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Lot 33 Preparatory study Smart appliances

Under multiple framework contract N°ENER/C3/2012-418-Lot N°1

Project team at Stakeholder Meeting 19 November 2015:
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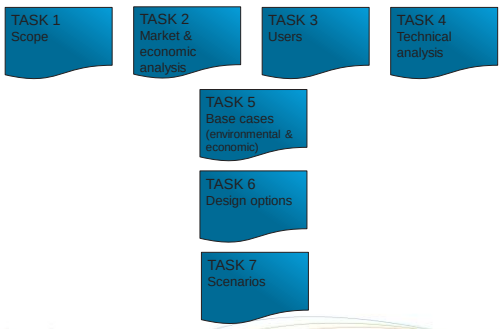
Goal of the Lot 33-Preparatory Study

Preparatory Studies analyse the technical, economic, environmental, market and societal aspects of a product group according to the "MEErP" (Methodology for Energy related products)

The Lot 33-Preparatory Study (kicked off in October 2014):

- has a horizontal approach
- is mainly about functionalities (strong focus on demand response)
- assesses possible positive and negative impacts of these functionalities on the environment, consumers, industry etc.

MEErP Tasks overview



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TASK 1 REPORT – SCOPE

MAIN COMMENTS FROM STAKEHOLDERS

Sarah Bogaert & Koen Vanthournout,
VITO/EnergyVille

20 organisations

5 countries

174 stakeholders registered through the website http://www.eco-smartappliances.eu (manufacturers, associations, experts, member state representatives, etc.)

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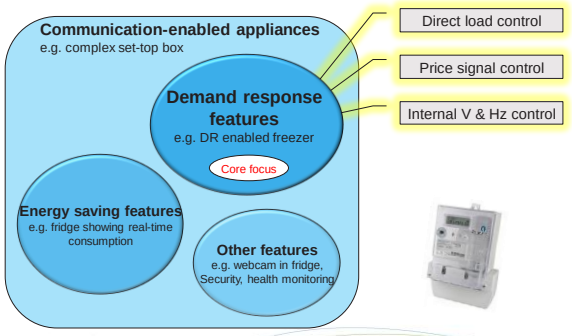
"Smart" Appliances under Lot 33



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"Appliances" under Lot 33

Focus on "end devices":

☞ Appliances that are being controlled…

…versus devices that control other appliances/end devices

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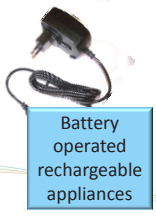
Appliance types



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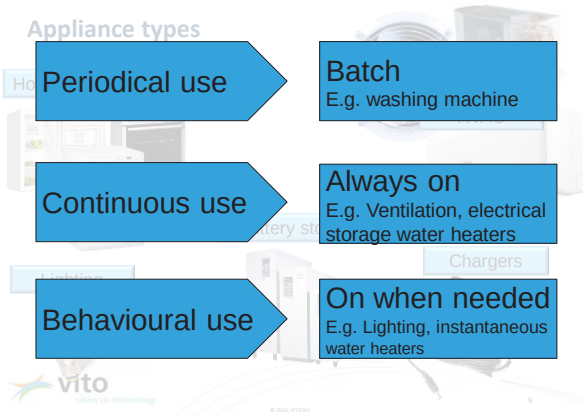
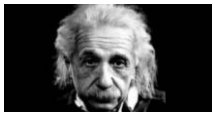


Scope – End-user

- Focus on appliances for residential consumers
- Large-scale industry applications are out of scope

- Include 2 commercial cases:
  - Commercial refrigeration appliances – data to be collected from industry
  - HVAC in tertiary sector

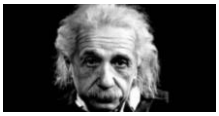
"Smart Appliance" under Lot 33 - Definition



For the purpose of this preparatory study,
a smart appliance is an appliance that **supports Demand Response** (DR):

- is an appliance that is able to **automatically** respond to external stimuli e.g. price information, direct control signals, and/or local measurements (mainly voltage and frequency);
- The response is a **change** of the appliance's **electricity consumption pattern**. These changes to the consumption pattern is what we call the 'flexibility' of the smart appliance;

"Smart Appliance" under Lot 33 - Definition (Footnotes)



Whereby:

- ~~The appliance is within the scope of the Ecodesign and Energy labelling framework;~~
- The specific technical smart capabilities do not need to be activated when the product is placed on the market; the activation can be done at a later point of time by the consumer or a service provider;
- A distinction might be made later in the process between appliances able to communicate and process external signals and (non-communicating) appliances automatically reacting to local power quality measurements.

Smart appliances - clarifications

- **Start time delay ≠ smart** because it is not automated. The action of the user would be smart, but the smartness is not part of the appliance
- No specification of who or what should activate the DR functionality. **All control architectures should be supported**, e.g.:
  - cloud model or central energy manager model
  - Central manager could be BACS that controls the smart appliances, both for DR and energy efficiency
  - Central manager could be the smart meter

Flexibility potential

The DR or flexibility potential of a group of appliances is defined by two parameters:

1. A **shifting potential** = amount of energy that can be shifted, expressed in [MWh/h].
2. **Average maximal shifting period** = average maximum number of hours [h] that appliance can be shifted (i.e., to consume later/earlier in time than initially planned)

Residential DR and the EU energy markets

- Organization of energy market influences
  - what DR business cases are possible
  - Business cases return and distribution
  - Remuneration mechanisms possible
- Significant variation between MS, e.g.:
  - Ownership of smart meter (e.g. DSO/retailer)
  - TSO ancillary service products and access to those services for DR sources
  - Support of variable tariffs and/or tariff structure
  - Role, obligations and rights of DR aggregators
  - Rights/methods of DSO's to interact with DR for safeguarding distribution grids from this extra source of variability
  - Mechanism to alter perimeter of BRPs with the effects of residential DR

Residential DR and the EU energy markets

- Focus of this study is on smart appliances and their capability and potential to support the possible range of DR business cases.
- **This study is not about market design, i.e. what market structure or business cases are to be preferred.**
- However:
  - T2 contains a list of remuneration mechanisms
  - T5 contains European market level simulations to estimate the potential economic and environmental value of smart appliances if used in day-ahead markets or for intra-day balancing

Examples of DR based on smart appliances

- Load shifting of heat pump supplied houses
- Self-consumption of on-site produced RES energy
- Variable pricing support by a washing machine
- Appliance-based system frequency control of freezers
- Added: Distribution grid congestion management by buffered water heaters
- Added: Frequency restoration reserves based on commercial refrigeration
- Added: Peak shaving combined with energy efficiency by appliances controlled by a building automation and control system

Closing remarks

- T1 was aligned to the Smart Grid Coordination Group reference developed through the standardization mandate M490
- Input from other (ongoing) initiatives (status updates and improved numbers)
- Spelling/wordings/layout edits.
- **Many remarks and questions will be addressed in the upcoming tasks.**

Thank you for all your input!

Target release of new Task 1 report on 11 Dec 2015