



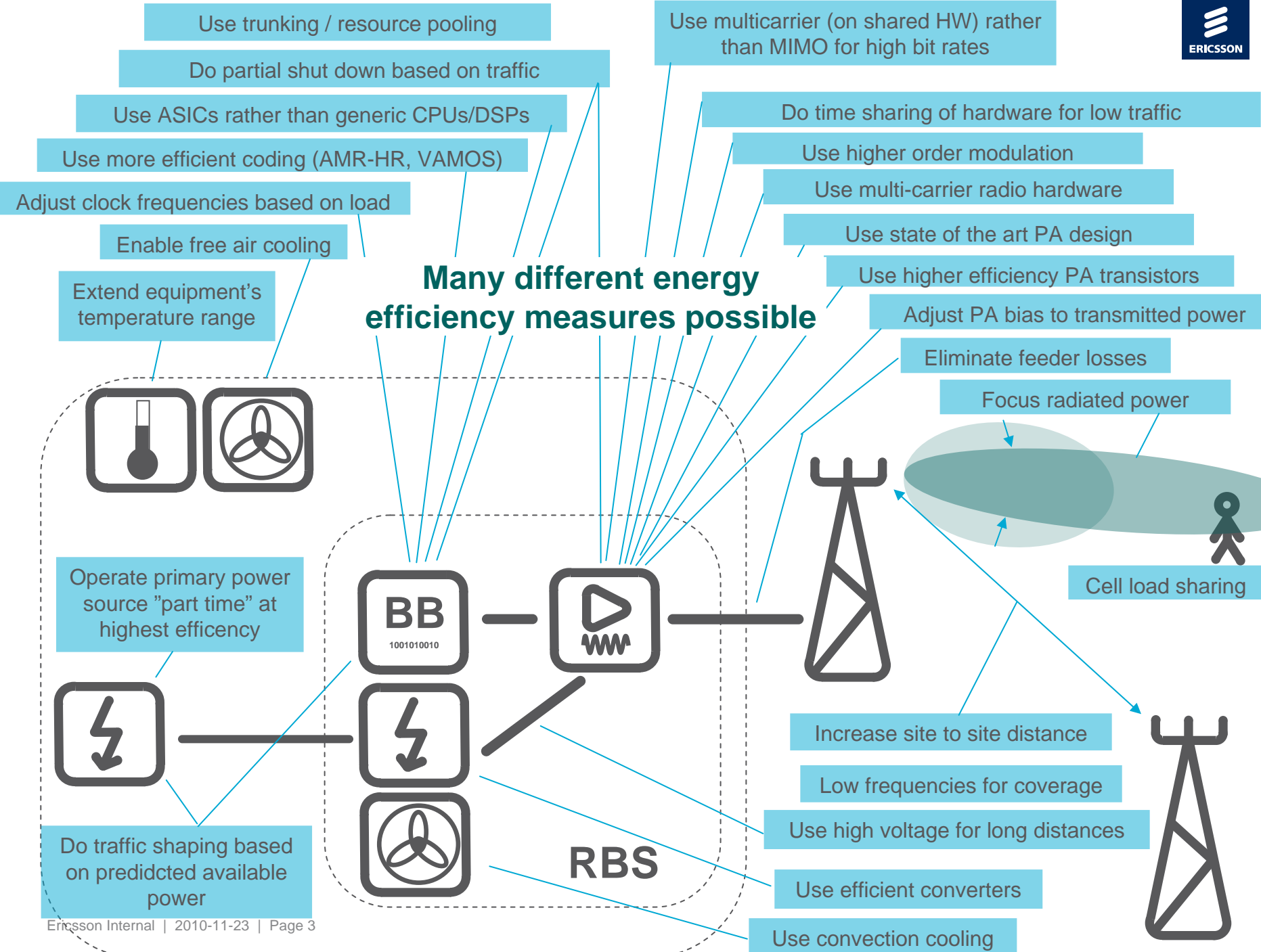
Green Mobile Power & Community Power Project

Ericsson Approach

Agenda

- › Ericsson Approach to Energy Efficiency
- › Ericsson Energy Efficient Solutions
 - Network Features
 - RBS 6000-Next Generation RBS
 - Tower Tube- Re-inventing the site
 - Blue Batteries

Many different energy efficiency measures possible



Efficient Energy Solution Content

I. Optimal network energy design

Energy optimized network design, maintaining the desired coverage, capacity and quality

II. Site energy optimization

The energy efficiency of entire sites – optimized or decreased energy consumption

III. Alternative energy sources

Ericsson efficient equipment makes it economically and technically feasible to use alternative energy sources

I. Optimal Network Energy Design

› Network Energy Optimization

- Network and site energy consumption investigation
- Energy optimized network and site design

› Environmental Consulting

- Assess environmental strategy and related business processes

› Network Life Cycle Assessment

- Assess the environmental impact of operating a telecom network
- Quantify CO₂ emissions

› Power Saving features

- Implemented throughout the network the RBS power consumption is reduced

› Remote Power

- One feeding power station, up to 10 receiving stations
- Reduction of the number of site diesel generators

II. Site Energy Optimization



- › **Efficient cooling concept**
 - Alternative cooling methods which reduces power consumption
- › **Generator-battery hybrid solutions**
 - Reduction of diesel consumption by optimal use of batteries
- › **Special durable batteries**
 - Deep cyclic and high recharging time performance
- › **Tower Tube**
 - Innovative design and top mounted equipment ensures energy efficiency

III. Alternative Energy Sources

› Solar power

- Ericsson sun site solution removes electricity grid dependency

› Wind power

- By deploying wind powered sites, Ericsson enables cost efficient expansion

› Fuel cells

- Replaces combustion engines and batteries in specific applications

› Bio-fuels

- A clean burning fuel derived from animal or vegetable basis, a replacement for fossil diesel

Agenda

- › Ericsson Approach to Energy Efficiency
- › **Ericsson Energy Efficient Solutions**
 - Network Features
 - RBS 6000-Next Generation RBS
 - Tower Tube- Re-inventing the site
 - Blue Batteries
- › The Community Power Project

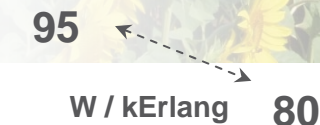
Energy Efficiency Features

- › BTS Power savings
 - TRX PA switch-off based on network traffic.
 - Applicable to the entire installed base of base-stations
- › Time-Slot Power Savings
 - PA switched on only when the TS is carrying traffic
 - New TRX hardware
- › Network Power Savings
 - Halt the sites that are installed for capacity purposes during lean traffic hours
- › MCPA based base-stations for GSM
 - Enables use of main-remote concept for high capacity sites as well

Automatic Power Savings in MGw

Taking Energy Efficiency into Core Nodes

- › When traffic load is decreased the media stream processing boards (MSB4) will go to low power state.
- › A certain number of boards are always in active state to ensure capability to accept new connections.
- › When the load of active boards exceeds 80% boards from low power state are taken into use.
- › The power save gain depends on the selected hardware option and traffic load conditions and same is expected around 15-20%.



95
W / kErlang 80

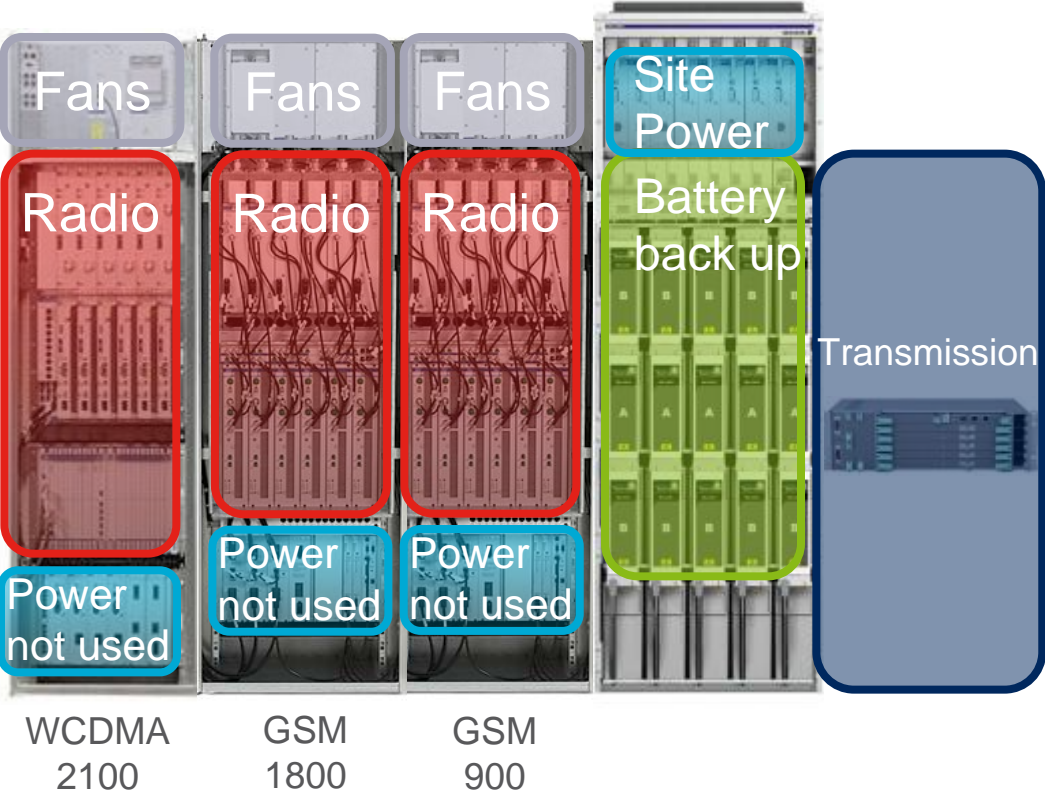
GMP V4

**Reduced
power consumption
at low traffic**

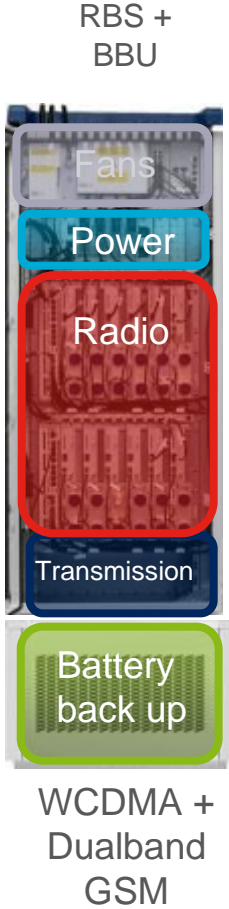
RBS 6000: The Site Becomes the Cabinet

Example of an Indoor Site

Before



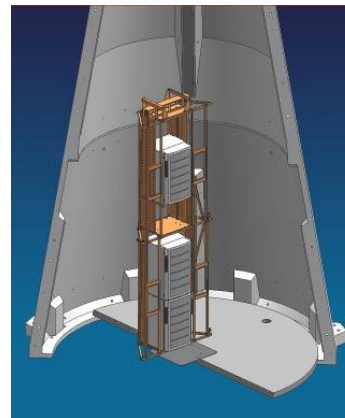
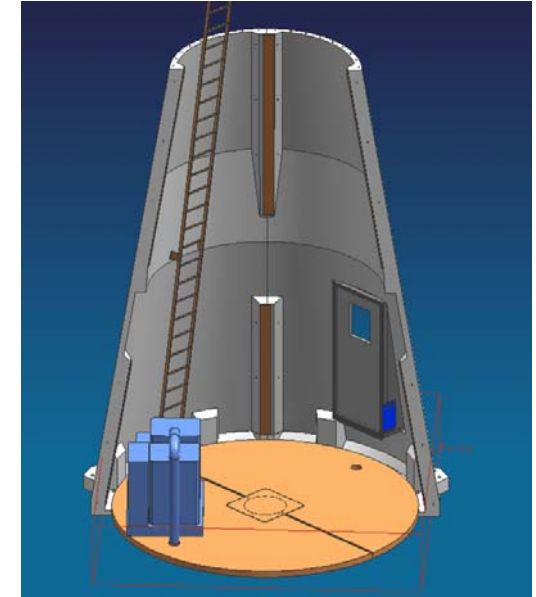
Today



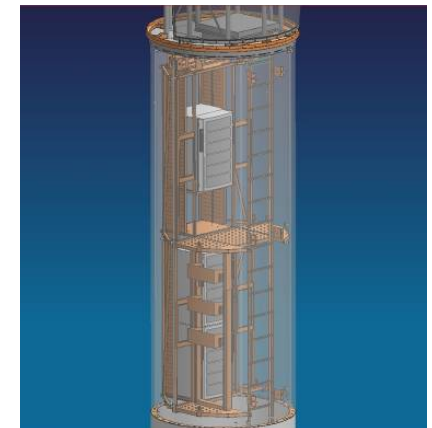
Power Consumption Reduced by 40%

Tower Tube: The All-in-one, ENCAPSULATED SITE

- › All equipment inside
 - › Indoor climate
 - No need for active cooling
- › Small footprint
 - Approx. 5m diameter
- › RBS in the Top
 - Lower feeder loss
 - Positive impact on capacity, coverage and power consumption
- › Prepared for site sharing



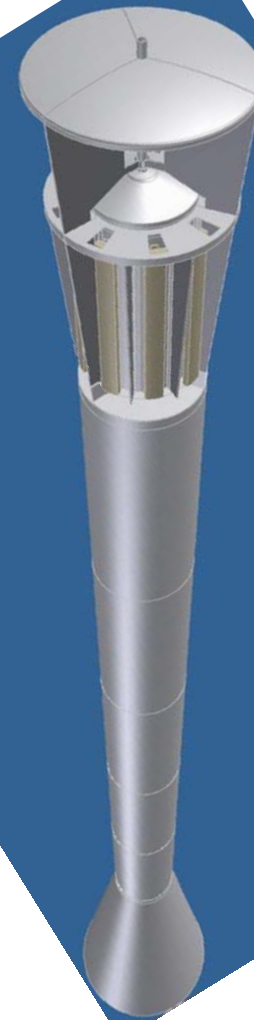
The equipment is installed in the base of the tower...



... and is then lifted to the top with an elevator.

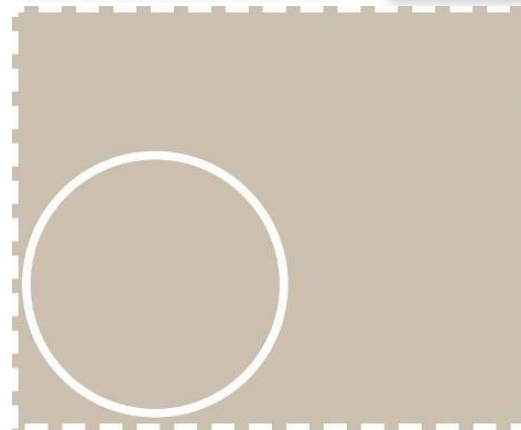
The Design and Construction

- › Flexible antenna structure
 - No Radome
 - Visual Radome
 - Radome with cloth
- › Protection from the weather, wind, dust and lightning
- › 360° radio transparency



Lower TCO

- › All-in-one
 - Fences
 - Shelter
 - Grounding
 - Cooling
 - Feeders
- › Requires a minimum of maintenance
 - No need for security or gardening
- › Prepared for multi vendor site sharing
 - Indoor equipment may be used
- › 60-75% less footprint needed
 - Easier to find site locations
 - Faster revenue back
 - Lower rental costs



Lower Environmental Impact

- › Greatly reduced feeder loss and no need for active cooling
 - A 40% CO₂ emission reduction could be obtained
- › The construction material has lower environmental impact, uses 1/10th of steel compared to traditional sites
- › CO₂ emissions related to material – production and transport – are at least 30% lower
- › Consumes lower amounts of energy – 40% reduction



Tower tubes worldwide

- Sweden, Kista and Uppsala,
- China, Wuhan
- India, Hyderabad
- Saudi, Riyadh...



Blue Battery – Background & Features

Background

- Need to solve Customer problems with poor power grid
- Unique chemical design
- Joint development Ericsson/ Northstar Battery



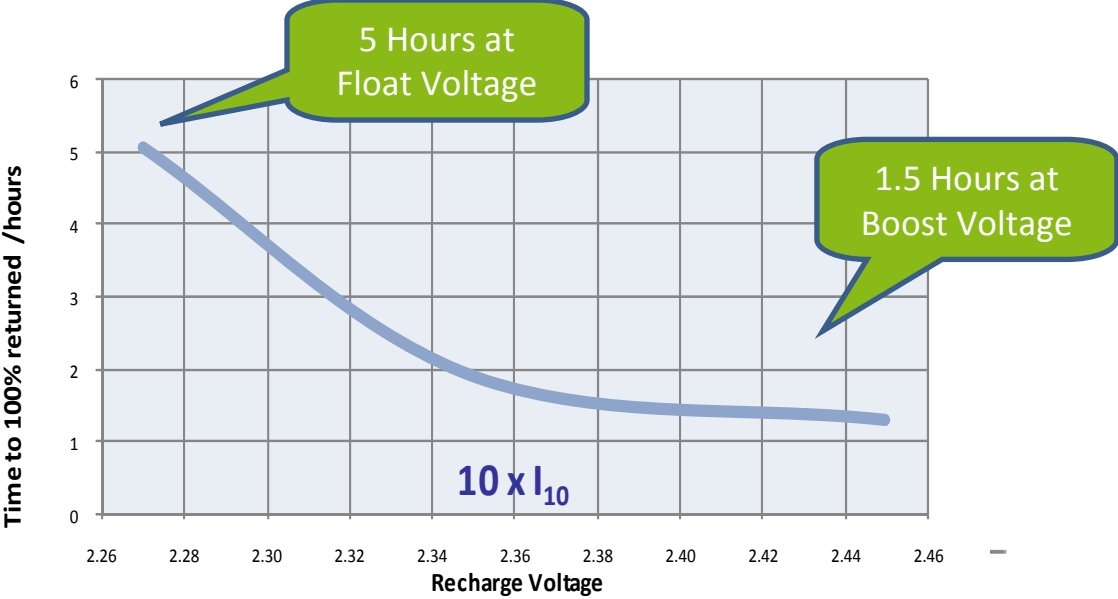
Battery Features

- Advanced Battery Chemistry
 - Increased Charge Acceptance
 - Able to support PSOC cycling
 - Ability to operate in a low SOC for extended periods
 - Designed to achieve a high number of PSOC Cycles

The unique combination of Thin Plate Technology , premium Mechanical construction , premium metallurgy and Electrochemical design offers

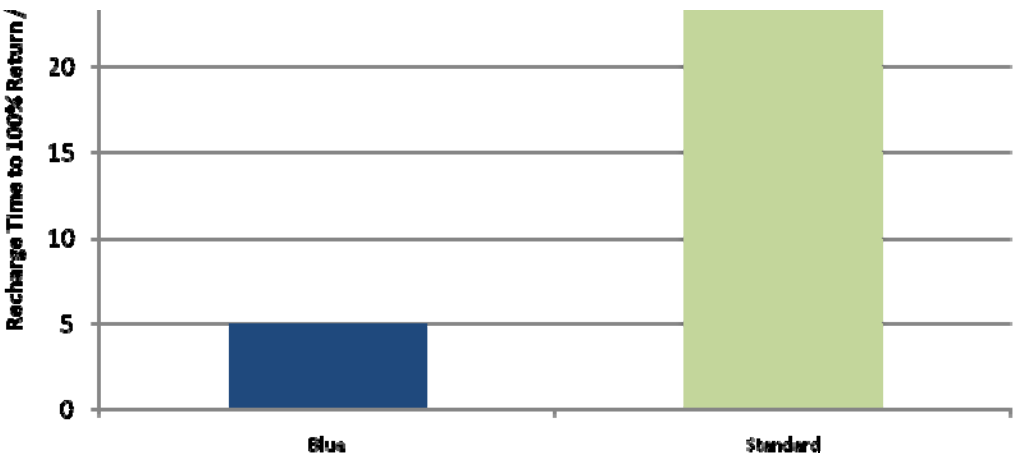
- Higher Temperature Performance
- Longer Float Life
- Higher Cycling Capabilities

Charging Characteristic



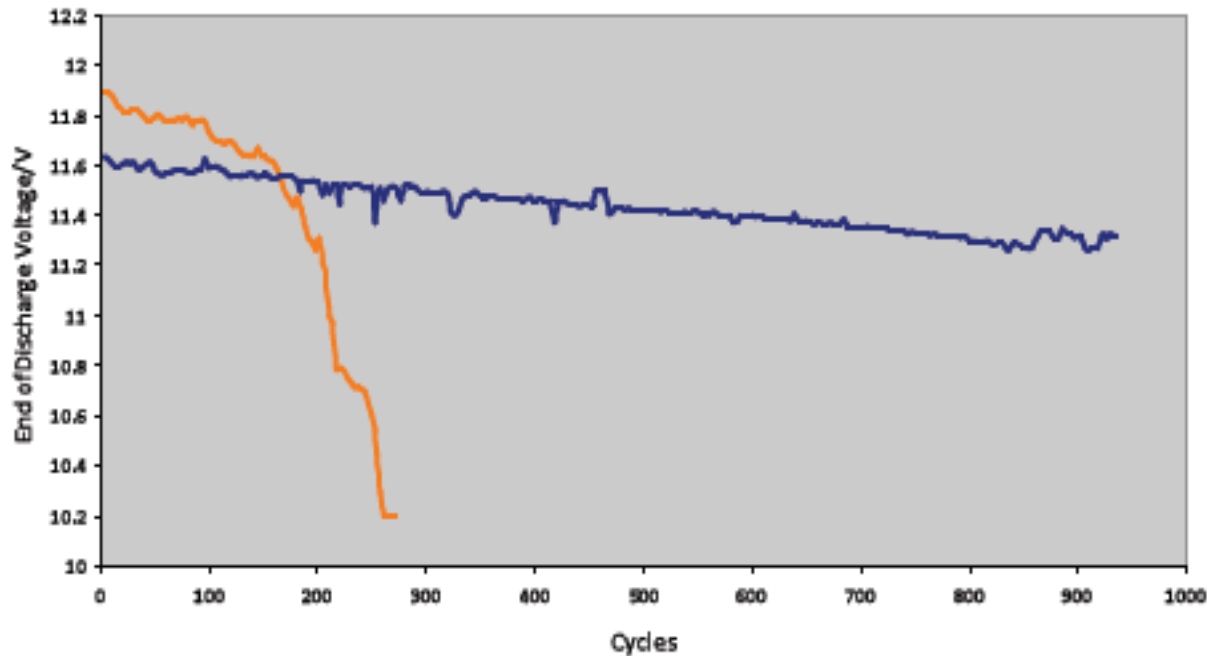
Blue battery technology has a very high charge acceptance. As a result it can recharge quickly and efficiently even at Float voltage.

At Float Voltage NSB Blue can be fully recharged in 5 Hours that is 5 times Faster than standard AGM .



Blue battery Trial Results

South East Asia Case



A standard battery will fail after a couple of hundred cycles where the Blue Battery will continue to work

Trial Results with North Star Standard Battery

Blue battery, with enhanced charge acceptance, can maintain the float-cyclic requirement even at float voltage .
The SE Asia ongoing tests are showing already over 1800 cycles without any failure.



ERICSSON