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Views on Smart Meters : End Use Perspective

CAT-iq Developers Conference

Sept 20, 2011- Eindhoven

Topics

1. eMeter Background

2. Smart Grid roadmap

3. Consumers, the “last mile”

4. SEDC- Smart Energy Demand Coalition

eMeter Background

eMeter Executive Summary

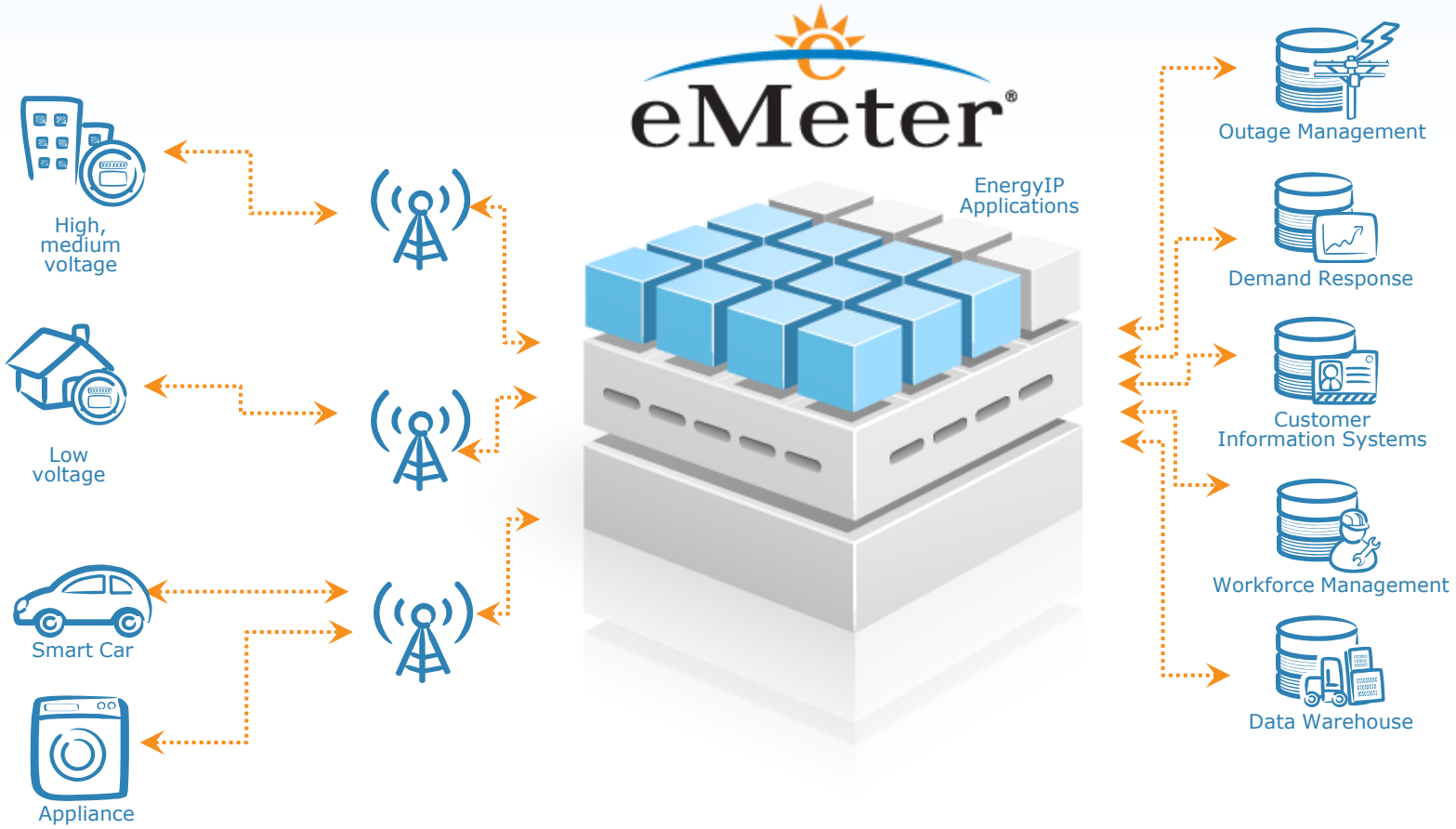
Smart Metering Experience – 25 Years
- eMeter founded in 1999 in San Mateo, CA
- Core Mgmt team 20+ yrs Utility experience
- 100% dedicated to Smart Grid software solutions

eMeter HQ San Mateo, CA

Smart Grid Software
- eMeter EnergyIP™
  - Platform designed from scratch for mass market Smart Grid/AMI
  - MDM is application that runs on the platform
- eMeter Energy Engage™
  - Award winning consumer portal

Global Customer Base
- 25 implementations worldwide
- Over 20M meter points

EnergyIP Platform



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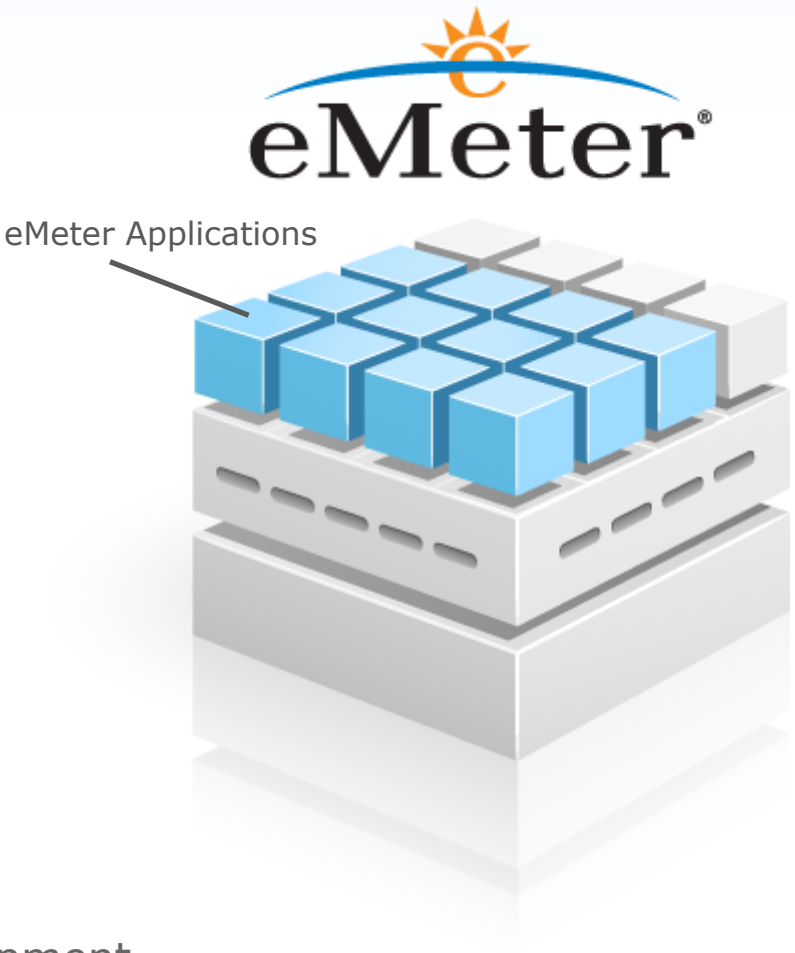
eMeter Applications

Available Applications

- Network Loss Management
- Revenue Protection
- Outage Event Management
- TOU Rate Support
- Provisioning
- Interval & Register Billing
- Customer Portal: Energy Engage™
- Connect / Disconnect
- Feed-In Tariff



Future Applications

- Prepayment
- Demand Response
- eCurtailment
- Open APIs for 3rd party development

Customers in production, at scale around the world.

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eMeter is partnered for success.

Enterprise Applications

ORACLE
SAP
INTERGRAPH
IBM

Managed Services

SIEMENS
verizon
CONVERGYS
Outthinking Outdoing

Hardware & AMI

SENSUS METERING SYSTEMS
ECHELON
Trilliant NETWORKS
SILVERSPRING NETWORKS
Landis+Gyr
Itron
Smart Synch
ACLARA
elster
eka systems
Tantalus
EDMI

Leading Integrators

IBM
enspiria SOLUTIONS
HCL
SIEMENS
UISOL
accenture
WIPRO Applying Thought
CSC

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Smart Grid roadmap: Why, When, How?

Why: Market Drivers- Mandates & Benefits

- Targets: 20/20/20 EU and more strict ones such 50% UK CO2 reductions by 2025
Means: EU CO2, UK Carbon Floor Price- GBP 16 per ton in 2013 to GBP 30 in 2020

- Country specifics: Denmark aims to achieve independence of fossil fuels, Germany and the nuclear phase out

- Smart Meters roll out deadlines ((EU, UK, Spain, Sweden, etc) and technical specifications

- Operational benefits (ENEL and Energy Center Point, 400 tructs rolls
  - Reduce manual meter reading costs, remote connnect/disconnect, bill to pay time, call center costs

- Time of Use/dynamic rate support
  - Shifting Peak Load + Demand Reduction

- Customer information and reduction of peak demand
  - Conservation, energy efficiency

- Line loss
  - Theft, technical loss

- Reliability and better use of existing assets
  - Outage, voltage management

- Renewables/distributed generation
  - PV Solar, electric vehicles

- Utilities return
  - Different business cases

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eMeter Customer case studies

Revenue protection, TOU rates, advanced services

- *First mandatory large-scale residential TOU program*
- *Installing transformer meters, implementing feed in tariffs*
- *680K meters, daily register reads, 60 min. interval data*

Network loss analysis, reliability

- *Monitoring and measurement of daily network loss*
- *First time actual loss data available*
- *Voltage monitoring and alarming*
- *400K meters, hourly interval data*

Scalability, interoperability

- *Processing daily register reads and 60 min interval data for 3M meters*
- *TOU Billing determinants for >1.8m customers*
- *Multi-Org, multi-tenant system for 85 LDCs, multiple metering systems & CIS systems*

Reliability, new services

- *Electric, Water*
- *Real time outage event management via Energy IP*

Customer engagement

700K meters, EnergyIP & E. Engage rolled out before smart meters

Customer engagement

- *Consumption data*

in Energy Engage phase 1

Operational efficiency, new services

- *Daily mass market settlement for competitive retail markets*
- *>800K meters so far, processing daily register reads and 15 minute interval data*
- *Remote connect/disconnect has avoided >400k truck rolls*
- *eCurtailment application*

When?

- Mandates deadline (SM, EE, CO2, Renewables & EV)
- Willingness to move forward: Money & Clear Return
- Regulatory support, clear message and incentives: Certainty
- Country specific and utility specific
- There are benefits coming from SG. Basque Country SG project, ONE MORE DRIVER: to make Basque Companies around SG competitive internationally
- SG is in constant development ongoing with different stakeholders involved
- Short Pilot with clear objectives, test multi- stakeholders integration, and GO
- Advise to start earlier to gain competitive advantage

HOWEVER…..the most important it is not *when but how*

How ? Requirements for successful a SG– how to avoid risk:

- Scalability (watch number, diversity, scope and future)
- Flexibility to add future needs and thirds parties applications at the consumers premises.
- Start with educating the parts involved on the benefits and how to achieve them
- Consumers are the last mile of SG
- Avoid locking
- Standards, Interoperability and openness

Consumers, the “last mile”

DR & Peak Load Control = Last Mile of SG

- Where the balance between supply and demand gets optimized across the power grid

- Enables: real-time management of energy generation, distribution, usage, and efficiency.

- Comprise: devices, systems, and processes where utilities and consumers come together..

How to get there?

The How

1. Widespread smart meter deployment (that support SG)

• Measuring interval data at least as often as market operator settlements occur (typically half-hourly or hourly).

• Tracking how wholesale electricity prices change in response to demand.

• Tracking the amount of electricity supply available to meet demand.

2. Show immediate consumer benefits from smart meters

No gap between SM installation and consumer seeing direct benefits.

If the smart meter "just sits there" for a while before it really does anything that the consumer would notice, it'll be harder to engage the consumer's interest.

The How

3. Connections to the home

- Devices need to communicate directly with the SM (s. thermostats, s. appliances and IHD, show real time data)
- SM interface with on premises network (PLC or standards-based wireless). CAT-iq / Zigbee (Texas Lab)
- SM communicate with devices either directly or through a gateway — or potentially both.

4.Dynamic prices that support dynamic demand

Consumers should be able to sign up for automated demand response programs and control systems, that allows them to receive price signals to which they can respond by modifying their energy use- PowerCents DC

POWERCENTS DC- Price Pilot

Smart Grid pilot

- About 1,000 residential customers throughout District of Columbia

Integrated "Smart" approach

- "Smart," dynamic prices
- Energy information feedback: with bills, in home, online
- Smart appliances: automated control via smart thermostats

Consumers had ability to manage their energy costs

- By shifting use from peak
- By reducing total electricity use

- Customers reduced peak demand
  - Average of 13% and Low income customers by average of 11%
- Success requires three consumer elements
  - Energy information feedback
  - Choice of pricing plans
  - Smart thermostats or appliances for convenient response
- Consumers want-like these options
  - Very high customers satisfaction rates
  - 93% preferred the new program to the past

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Texas

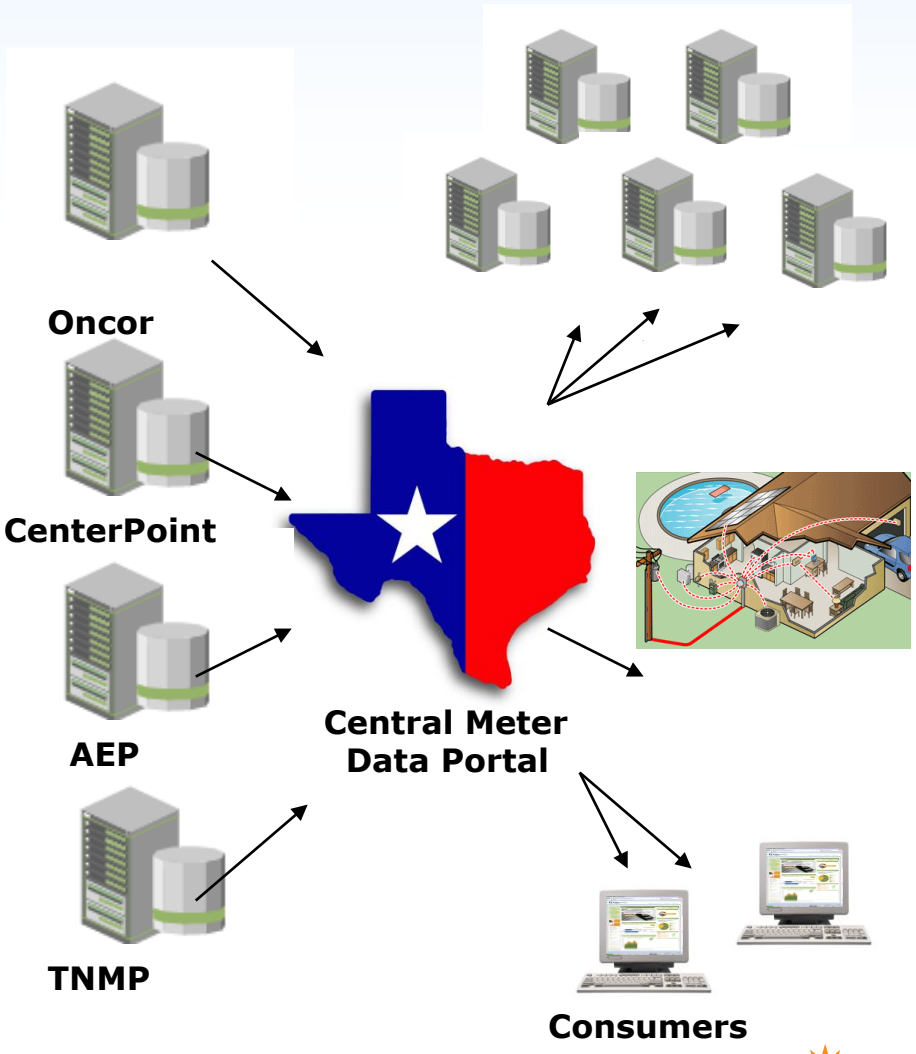
7 million smart meters by end 2013, started in 2010

Demand response

- Energy usage feedback
- Automated appliance control
- Dynamic pricing

…enabled by

- Meter to premise interface
- Smart Meter Texas
- Offered by retailers
  - Optional TOU
  - Smart thermostats
  - Zigbee Lab



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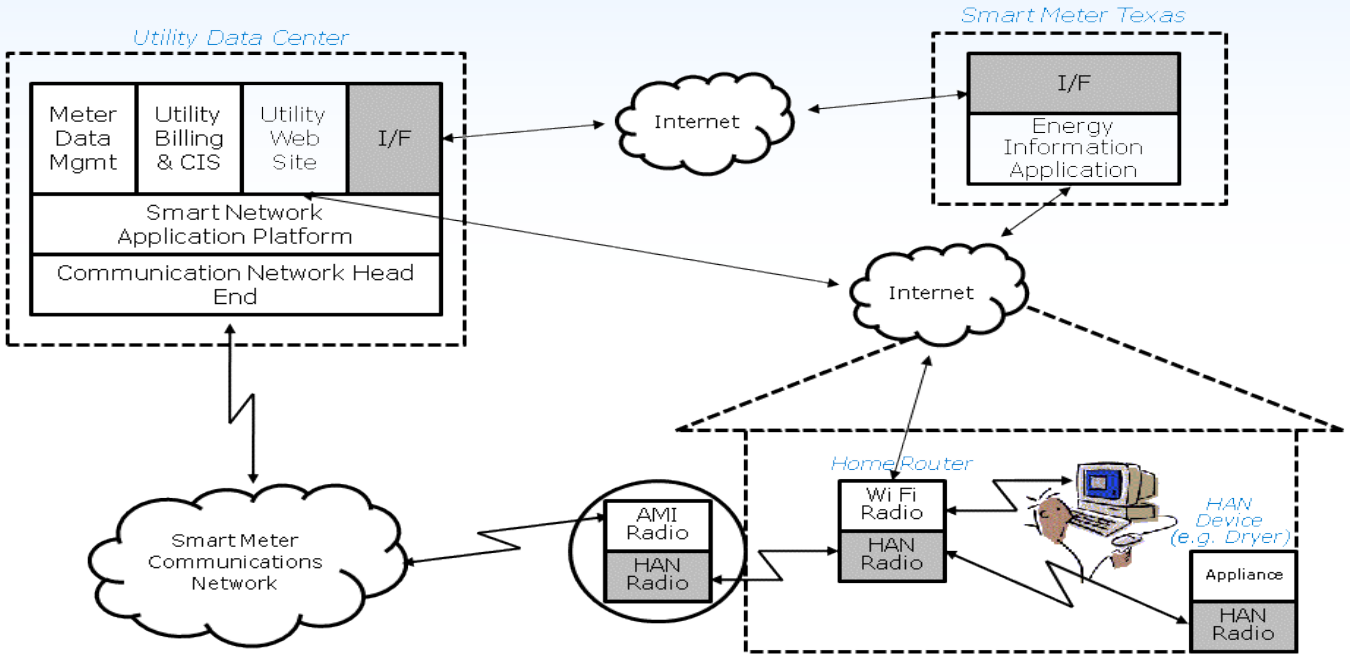
Texas - *Data interfaces, incl. HAN interface to a gateway*



SM interact with HAN devices in a customer's premises. HAN's interface in the meters is a ZigBee radio with capability of communicating with multiple devices in the home, (min. 5). The communications may be directly between the SM and smart appliances or through a gateway, or potentially both. The figure also shows delivery of usage data to the consumer via the Smart Meter Texas portal gateway

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SEDC- Smart Energy Demand Coalition

The SEDC is an industry group representing the requirements of programs involving Smart Energy Demand in order to enable the further development of the Smart Grid and to ensure improved end-consumers benefits

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SEDC today and next steps

- SEDC short report for Energy Commissioner Cabinet on Tech & Regulatory barriers and further actions. Presentation to ACER tomorrow (Agency or Energy Regulators)
- Bring awareness that DR benefits the whole "system efficiency" and different stakeholders
- Smart metering systems that support tariffs and DR programs, and open gateways.
- The creation of a wholesale market structure (capacity market) where energy savings can be sold reflecting real market values.
- Ongoing work, members meeting last week in Brussels
- 3rd of October WORKSHOP in Amsterdam at the Metering in Europe

Thank you

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