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Outline

- Energy@Home Project
- Architecture
- Devices
 - Home Broadband Gateway
 - Smart Info
 - Smart Appliances
- Technical Specifications
- Use Cases
- Next steps

E@H: the project



Energy@home is a collaborative and spontaneous project between Electrolux, Enel, Indesit and Telecom Italia

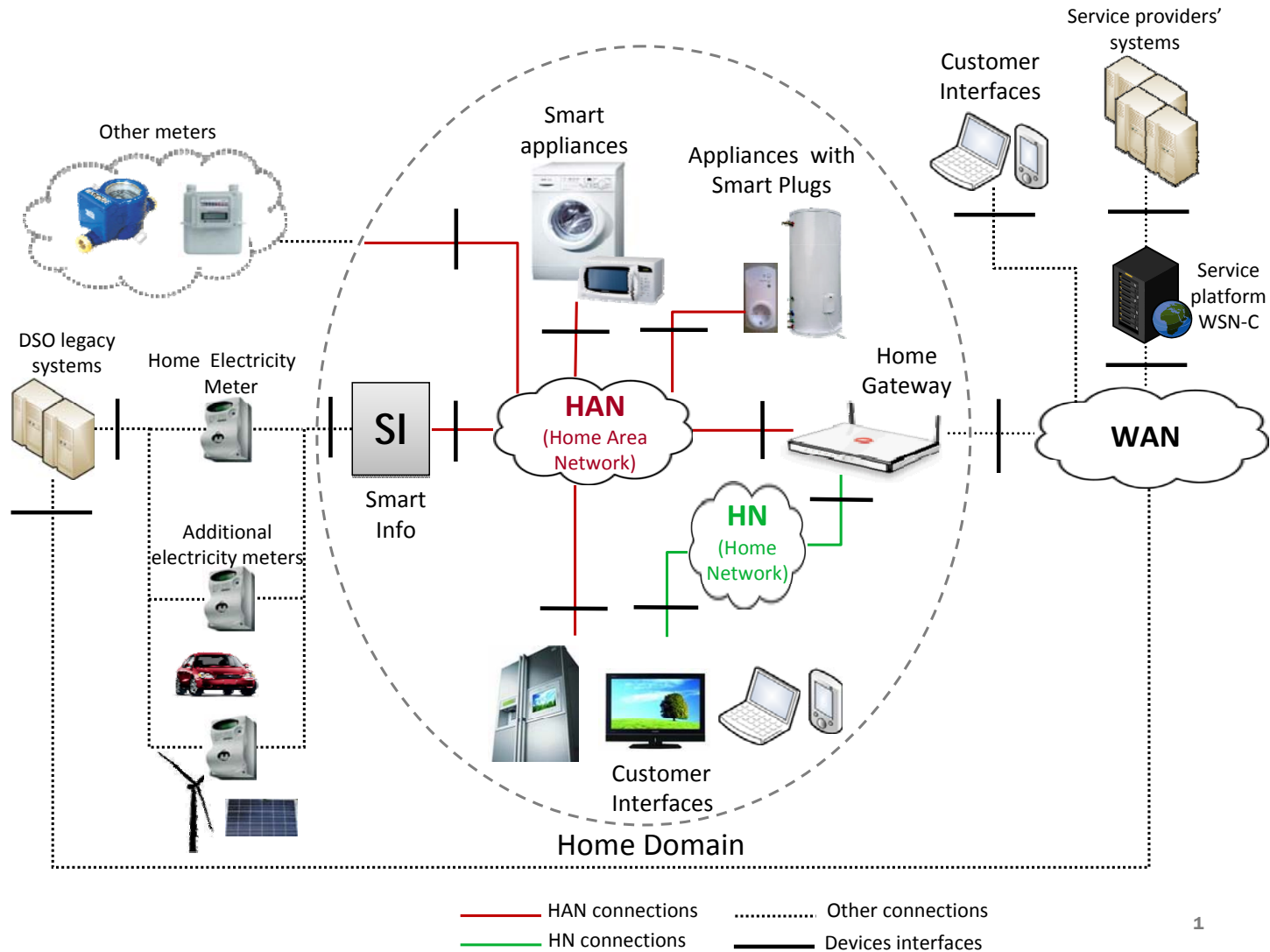


*The aim of the project is to develop a communication infrastructure that enables provision of **Value Added Services** based upon information exchange related to energy usage, energy consumption and energy tariffs in the **Home Area Network (HAN)**.*

*The project envisions a **protocol** that shall be used to build an integrated platform to allow cooperation between the main devices involved in **residential energy management**.*

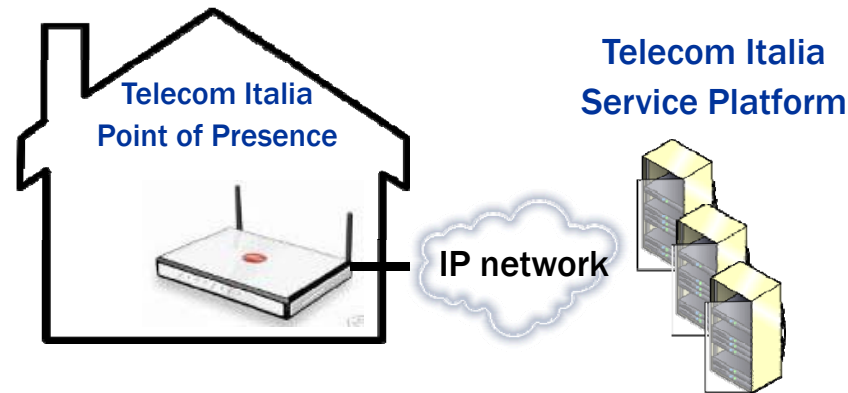
*The collaboration and consensus between **3 different industries** (TLC, Energy, Whitegoods) represents one of the main values of the project.*

Energy@Home : Architecture



Access Gateway – the Entry Point to the Digital Home

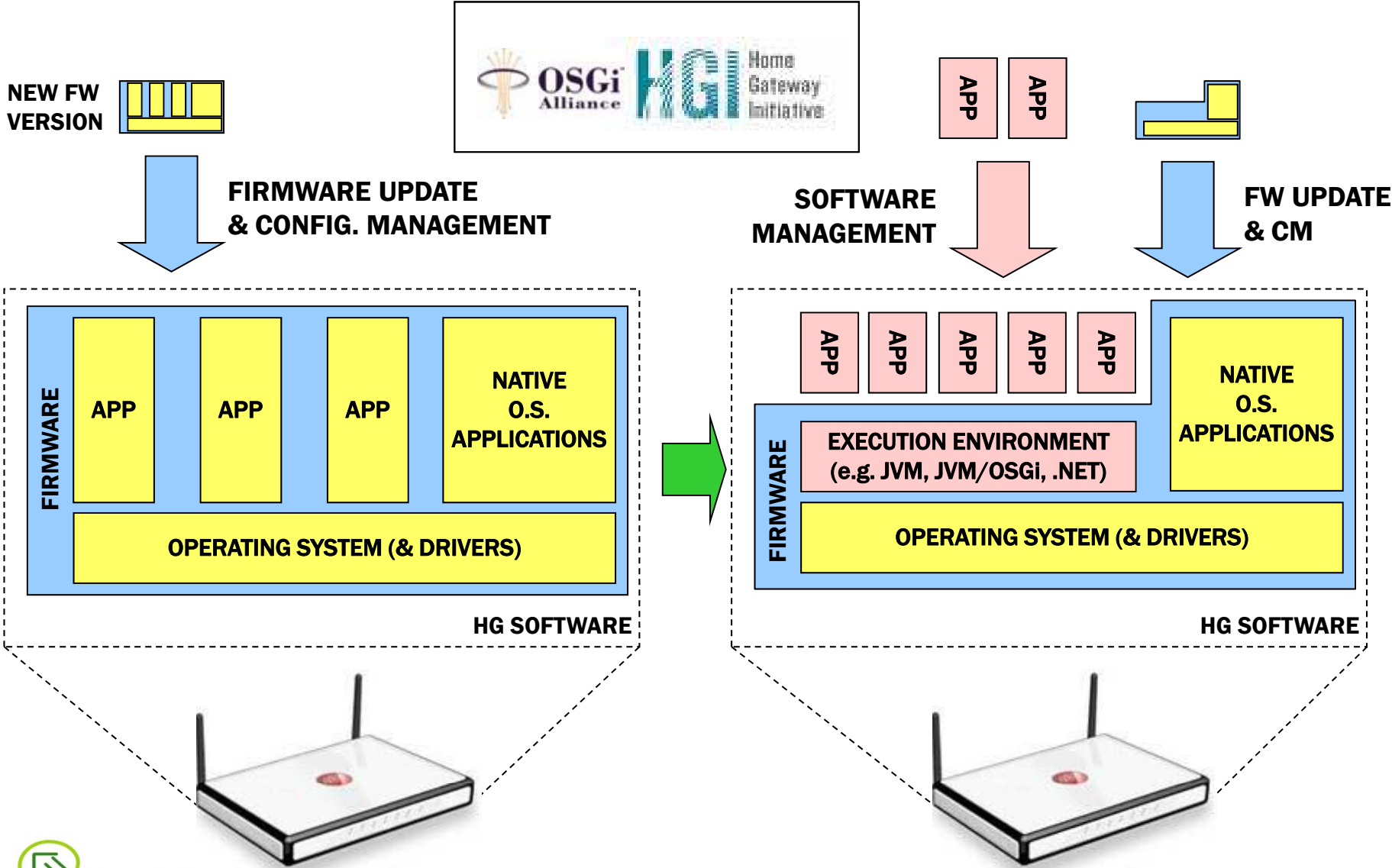
- TI Point of Presence
- always-on
 - multiple network i/f
 - user-aware
 - in a short distance from appliances



The residential gateway can play a strategic role:

- BB/Internet access point for all the house appliances
- Access point for third party's domotic solutions to native service centres
- Point of presence for connected whitegoods/utilities smart metering
- HW/SW platform open to evolve with the pace of services

Home Gateway – from Firmware Management to Software Management



The Enel Smart Info project

The project aims to develop an innovative device able to provide and support energy services to incentive the **customer consciousness** on its energy consumptions.

The availability of the Smart Info will be the first step to create a **new energy services marketplace**:

- Automatic load management
- Networking with smart appliances
- Energy efficiency
- Active demand services

The Smart Info will make available data collected from the Enel smart meter to different **customer interfaces** available in the indoor environment (e.g. PC, TV, custom display, appliances)



Smart Info – main functionalities

Smart Info is fully integrated in the Enel AMM solution (Telegestore).

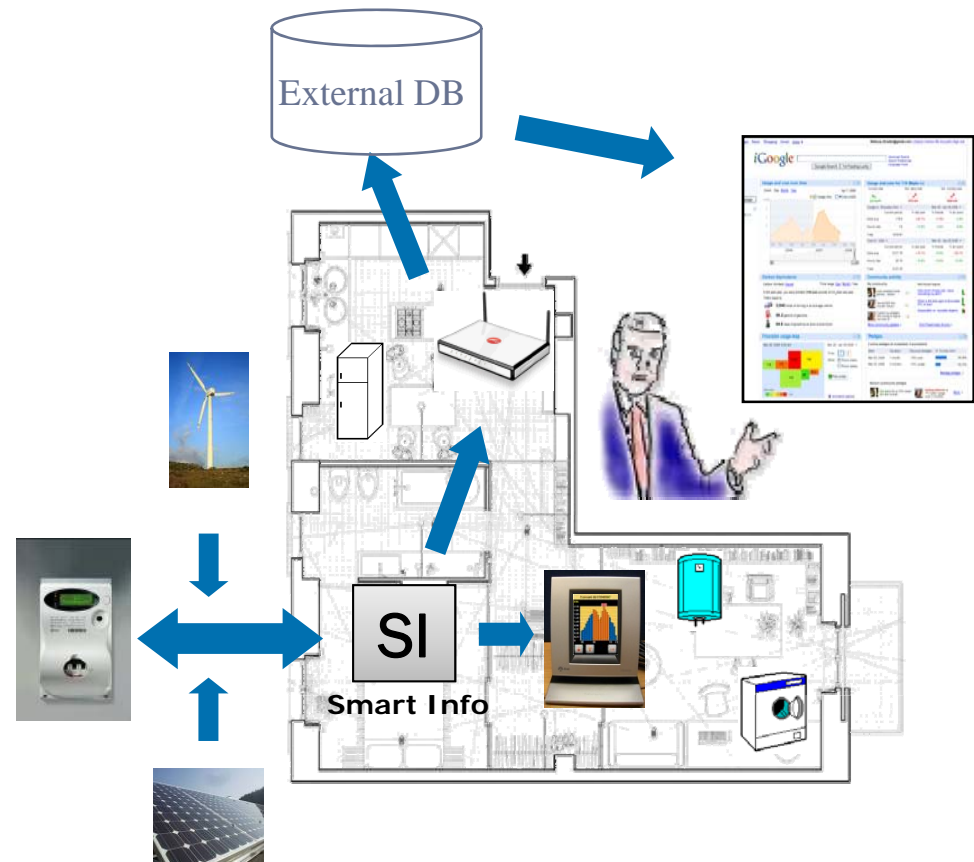
Every indoor socket will be an access point to the network.

It is the Telegestore **gateway** for the indoor energy data communication

It is **linked with different Smart Meters.**

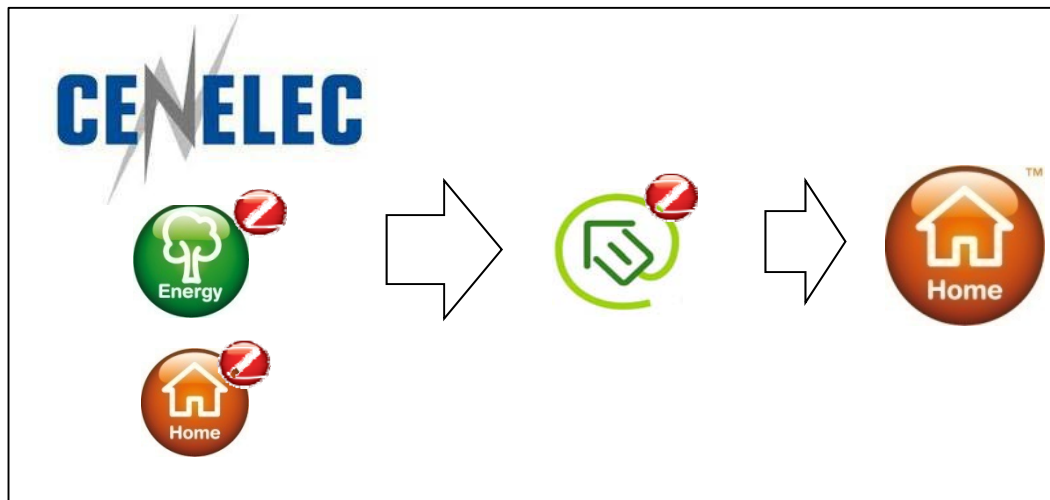
It enable a **bidirectional data communication** between the Telegestore infrastructure and indoor environment

It enable a **standardized and open communication** in the indoor environment



Energy@Home Technical Specification

- Specifications of the **HAN communication** protocol that enables the set of use cases defined by the Energy@Home partners
- Specifies the **wireless protocol**, the data model, the set of application messages, and the sequence activity diagrams
- Can be mapped to a standard ZigBee Public Profile that includes connected appliances of CECED and that extends “Home Automation” and “Smart Energy”

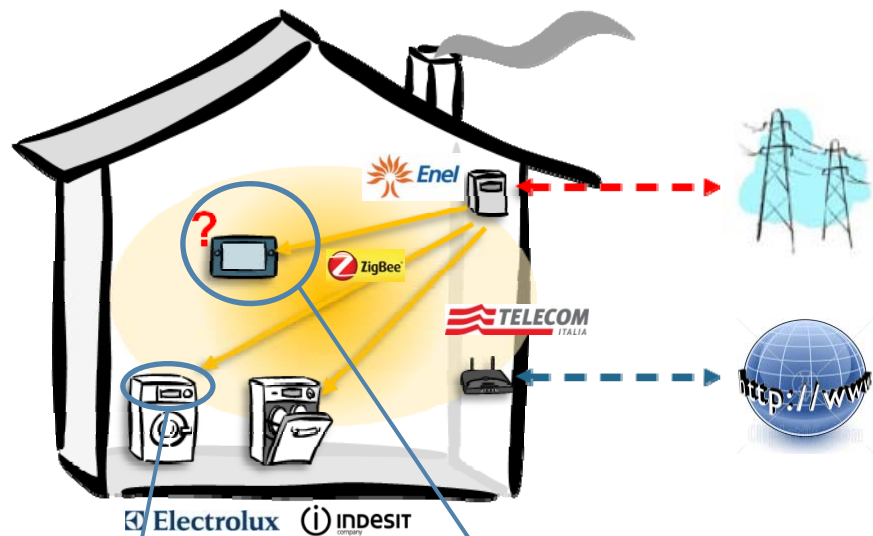


**The profile
has been designed to be
potentially mapped as an
extension of existing
standard Public profile**

Smart Appliances Scenarios in E@H

Customer energy awareness

Customer energy awareness alone could reduce up to 15% energy consumption (Darby – Oxford university).

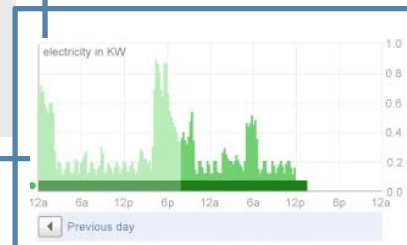


The user could improve her/his awareness on energy consumption and cost using information coming from the grid and the home itself.

Data and information refer to:

- User and contract references
- Current power use
- Historical data
- Current tariff and tariff time frames
- Overload Alarms

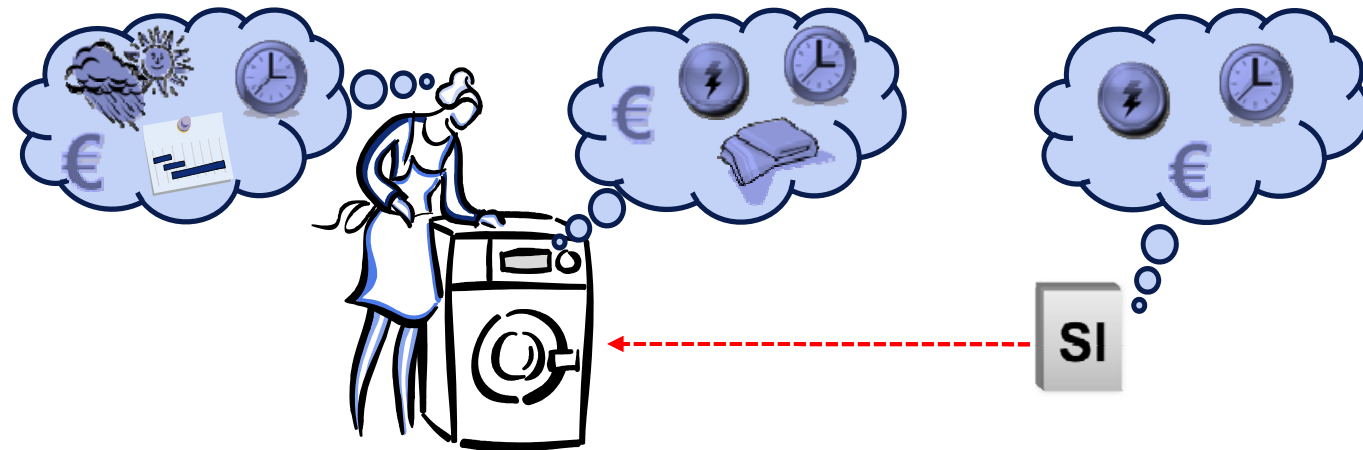
The cost for the selected cycle is...



Smart Appliances Scenarios in E@H

Self Management Appliance Regulation

The **Self Management Mode** is the condition where any Smart Appliance receives Price and Volume Signals from a device (Smart Info or Smart Meter or basic Home Gateway) and proposes the customer the proper **starting time** to take advantage of the most advantageous tariff. The customer could override the proposal if needed. This is made independently and without any coordination with the other devices.

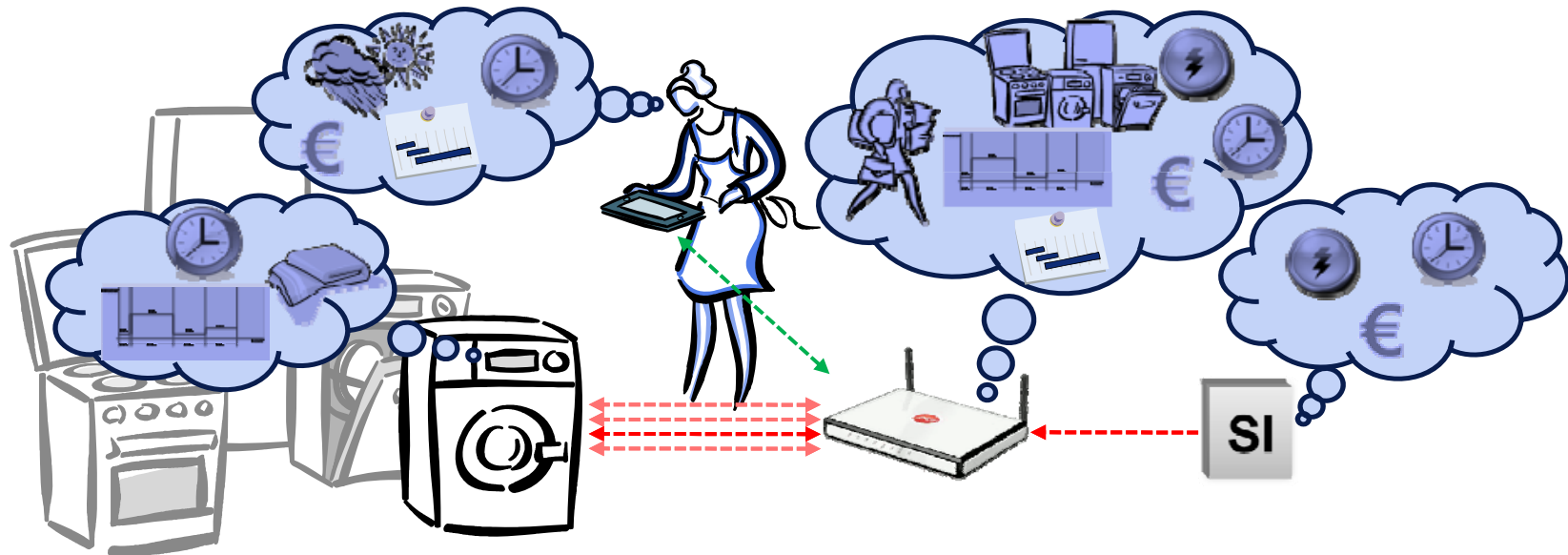


Smart Appliances Scenarios in E@H

Coordinated Management Appliance Regulation

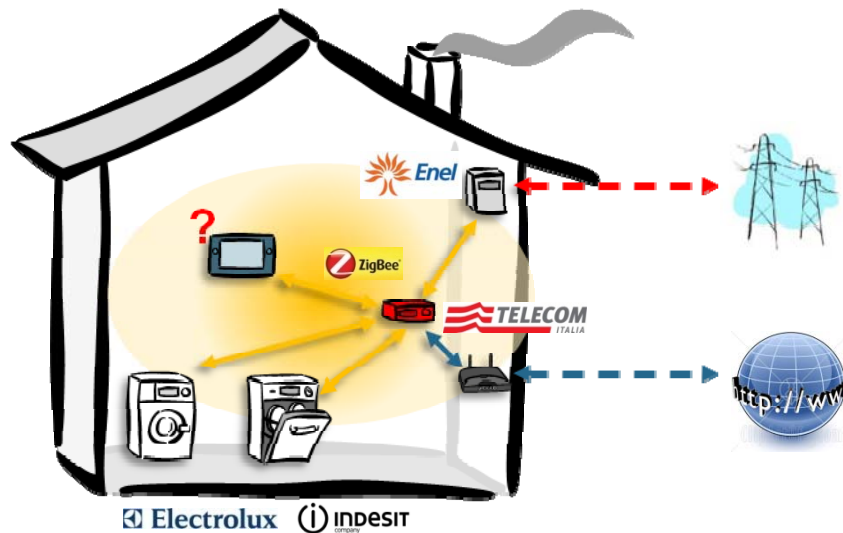
The **Coordinated Management Mode** is the condition where any Smart Appliance coordinates its operations with the Home Gateway.

The Home Gateway, through a dialogue with the Smart Appliances, **plans** their operations taking into account Price and Volume Signals, selected Household Appliances programs and Customer needs and constraints.



Smart Appliances Scenarios

Enabler for new Value Added services

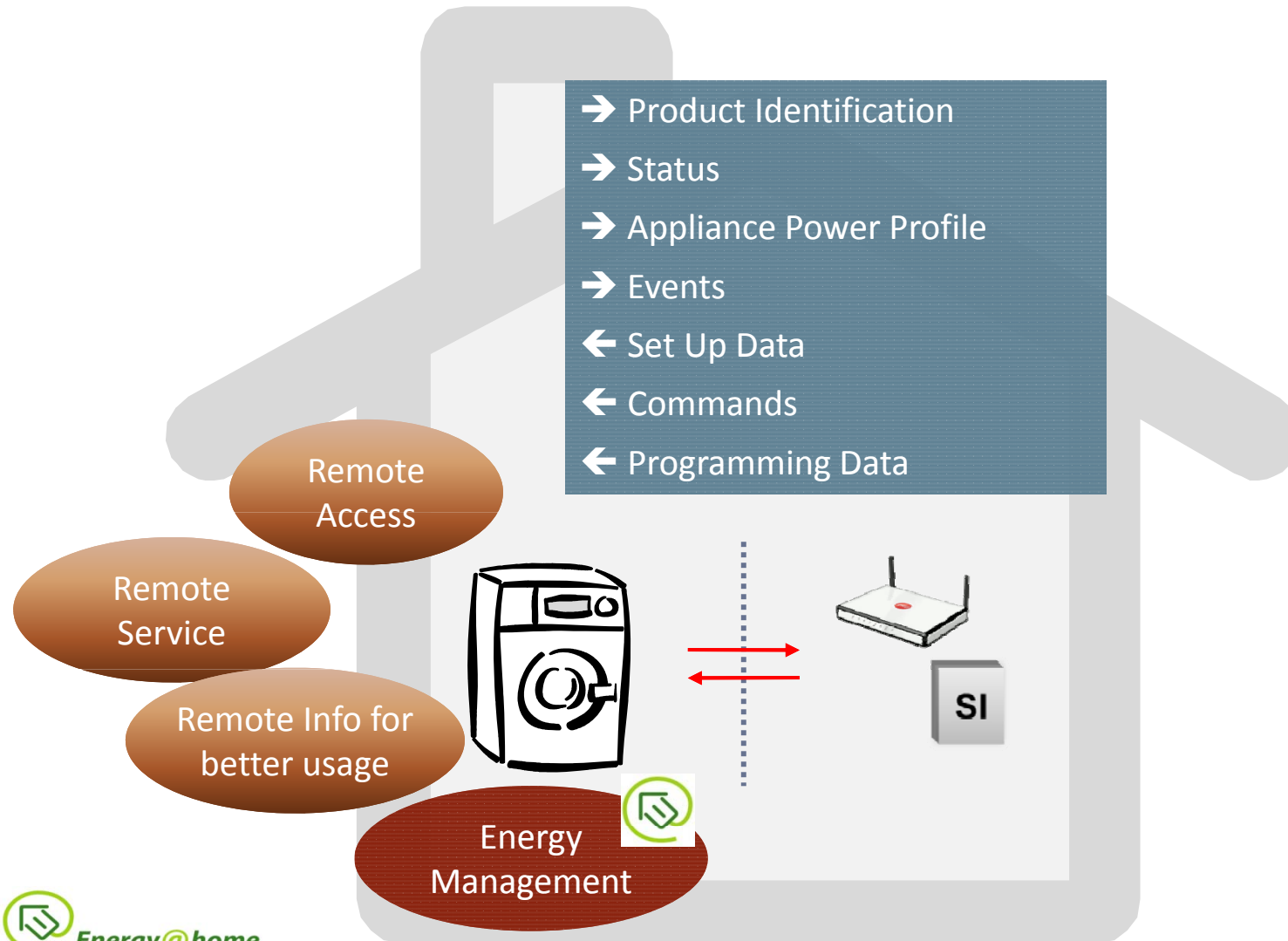


The infrastructure for “Smart Grid” and Energy Management advanced functions enables also the extension to a **new set of services** dedicated to the appliance users as:

- remote access for monitoring and control;
- remote preventive maintenance;
- dedicated marketing services

Smart Appliances in Energy@Home

Co-operation between the Home Gateway and the Smart Appliances



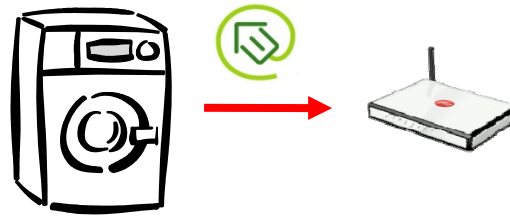
Smart Appliances in E@H: Status and Power Profile

Status

- Status
- Current Cycle – Current Phase
- Time To End
- Start Time
- Finish Time

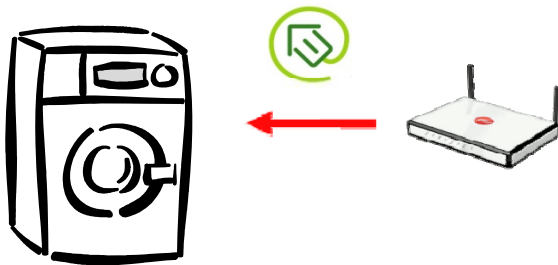
Events

- Faults
- Warnings



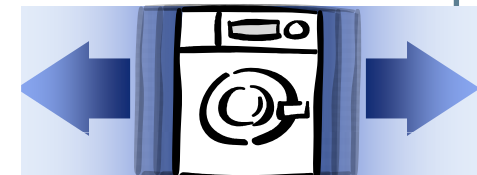
Appliance Power Profile

- Appliance operation -> sequence of electrical loads activation/deactivation (**Power phases**)
- Sequence of Power phases -> **Power Profile**
- Power Phase (basic “uninterruptable” elements):
 - ✓ Expected duration
 - ✓ Peak Power consumption
 - ✓ Maximum activation delay
 - ✓ Expected Energy consumption



Commands

- Based on Smart Appliances Reactive Attitude (**Load Shifting**)
- Depending on Smart Appliances **set up** and **constraints**
- Commands:
 - ✓ **DELAY START**
 - ✓ **PAUSE BETWEEN PHASES**
 - ✓ **OVERLOAD PAUSE**



Energy@Home: Conclusions & Next Steps

Objective:

To define a open and standard platform for the indoor communication between home appliances, smart meter and broadband gateways to enable energy efficiency services

Project Partners:



Project Timeline:

