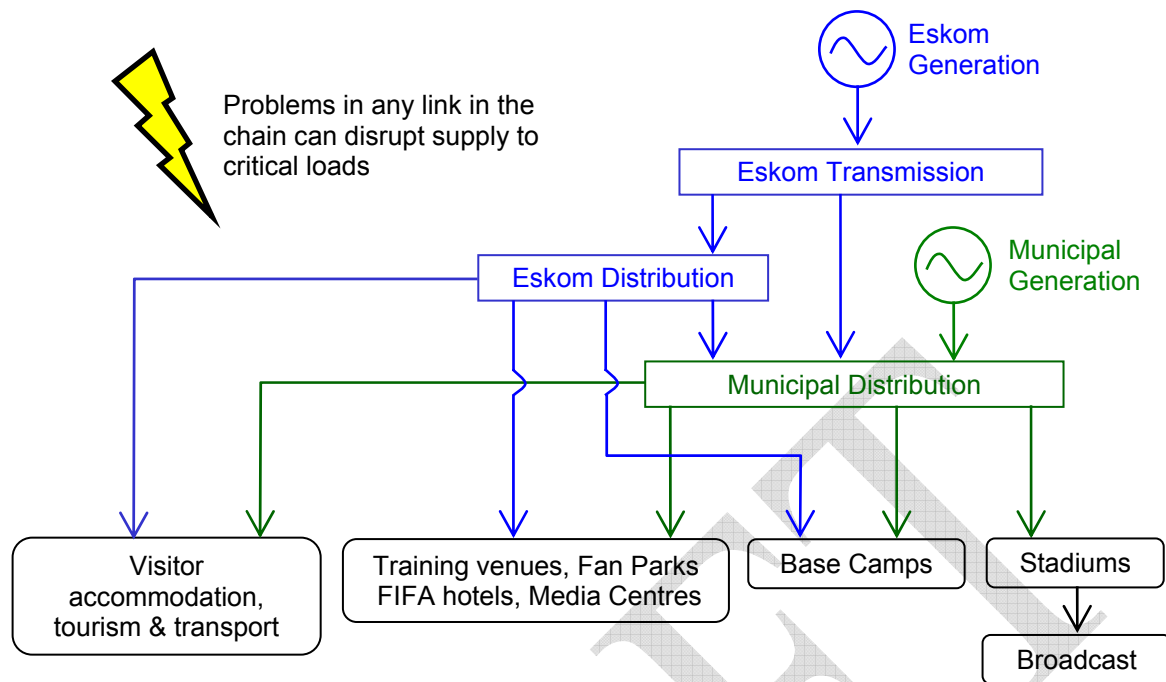


Figure 1: Electrical supply chain

3. Strategy to deal with 2010

Eskom and the AMEU established a 2010 ESI forum in August 2006 with the objective of raising awareness of issues related to the provision of adequate electricity supplies during the tournament. Five meetings have subsequently been convened and attended by representatives from the 2010 Host Cities, AMEU, Eskom, DME and NERSA. There has been limited LOC participation. SALGA has recently nominated a representative to attend forum meetings.

The forum does not have formal decision making capacity. Its purpose is for information sharing and facilitation. Where necessary, issues and risks are escalated to other role players.

4. Key electrical risks

The following 2010 related electrical supply risks have been identified:

- **Increased load due to general load growth:** The 2010 tournament coincides with the South African winter load peak with the first match due to be played on 11 June 2010. Load growth until 2010 will place further stress on generation, transmission and distribution.
- **Power quality and security of supply for stadiums:** Lighting and broadcasting loads are sensitive to momentary interruptions and voltage dips. A voltage dip to lighting supplies

could result in a 40 minute delay due to the lighting cool down and restart times. In addition to ensuring supply adequacy via equipment redundancy, uninterrupted continuity of supply is essential via dip proofing and UPS.

- **Power quality and security of supply for other critical FIFA loads:** Adequate power quality (continuity and waveform) is required for critical FIFA loads such as training venues, fan parks, FIFA hotels and media centres. These loads may be geographically distributed within the Host Cities and fall within municipal and Eskom Distribution supply areas. The locations and magnitudes of some of these loads are not yet known.
- **Base camps:** The decision on the location of base camps is likely to only be made by teams after their group and match venues in the knockout stages of the tournament is known. As the qualifying process will only be completed at the end of 2009, the final 32 teams will probably only make this decision early in 2010. It is anticipated that numbers of supporters will want to base themselves near their favourite team. This behaviour could have a positive economic effect on the area around the chosen base camps as well as an impact on the electrical demand around this area. The scenario of large numbers of supporters following some of the teams during the tournament creates the potential for the electricity demand in the vicinity of some of the Base Camps to increase by as much as the demand for a small to medium sized town. This may have a huge impact on

the electricity network supplying smaller towns/cities/resort areas where this additional load may represent a very significant increase to the normal demand profile and exceed the capacity of the network.

- **Increased load associated with visitors:** The number of visitors to South Africa for a two month period spanning the event is expected to be of the order of 300 000 to 500 000. The location and movement patterns of these visitors are not yet known.

5. 2010 ESI forum progress

Progress of the 2010 ESI forum can be summarised as follows.

5.1 Stadium supply recommendations

A document titled "Recommendations for the 2010 soccer world cup stadium supplies" has been compiled by members of the forum, and provides guidelines for the electrical supply to, and reticulation within, the stadiums in which world cup games will be hosted. In order to comply with FIFA requirements [1], three tiers of supply are recommended [2]:

5.1.1 First tier of supply

Preferred Supply: The Preferred Supply is the normal supply to the stadium provided by the Local Supply Authority. This supply should be a firm supply via a minimum of two dedicated MV feeders from the local HV/MV substation(s). The preferred supply incoming feeders to the stadium should have unit protection and be operated in parallel ensuring an uninterrupted supply to the stadium in the event of a fault on any one of the feeders. Each feeder must also be capable of supplying the maximum expected stadium load for an indefinite period. Ideally the closest common cause of failure for these supplies should be the Main Transmission Station (MTS) or alternatively the HV supply to the HV/MV substation used to provide supply to the stadium. None of these stadium supplies must be linked to any under frequency or other automated load management system for the duration of the world cup.

Alternate Supply: The Alternate Supply should be provided by a set of local generators which are capable of synchronising with, and operating in parallel with the Preferred Supply. The Alternate Supply needs to be of sufficient capacity to enable it to independently supply all important stadium loads for a minimum of 3 hours such that games can continue uninterrupted in the event of the complete failure of the preferred supply.

In the event of failure of the Preferred Supply, the change over operation to the Alternative Supply (Local Generation) should be achieved via an automatic changeover system. This should not cause an interruption to any critical loads as addressed via the 2nd and 3rd tier supply recommendations.

5.1.2 Second tier of supply

As it is not practical and necessary to provide dip proofing for all stadium loads, independent dip proofed supplies are only proposed for stadium lighting and broadcasting supplies i.e. loads that are sensitive to dips or interruptions and are critical for the continuation and broadcasting of the game.

Backup supply for the critical loads must be able to operate for at least 3 hours.

5.1.3 Third tier of supply

All equipment needed to ensure the orderly evacuation of the premises under emergency conditions such as emergency stadium lighting, emergency/selected lifts, PA and CCTV systems must be connected to UPS devices that will ensure a minimum of 1 hour of normal operation.

5.2 DME business plan submission

Each Host City has submitted a business plan to the DME identifying the electrical infrastructure projects that need to be funded to support their 2010 effort. The total funding requested by the Host Cities exceeds R2billion.

5.3 Eskom project identification

Eskom has identified a number of projects (Distribution and Transmission) deemed necessary for Host City supply strengthening required for 2010. These projects are bulk infrastructure projects to ensure adequate supply to each Host City. Projects that are not already approved are in the process of being included in business case and rolling plan submissions for the 2007/8 financial year and beyond.

5.4 Project summary report

A 2010 ESI project summary report has been compiled and summarises the projects identified to ensure adequate supply to and within the Host Cities [3]. It covers Eskom Transmission, Eskom Distribution and municipal Host City electrical infrastructure projects. It must be noted that the vast majority of these projects are required regardless of the 2010 FIFA tournament, and are

essential to meet normal load growth. In some cases the 2010 FIFA tournament has moved the project required completion dates forward. These projects need to be completed in order to ensure an adequate and reliable electrical supply.

5.5 Position paper on base camps

A position paper has been drafted on the possible risks associated with 2010 base camps [4]. This position paper is aimed for circulation to municipalities and the accommodation and tourism industry. It aims to create awareness of the possible impact that base camps could have on local electrical infrastructure, and the need to liaise with electrical service providers.

5.6 Media statement

A joint media statement has been issued by Eskom and the DME, informing the media of the proactive joint planning initiative and to correct misinformation regarding possible risks.

6. Activities going forward

The following need to be addressed by the forum in consultation with key stakeholders.

6.1 Municipal bulk infrastructure funding

The projects listed in the DME Host City business plan submissions have lead times estimated to range between 1 and 3 years. Requirements of the Municipal Finance Management Act make it difficult for municipalities wishing to order long lead time materials if the funding for these projects has not been confirmed.

It is essential that the projects identified by the Host Cities are initiated as soon as possible so that required completion dates for the 2009 Confederation Cup and the 2010 FIFA tournament can be met. Further delays may result in required completion dates not being met, with the subsequent risk of power interruptions.

The DME have confirmed funding of R7.5million for each Host City stadium for the 2007/8 financial year. There is however no funding commitment from Treasury (via the DME) for 2008/9 and beyond. The DME indicated that additional funding may be available via the Integrated National Electrification Planning (INEP) unit within the DME. This funding would however be limited and would also be dependent on municipalities not meeting target spending on electrification.

Unless increased funding is made available in the following financial years (via the Medium Term Expenditure Framework), the burden of this funding will fall on the municipalities.

In order to mitigate the risks associated with projects that remain unfunded, an assessment of the risks and possible operational contingency plans is required.

6.2 Stadium supply recommendations

The stadium supply recommendations need to be disseminated to stadium owners and electrical consultants involved with the stadium electrical design. A review of the stadium electrical designs may be required to assess alignment with the recommendations.

6.3 Base camps

The risks associated with base camps should be mitigated as follows:

- The 2010 ESI forum position paper needs to be disseminated to municipalities and potential base camp bidders.
- Potential base camps need to be identified and the associated electrical networks assessed to identify risks.

6.4 Other FIFA loads

The location of training venues is known, however other facilities such as FIFA hotels and communication centres need to be confirmed and the distribution networks assessed.

6.5 Visitor locations and movement

Scenarios for visitor numbers, location and movement need to be developed and combined with load models to establish possible loading implications.

6.6 Operational planning

In addition to electrical infrastructure capital projects, operational issues need to be addressed. Planned maintenance will need to be coordinated to ensure that generation availability is maximised and network risks (transmission and distribution including Eskom and municipalities) are minimised for the duration of the 2010 tournament.

Operational risk assessment and planning between Eskom and the municipalities is the subject of a companion paper.

6.7 Stakeholder liaison

It is imperative that all stakeholders establish close working relationships and work together to ensure that risks are mitigated and problems are addressed in the most effective manner.

7. Conclusions

The 2010 ESI forum provides an environment for role players to share experiences, concerns, requirements and plans to ensure that electrical supply risks associated with the 2010 FIFA Soccer World Cup are managed.

Several activities have been identified for further action via the 2010 ESI forum, and will need to be driven via interaction with key stakeholders such as the 2010 LOC.

8. References

- [1] *Technical Recommendations and Requirements for the Construction or Modernisation of Football Stadia*, FIFA, 2007.
- [2] *Recommendations for the 2010 soccer world cup stadium supplies*, Draft 6a, 2010 ESI forum, August 2007.
- [3] *2010 FIFA Soccer World Cup ESI Project Summary*, Rev 3, 2010 ESI forum, 2007
- [4] *Position Paper: Base Camps for the 2010 soccer world cup*, Rev 2, 2010 ESI forum, 2007

References 2, 3 and 4 can be downloaded from <http://www.ameu.co.za/mediacentre/worldcup/>.

9. Acknowledgements

The authors would like to acknowledge the contributions of all of the members of the 2010 ESI forum.

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