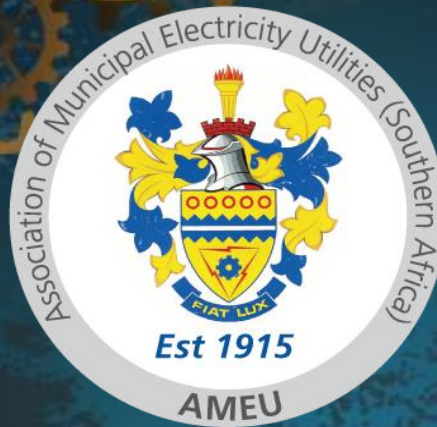




27th Technical Convention 2019

The 4th Industrial Revolution (“4IR”) | *Building the Power Utility of the Future, Today*

Internet of Things based Smart Grid data communication networks

Presented by Gerhard Brown (Pr Eng)
Principal Professional Officer
Energy and Climate Change Directorate
City of Cape Town

Hosted by



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

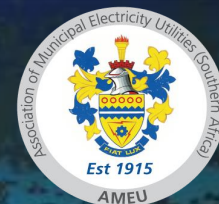
What is a Smart Grid?

- *“A grid with high school qualification.”*
- *“A grid that knows how to Google.”*
- *“A creative term invented by the IT industry to make money out of the energy industry.”*
- *“It’s like an iPhone, but bigger and slightly more expensive.”*
- *“I don’t know. Siri what is a Smart Grid?”*

27th Technical Convention 2019

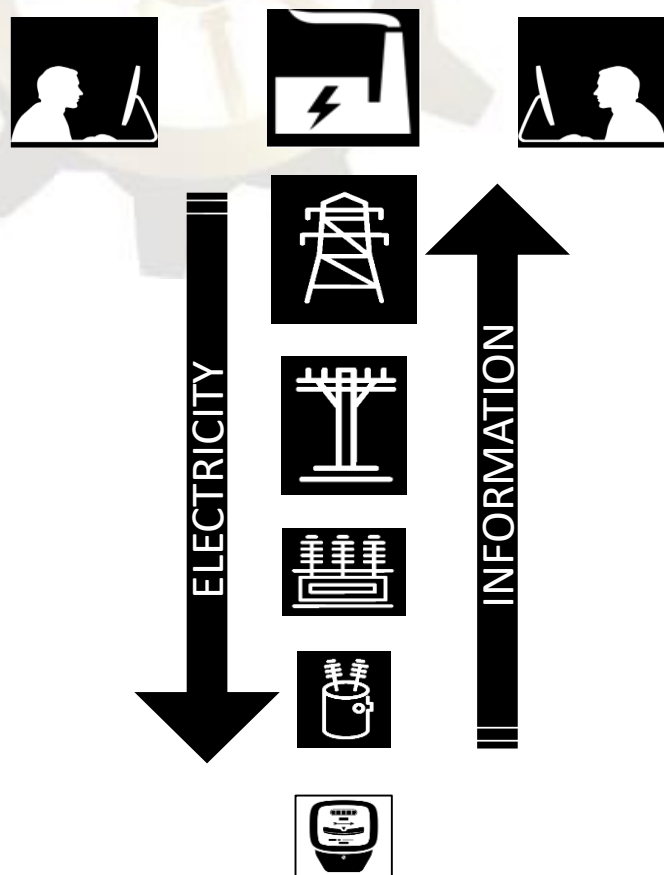
The 4th Industrial Revolution (“4IR”)

Building the Power Utility of the Future, Today

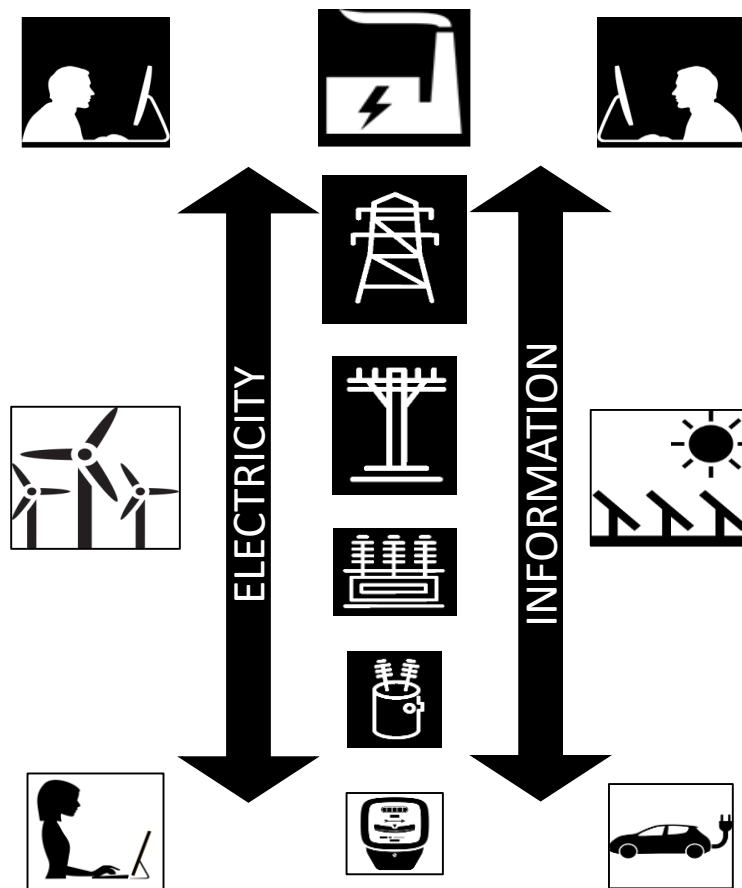


How are our grids changing?

CONVENTIONAL ELECTRICITY GRIDS



NEW ELECTRICITY GRIDS



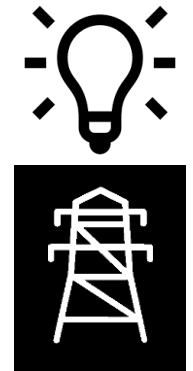
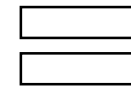
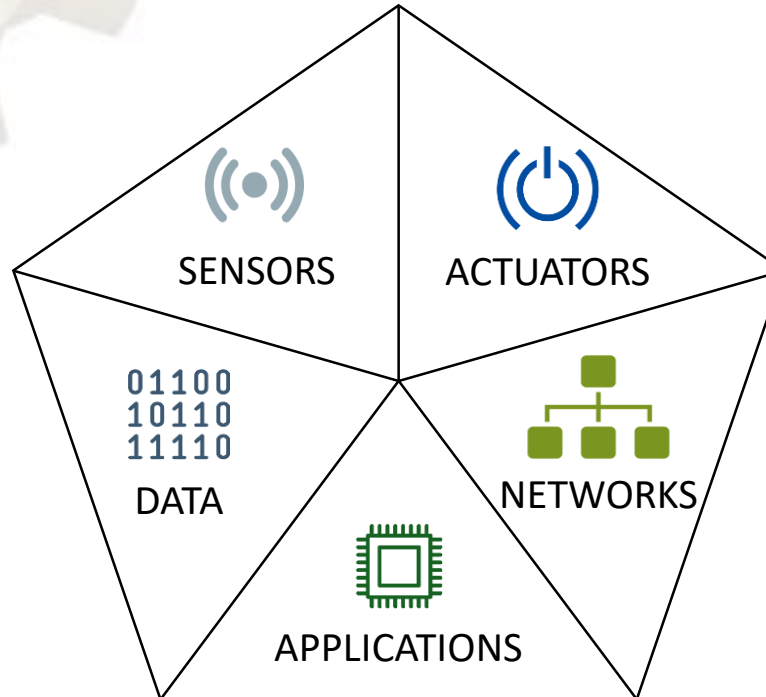
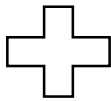
27th Technical Convention 2019

The 4th Industrial Revolution (“4IR”)

Building the Power Utility of the Future, Today



What is a Smart Grid?



27th Technical Convention 2019

The 4th Industrial Revolution (“4IR”)

Building the Power Utility of the Future, Today



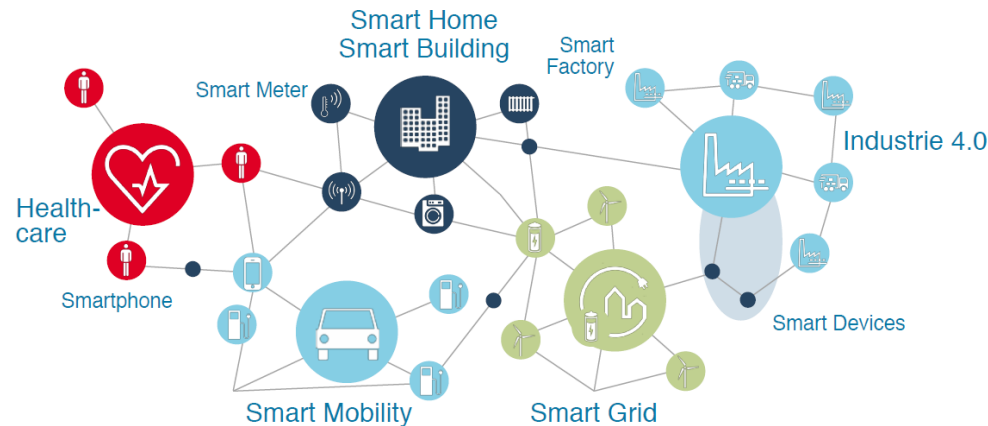
Why do Municipalities need to think about Smart Grids?



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

**Strategic National Smart Grid Vision for the South African
Electricity Supply Industry**



Platform Industrie 4.0 - Graphics © Bosch Rexroth AG

Smart Grid Applications

Wide-Area Situational Awareness

Electrical Vehicles

Distribution Management

Vehicle to Grid

Distribution Automation

Demand Response Management

Substation Automation

Advanced Metering Infrastructure

Outage Management

Home Energy Management

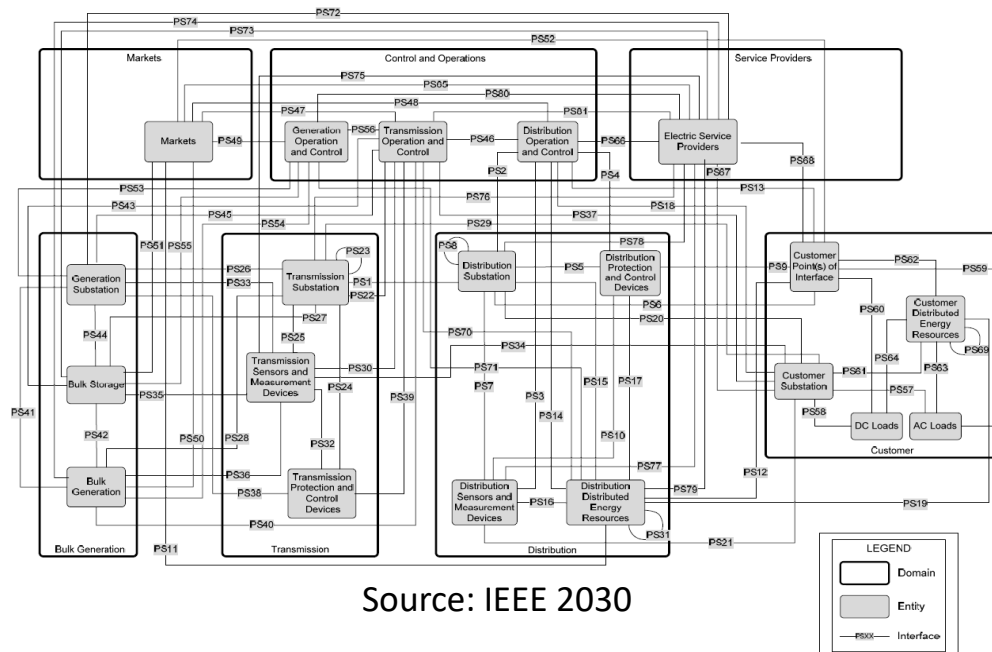
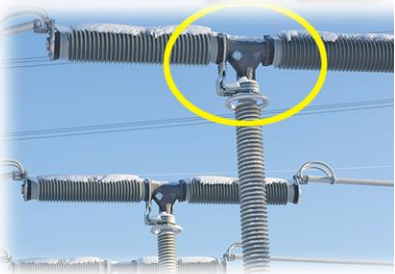
Mobile Workforce Management

Enterprise Asset Management

Renewable Distributed Energy Resources

Meter Data Management

Why haven't our grids changed yet?



27th Technical Convention 2019

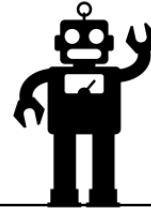
The 4th Industrial Revolution ("4IR")

Building the Power Utility of the Future, Today



Can IoT solve our problems ?

Real world
problems



Applications

Data
Communication

Devices

Software
Defined
Solutions



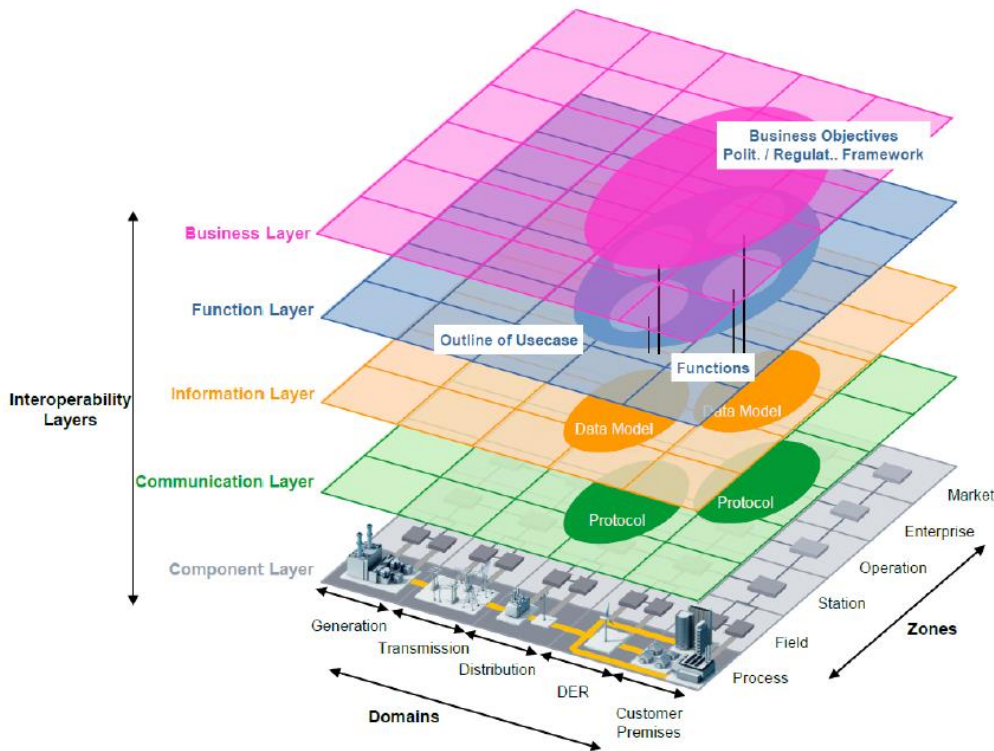
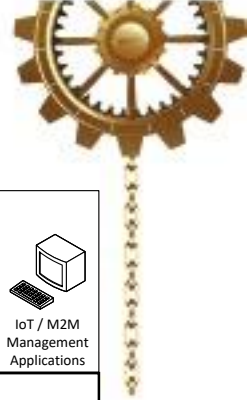
27th Technical Convention 2019

The 4th Industrial Revolution (“4IR”)

Building the Power Utility of the Future, Today

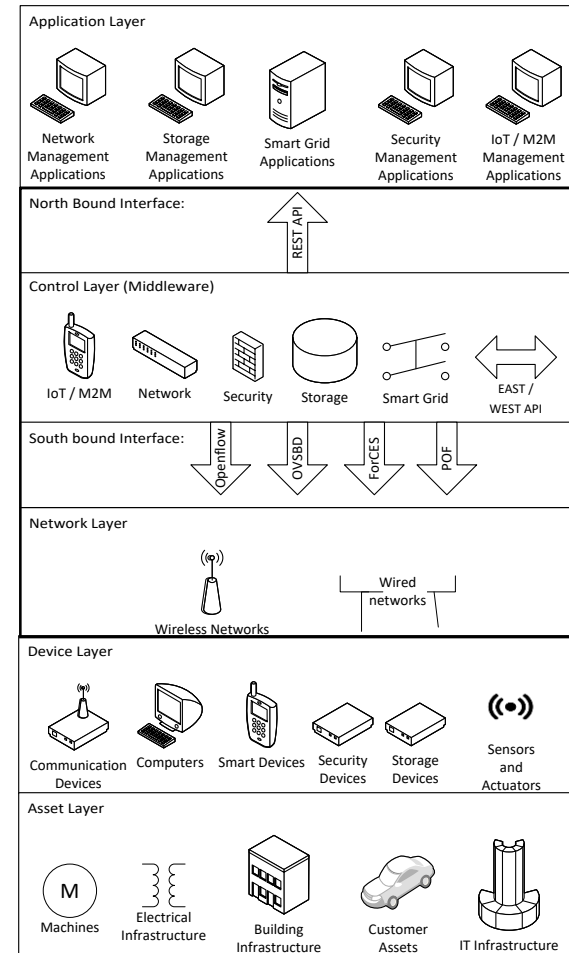
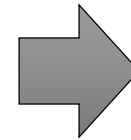


How could we design IoT based Smart Grids ?



Smart Grid Reference Architecture

Source: CEN-CENELEC-ETSI



IoT based Smart Grid Reference Architecture



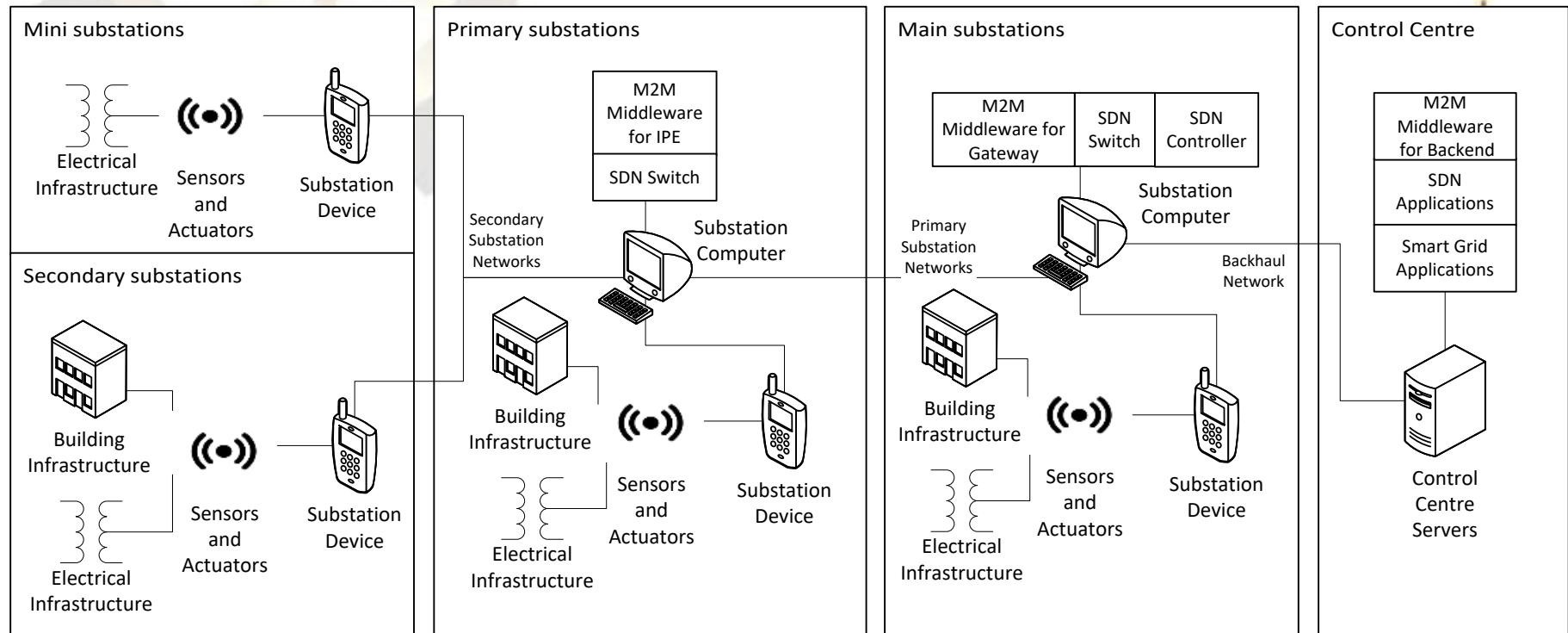
27th Technical Convention 2019

The 4th Industrial Revolution ("4IR")

Building the Power Utility of the Future, Today



How could we implement an IoT based Smart Grid design in an electricity distribution network?



Example of a system architecture proposal for an IoT based Smart Grid implementation in an electricity distribution grid

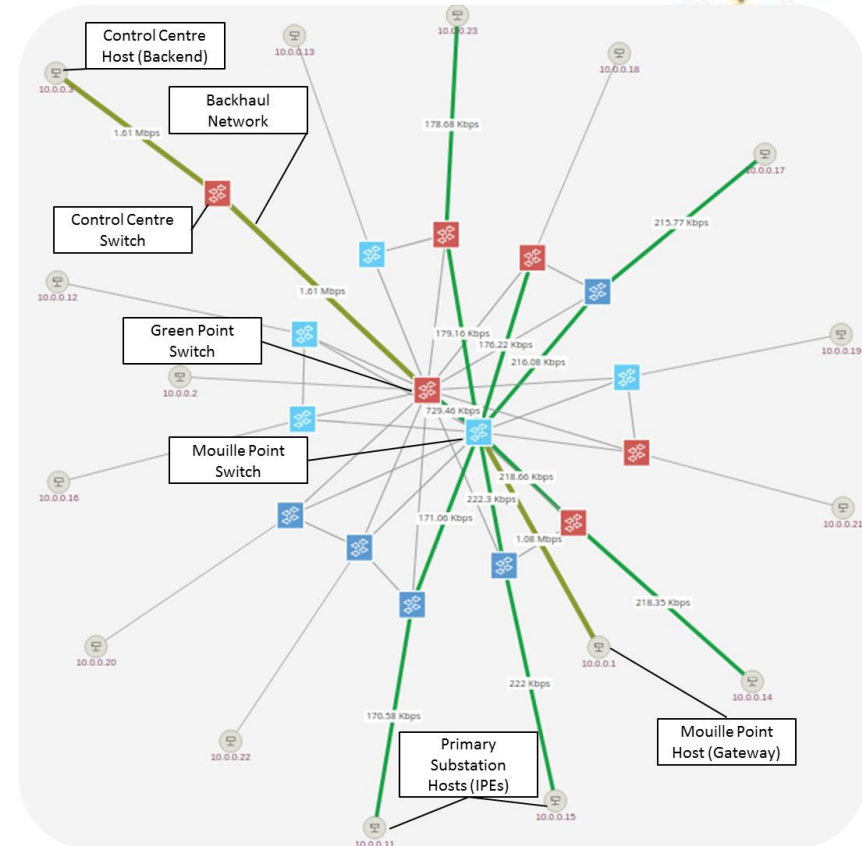
27th Technical Convention 2019

The 4th Industrial Revolution (“4IR”)

Building the Power Utility of the Future, Today



Section of Cape Town distribution grid chosen a reference model.



Network topology view of data flow during data acquisition.

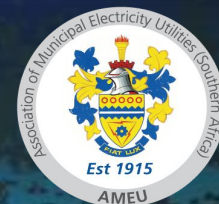
What of the Benefits?

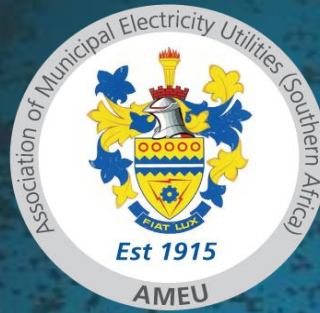
- *Smart Grids become less hardware dependent*
- *Smart Grids become very flexible to change*
- *Less risk “tie-in” to specific technologies.*
- *Smart Grids are easier to develop (reduced OPEX)*
- *Smart Grids are easier to operate and maintain (reduced OPEX)*

27th Technical Convention 2019

The 4th Industrial Revolution (“4IR”)

Building the Power Utility of the Future, Today





27th Technical Convention 2019

The 4th Industrial Revolution (“4IR”) | *Building the Power Utility of the Future, Today*

Thank you

Hosted by



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD