GSMA - Discussion of feild results for shared sites

Venue – Hotel Leela Kempenski

Date -23-Sep-09, Location - Gurgaon

Sandeep Nishikant Gupte
Vice President - Technical, Indus Towers Limited

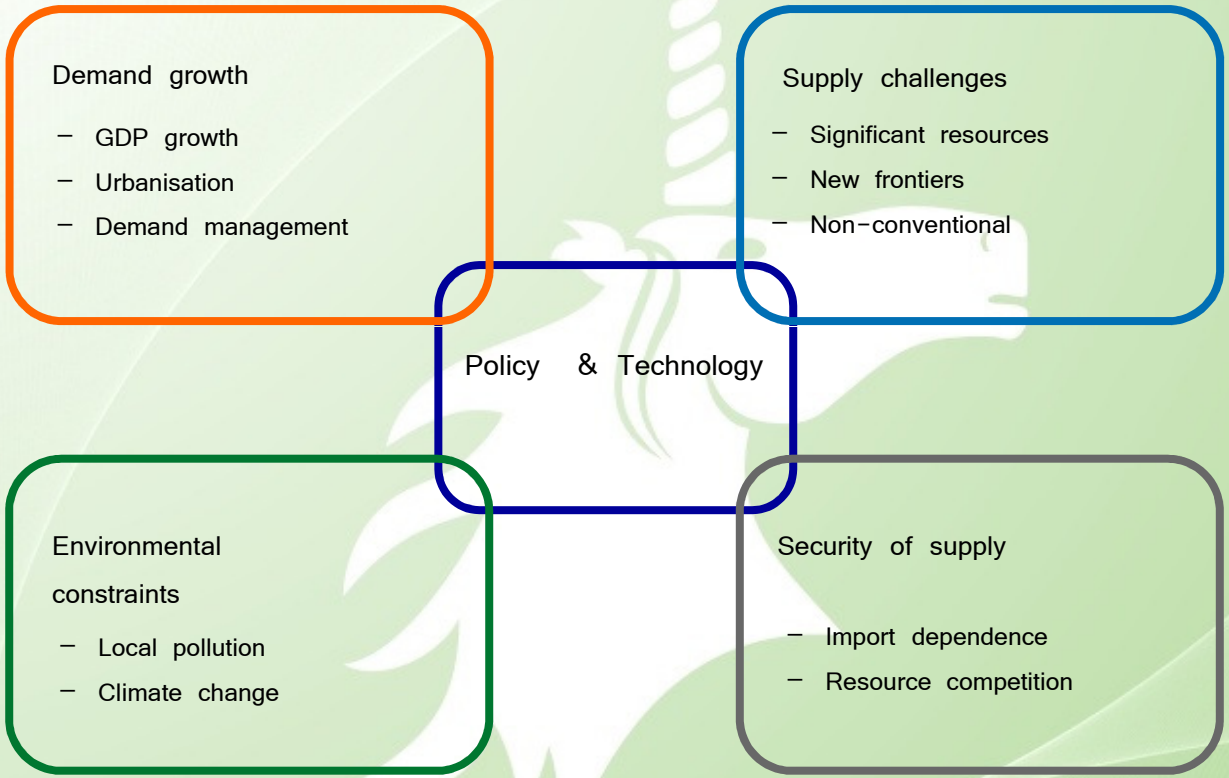
Prophecy

.....In a remarkably perceptive book written in 1952, The Next Million Years, Charles Galton Darwin described historic changes in the human condition, calling them "revolutions." He wrote that there is one more revolution clearly in sight:

.....The fifth revolution will come when we have spent the stores of coal and oil that have been accumulating in the earth during hundreds of millions of years...it is obvious that there will be a very great difference in ways of life..."

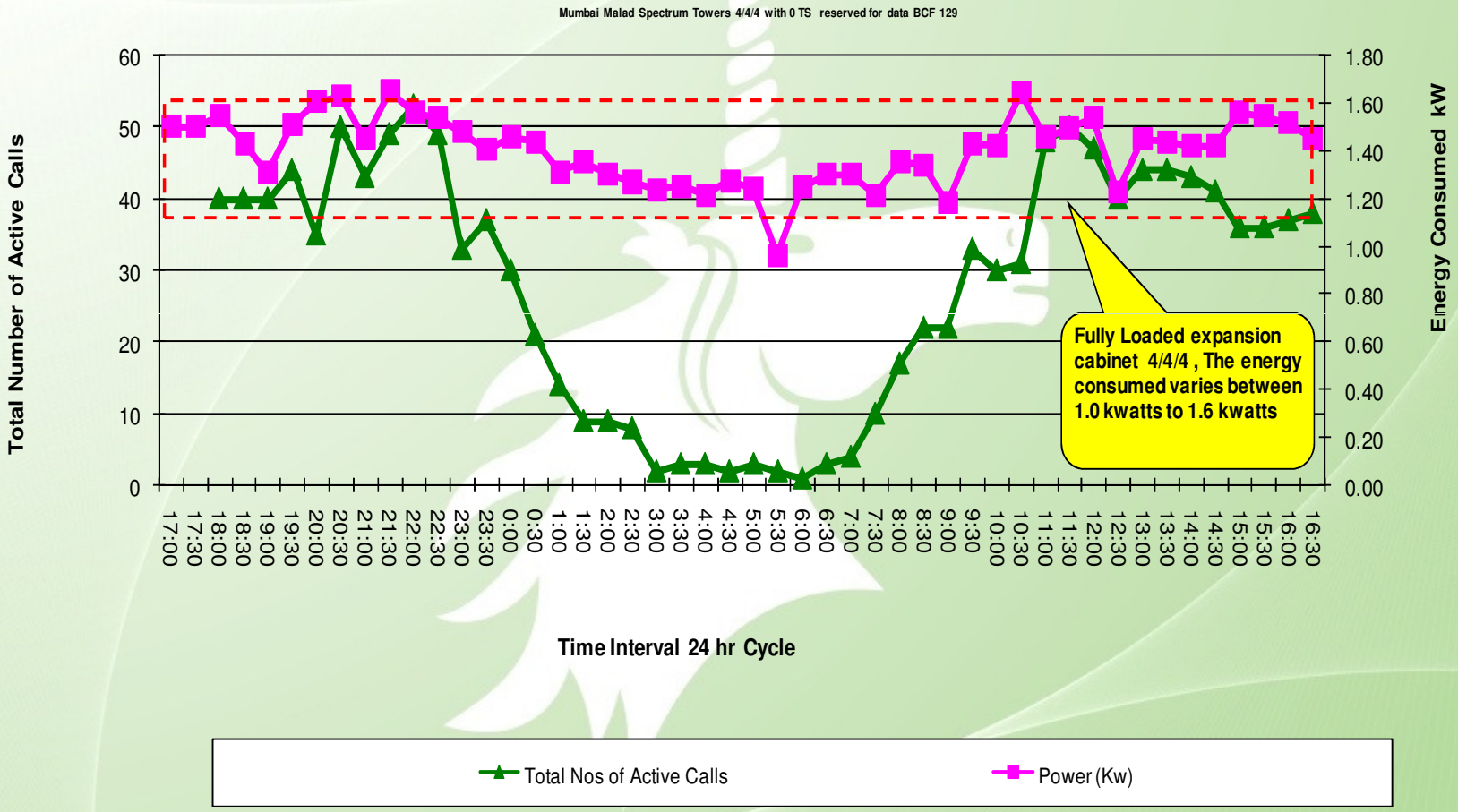
.....Life will go on, but in a different paradigm. Oil will be sorely missed.

Key drivers of the energy future

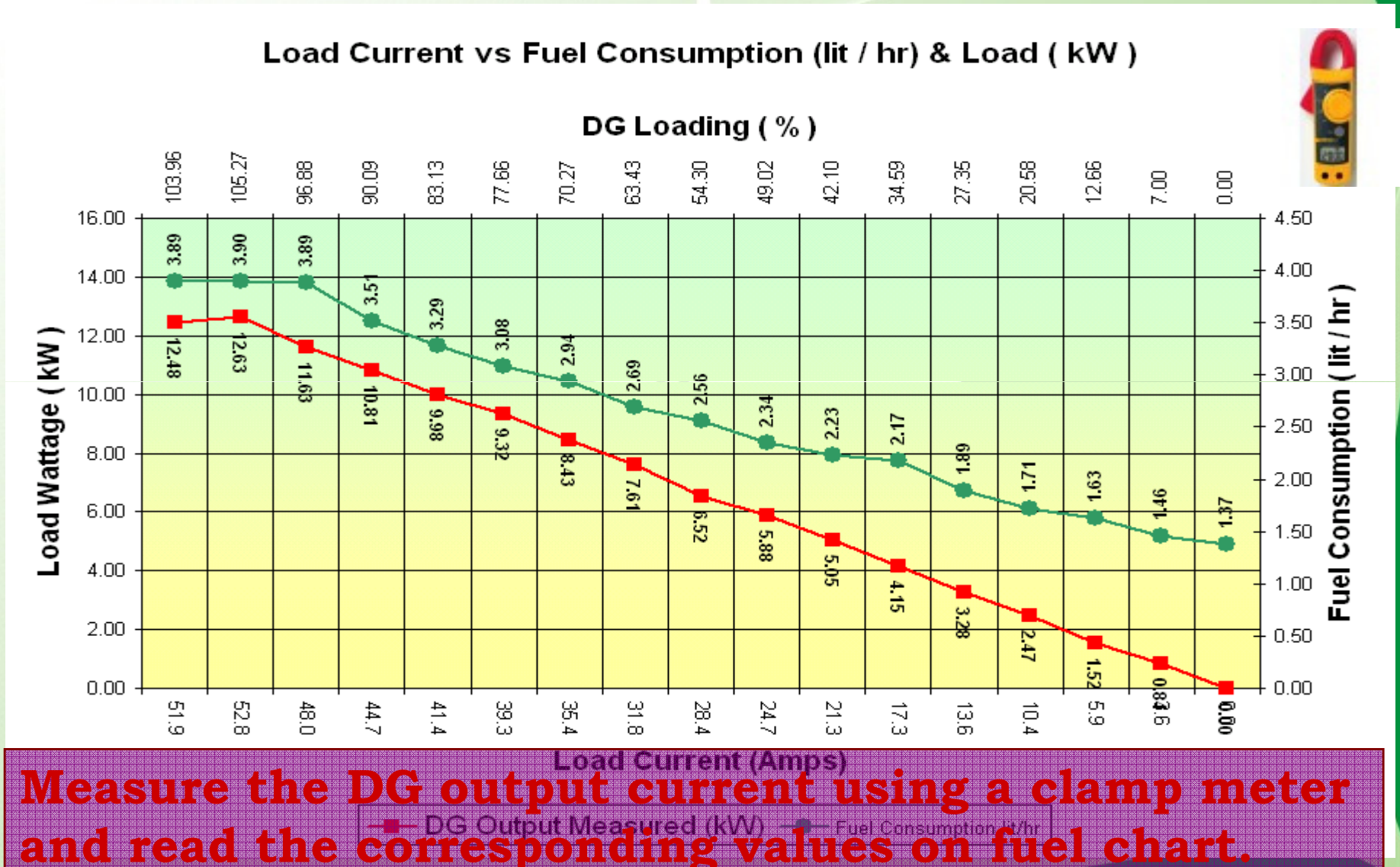


TRX Timeslot vs Energy Consumption

Variation of Energy Consumed Vs Number of Calls

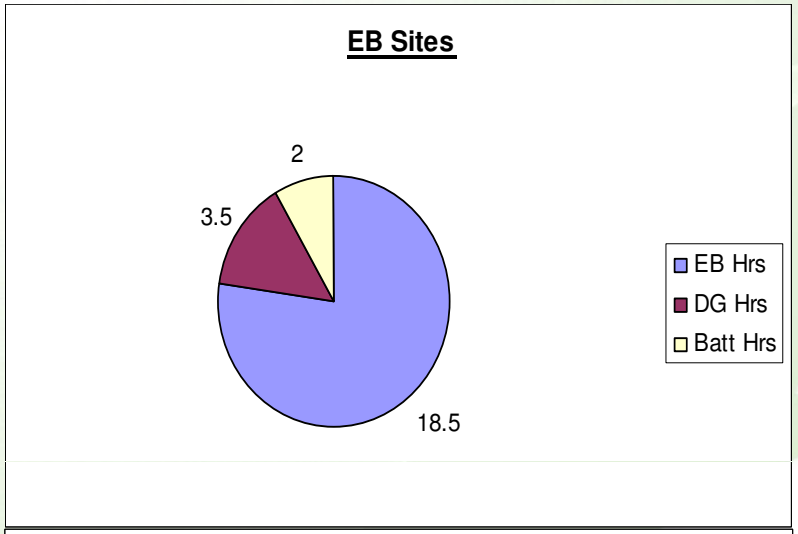


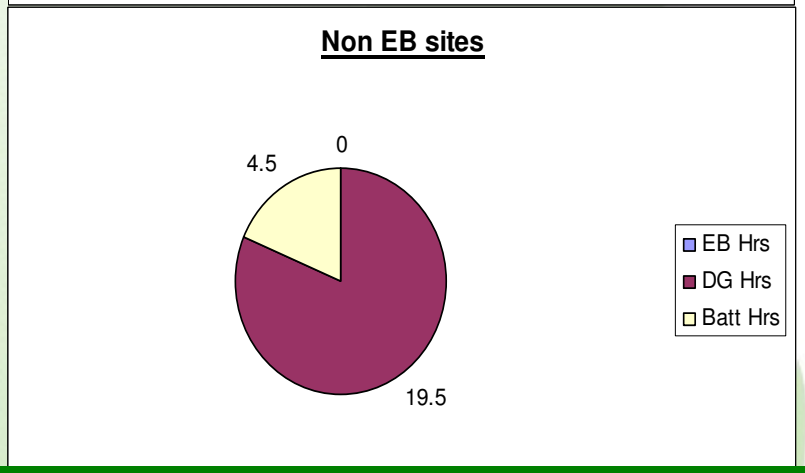
Calibration Curves for 15 kVA DG

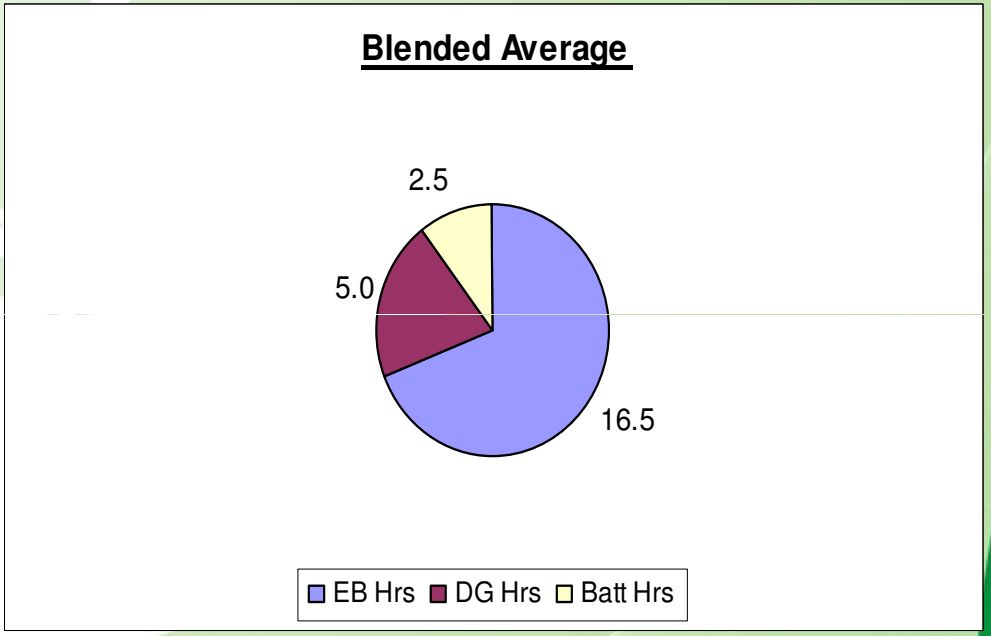


Measure the DG output current using a clamp meter and read the corresponding values on fuel chart.

Energy Source Distribution (Hrs)







DG Running Hours is a Critical KPI to be Improved !!!

Solar-Wind Hybrid -Results

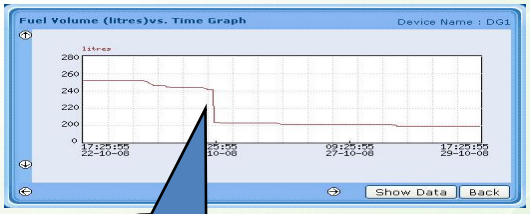




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Telecom Grade - Fuel Sensor

Automated diesel management software



Abnormal consumption

- Real time Circle, Cluster & site level view of the following:
  - Remaining diesel, fill required sites, filled diesel volume in liters
  - Number of fills, abnormal consumption volume
  - Various fill, consumption & abnormal consumption finger prints captured in software
- View data from a mobile phone or PC browser

Solid state diesel sensor with no moving parts



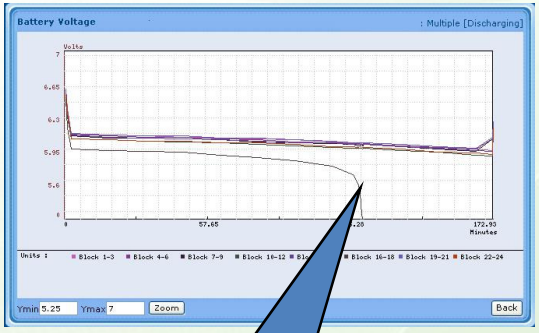
Connector to aladdinbox

Capacitance stem

- Supports different tank heights (100mm to 750 mm height)
- Supports different tank shapes
- Flame proof, tamper resistant
- Capacitance based, solid state technology
- 1 % accuracy (+/- 2 liters for a 200 liter tank)
- Temperature compensated and designed for telecom conditions
- Will connect to Aladdinbox through Modbus over RS485

Battery Management Sensor

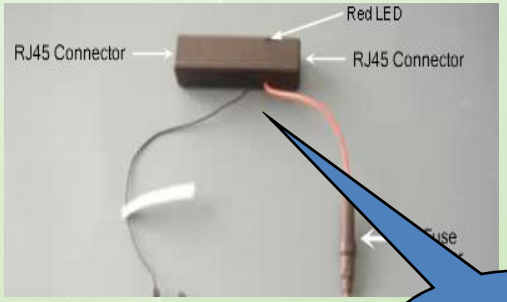
Battery expert software preventing loss of batteries



Failed cell

- Follows IEEE guidelines on battery management
- Identifies health of batteries on cell level
- Identifies improper site conditions and alerts to prevent battery degradation and loss of batteries
- Computes utilized life of batteries to enable life cycle management
- Charge level, cycle count, Depth of discharge on cycle basis
- Temperature, utilized life, current, voltage, KwH, power

Digital sensor LAN to connect all sensors with a single cable



Voltage sensor

- Sensors to measure voltage, current, temperature
- All sensors connected with a single cable
- Ability to monitor at 2v, 6v or 12v battery banks
- Hall effect current sensor, not in critical path

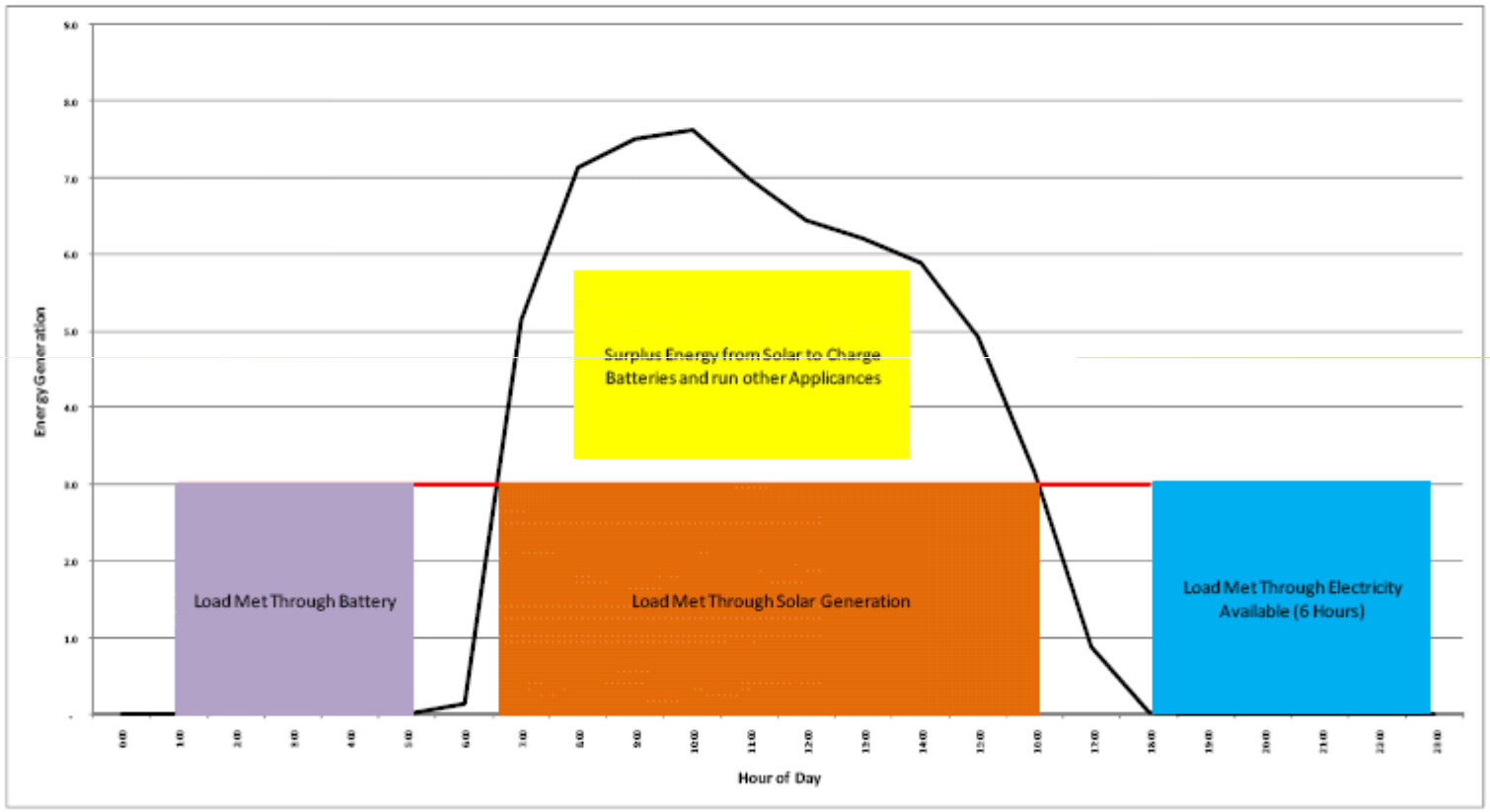
Fuel Cell Trial 8 kW



0.074kg/kWh

Solar Optimisation

Energy Deployment (Daily Basis)



Thank You