



**Input from ESKOM on the**

**DRAFT FREQUENCY MIGRATION PLAN  
for the requirement of spectrum for  
SMART GRID**

**31 October 2012**

**Eskom Team**

**Cornelius Naidoo, Telecommunications Technology Manager**

**Noluntu Ngcwabe, Legal Advisor**

**Kgomotso Setlhapelo, Technology Engineer**

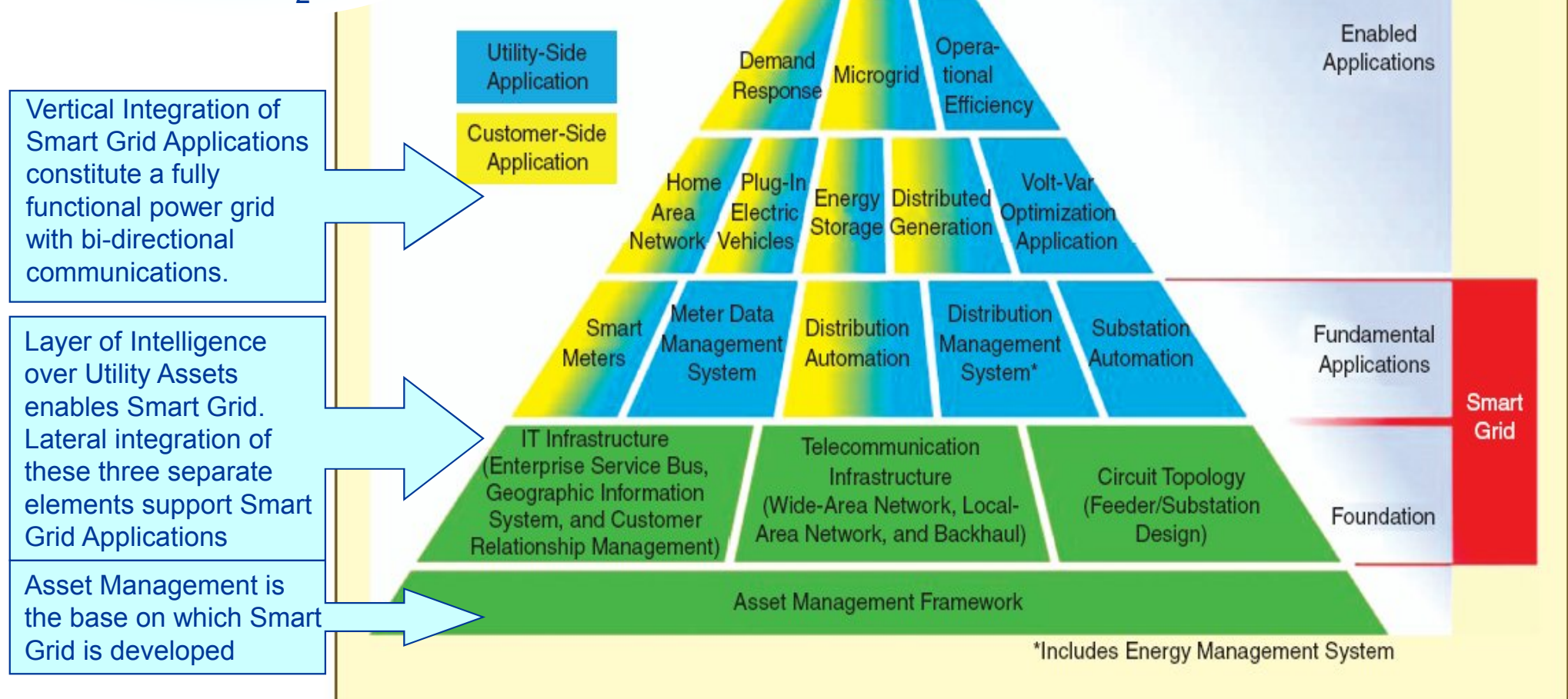
**Dhiru Patel, Frequency Management Consultant**

1. Introduction
2. What is Smart Grid?
3. Spectrum requirement for Smart Grid
4. Examples of Smart Grid spectrum allocations
5. Applicable bands for Smart Grid
6. The benefits of Smart Grid for South Africa

- Eskom Telecommunications is the custodian for the frequency spectrum allocations issued by the Independent Communications Authority of South Africa (ICASA) within Eskom.
- Individual frequencies are allocated for various applications which include Supervisory and Control of the power grid, Handheld, Professional Mobile Radio (PMR) area coverage systems and point-to-point backhaul links.
- There is an increasing demand for spectrum to support applications that will form part of an integrated Smart Grid strategy, particularly for point-to-multipoint communications in the Distribution Power Grid, where power utilities have very little allocated spectrum for secure and interference free communication.
- However, there is currently no harmonised spectrum allocation to enable Smart Grid communication requirements in the power utility industry.

# What is Smart Grid?

*Benefits to SA*  
Virtual Power Plants,  
Reduction of power usage  
Reduction in CO<sub>2</sub> Emission



'The Path of the Smart Grid' - IEEE POWER AND ENERGY MAGAZINE – JANUARY/FEBRUARY 2010

1. The intention of this presentation is to request the Authority to allocate suitable spectrum for Smart Grid for use by South African power utilities.
2. The European Utilities Telecom Council (EUTC) estimates that up to 30 MHz of spectrum, ideally below 1 GHz, but up to 3 GHz may be viable for the increasing bandwidth requirements of Smart Grid.
3. The sub 1GHz band is ideal, because it offers the following advantages:
  1. Range: The lower the frequency, the further a signal can propagate.
  2. Penetration: Signal attenuation rates increase with increasing frequency. Thus, a radio signal at a higher frequency weakens more than one at a lower frequency.
4. For the initial trials and rollout the required spectrum is as follows:
  1. A band of 6 MHz below 1 GHz (and additional 6 MHz from the digital dividend in the future).
  2. A band of at least 14 MHz between 2 and 2.6 GHz.
  3. Additional spectrum below 1 GHz will be required for the full scale rollout

Some countries have already allocated or are considering suitable spectrum for Smart Grid

- a) 1800 – 1830 MHz      Canada (allocated)
- b) 700 MHz band      USA is considering band sharing with Public Safety
- c) 457.5 to 464 MHz      United Kingdom (under consideration)
- d) 415 to 465 MHz      Various European countries (under consideration)



1. There are a number of bands below 3 GHz where spectrum could be made available for Smart Grid. The applicable bands are:

1. 700 - 862 MHz      Spectrum available after migration of TV and studio links out of this band (Digital Dividend 1)
2. 862 – 890 MHz      Spectrum available after migration of users from this band
3. 1890 – 2010 MHz      Being considered for allocation to BFWA
4. 2025 – 2110 MHz      Fixed links – currently under-utilized
5. 2500 – 2690 MHz      125 MHz is available for assignment

The details above are from **Section 4.9 Proposed Migration Plan** of the August 2012 Draft Frequency Migration Plan (pages 32 to 41)

2. It is envisaged that the allocation for Smart Grid would be in a combination bands below and above 1 GHz. At least 30 MHz of spectrum would be required.

1. Smart Grid is required to improve the quality of electricity delivery, reduce carbon emissions, incorporate distributed energy generation, provide automated demand response and reduce the cost of electricity to consumers by reducing operating costs.
2. It will enable the effective management of energy consumption, automatic metering and preservation of the natural resources required to generate power.
3. It is thus of national strategic and economic importance for South Africa to have spectrum allocated for Smart Grid applications.
4. Eskom therefore encourages the Authority to allocate suitable spectrum for Smart Grid in the current Frequency Migration Plan.

Thank you