MAKING THE METERING SMART - A TRANSFORMATION TOWARDS SMART CITIES
1. Introduction – The way towards Smart Cities
   › Smart Metering as a part of a Smart City
   › Traditional Grids & Smart Grid Management
   › Making the utilities smart
   › Current focus on metering and communications
   › Smart Grids – Applying Internet Concepts

2. Smart Metering Service
   › What are your meters going to be used for?
   › What are your communication needs?
   › Architecture
   › Technology overview

3. Smart metering – Players & Challenges

4. Smart Meter Management - Reference cases

5. Conclusion
INTRODUCTION – THE WAY TOWARDS SMART CITIES
SMART METERING AS A PART OF A SMART CITY

Grid Management

Access

Smart Homes

Network Infrastructure

› Critical multiservice communication networks
› Network management, security & service assurance
› Critical Infrastructure Protection
› Field Force Management and Crisis Communication

› Wireline & wireless access networks
› Public & private access networks
› Infrastructure for Smart Metering, electrical appliance management

› Customer Lifecycle Management
› End-to-end Smart Metering solutions
› Connected Home & Home Energy Management
› Revenue Management & Assurance Solutions
A Smart Grid is an electricity network that can intelligently integrate the actions of all users connected to it – generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies.

Source: European Smart Grid Technology Platform
www.smartgrid.eu
MAKING THE UTILITIES SMART
AN UTILITY INDUSTRY TRANSFORMATION HAS ALREADY BEGUN

Traditional utilities
Very little use of ICT in operations and grid

Smart operations
Increased Efficiency
- Field force automation
- Multiple-tariff billing, centralized pre-payment
- Integrated SCADA, Distribution Network Automation (DNA)

Smart grid
Introduction of new “internet-like” electricity system concepts
- Micro-grids
- Virtual Power Plants
- Self-healing and flexible
- Consumer as active market participants

Drivers: OPEX pressure and regulatory fulfilment
Drivers: Transmission and distribution bottleneck, distributed generation/renewables, reliability & transparency requirements

Today -2015
2015 - 2030

Manual metering
No communication or one-way communicating meters

Smart metering
Two-way communicating meters

Advanced meter infrastructure (AMI)
Two-way communicating meters as part of an integrated grid communication and data network

SMART METERING IS THE CATALYST OF THE INDUSTRY TRANSFORMATION
### Current Focus: Metering and Communications

#### Generation
- Energy Market Management
- Regulatory requirements

#### Transmission
- Electricity transport
- Customer & revenue management
- Regulatory requirements

#### Distribution
- Electricity distribution
- Customer & revenue management
- Regulatory requirements

#### Consumer
- Customer management
- Revenue management

### Business Layer
- Generation
- Asset Management

### Analysis / Asset Management & Planning
- (Virtual) Plant Operations
- Infrastructure Protection

### Control / Operations Layer
- Local Area Networks
- In-building Cellular

### Comms Layer
- Device Connectivity
- Access Networks
- Backhaul Networks

### Devices Layer
- Device & Smart Meter Connectivity
- Access Networks
- Metro Backbones
- Neighbourhood Area Networks

### Corporate Layer
- Home Area Network
- Electrical Appliance Connectivity

### Current Focus
- Metering and communications

### Garden Focus
- Generation
- Transmission
- Distribution
- Consumer
SMART GRIDS
APPLYING INTERNET CONCEPTS

[Diagram with various components including micro-grids, virtual power plants, communication networks, transmission, grid-friendly consumption, micro-generation, and smart metering.]
SMART METERING SERVICE
**Meter Use Cases**

**What are your meters going to be used for?**

**Demand Side Management**
- real-time consumption monitoring
- Load profiling
- Load shedding
- ToU, CPP tariffs

**Revenue Management**
- collect billing data
- pre-payment
- remote disconnect
- demand limitation
- cost calculation

**Value Added Service**
- consumption analysis
- home energy management
- „infotainment“
- ...

**Network Maintenance Unit**
- outage detection
- quality of service documentation
- „smart grid sensor“ (SCADA device)
- alarming

**Consumer device**
- Home Area Network
- communicate with IHD, TV Set-top box, PC, mobile

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SMART METERING COMMUNICATIONS
WHAT ARE YOUR COMMUNICATION NEEDS?

› Meter Data Record Collection
  Billing: within days?
  Pre-payment: within minutes?

› Remote Connect / Disconnect
  Revenue Mgmt: within minutes?
  Load shedding: within seconds?

› Consumer Feedback
  Information: within seconds?
  Education: within days?

› Remote Appliance Management
  Demand Side Mgmt: within minutes?
  Home Energy Mgmt: within seconds?

› Quality of Service Measurement
  Outage detection: within minutes?
  QoS Documentation: within days?
Applications for Utilities
- Meter reading and billing
- Tariff mgmt
- Demand management
- Remote connect/disconnect
- Value-add services (alarms, home ctrl)
SMART METERING
TECHNOLOGY OVERVIEW

Network Mgmt
Distribution Mgmt System
Geographical Info System

Customer Relationship Mgmt
Customer Information Sys
Value Added Services
Charging & Billing

Data Center

Meter Data Management
• Meter data validation and cleansing
• Data processing for business process support

Automatic Meter Management
• Meter device management
• Meter data collection

Data transfer

GPRS
HSPA/LTE
WIMAX, Zigbee
...
PLC
DSL
Fiber
...

Data acquisition

End-to-end Smart Metering
solution & system design

Implementation and System
Integration

End-to-end Service Management

Roll-Out Management

Solution Lifecycle
Management

SLA-based Managed
Operation
• Meter management,
• Communication infrastructure
• Metering Data Center
SMART METERING
PLAYERS & CHALLENGES
SMART METERING
THE PLAYERS & CHALLENGES

› Governments/EU
  – *Typically deciding policy on how smart metering/grid infrastructure should be rolled out*
  – *Typically aim to maximise overall benefit to society*

› Energy Regulators
  – *Typically Implementing govt policy on smart metering/grid infrastructure*
  – *Typically look to ensure most cost effective and efficient implementation*

› Communication regulators
  – *Typically looking at spectrum & communication aspects of smart metering/grid infrastructure*

› Utilities
  – *Electricity, Water & Gas*
  – *Being directed to implement smart metering*
  – *Get regulated rate of return on CAPEX*

› Communications Services Providers (RAN, WAN, Fibre ..)
  – *Looking to see how they can maximise their opportunity to provide comms*
  – *E.g. looking to avoid new network builds that are not necessary*

› Standards bodies, vendors & associations
  – *Typically trying to establish best solutions, economies of scale and best competitive positions in market for their preferred technologies*
SMART METER MANAGEMENT
ERICSSON REFERENCE CASES

 › Hydro Quebec, Canada
  - Smart Metering / MDM
  - Designed for 4 Million Smart Meters
  - Prime Integrator role
  - Partnership with EnergyICT

 › Acea, Italy
  - Smart Metering / AMM
  - 1.6 Million smart electricity meters
  - Partnership with Landis & Gyr
  - 10 years managed service contract

 › Federutility, Italy
  - Smart Metering / AMM
  - 140.000 smart el. meters
  - Partnership Landis & Gyr
  - 5 years hosted service contract, 8 DSOs

 › Energy Australia
  - Design & deployment of private 4G network for Smart Grid & Field Force Communications
  - Smart Village Project

 › Endesa, Spain
  - Managed nationwide telecom infrastructure
  - Smart Grid / Smart City Malaga: Substation connectivity

 › Stockholm Royal Seaport
  - Smart Grid / Smart City Pilot
  - Part of R&D Consortia, comms infrastructure, Electric Vehicles
  - Partnership with Fortum, ABB

 › GAD & ADDRESS Projects
  - Demand Side Management
  - Integration of renewable, distributed energy generation
  - Large R&D consortias
  - Leading comms infrastructure workgroups
SMART METERING SERVICE
REFERENCE CASES

› **Customer Objective**
  › Conform with legislation
  › Integrate collection and management of metering data
  › Implement smart grid operation strategies

› **Customer Benefits**
  › Revenue protection & Reduced opex
  › Increased customer satisfaction
  › Operational efficiencies

**Ericsson Solution**
› Complete Advanced Metering Management service for 1.6 Mio electricity meters
› Customized Metering Middleware Systems Integration & Managed Services

**10-years Managed Service contract**
Federutility, Italy
- Design implementation and operation of Smart Metering data center
- Hosting of Smart Metering Solution for initially 8 small Distribution System Operator
- Initially 120.000 meter

Hydro Quebec, Canada
- Meter Data Management System (MDMS) implementation
- Designed for 4 Million Smart Meters
- Prime Integrator role
- Partnership with EnergyICT
CONCLUSION

› Smart cities **improve** the **quality of life** of its citizens while contributing to **environmental sustainability**

› Smart Metering is a **critical component** and framework **in establishing** a Smart City based on grid technology

› Ericsson helps **explore communication** solutions as **key enablers** of Smart Grids and Smart Metering

› Ericsson **references and experience** in various **utility** segments to leverage on