ITU Kaleidoscope 2011
The fully networked human?
Innovations for future networks and services

Investigating Implementation of Communication Networks for Advanced Metering Infrastructure in South Africa

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- Why this topic?
- What is AMI?
  - Challenges
- What is the state of AMI in SA?
- AMI LAN and WAN technologies
  - Which technologies to use?
- The investigation
- Investigation Results
- Conclusions with Recommendations

Why this topic?

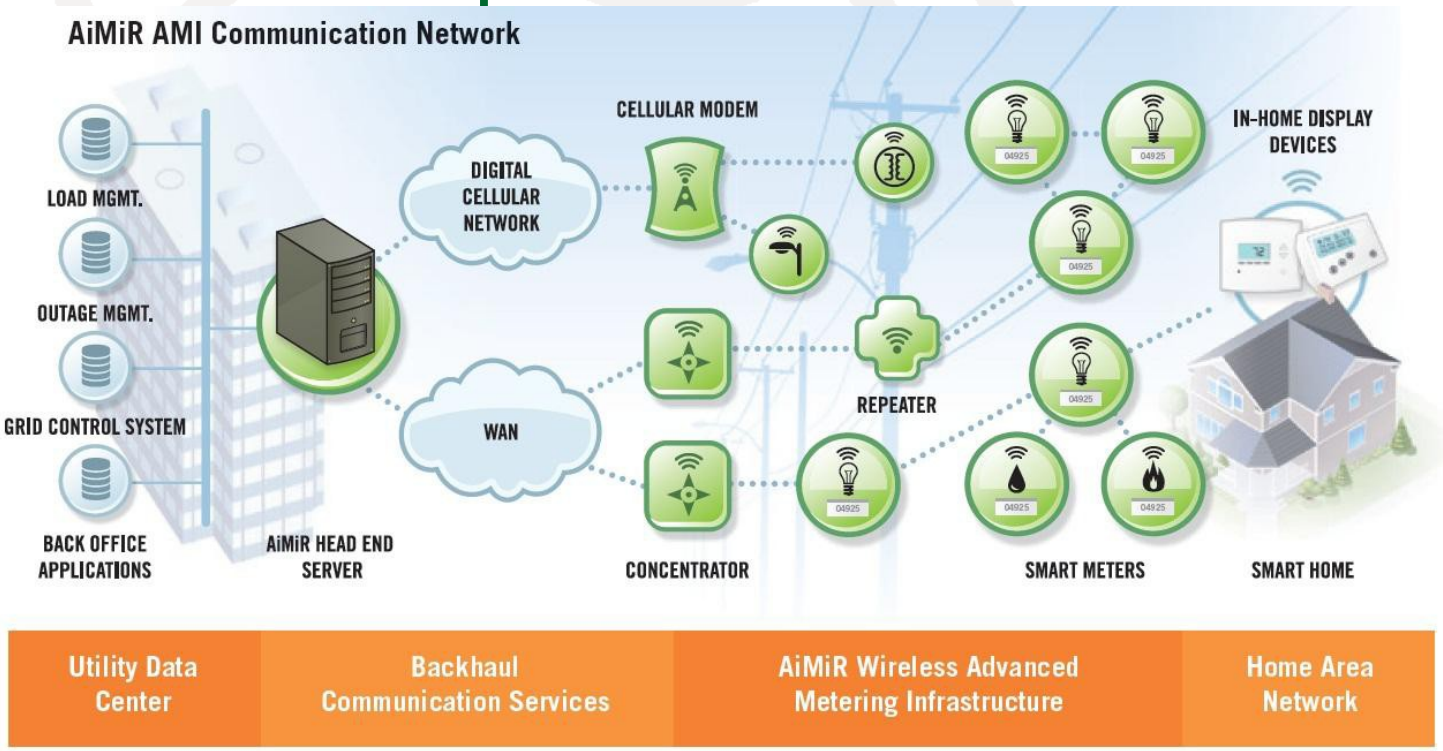
- The world is going green…
- AMI is a tool for energy management.

- ›portunities
  - Curbing peak demand
  - Supporting multi-vendor pen
  - Demand Side Management
  - Enabling Smarter grids

- Motivated by SA's AMI requirements in NRS049 released in 2008…more in slide 7.

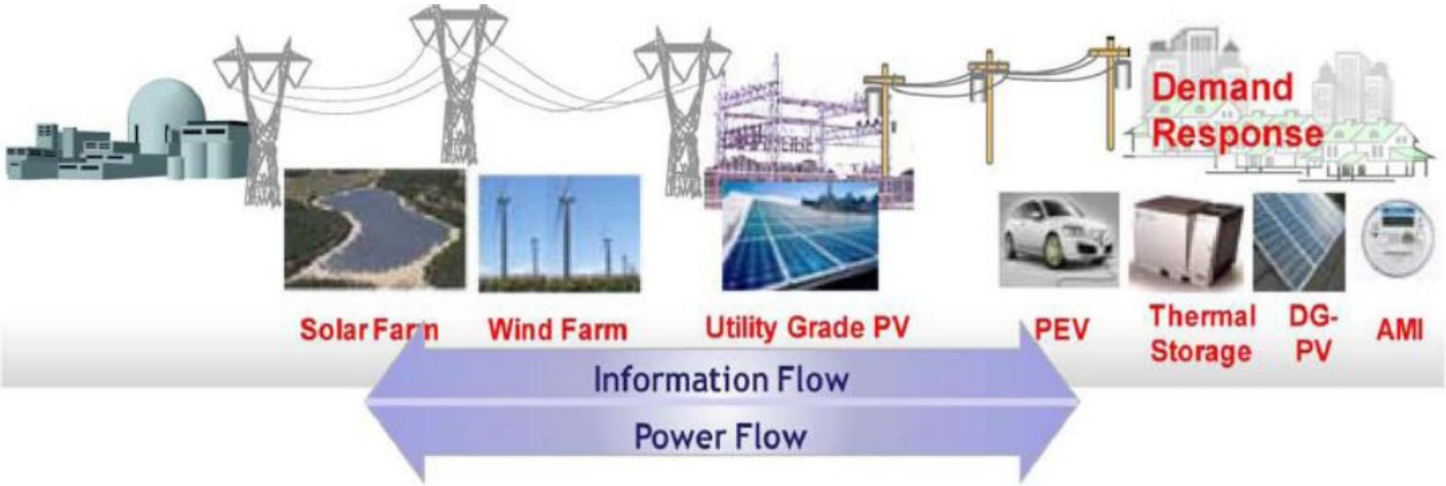
What is AMI?

- Incorporating advanced IT, communication, sensors and smart meters to a power network – AMI



What is AMI?

- Provision of a two way communication
- Functions
  - Integrated communication between utility management and sensing devices
  - Grid self-healing capabilities

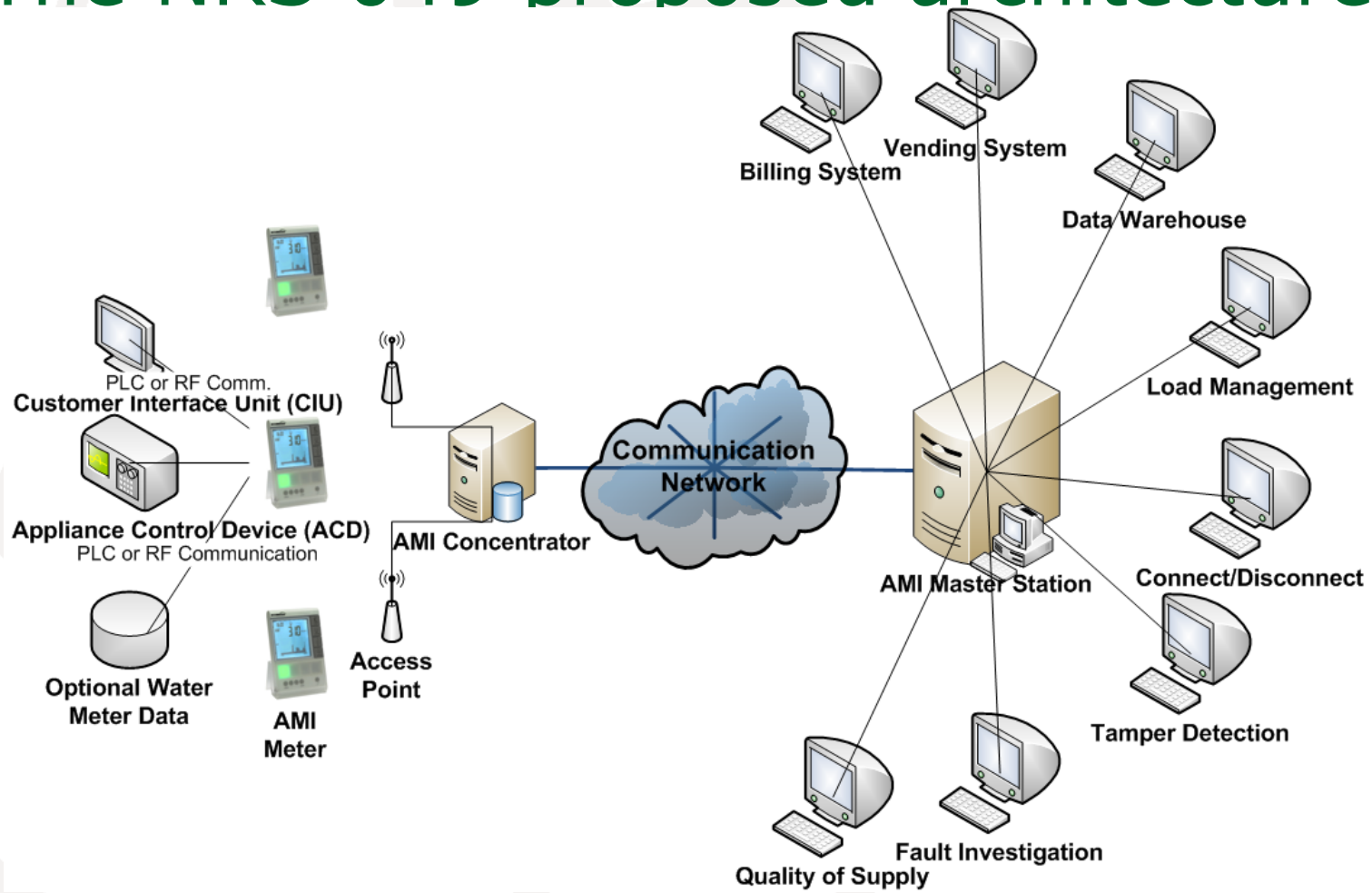


Challenges of Rolling out AMI

- Electricity and equipment theft
- Design restrictions
- Regulations on
  - Bandwidth
  - Spectral allocations
- Communication networks
  - Infrastructure
  - Coverage
  - Security

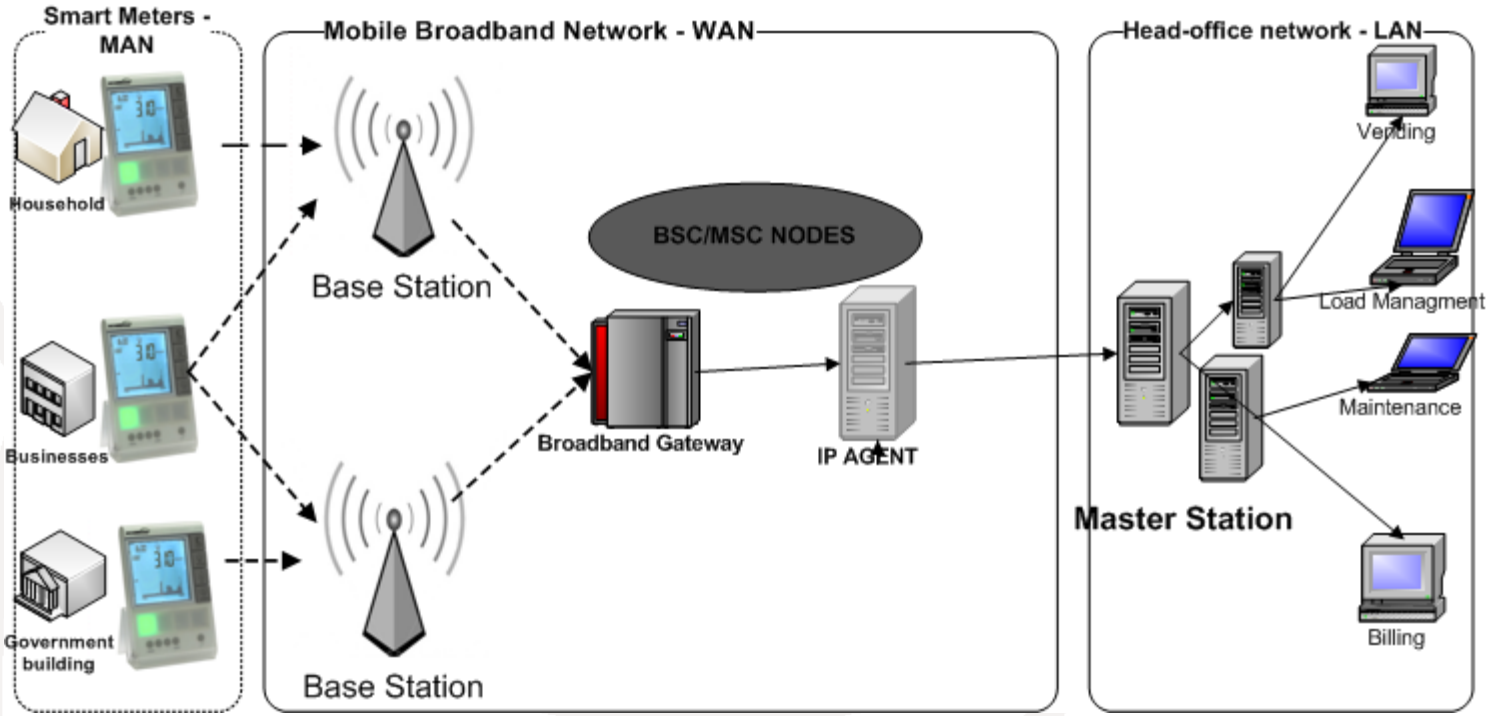
What is the state of AMI in SA?

- The NRS 049 proposed architecture



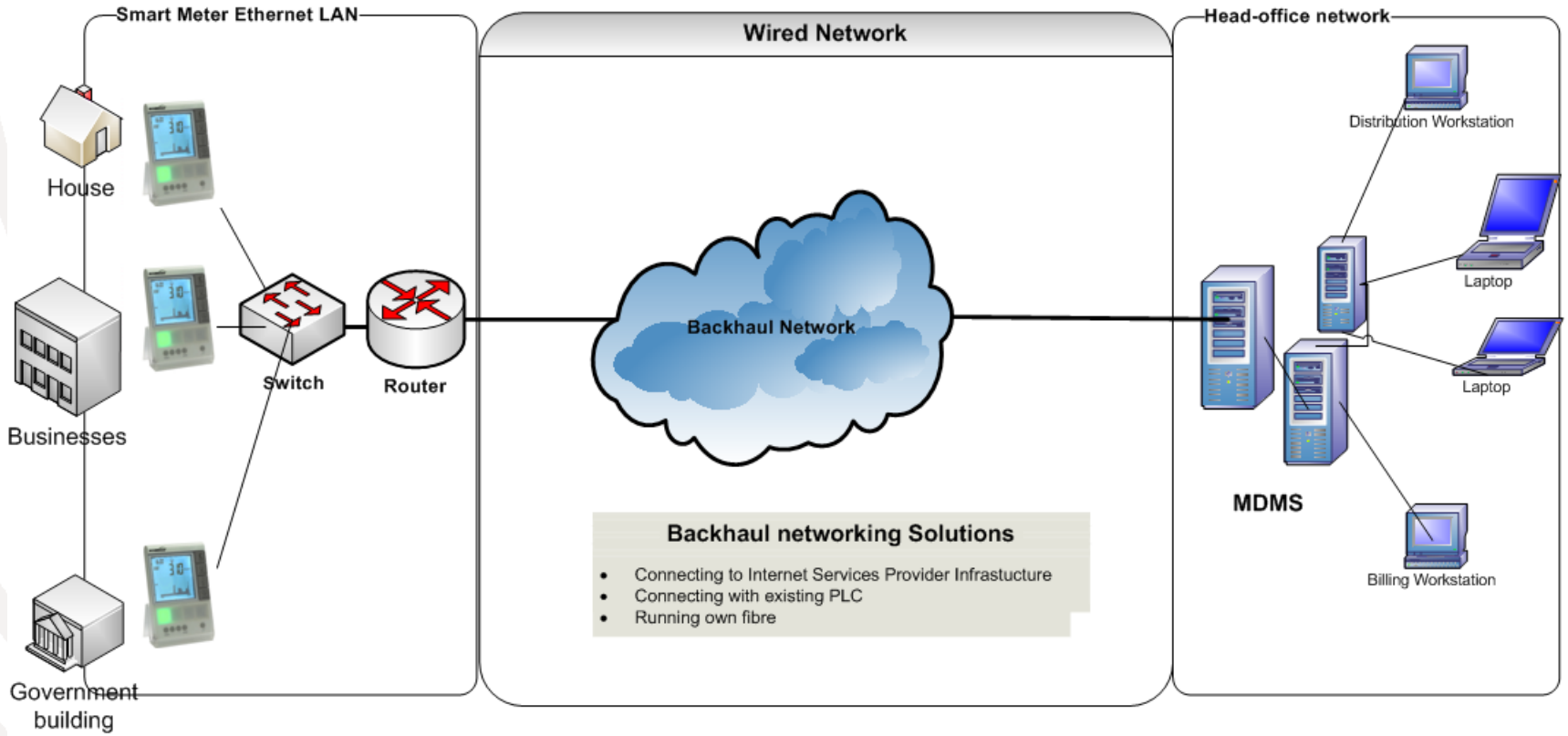
WAN and LAN technologies for AMI?

- Wired networks



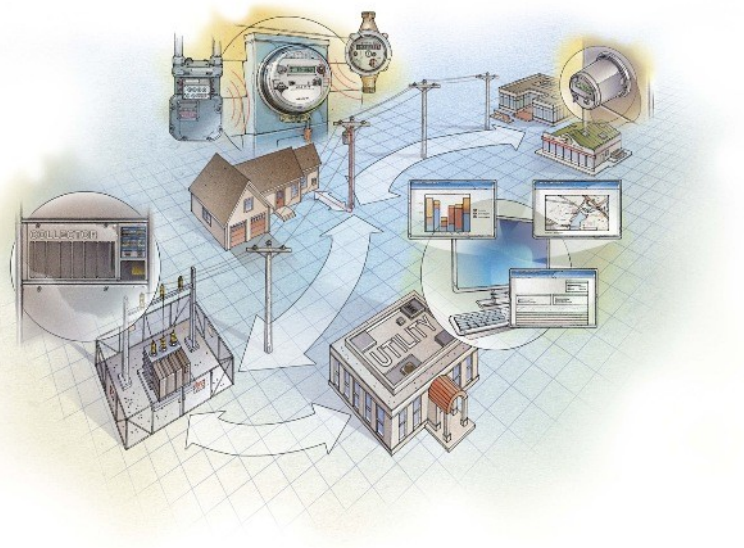
WAN and LAN technologies for AMI?

- Wireless networks
-



WAN and LAN technologies for AMI?

Own network **vs** **NSP network**

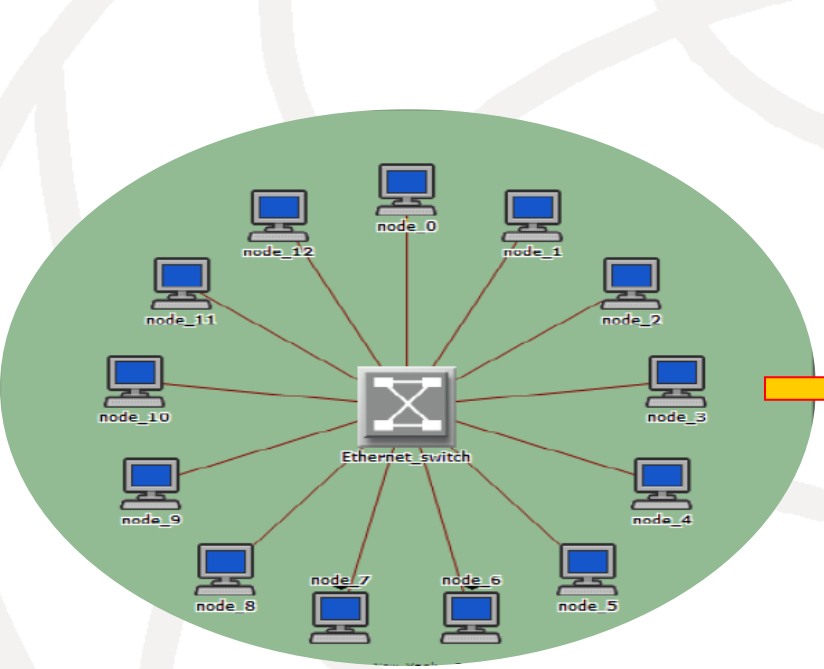


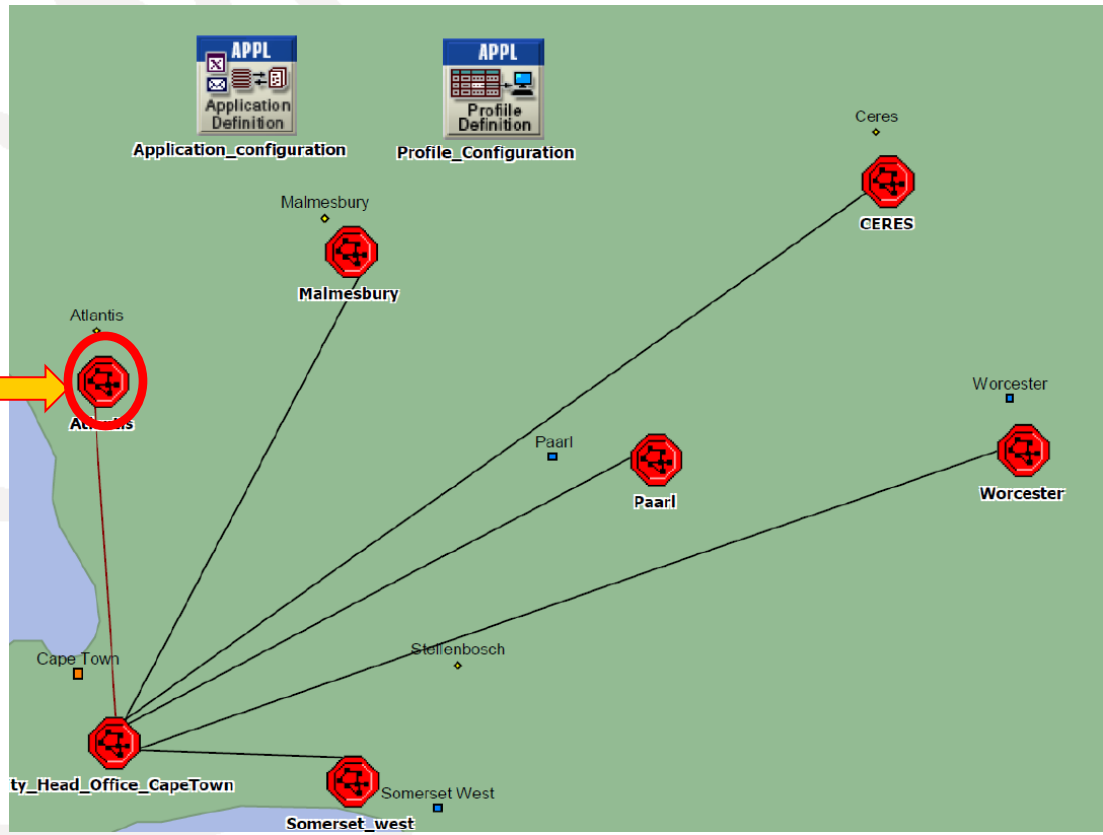
Which technologies to use?

- It depends on…
  - The utility – financial resources
  - Size of the population being served – bandwidth requirements
  - Services provided over the network

The Investigation

- The simulation was done on OPNET 14.0



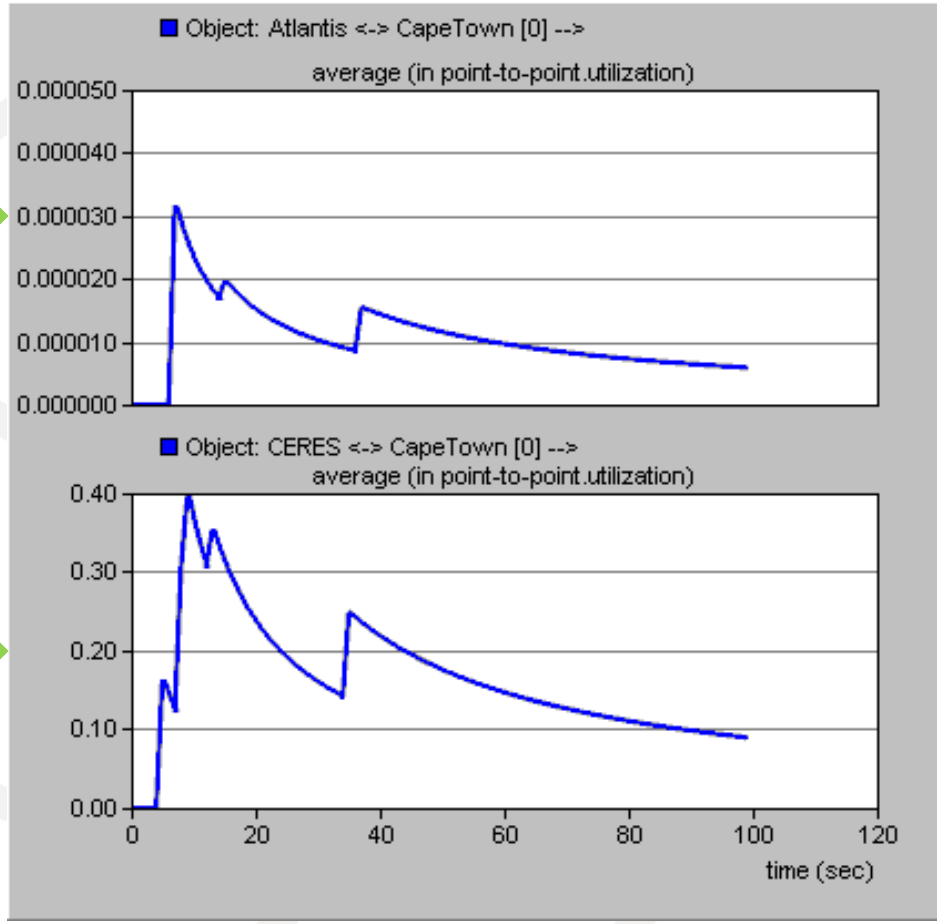


Investigation Results

- Bandwidth Utilization

Optic Fibre

DS0



Analysis

- Network capacity requirements analysis

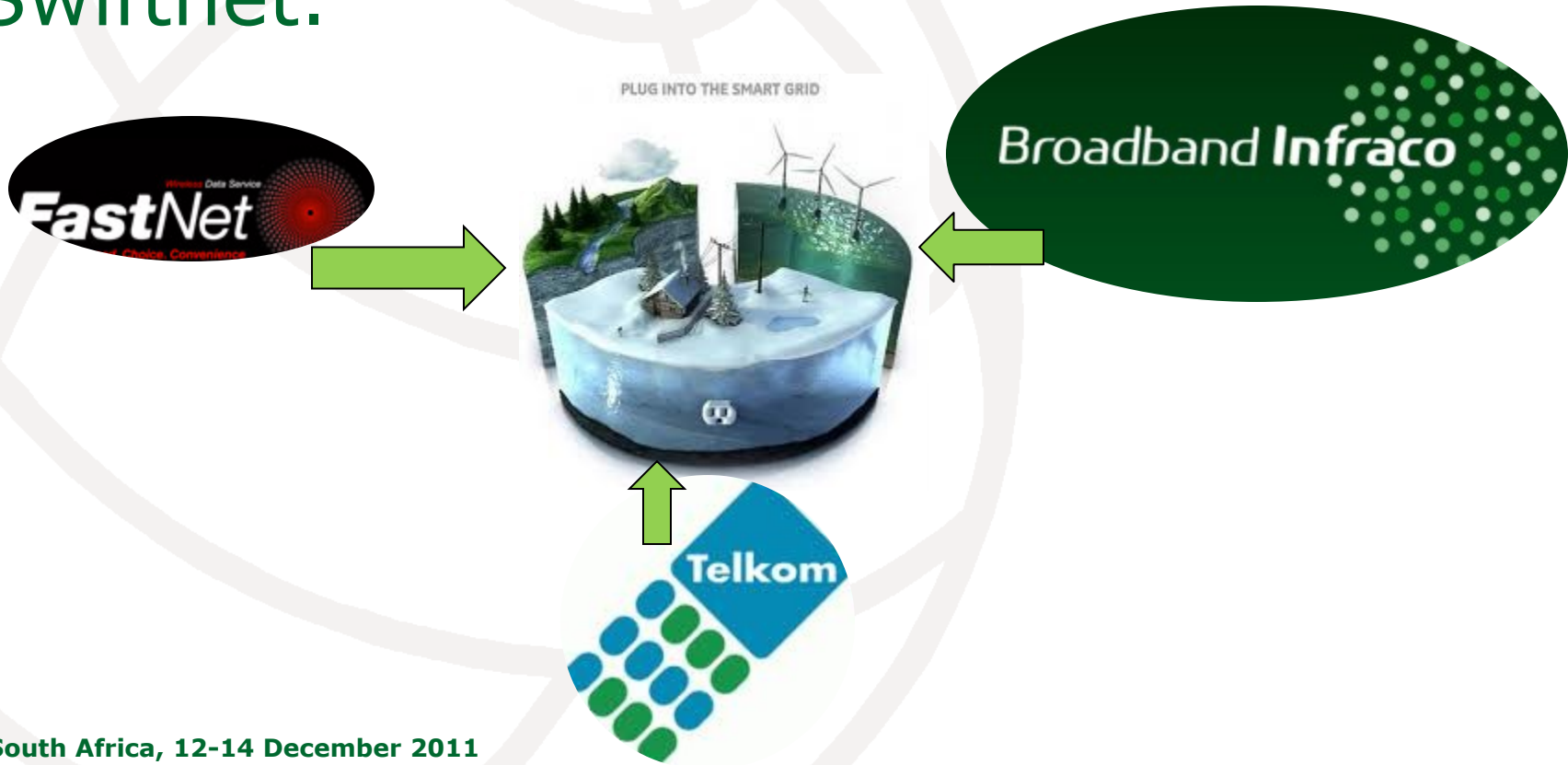
Town	Population	Houses/ Smart Meters	Bandwidth Mbytes/sec
Ceres	41 596	10 399	0.24
Atlantis	60266	15067	0.34
Cape Town	3433441	858360	19.6
Worcester	127597	31 899	0.7
Paarl	61660	15415	0.4
Somerset West	60000	15000	0.3
Malmesbury	34991	8747	0.2

Conclusions

- AMI consumes very little bandwidth
- All the reviewed networking technologies are suitable.
- Building own network will be more expensive
- The network will be under-utilized

Recommendations

- Eskom should liaise with NSP such as Telkom, Broadband Infraco, and Swiftnet.



Future Work

- Integrated utility communication network services
- MPLS
- Secure VPN for utilility traffic over the internet.