Project Overview

Smart Grid Week
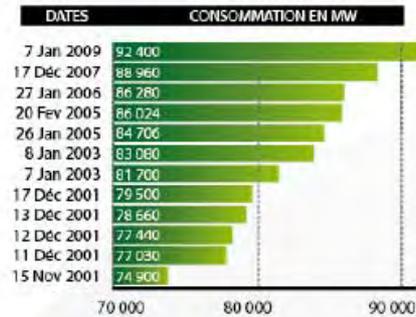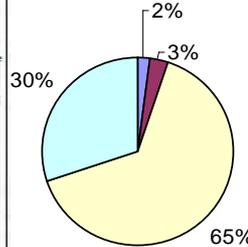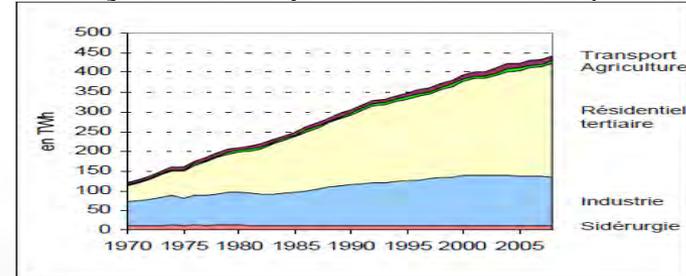
Salzburg, 24th of June 2010

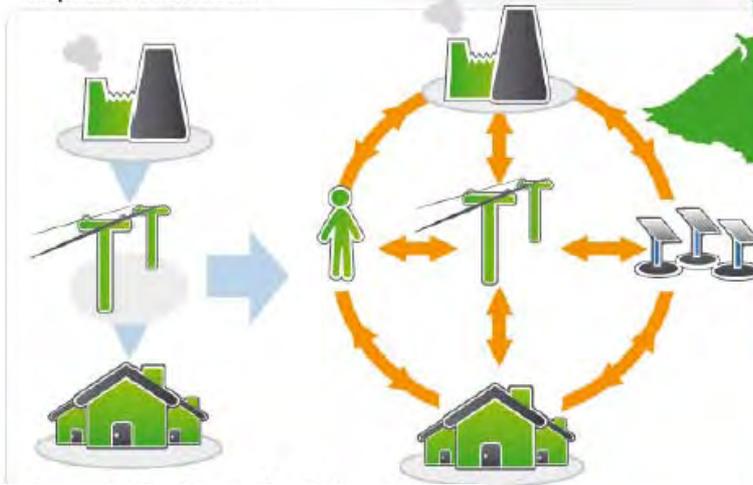# Energy context : The example of France

Peaks history in France

Electricity consumption in France (source SOeS)

L'expérimentation PREMIO

The « new » electrical system

Electric Vehicle

Renewables


Smart meters

Amortization of Loads

- The global electricity load that is most influenced by residential/professional consumption can be **"streamlined", if some of the customers accept to reduce their consumption during the** "peak hours"

- Some customers would accept to reduce their consumption during the "peak hours", if they had significant reduction at their bills.
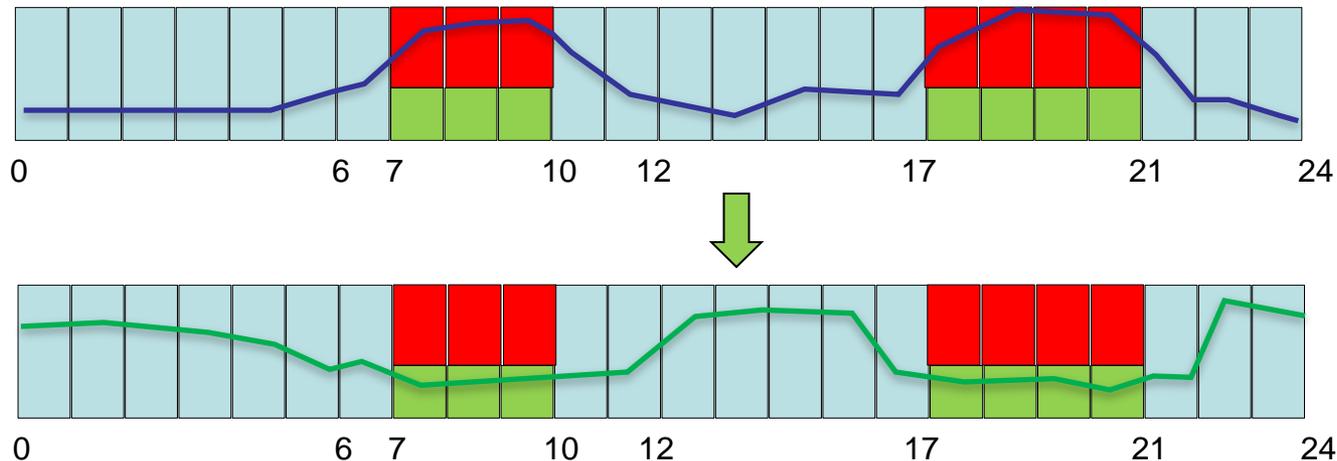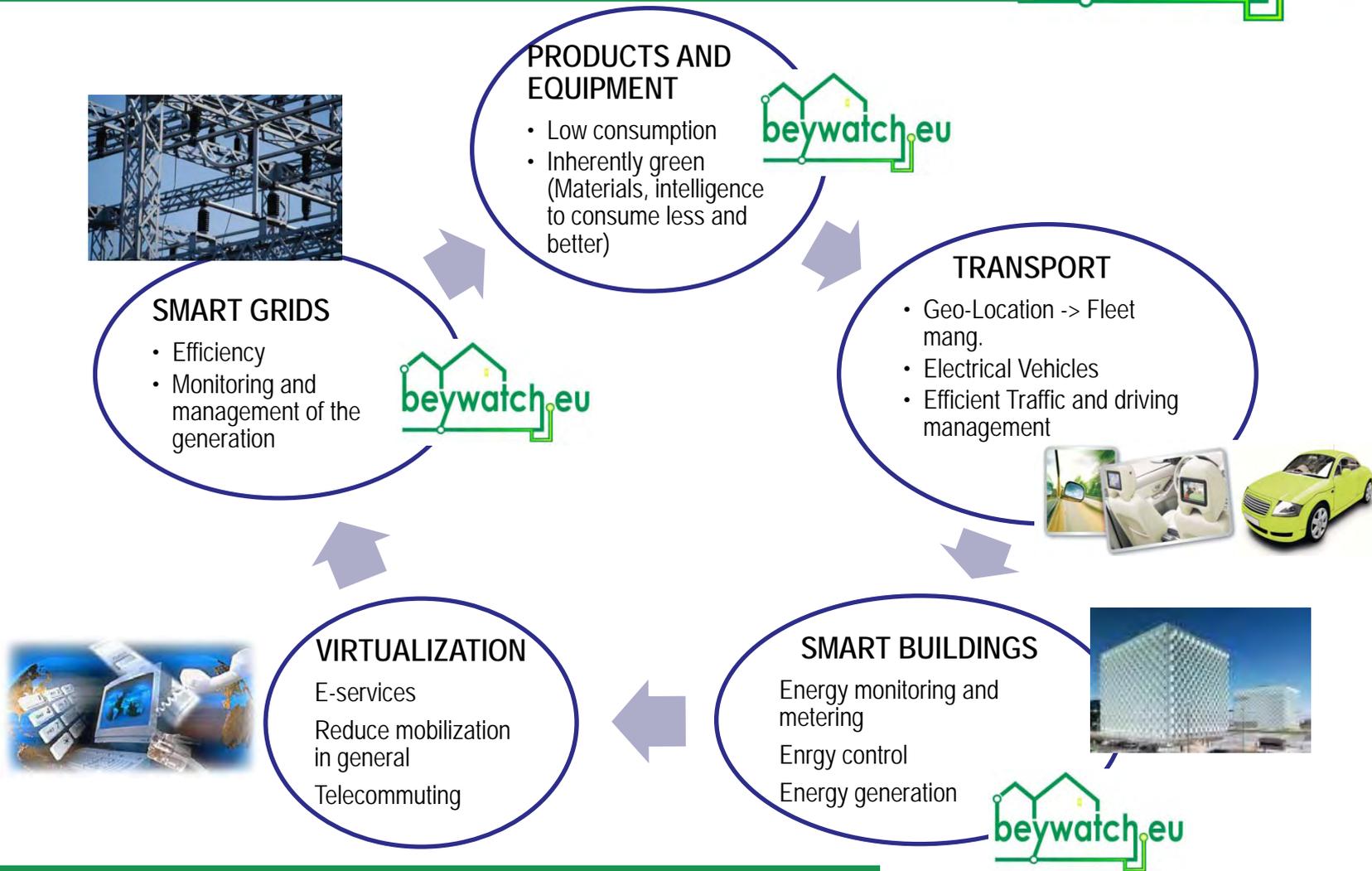
The ICT4EE target is OURS!

- Reduce Energy consumption
- Rise user awareness
- Help the utilities to shape a sustainable energy utilisation
- ICT will help maintaining the same comfort and human activity levels while coping with sustainability!

The ICT sector potential: Green ITs

PRODUCTS AND EQUIPMENT
- Low consumption
- Inherently green (Materials, intelligence to consume less and better)

TRANSPORT
- Geo-Location -> Fleet mang.
- Electrical Vehicles
- Efficient Traffic and driving management

SMART GRIDS
- Efficiency
- Monitoring and management of the generation

SMART BUILDINGS
Energy monitoring and metering
Enrgy control
Energy generation

VIRTUALIZATION
E-services
Reduce mobilization in general
Telecommuting

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BeyWatch in a few words…

- A European project aiming at ICT for energy efficiency

    - *Ultra-low power white goods*

    - *Intelligent control of electrical devices in smart homes & neighbours*

    - *Hot water & electricity generation from renewable energy sources*

    - *Business plans for all stakeholders*

    - *Enhanced consumer awareness towards less CO2 emissions*

Beywatch
Building Energy Watcher

European Project

More efficient

A
B
C
D
E
F
G

Less efficient

|	
Strategic Objective	6.1
ICT for environmental management and energy efficiency	
Contract number FP7-ICT-2007-2-223888	
Start Date	01/12/2008
dd/mm/yyyy	
Duration	30
in months	
Website	
Further information is available at www.beywatch.eu	

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Beywatch partners

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Our Voice!

- **www.beywatch.eu**
  - All project details (including The Beywatch Story!)
  - Deliverables and reports
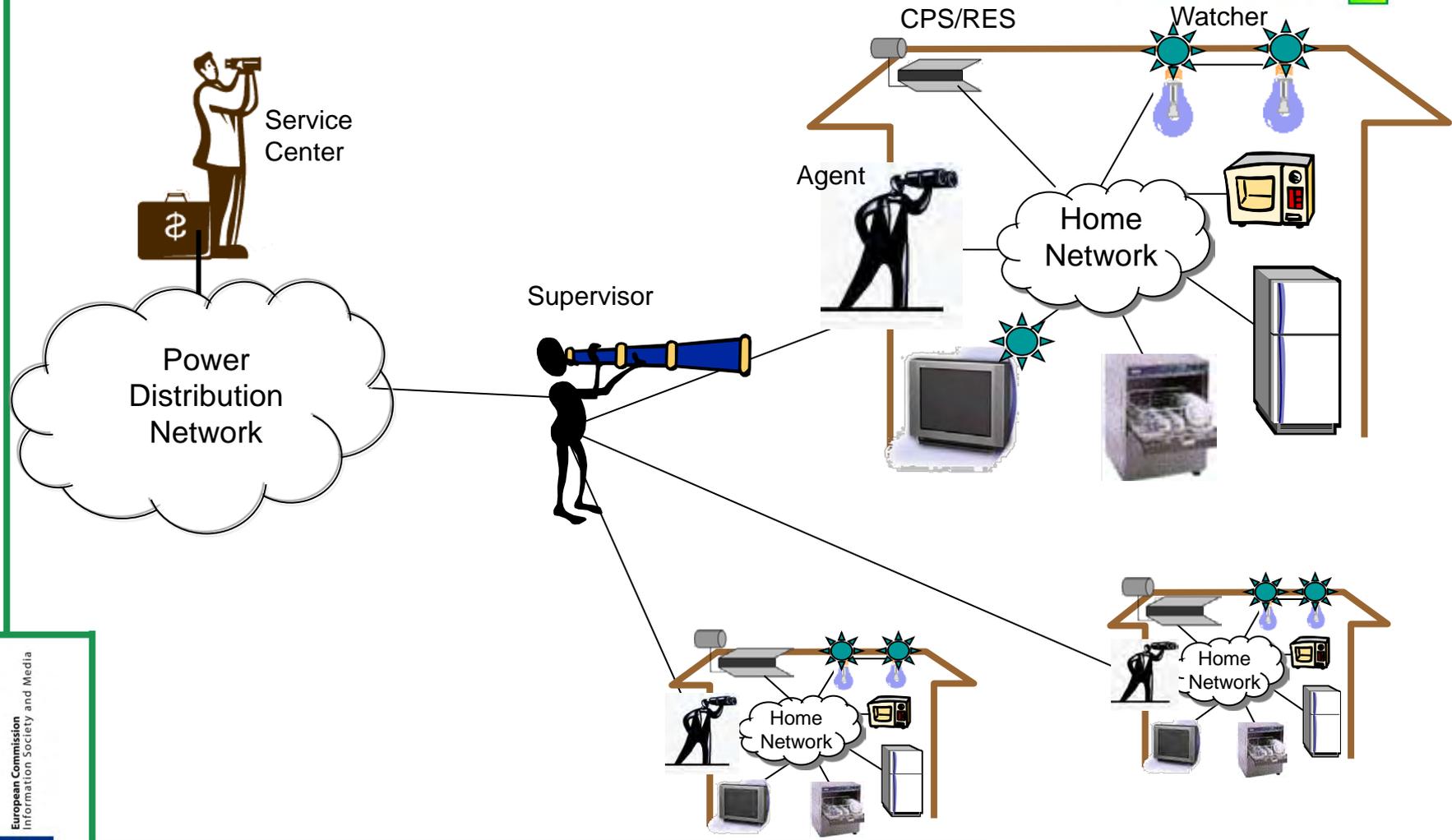 - Industry news
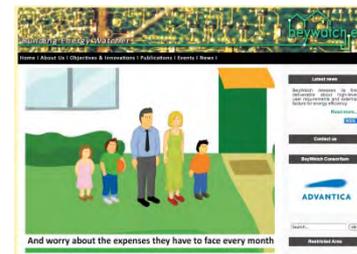
- **Beywatch group on LinkedIn**
  - The right forum to discuss home energy management

- Beywatch Workshop & Conference on **energy efficient white goods and energy management**
  - Nov. 19 & 20, 2010 – Nice, France
  - In the context of the **ICT for sustainable homes** conference
  - www.ict-sustainablehomes.org

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Energy Monitoring Hierarchy

How we implement demand side management 1/3

EDUCATION

🌸 Information to the users about the energy they are consuming:

🌸 type of energy they are consuming is important: Clean generation (renewable).

🌸 Offer detailed info on a per device way: Users may act more efficiently to reduce consumption.

ACTIVE DEMAND MANAGEMENT

🌸 Permit the (automatic) control of energy consumption on loads that are not critical- more beneficial tariffs

Tariffs and Incentives

🌸 Multiple Tariff Schemes: Time, Day, period allowing the users to adapt easily to their particular cases.

🌸 Billing depending on the actual demand (Means real time Billing!): The consumption on Peaks will be penalized, incentivizing the users to modify their habits to valley conditions.

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Services for Efficent Energy Provisioning

Detailed information about the energy consumed to improve the demand predictions: Per building, neighborhoods, etc…

New contract models between the user and the energy provider. Benefitting both stakeholders.
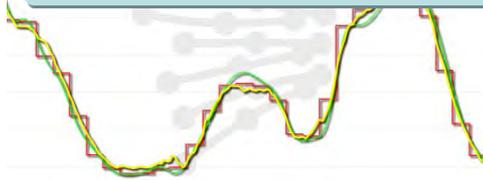
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How we implement demand side management 3/3

New Tarif Models

and/ or

Active Management per individual dwelling

1

'I need to decrease demand in this area for about 10%'

2 The Agent receives commands an can act on non-critical devices/services: reducing the temperature by 2 degrees for example

3 Notification to the user

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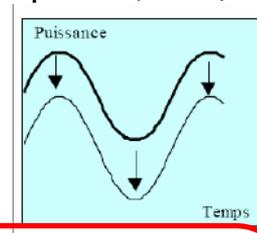
Types of services to the user

Primary services : Energy and Load Management

- **Energy Management :** better <u>manage</u> and <u>lower</u> their <u>energy consumption</u> (kWh) and related bill (€) and greenhouse gas emissions (g.eqCO2)
    - More <u>efficient</u> technologies
        - Efficient Washing Machine, Dishwasher, Fridge/Freezer
    - Services related to customer <u>information</u> and appliance <u>control</u>
- **Load Management / Demand Response :** To propose to customers, systems allowing them to <u>act on </u>the electrical system, through their white goods / Solar & PV
    - Emergency Programs
    - Direct Load Control, with incentive
    - Dynamic tariffs of electricity
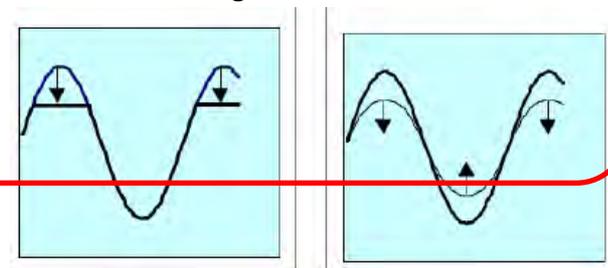
<u>Complementary services</u> :

- **Monitoring and control**
- **Failure detection services,**
- **Backup mode**
    - In case of failure of parts of the Beywatch System (Agent, communications Link, CPS), the user should have at least the functions of a non Beywatch Home and appliances :
        - standard appliance functions, hot water and electricity.
        - but potentially no energy or load Management

Energy & Load Management capabilities of the appliances

	HVAC	Hot Water	WM	DW	Dryer	Fridge / Freezer	Lights	Multi Media
May use external heat	X	X	X	X				
May store energy	X	X				X		
Shifting possibilities		X	X	X	X	X		
Dimming possibilities	X	X	X	X	X	X	X	X

- In particular, with a CPS :
  - Use **Solar Hot Water** for domestic use but also for **Washing Machines**
  - **Photovoltaic** production either **consumed locally or sold** to the grid depending on Price conditions, DR signals, internal needs

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Global Service Scenario

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- **Dealing with hot water (shower, …)**
  - From Solar panel then PV panel then other
  - According needs, sun, energy prices (day/night)
- **Washing greener**
  - Possible use of the external hot water (Solar, …)
  - Delayed start, controlled interruption of cycle, adaptation of temperature and cycle duration

- **Taking advantage of energy tariffs**
  - Day/night prices – Dynamic prices
  - PV electricity sold to the grid Vs auto-consumed

| 0 | | | 7 | 10 | | | 17 | 21 | |
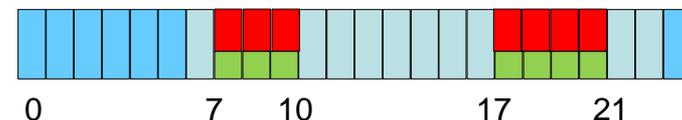
- **Simplicity, transparency**
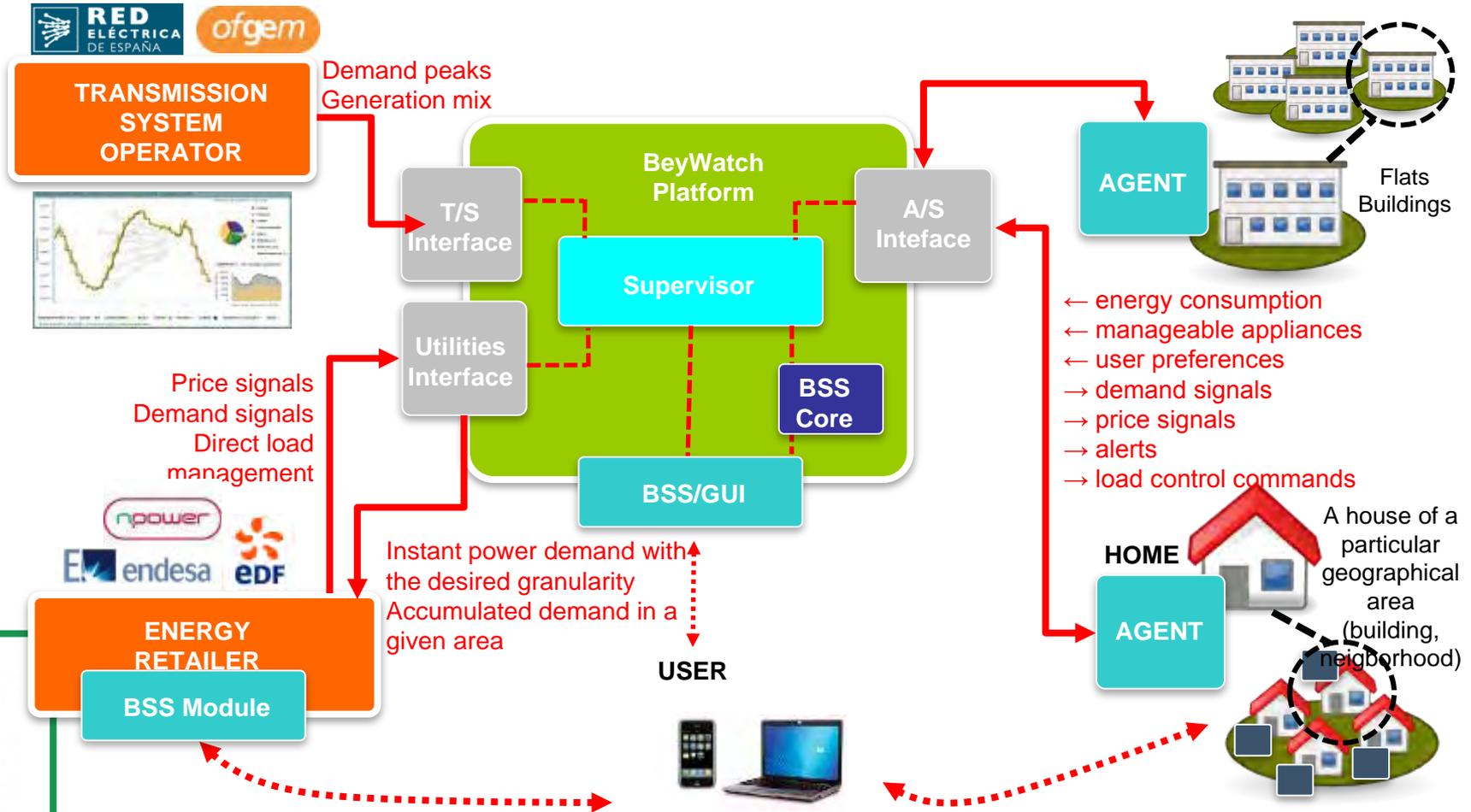 - Beywatch Button, information to the customer
- **Daily information (energy, €), feedback, personal advices**
- **Grid Management**
  - Through the Beywatch system, cooperation btw the home and the utility
  - Override by the user always possible

Provide the customer with a global but **transparent** and **simple** **optimization** to satisfy its **needs** while participating to the **smartgrid**

BSS within the architecture

TRANSMISSION SYSTEM OPERATOR

Demand peaks
Generation mix

BeyWatch Platform

T/S Interface

Supervisor

A/S Inteface

AGENT

Flats Buildings

Utilities Interface

BSS Core

Price signals
Demand signals
Direct load management

← energy consumption
← manageable appliances
← user preferences
→ demand signals
→ price signals
→ alerts
→ load control commands

BSS/GUI

ENERGY RETAILER

BSS Module

Instant power demand with the desired granularity
Accumulated demand in a given area

USER

HOME

AGENT

A house of a particular geographical area (building, neigborhood)

Applications in BeyWatch

- The BeyWatch GUI is designed as a framework which includes encapsulated software modules called **BeyWidgets**

- A BeyWidget is an individual application within the BeyWatch system which generates an interface to a specific functionality, covering a particular necessity
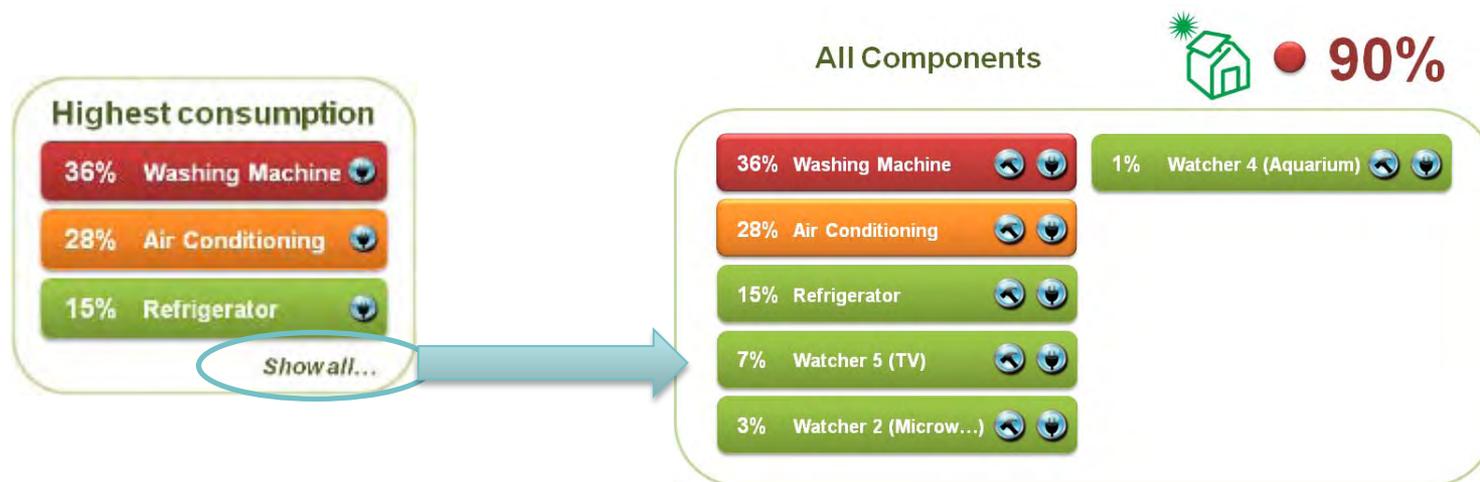
Current electricity consumption

- At first glance, the user may see the three most power-consuming appliances detected.
- Another screen will expand the view of the current electricity consumption of all appliances (including different watchers).

Current electricity consumption

- The user will be able to change the behavior of an appliance referring to the associated BeyWidget, or even turn it off directly.

Conclusions: Where are we?

- Appliances
    - Prototypes are being finalised:
        - Refrigerator
        - Washing Machine
        - Dish Washer
        - CPS System
        - Electricity Meter interface
- Software
    - Agent prototype
    - Supervisor prototype
    - BSS prototype
- Networking
    - Struggling with ZigBee
    - Trying to comply to HA and SE Profiles

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Thank you!

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