Energy@home

Open Eco-systems for Smart M2M Applications @ Home

E*xperiences and Future Developments of the JEMMA project*

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M2M Forum

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Smart Grid & Home Automation Trends

The Smart Grid

- Growing shares of **RES** to be exploited
- (more) **dynamic** market conditions
- Emergence of new **business models and contract frameworks** across EU
- Stimulating and exploiting **flexibility of user's loads** is becoming a must!

Home Automation

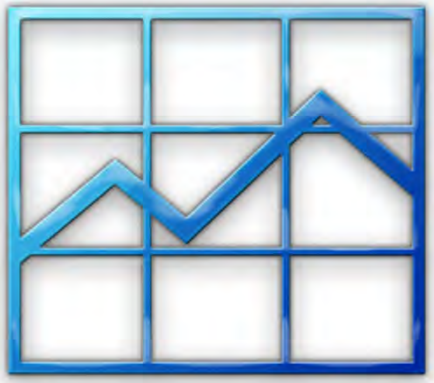
- Growing number of **heterogeneous connected devices** at home (smart appliances, sensors, HA devices etc.)
- **Standards fragmentation** in the HA domain (slowly) reducing
- Tapping flexibility without hindering comfort requires **deep knowledge** about **devices behavior** and …
- **…** personalized **interaction** with users by means of "friendly" interfaces accessed through his/her own devices

Customer Energy Management System * (CEMS)

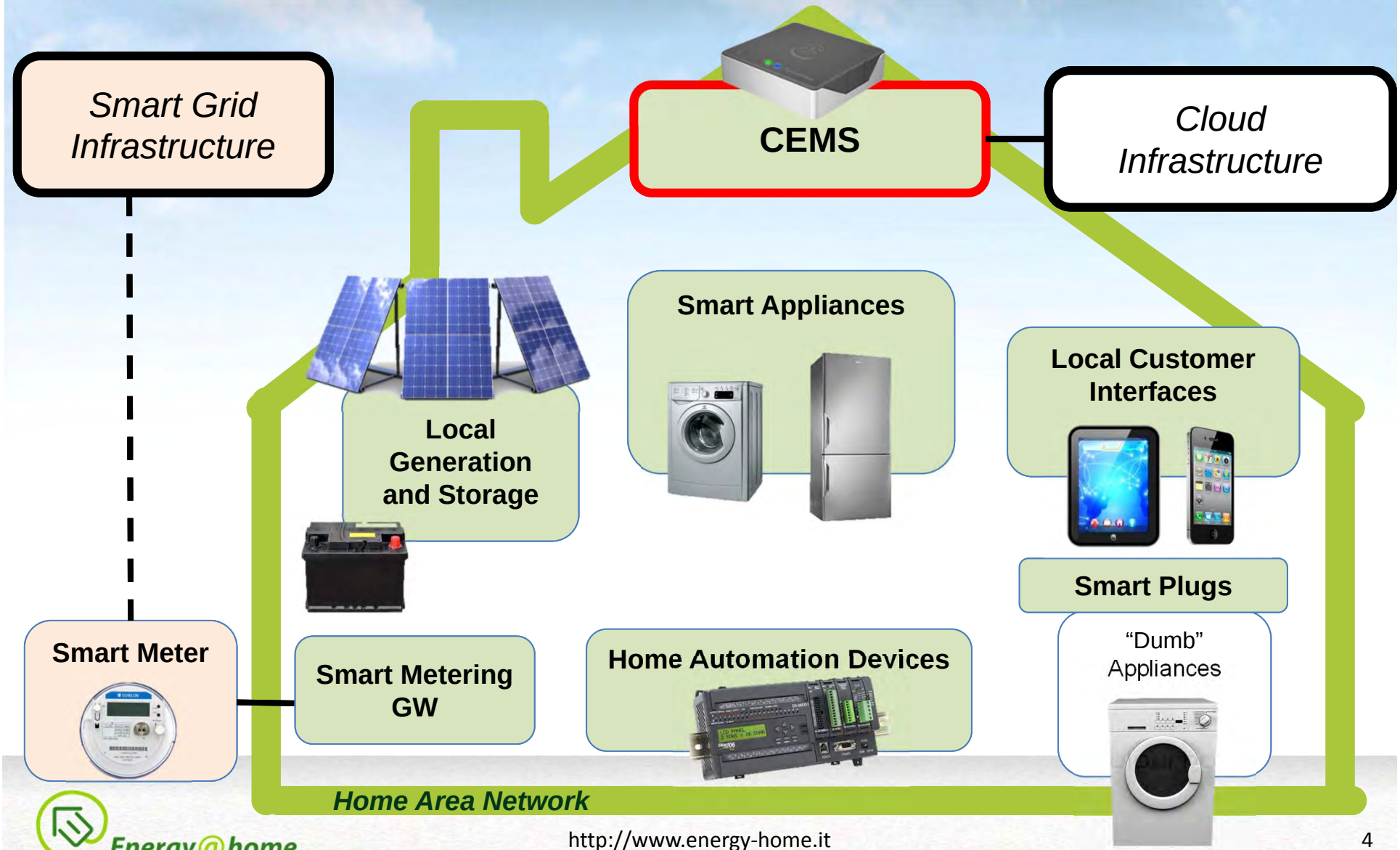
* *CEN-CENELEC-ETSI Smart Grid Coordination Group – Sustainable Processes*

Customer Energy Management System (**CEMS**)

- The CEMS is **a functional component** enabling optimization of **energy consumption** and **production** in home environment
- How does it work ?
  - it **interacts** with **connected devices** and **users,**
  - it knows about **consumer's settings** and **contracts**,
  - It receives **grid signals.**
- Typical interactions with devices:
  - collection of **consumption** information,
  - collection of **load profiles,**
  - **scheduling,**
  - **direct control,**
  - **device configuration** (e.g. of thresholds, etc.).



Home Automation & Energy Reference Architecture



Main challenges for CEMS

- **Modularity**:
  - CEMS are deployed in a wide number of **different configurations** to provide energy-related services in a multi-service environment, possibly requiring to comply with specific local/national requirements
- **Interoperability** with:
  - **standard** user device technologies in the HAN,
  - pre-existing **consumer services** and **applications**,
  - **3rd party systems** operated by energy operators, service providers, telco operators, etc.
- **Security** and **reliability levels**
  - to be achieved through standard/mature SW components

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Energy@home *approach:*

*Turn **CEMS** into an* **Open Eco-system**

JEMMA: the Energy@home CEMS

- **JEMMA**: **J**ava **E**nergy **M**anage**M**ent **A**pplication is the **CEMS reference implementation** delivered by Energy@home
- It can be used to **rapidly prototype** and **deploy** smart energy applications at home
- First Released (v0.0.1) in October 2013
- Based on an a CEMS solution developed and validated in the Energy@home trials
- Initial code contribution by Telecom Italia
- Current version: v0.2 (released **yesterday!**)
- Hosted on GitHub

http://jemma.energy-home.org

JEMMA: License

- Most of JEMMA has been released under the **LGPL** (*Lesser General Public License v3)*
  - *(except for components already covered by other licenses)*
- LGPLv3 is a permissive “copyleft” license:
  - it allows bundling and re-distributing the software for any purpose including commercial, also integrating 3rd party components released under other licenses

- It is thus **allowed**:
  - To freely share JEMMA and its source code
  - To extend and integrate JEMMA with other (free and non-free) products or services

JEMMA Architecture *(work in progress)*

GUIs

Cloud services

3rd party services

JEMMA Open Source Project

JEMMA Open API

JEMMA Core

Scheduler

Local Polices

3rd party plug-ins

CEMS Engine

Device API

Device Abstraction Layer (DAL)

Device Ontology

ZigBee Adapter

Cluster Libraries

(Java) GAL

Other Adapters

Devices

ZigBee HA 1.2 Devices

ZigBee Devices

IP Devices

Others

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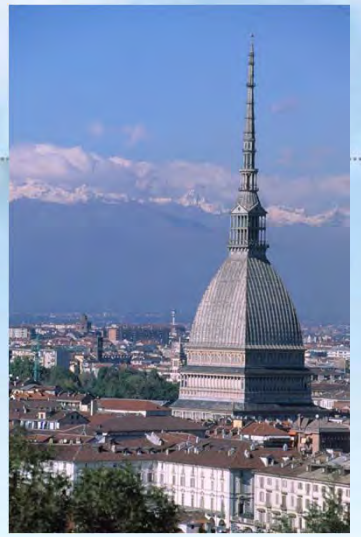
JEMMA: Next steps

- Next release (**v0.9**) planned for **October, 2014**
- Main features
  - Refactored architecture
    - clearer separation of API, insulation of Device-Access components (e.g. GAL), simplification of internal architecture, etc.
  - Unified **REST API**
  - New Modular (metro-style) GUI Framework with websocket support
    - PoC implementation already available in v0.2
  - Initial support of IP-based devices

The Energy@home Demonstrator



- Replicates a complete «trial» home set-up
- Maintained by Energy@home partners in **ISMB Laboratories** in **Torino**
- It is used to validate and test in controlled conditions new hardware, applications, etc.

See it in action in the Lobby !!

Thanks for your attention !

For more information:

JEMMA's Website

http://jemma.energy-home.org

For any question/comment:

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