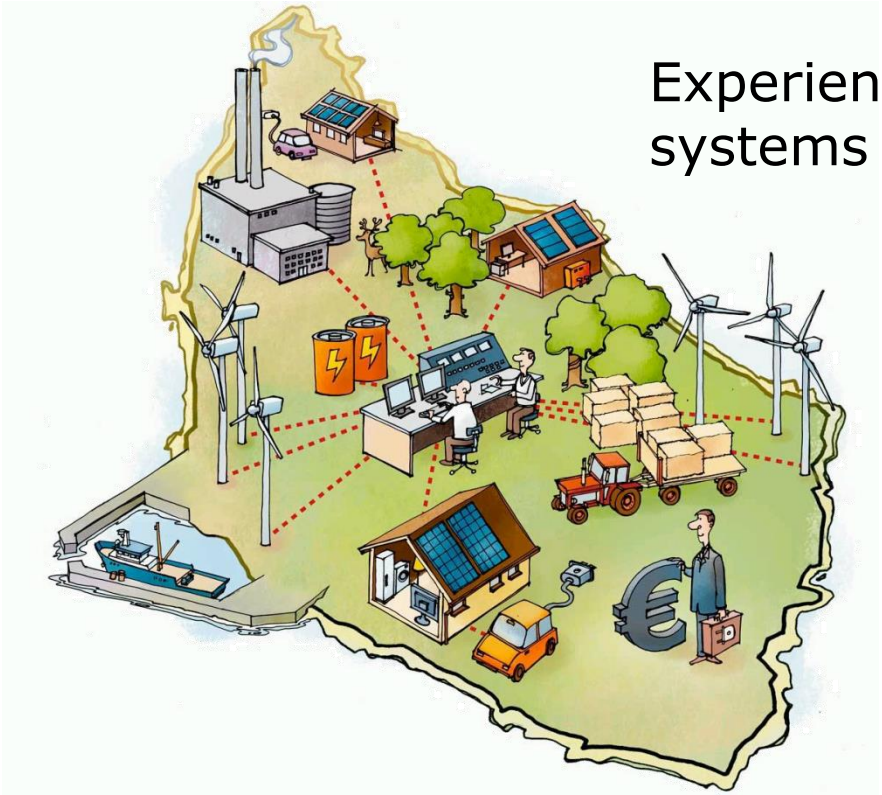
EcoGrid EU

A Prototype for European Smart Grids



Experience with energy management systems and customers

Presentation by:

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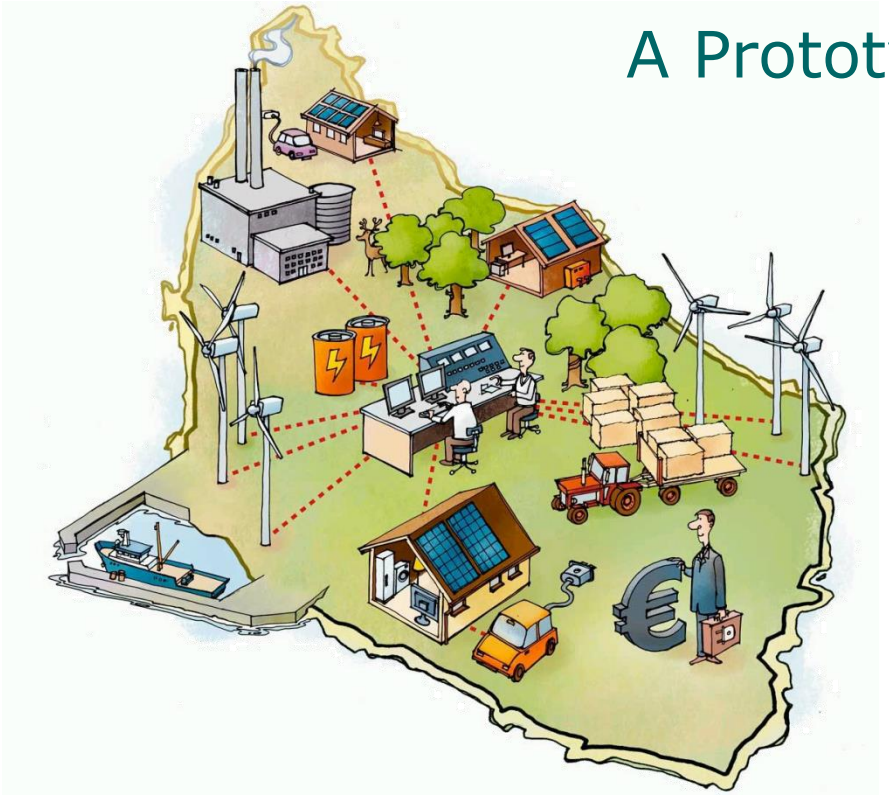
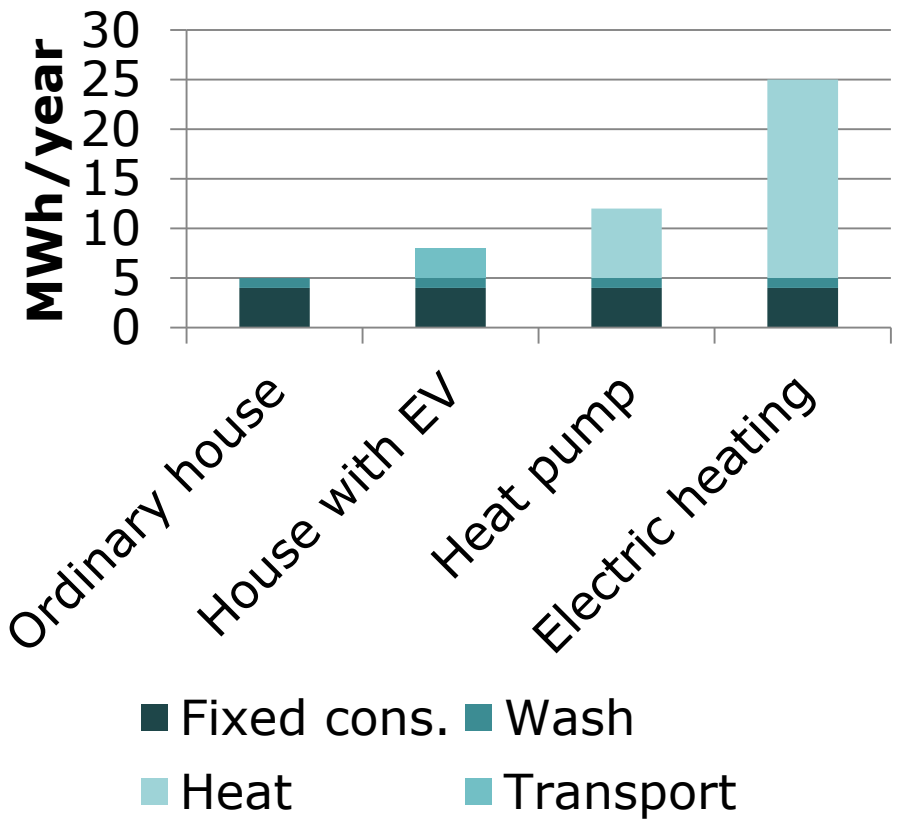


- Co-funded by FP7
- Smart Grid demonstration project
- 16 European partners
- Total budget 20,5 mio. €
- Project period 2011-2015

Flexibility in the household comes from electric heating and heat pumps

Appliances	Load in kW
Television	0,15
Stereo	0,25
PC + printer	0,10
Refrigeator	0,09
Freezer	0,09
Dish washer	1,50
Stove	7,00
Oven	2,60
Small appliances*	0,01-2,00
Washing machine	1,50
Heat pump	2,30
Electric vehicle	3,00
Total	>18,6



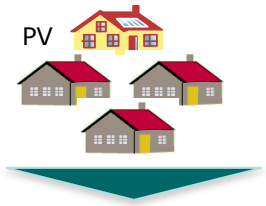
* Consuming on demand. Example coffee machine, vacuumer, cell phone

The EcoGrid EU participants

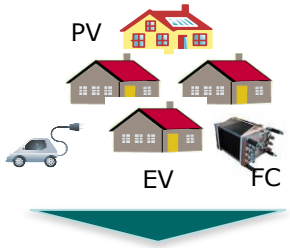
- 350 customers in the reference group
- 500 ordinary households. Will be equipped with smart meter. Price prognosis send daily. Price warnings when price exceed certain levels
- 650 IBM/PowerMatcher households. Get smart meter and home automation system. Primarily electric heated or heat pump households
- 450 Siemens households. Get smart meter and home automation system. Primarily electric heated or heat pump households
- 20 businesses with smart meter and energy management system

Reference group

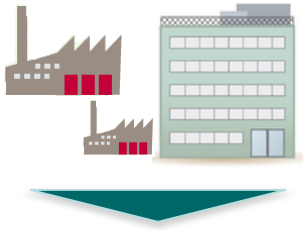
Manual control user



IBM/PowerMatcher users



Siemens users



Smart businesses

Basic requirements and info

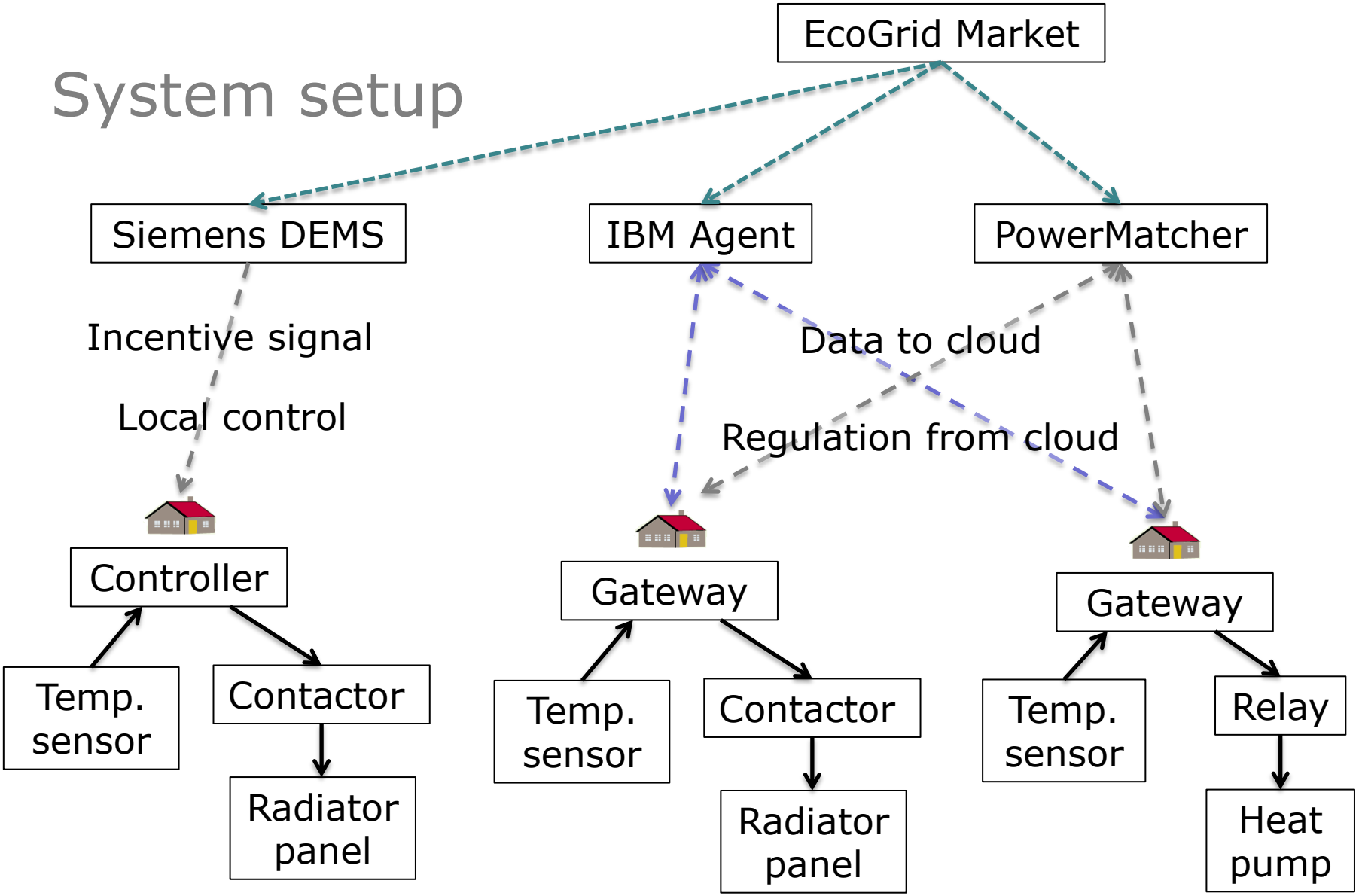
- We only regulate load if it possible to get a data feed back, i.e. temperature or consumption measurement

- The EMS can only regulate load by switching power on or off
  - We don’t regulate appliances, which are not compatible with on/off regulation, i.e. we will not regulate air condition

- Heat pumps controlled by ripple signal relay
  - 95 % of regular models are prepared for ripple signal control
  - Delays in response
  - Can only turn it off, not on

- Regulation happens on fuse box level, no regulation of individual panels
  - Wiring have to be dedicated for heating
  - IBM/Greenwave houses with electric heating works a one zone
  - Siemens houses can be divided in to more heating zone depending on the wiring in the house and size of panels

System setup



Challenges to realise the full DR potential

- Installation of Greenwave began in august 2012 and Siemens in march 2013, we have more than two years running experience with ~1100 installations
- Robustness of systems needs to be increased
  - 25 % of systems are constantly unavailable
  - Primarily caused by technical failure
    - No connection to the house, no temp. measurements, units loose contact
- Customer choice are limited
  - Greenwave, only lower boundary and flexibility degree
  - The aggregators/agent utilize the full temp. interval on daily basis → the customers narrow temp. interval to reduce discomfort → reduced potential for special incidents
- Heat pumps
  - Delay in response, slow responding, no forced start
  - Cannot integrate air condition (air/air heat pumps)

Is it all bad??

Off course not

We can find the solutions,
we just need more time…

EcoGrid 2.0

- New project
  - Existing participants
  - Prototype of new more advanced EMS
    - Utilising more of DR potential
  - Robustness of systems
  - Interoperability
    - Aggregators can aggregate independent on installed EMS
    - Customer choice not limited by EMS UI design
  - Services for both DSO and TSO from same portfolio
  - Customers can chance aggregators
  - January 2016-June 2019

  - Keep your fingers crossed 15th of June

Thank you
for your Attention