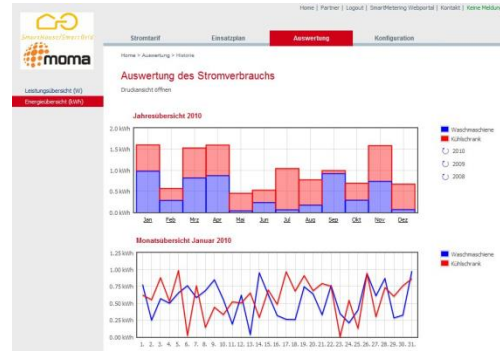


# Home Energy Management System Solutions for the European Grid

IREC 2014 Session 6

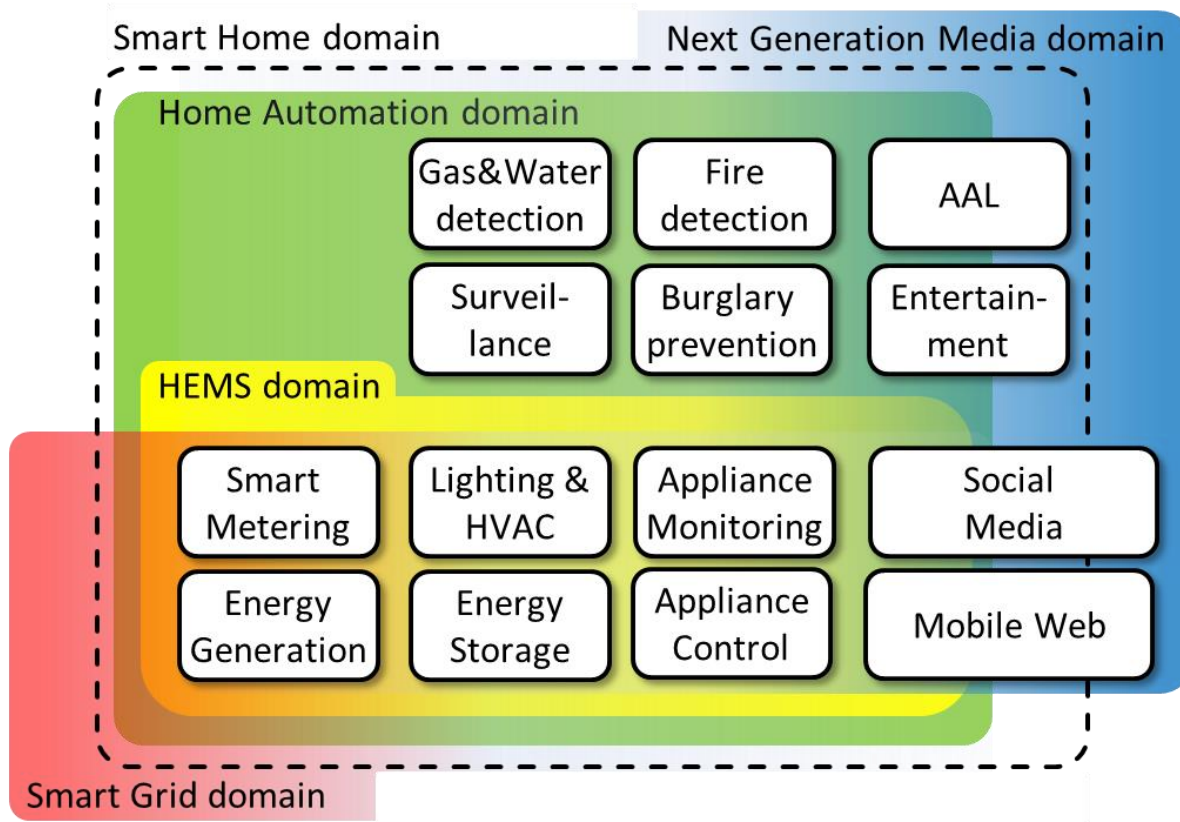
Panel Discussion: End User Energy Management System in the Near Future  
November 20<sup>th</sup> 2014, Kyoto, Japan

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# Definition of „Home Energy Management“

Proactive, organized and systematic coordination of procurement, conversion, distribution and use of energy within a privately used residential area with the goal of providing services and meeting requirements of the inhabitants, taking into account environmental, economic and social objectives<sup>1</sup>



<sup>1</sup> Combined Definition from VDI-Guideline 4602 and German standardization roadmap Smart Home & Building

# Why bother with Home Energy Management ?

## Estimated home automation market values by 2020<sup>1</sup>:

**~ 48 – 115 Billion US-\$ (Global)**  
**~ 8 – 22 Billion US-\$ (USA)**  
**~ 14 Billion US-\$ (EU)**

## Commonly known barriers:

### Technical: Lack of...

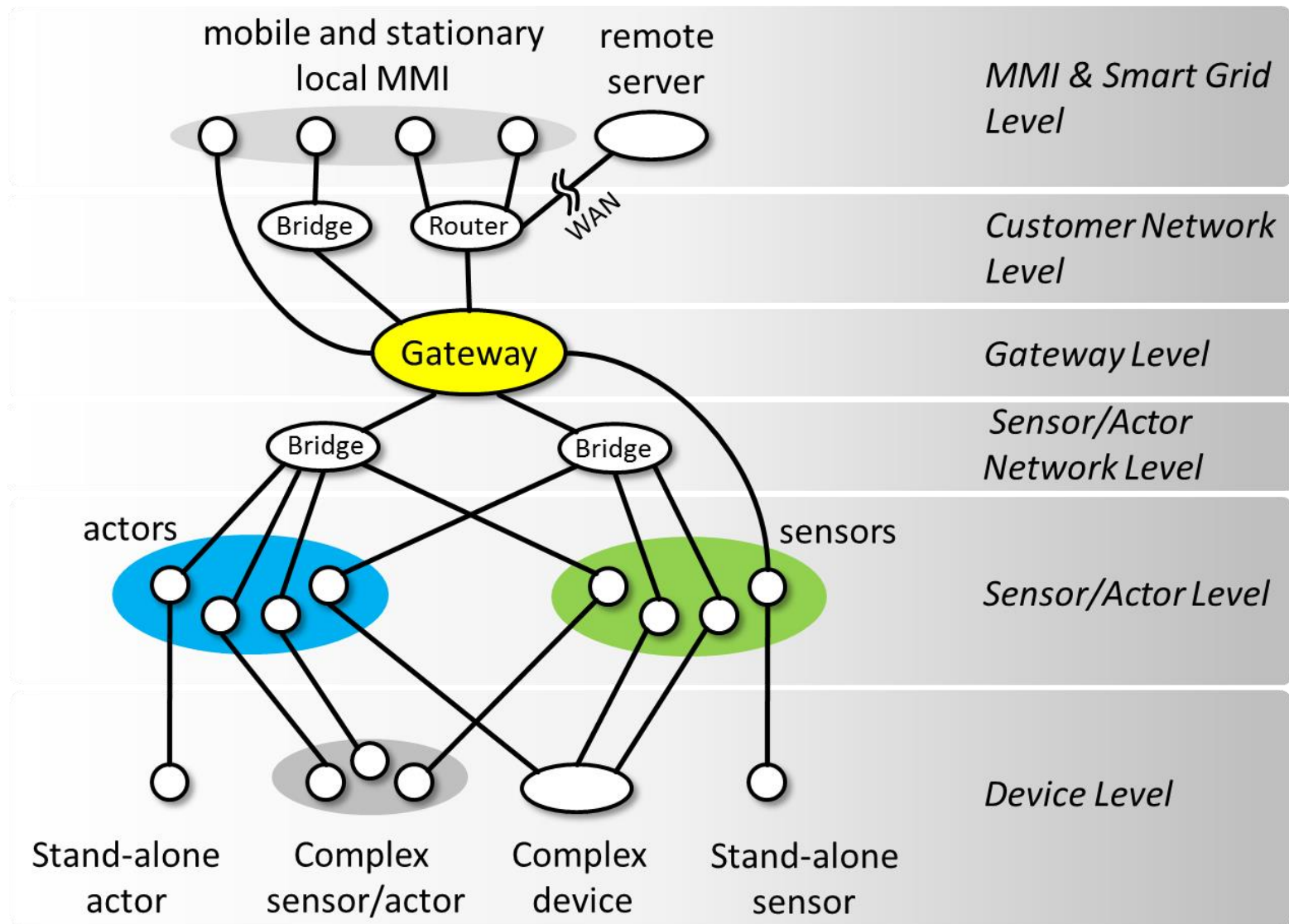
- Smart meter infrastructure
- Home automation controllers
- Smart home appliances
- Interoperability with smart grid actors
- Manufacturer Independence
- Plug-and-Play Solutions
- According Standards

### Non-Technical:

- Customer privacy threatened
- Customer does not understand or is not interested
- Customer fears loss-of-control
- Lack of trust in energy suppliers and governments
- Unfavorable regulatory and political conditions

1: Today: 1.5 Bio. US-\$ (Global), acc. to studies from Marketsandmarkets 2013, Grand View Research 2014, Strategy Analytics 2014, Forbes 2014

# HEMS Components: a generic view



# HEMS Comparision – Selected Products and Middlewares

Product Nr.	Aim	Product Class	Energy Type	Status	Investment Cost	Running cost [€/a]	Wired/Radio	Standard Conformity	API	App Runtime Env.	DIY support	Online community	Blog	Gamification	Smart Grid interface	Metering Interface	Online Software store	Developer support	Open Source	Running mode	Smart Phone IF	Data security technologies
1	EE, HA	A1	G	C	low	-	R	HomeMatic, ZigBee	1	N	Y	Y	N	N	N	N	N	N	N	online	Y	AES256 CBC, TPM Spec. 1.2
2	EE, HA	A1	G	C	low	-	R	N	1	N	Y	N	N	N	N	Y	N	N	N	online	Y	SOTA
5	EE	A2	T	C	low	-	R	N	-	N	P	N	Y	N	N	N	N	N	N	online	Y	SOTA
6	EE	A2	T	C	med	-	R	N	-	N	P	N	N	N	N	N	N	N	N	both	Y	SOTA
7	EE, HA	A1	G	C	med	59	R	Z-Wave	Y	N	Y	Y	N	N	N	Y	N	N	Y	online	Y	SOTA
8	EE, HA	A1	G	C	med	-	R,W	misc.	-	N	P	N	Y	N	N	Y	N	N	N	both	Y	SOTA
9	EE	A2	T	C	low	-	R	N	-	N	Y	N	N	N	N	N	N	N	N	both	Y	AES128
10	EE, HA	A3	G	C	high	-	W	KNX	-	N	N	-	-	-	-	-	-	-	-	Y	-	
17	EE, HA	A2	G	C	low	-	R	WLAN	Y	N	Y	Y	N	N	N	N	N	N	N	online	Y	SOTA
33	EE, HA	A5	G	C			R	Z-Wave	Y	N	Y	Y	N	N	N	Y	N	N	P	online	Y	SOTA
32	EE, HA	A5	G	C			R,W		N	N	N	Y	N	Y	N	Y	N	N	N	online	Y	SOTA
35 <sup>2</sup>	EE, HA	A5	G	R&D	0	0	R,W	OGEMA 2.0	Y	Y	Y	N	N	N	Y	Y	N	Y	Y	both	N	SOTA

EE: Energy Efficiency – HA: Home Automation – G/T: General/Thermal – R/W: Radio/Wired – Y/N/P: Yes/No/Partly – SOTA: State of the Art

1: Only for selected partners – 2: Online software store not yet established

# HEMS Comparison – Summary of Findings

- **> 30 market ready solutions** with different aim and focus
- Often featuring:
  - do-it-yourself
  - plug-n-play
  - radio based sensors / actors
- Initial **investment cost 100 - 2000 €**
- Subscription fees are rather unusual
- “Social Energy Networks” emerging, but potential of **Gamification** not yet fully used
- App-based extendability, Online software stores, Developer support and open-source licensing are rare
- Support of complex **intelligent appliances still missing**
- Approx. half of the solutions **rely on online operation**, but holistic privacy / **data security standards are still missing**

# HEMS based on open source platform „OGEMA 2.0“ (currently used in R&D projects EEPos, SEMIAH, ...)



[www.ogema.org](http://www.ogema.org)

