Sagemcom Energy & Telecom
HMW 2011 Seminar Presentation

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Agenda

Presentation - Sagemcom Energy & Telecom

Adaptation potential to HMW Sustainable Home Design

Smart Metering architecture potential

Field applications of the connected systems
Sagemcom Group vision

Our ambition is to become a leader in high value added communicating terminals

In our 3 core business markets:
energy & telecom, broadband, content management

Terminals to services access
Applications platforms
About Sagemcom - History

1924: Birth of SAGEM

1984: Employee Buyout

2005: Safran Group Merge Sncema + Sagem

2008: Gores Group

2011: The Carlyle Group

Sagem

Sagem Sécurité

Sagem Défense Sécurité

Sagem Mobiles

Sagem Communications

Sagem Communications

Sagemcom
Sagemcom significant WW positions on target markets

**M2M Market**

- WW N° 5 cellular modules – 7% of PDM
- WW N°1 GSM-R devices
- 1st European player having deployed femtocell

**Connected home devices’ Market**

- EUR N°1 for multi-play home gateways
- EUR N°1 & WW N°3 for IP STB

**Energy Market**

- N°1 installed base of energy management systems
- WW 1st to have IP V6 OFDM meters
- EUR n°3 for smart meter – 15% of PDM
- EUR n°4 for electricity meter – 5% of PDM
Sagemcom R&D – Product design focused on clients requirements and customers uses
Sagemcom R&D – Technologies convergence

Sagemcom systems are based on Open & Standard Applications

- OSGi
- Linux
- Android

... supporting and using standard protocols
- IPv4 / IPv6
- DLNA
- UPnP
- 6LoWPAN
- SNMP

... managing any kind of communications interfaces
- USB
- G.hn
- ZigBee
- DECT
- FXS
- PLC
- X2D
- OFDM G3/Prime

To be integrated in any Ecosystems

Femtocell
Home screen
STB
HGW
Meter
Modules
Vehicle
Sensors
Sagemcom Energy Department – The way of smart management

Our vision is to conceive the ways to make smart resources management for utilities, energy retailers and operators

Mission
The Energy Department brings innovative and value added equipments & platforms of energy management.
The smartest technologies to manage resources:
• Metering technologies
  • OFDM – G3 & PRIME
  • DCSK
  • SFSK
  • MUC
• Energy Management Services solutions: energy box and MUC
Sagemcom Energy Department – Snap Shot

Best of end-to-end customized solutions thanks to a global approach and support to clients

Top 10

1. Enel
2. EDF
3. e.on
4. IBERDROLA
5. RWE
6. AFH
7. VATTENFALL
8. edp
9. STEG
10. somaNatural fenosa

Sources: Berg Insight Top 20 Utilities ranking by customers, IMS Research, Sagemcom

- 1.4 M meters delivered in 2009
- 13 M static meters installed base
- Interoperable AMM site in operation
- 10 000 Energy Gateways already deployed
Sagemcom Energy Department – Market share

Best of end-to-end customized solutions thanks to a global approach and support to clients

Energy Dept.
The way of smart management

- The n°1 having an install based of energy management systems
- The n°1 having IP V6 OFDM
- The 3rd Smart meter in EMEA – 15% of PDM
- The 4th electric meter in EMEA – 5% of PDM
Sagemcom Energy Department – Worldwide presence

**Headquarter:**
Rueil-Malmaison

**R&D:**
- France
- Tunisia
- Germany

**Manufacturing:**
- France
- Tunisia
- Germany

**Logistics:**
- Strasbourg
- Lyon
- China
- Philippines
- Hungary

**International presence:**
- Germany
- Marroco
- Hungary
- Tunisia
- Spain
- Dubai
- Brazil
- Senegal
- Colombia
- Madagascar
- Mexico
- Kenya
- China
- Togo
- Vietnam
- Mauritania
- Thailand
- Ghana
- India
- Indonesia
- Australia
Sagemcom Energy Department – Position in the value added chain
Sagemcom actively participates to the most important standardization groups and associations
Agenda

Presentation - Sagemcom Energy & Telecom

Adaptation potential to HMW Sustainable Home Design

Smart Grid architecture potential

Field applications of the connected systems
Energy Department – field application
Commercialization of Smart Grid solutions according to market type

Industrialized countries: Good perspectives in EU market

- SAGEMCOM Commercial ties with energy operators
- Institutional support in EU market for electricity networks of the future (SmartGrids ETP), based on:
  - Smart Metering
  - Multi energies solution ot include micro-power generation

Difficult implementation in Developing countries

- In most cases, public national energy operators, under political influence
- Obsolete electro-mechanical metering technology
- Lower purchasing power and fraud discourages investments in networks
- Necessary adaptation for electricity payment system

> SAGEMCOM shall participate to the ‘smart home’ initiative for a wider reach.
Sagemcom wishes for EU call collaboration

Collaboration with HMW parties in the aim of answering EU call is expected to bring:

- Better knowledge of developing markets’ specificities
- Adapt the existing technology to the local standards
- Lower the costs through adapting functionalities
- Develop from a “smart village” system in order to spread the system costs on more than one households

Market potential is yet to be tapped in developing markets for Sagemcom, and HMW project should be used in this aim.
Smart metering integration advantages for HMW

Project phase

- Allow reliable measure of water, gas and electricity generation through the system
- Permit centralized management of data mining

Post Field application

- Inter-operability with Eskom network (complementary supply and sale of surplus)
- Value the energy creation and consumption, for adequate billing of resources locally created
- Reduces electricity theft (Eskom’s operation khanyisa, valued to R1.3MM)
- Allow automatic dysfunction information for maintenance
Integration of smart metering in HMW framework

Energy, water, environmental efficient communities

- Solar Heater
- Isolation
- Rain water storage
- Gray Water
- Filter
- Black Water
- Organic Waste
- Heat + Cook
- Generator
- Bio-Gas
- Bio-Reactor Anaerobic Digestion
- Solid/Fluid Separator
- Refinery
- Waste Heat
- Syngas
- Bio-char
- Recovered Mine elec Elements
- Alien invasive plants and wood rests
- Green Areas Agriculture
- Terra Preta
- Solid Mixture

Collect data:
- Electricity meter
- Gas sensor
- Water sensor

Centralize data

Transmit data

Analyse data

Integration of smart metering in HMW framework

Electricity meter
Gas sensor
Water sensor

Collect data

Centralize data

Transmit data

Analyse data

Integration of smart metering in HMW framework

Electricity meter
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Adaptation potential to HMW Sustainable Home Design
Smart Grid architecture potential
Field applications of the connected systems
Sagemcom Energy Department – Unbundled market customers approaches in Europe

Enable efficient business processes

Provide real-time information

Open the door for new services

Create consumption awareness

Demand response

In-house display

Home automation

2-way communication

2-way communication

Data management

C&I meter

Smart grid

Electricity smart meter

Energy Box

Energy Gateway

AMM Smart Grid

DNO

RETAILER

Meter operator
Energy Management Systems concept

Make it FASTER
- Real-time multi-energy index collection
- Meter connection / disconnection
- Customer profiling

Make it SMARTER
- Optimized usage of energy at the best price
- Massive load shedding on a large number of customers

Make it EASIER
- Large range of compatible peripherals
- Lighting, personal energy management
- Entertainment, security and healthcare

Make it GREENER
- Real-time measurement of local electricity production
- Remote configuration and survey of installations
- Local production optimization

Make it CONNECTED
- Ability to deal with millions of devices
- Extremely reliable communication
- Configuration and software update of devices
Sagemcom SCAPE – middleware solution

SCAPE is an innovative end to end middleware designed to connect users, service providers with strong benefits for every stakeholder.
Sagemcom SCAPE – End to end solution to manage Data and Services
Sagemcom SCAPE – benefits for utilities & energies operators
Sagemcom SCAPE – Main technical advantages

Developing smart systems and equipments for today and tomorrow

Scalable
- Manage up to 3 million of units
- Collect data from up to 3 millions units as well
- Support residential and professional applications
- Host several application services (OSGI framework)

Secure
- Encrypted exchanges & authentication
- SSL certificates testing and exploitation
- Firmwares and application bundles should be encrypted and secured on a service operator basis

Open
- Modular and open architecture:
  - Linux
  - Java
  - OSGI
- Data collection and technical management data are done using Internet and Telecommunications standards
- Several DMZ areas

Reliable
- Real time management: the most efficient technology is selected at network and radio levels
- IS integration by proposing a single standard interface based on Web services
- Independence regarding the network. IS has no direct connection with the network
Enerscape Webserver: a Taylor-made platform

- **Modular:** Linux / Java / OSGI platform
- **High reliability:** 3 levels of DMZ
- **Real time management:** 2 ways communication to EGW
- **High Scalability:** up to 3 million EGWs
- **Third parties applications:** Parameter & configuration management
- **Security:** Encrypted exchanges & Authentication
- **Proxy to the IS**
- **Firmware management**
- **New services to be implemented at the most efficient place in the system**

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**Home Area Network devices**

**Smart Home Box**

**Software applications**
Energy Gateway – Telecom expertise for data collection

Telecom expertise to manage all data communications’ flows

RF technologies*

Dedicate for electricity, gas or water meters

• Short range RF and mesh technologies:
  • MBUS (EN 13 757-4), 868 MHz
  • Zigbee , 2.4 GHz

• Long range RF: direct access to the meter without repeater technology
  • MBUS (EN 13 757-4) 169 MHz

* Radio frequency technologies
Detailed architecture

Appliances

Sensors

Gateway

Enerscape Webserver

Customer Management System

HAN:
- Wireless M-bus
- Zigbee

WAN:
- GSM/GPRS
- Wifi
- Ethernet

Supervision System
Agenda

Presentation - Sagemcom Energy & Telecom
Adaptation potential to HMW Sustainable Home Design
Smart Grid architecture potential

Field applications of the connected systems

• Applications for Smart Grid
• Applications for home consumption
• Applications for commercial buildings
• Applications for the electric vehicles
Energy Management Systems

Applications for Smart Grid
Energy Management – multi energy management

Multi energy indexes management for retailers

Associated services

- Load profile analysis
- Specific daily price setting based for dynamic electricity management
  - Valley filling
  - Load shifting
- Information from inside our outside temperature
  - Gas consumption
  - Water consumption
  - Electricity consumption
  - Heat consumption
- Shared Gateway for several
- Meters in several flats in a building
Energy Management – Demand / Response Solution (VPPs)

The best local action to optimize grid efficiency and purchasing of energy for utility and retailers

Associated services

- Optimized usage of Energy at the best price
  - Appliances activity is based on tariff information
    - Heater
    - Boiler
    - Freezer
  - Massive load shedding on a large number of customers
    - Peak clipping
  - Pre estimation of power gain
  - Synchronized partial load shedding
  - Effective gain report after action

Sagemcom technicals advantages

- Massive load shedding on a large number of customers
- Using existing local ADSL/GPRS connexion
- Pre estimation of power gain
- Synchronized partial load shedding
- Single or multiple shedding
- Effective gain report after action
- Switch back bounce management
Energy Management – Local Micro Production survey

The best local action to simplify green energy in the building

Associated services

• Measure electricity production in real time
• Configuration and survey of remote installations
• Optimize local production
• Injection of energy in the network at Grid Operator request
Smart Grid – Sensors in LV substation and all over network…
G3 PLC a global communication solution

**MV / LV substation**

- Transfo Monitoring
  - Detection Gas Pressure and Temperature
  - Winding temperature survey
- GPRS
- 3G
- WIMAX
- xDSL
- DGPT

**Data Concentrator**

**MV Feeding control**

- Energy flow control
- Quality measurement (voltage swell and shortages)
- Outage management

**Air cooling control**

**LV Feeder status**

- E-Meter
- Wind production
- Distributed production
- Solar panels
- E-Meter
Energy Management – Automation (VPP)

The best local action to optimize energy consumption behavior

Sagemcom technicals advantages

- 2 way Energy gateway eco-system sensor to monitor power consumption and command breakers
- Regular breakers adapted to the specific load to be commanded
- No wire to be installed through the building
- Using RF connection to existing thermostat (X2D radio protocol)
- Using some specific sensors
- Centralized wiring
- Existing cables
Demand/Response Use Case – « Une Bretagne d’avance » trial

Managing part of the residential consumption during peak hours in order to optimize grid efficiency

Trial held by Edelia with Sagemcom technology

A peculiar energy situation in Brittany:
• Grid architecture
• Unable to warrant the whole need of electricity, growing by 3% every year.
• Deploy in customer premises of Brittany a set of equipments to optimize electrical consumption related to the heating and the boiler systems.

Benefits
• Avoid exploitation of CO2 producing sources
• Postponing of grid investments
• Control from remote without affecting customers’ comfort
Eskom initiative to reduce electricity peak demand

Source: http://www.eskomidm.co.za/residential
Energy Management Systems

Applications for home consumption
Home applications easy implementation
Energy Management Systems – Home consumption management

Home energy consumption management and web services

Local monitoring & management

Remote monitoring & management
Energy Management – Real-time personal consumption

Easy to use solution to control energy consumption

• Meter Address
• Chosen pricing option
• Instant power consumption
• Energy index value for single tariff option
• Low cost energy index value for dual tariff option
• High cost energy index value for dual tariff option
Energy Management – Real-time personal consumption

Connected display to Energy Gateway to control energy consumption and services in real time

Through any display devices

- What is my electricity, gas or water consumption since Monday?
- Are my solar panels efficient? How much did I produce?
- What is my carbon footprint?
- How much will be my electricity bill?
Energy Management – Real-time personal consumption

Compliant all connected screen and mobile devices to improve efficiency

Control when you want anywhere

• Basic screen for applications linked to the energy management
• Upscale screens enabling energy and entertainment applications sharing
• Embedded or stand alone screen
• 3G cellular screen phone
  • Directly on the a 3G network
  • Through a local Femtocell
• TV
• Personal computer
Energy Management Use Case – Poweo Box for B2C

The 1st real offer of Energy Management for B2C based on Sagemcom expertise in Telecom and Energy

10,000 Energy gateways delivered

According demanding requirements and needs:
- Domestic energy consumption data collection
- Consumption information preview
- Billing based on real consumption
- New services of retailer integration capacities

Sagemcom answer
- A complete solution:
  - Equipments
  - Front end server
  - Applications server

Energy Management for B2C
Sagemcom technology inside

Display for real time information
Front-end communication server
Application server
WWW
Meter module
Energy Gateway
868 MHz link
Ethernet
Energy Management Systems

Applications for Commercial Buildings
Energy Management – Smart Building applications
Energy Management – Smart Building use case “Réflexe” Project

Managing energy dynamically would ensure that the energy management system would well tuned

Energy aggregator

Consortium of C&I building needs or production capacities in order to have a one voice deal towards with energy producers and grid operators.

➔ Act as a “Virtual Power Plant “ on the balancing market
Energy Management Systems

Applications for Electrical Vehicle
PLC G3 : the convergence between smart grid and smart car

PLC G3 happens to be the relevant technology for smart car deployments:

• An open standard issued from electricity industry (≠ multimedia)
• A technology already tested and approved
• A cost effective solution: development costs are shared between utilities & car manufacturers
• A solution ready to be tested TODAY in automotive environment

G3 is a synergy opportunity at worldwide level
Communication between charging point and electric vehicle: a key issue

Electric vehicles

Contribution to the overall aim of reducing CO2 emissions

Contribution to eliminating peak loads in the network (storage of energy)

Need for a standardized technology allowing:

- Bidirectional flow vehicle / grid
- Payment for the energy charged by the car
- Compensation for the energy delivered by the car
- Communication for the energy metering
- Definition of the user readiness for charge
Energy Management – Smart Vehicle

Sagemcom Energy Management System – Smart Vehicle Communications Architecture
G3 Application for public lighting control

SI Grid operator

SCAPE M2M Lighting operator

Lighting poles controller connected on distribution network
PLC G3 operate in CENELEC band A
Communication shared with Grid operator

Lighting poles controller connected on separate network
PLC G3 operate in CENELEC band C
OFDM PLC communication, application: Smart Grid and Smart Metering

- Public lighting management
- Status of Local Distributed Production
- Energy flow control
- Transfo status
- Outage management
- Data Concentrator
- Repeater
- HV fault detection
- HV outage management
- EV charging control
- Energy storage
- Smart metering
- WAN connection

Network Diagram:
- Wind turbine
- Solar panels
- Smart grid homes with various energy functions (public lighting, energy flow control, energy storage, EV charging control, HV fault detection, HV outage management, etc.)
BACK UP SLIDES