



Energy@home



Open Eco-systems for Smart M2M Applications @ Home

Experiences and Future Developments of the JEMMA project



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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!



**Customer Energy Management System *
(CEMS)**

Home Automation

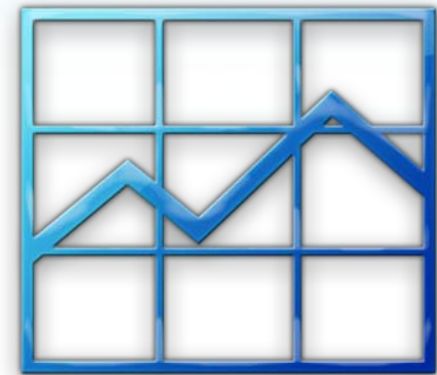
- Growing number of **heterogeneous connected devices** at home (smart appliances, sensors, HA devices etc.)
- **Standards fragmentation** in the HA domain (slowly) reducing
- Tapping flexibility without hindering comfort requires **deep knowledge** about **devices behavior** and ...
- ... personalized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



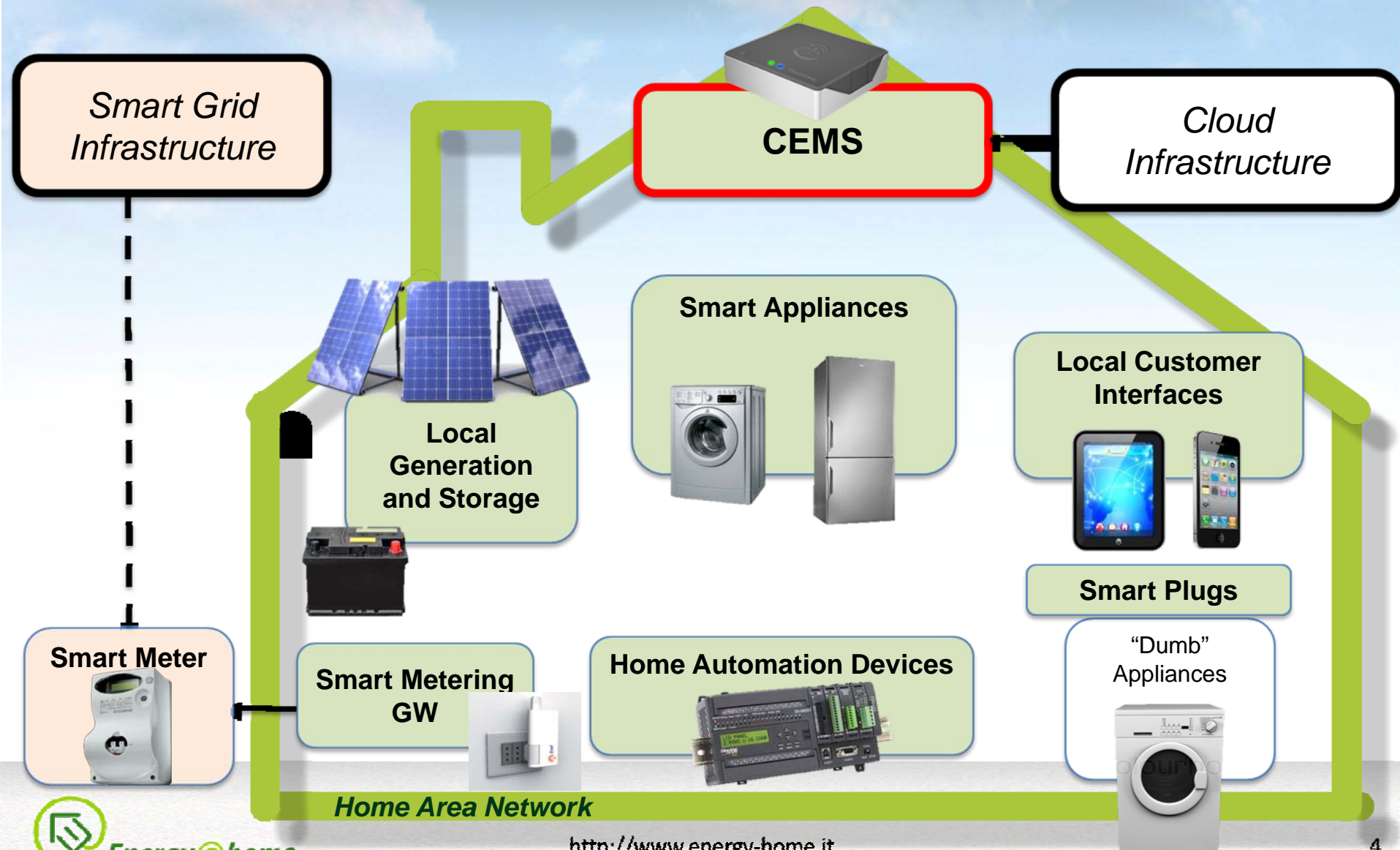
* [CEN-CENELEC-ETSI Smart Grid Coordination Group – Sustainable Processes](#)

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

- **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.
- **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
- **Security and reliability levels**
 - to be achieved through standard/mature SW components

Main challenges for CEMS

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 **Energy@home** approach:

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

with specific local/national requirements

- **Security** and **reliability levels**
 - to be achieved through standard/mature SW components

JEMMA: the Energy@home CEMS



- **JEMMA: Java Energy Management Application** 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



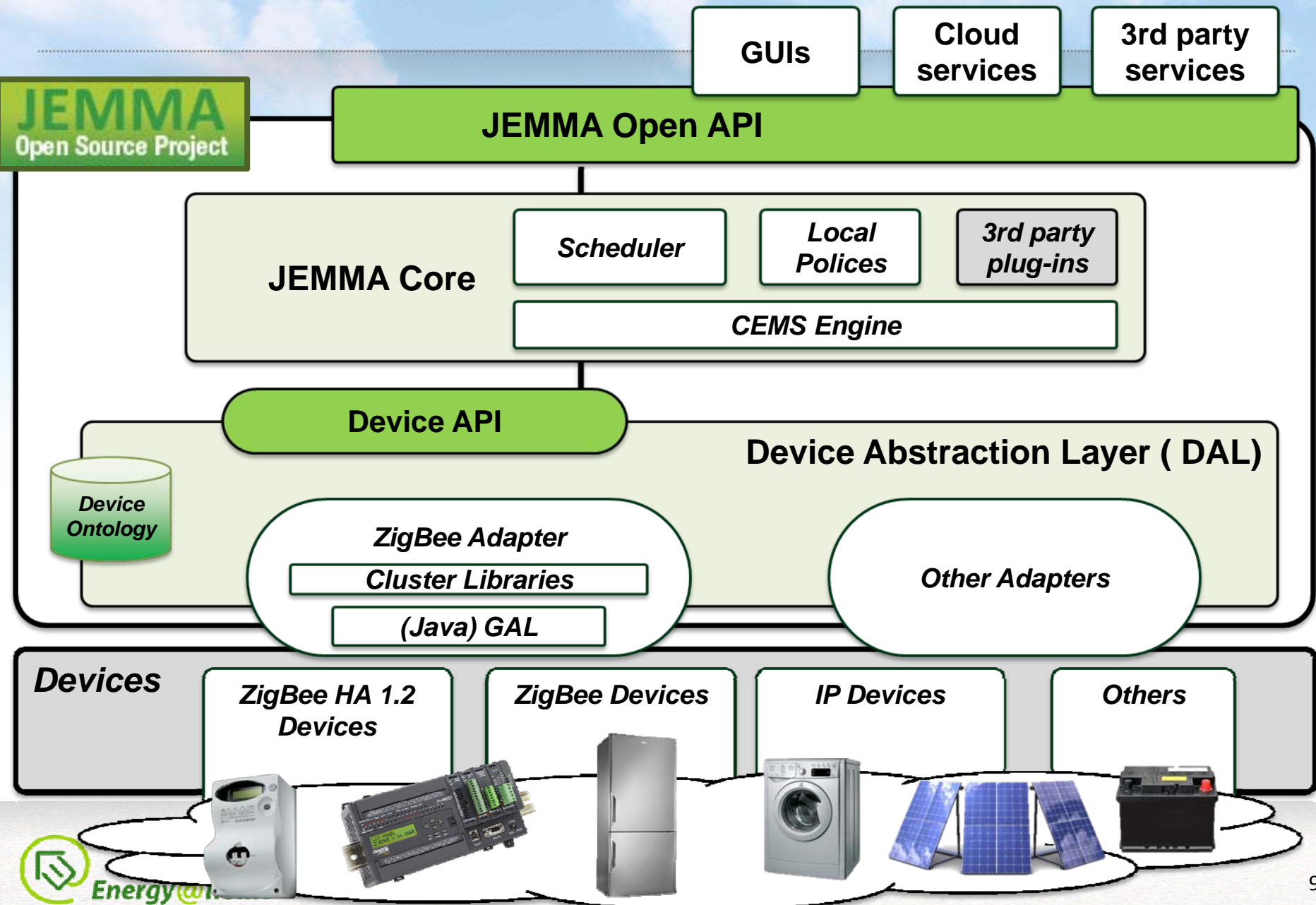
<http://jemma.energy-home.org>

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)*

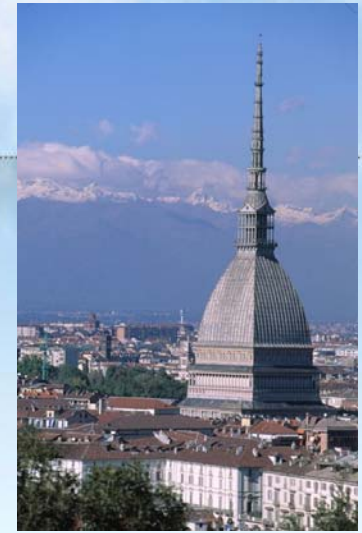


JEMMA: Next steps

- 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>

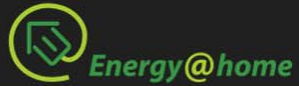
For any question/comment:

[Riccardo Tomasi <tomasi@ismb.it>](mailto:tomasi@ismb.it)

Some Snapshots ...



Some Snapshots ...



CODICE UTENTE :0128

16 Maggio 2014 8:15



Home



Configurazioni



Community



Tutto sul trial

SmartPlug PC	Lavatrice Indesit	Luci Mac	Forno Indesit	Termostato Centralite	Frigorifero Indesit
State: ON	State: ON	State: OFF	State: ON	State: ON	State: ON
Consumption: 24W	Consumption: 5W	Consumption: n.a.	Consumption: 5W	Consumption: n.a.	Consumption: 5W
Lab	Lab	Lab	Lab	Lab	Lab

Consumptions summary

Devices consumption: 39W
Other consumption: 0W
Total consumption: 35W

Termostato Centralite

Temperature: 23.8 °

Humidity: undefined %



Consumption: **n.a.**
Lab



FotoVoltaico



Consumi



Dispositivi

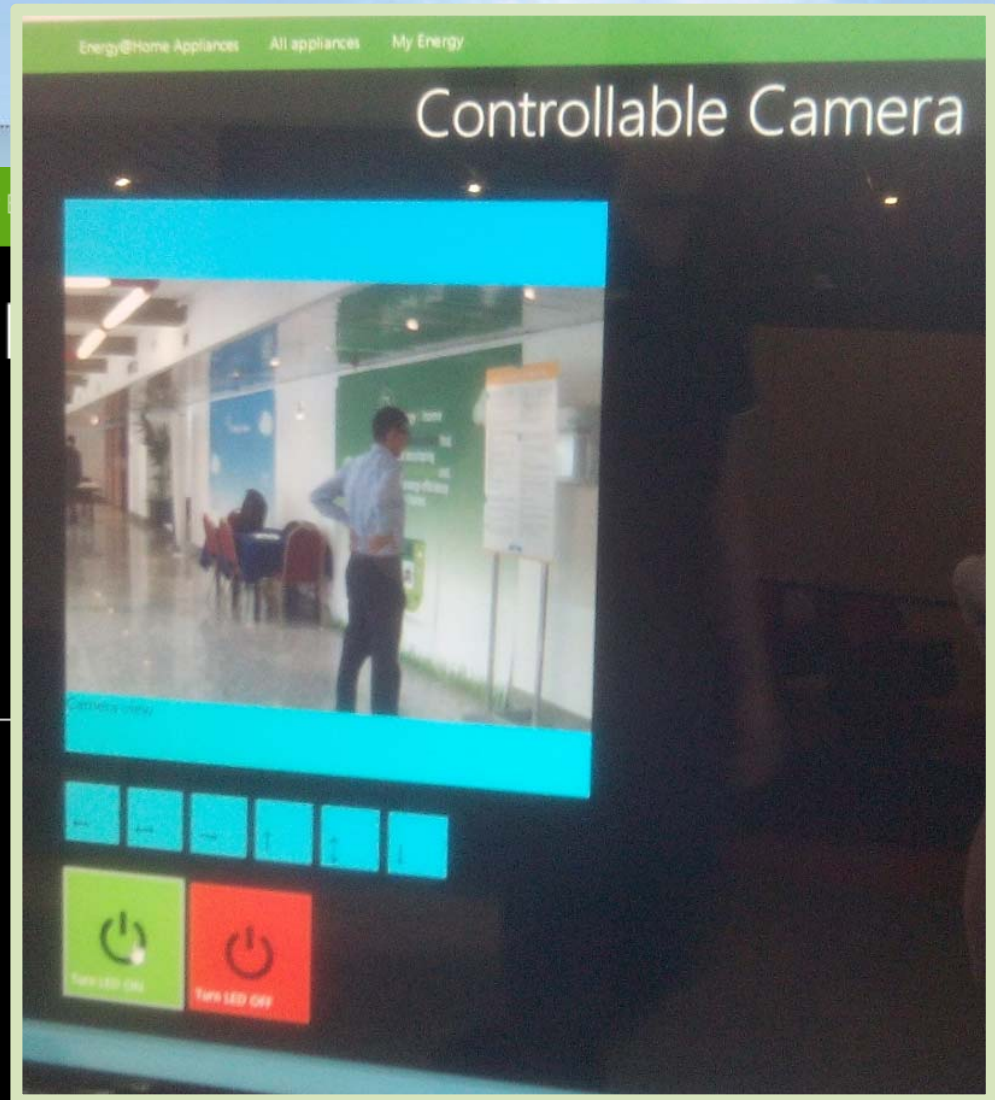
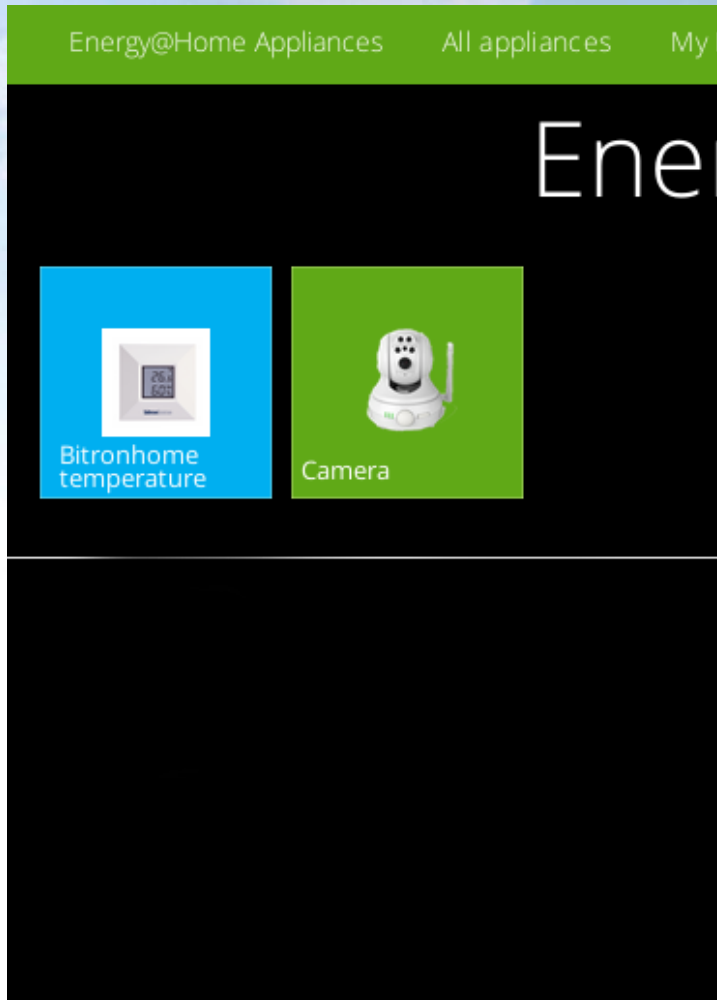


Storico

Some Snapshots



Some Snapshots



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