What is a HAN and how does it work?

David Egan, Ember
for SMIP HAN Workshop
19th November 2010

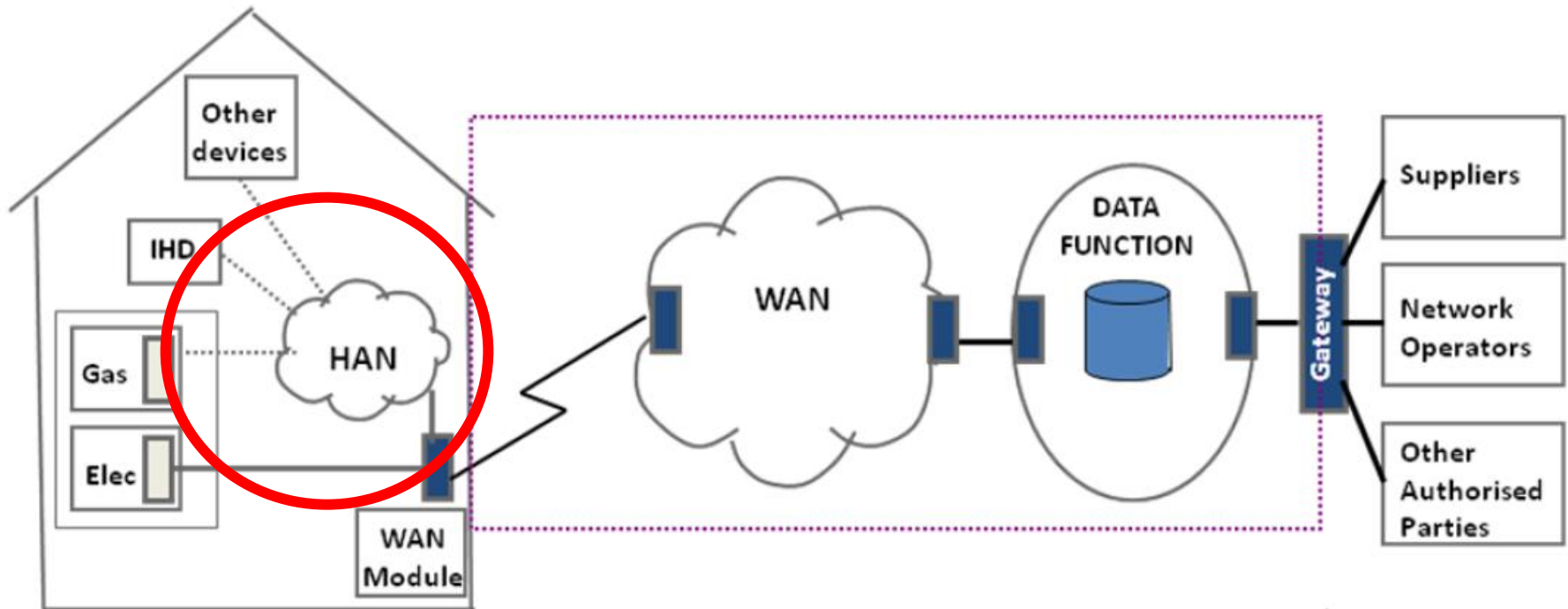# What is the purpose of a Home Area Network?

ember

- Part of the Smart Metering System

- Home Area Networks enable;

  - communication between smart meters in customer premises, and from meters to smart metering hub/gateway;

  - communication of real-time information from smart meters to an in-home display; and

  - other devices to link to the metering system

    - Microgeneration

    - Load control.

HAN and Smart Grid

ember

"The HAN is where the rubber hits the road in terms of enabling Smart Grid applications for the consumer. It allows multiple devices to cooperate with each other to fulfil complex functionality such as whole house energy management. In addition, it can provide a means to deliver utility prices to home devices so they use energy when it is least expensive".

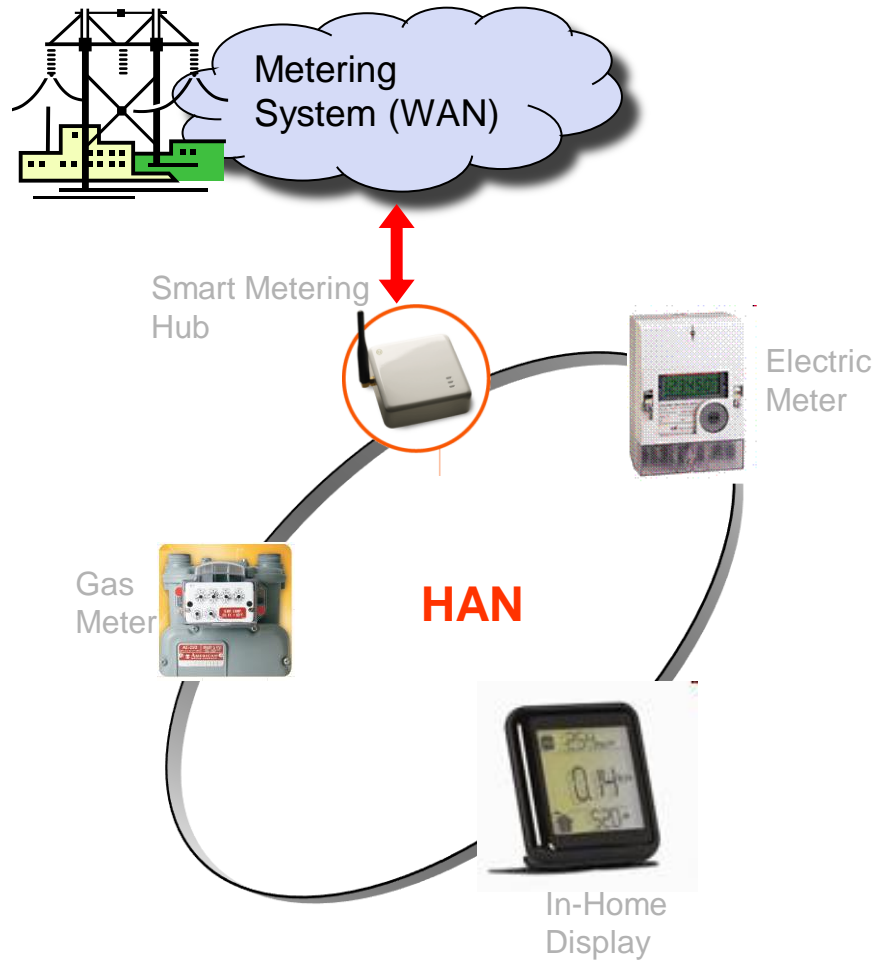(SmartGridNews, May 6, 2008)

Where does the HAN fit?

ember

HAN connects devices in the home or business to the smart metering system

(Smart Metering Implementation Programme: Prospectus, Ofgem/DECC, 2010, p25)

The Basic HAN

ember

- Smart Metering Hub / Gateway
  - Connects HAN to WAN/Metering System
- Electric Meter
- Gas Meter
- In-Home Display

Metering System (WAN)

Smart Metering Hub

Electric Meter
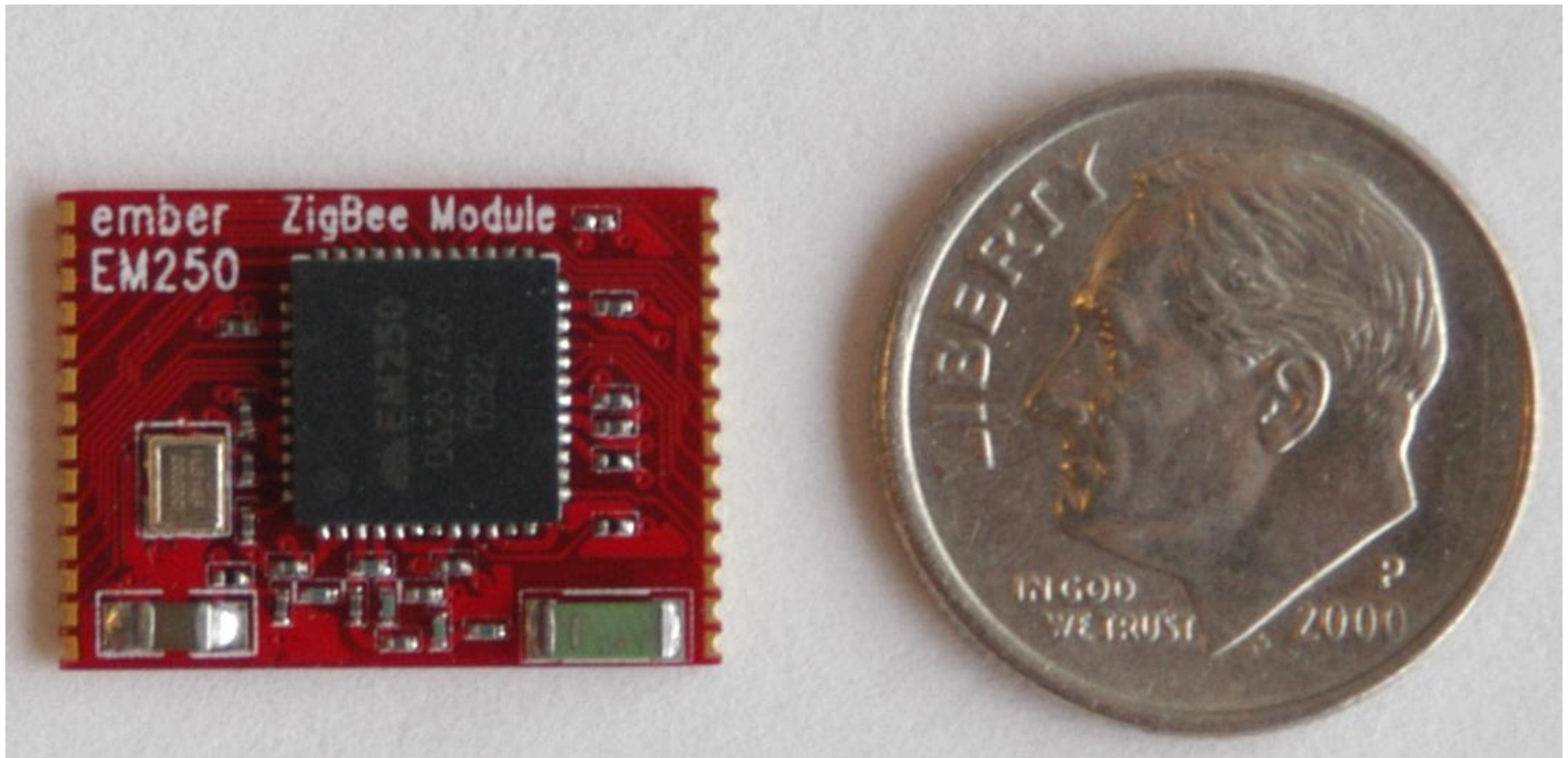
Gas Meter

HAN

In-Home Display

What makes up a HAN?

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1. Wired or wireless technology to provide medium for communications

2. Networking protocols to ensure robustness of communications

3. Security mechanisms to protect consumer data and protect the metering system

4. Application protocols to ensure interoperability of networked devices

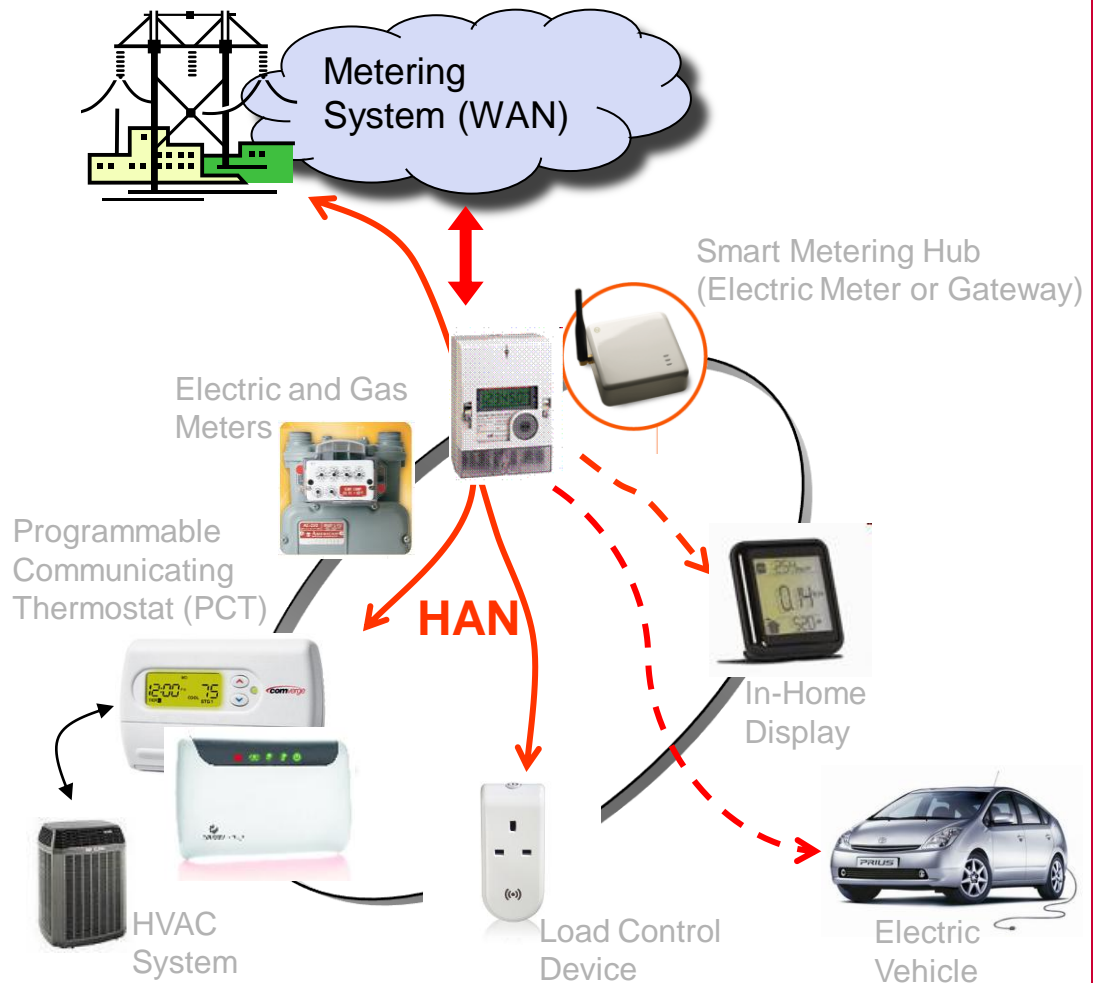5. Gateway(s) to smart metering WAN(s)

Wireless HAN Technology

ember

HAN Expansion

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- Real-time data to In-Home Display
- Meter usage data to WAN
- Demand response/ load control
- Microgeneration
- Electric Vehicles

Metering System (WAN)

Smart Metering Hub (Electric Meter or Gateway)

Electric and Gas Meters

Programmable Communicating Thermostat (PCT)

HAN

In-Home Display

HVAC System

Load Control Device

Electric Vehicle
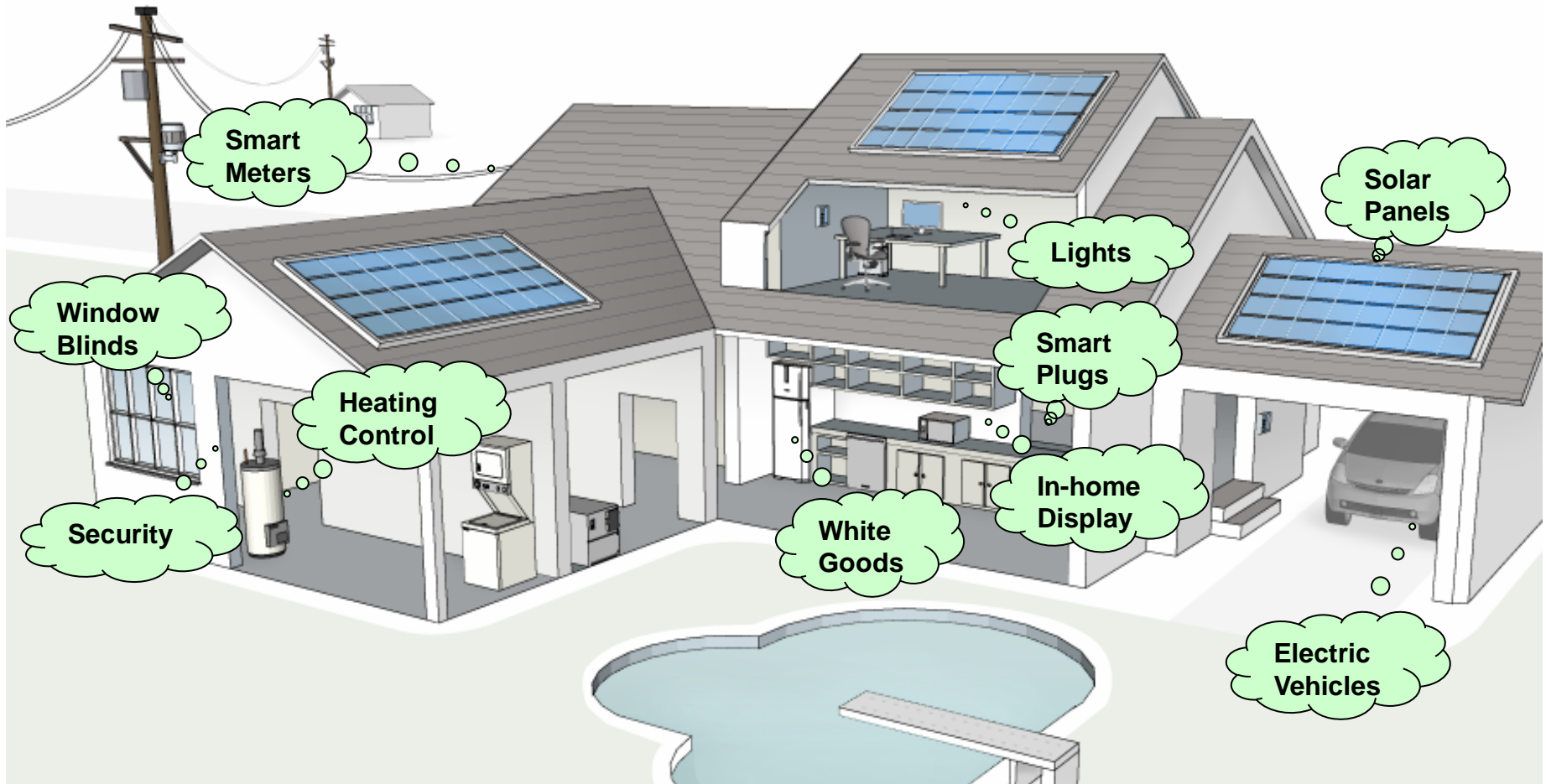
Data requirements for HAN

ember

(from Statement of Design Requirements)

- Time of use tariffs
- Load management / demand side management (incl. smart appliances)
- Switch from credit to prepay
- Communicate with measurement device within microgenerator
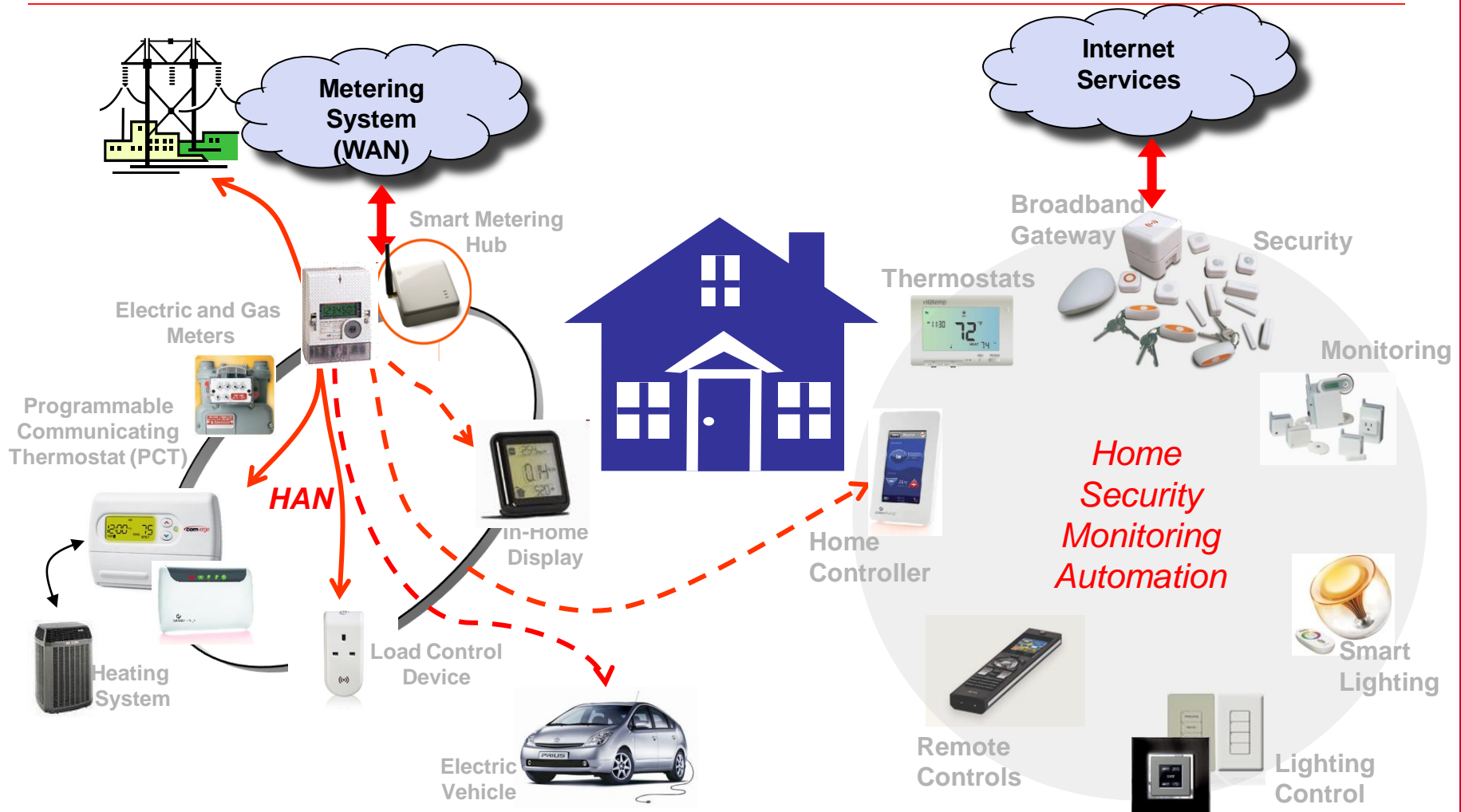
All implemented in application protocols

The Smart Home Vision

Smart Meters

Solar Panels

Lights

Window Blinds

Smart Plugs

Heating Control

In-home Display

Security

White Goods

Electric Vehicles

The HAN and Smart Homes

ember

Metering System (WAN)

Internet Services

Smart Metering Hub

Broadband Gateway

Security

Thermostats

Monitoring

Electric and Gas Meters

Programmable Communicating Thermostat (PCT)

HAN

Home Security Monitoring Automation

In-Home Display

Home Controller

Smart Lighting

Heating System

Load Control Device

Electric Vehicle

Remote Controls

Lighting Control

Broad HAN Requirements

ember

- Open Standards-based protocols
  - Interoperability, competition, multiple vendors
- Robust networking
- Security
  - Protect consumer data and metering system
- Commissioning
  - Ease of installation for supplier or DIY
- Future expansion to new services
  - Upgradability in the field, Market attractiveness

HAN Architecture questions

ember

(Independent of technology choice)

- Who owns the HAN?
  - Consumer, Energy Supplier, DCC?
  - Who authorises devices on the HAN?
- Is there one HAN or more than one HAN
  - Consumer network vs Smart Metering System
  - Smart Metering services vs Other services
- How secure to make the HAN
  - Ease of use/installation vs security

Breakout Session: HAN Basics

ember

- 14:00-15:00: Q&A Session
- Explore how HANs work
  - Security, Commissioning, messaging
  - Meters, displays, other devices
  - Demand response, microgeneration
  - Wireless networks
  - UK requirements

ember

End.

Comments, Questions?