



Introduction

Paola Petroni – Milano 26 Novembre 2013



Outline

- *New features of the electricity networks*
- *Two case studies*
 - *Enel Info+*
 - *ADDRESS*
- *The path towards active consumers*

New features of the networks

- *Sensible presence of renewables*
- *Empowered consumers*
- *Electric mobility*

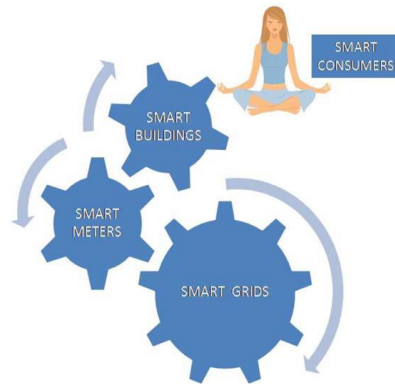


*Higher
Flexibility*



Active consumer

- *Are consumers willing to be active? Are they understanding what it means?*
- *It takes an **enabling infrastructure** that develops new behavioral patterns*
- *It takes the consumers on **a journey** towards active demand*



Two case studies



address

interactive
energy

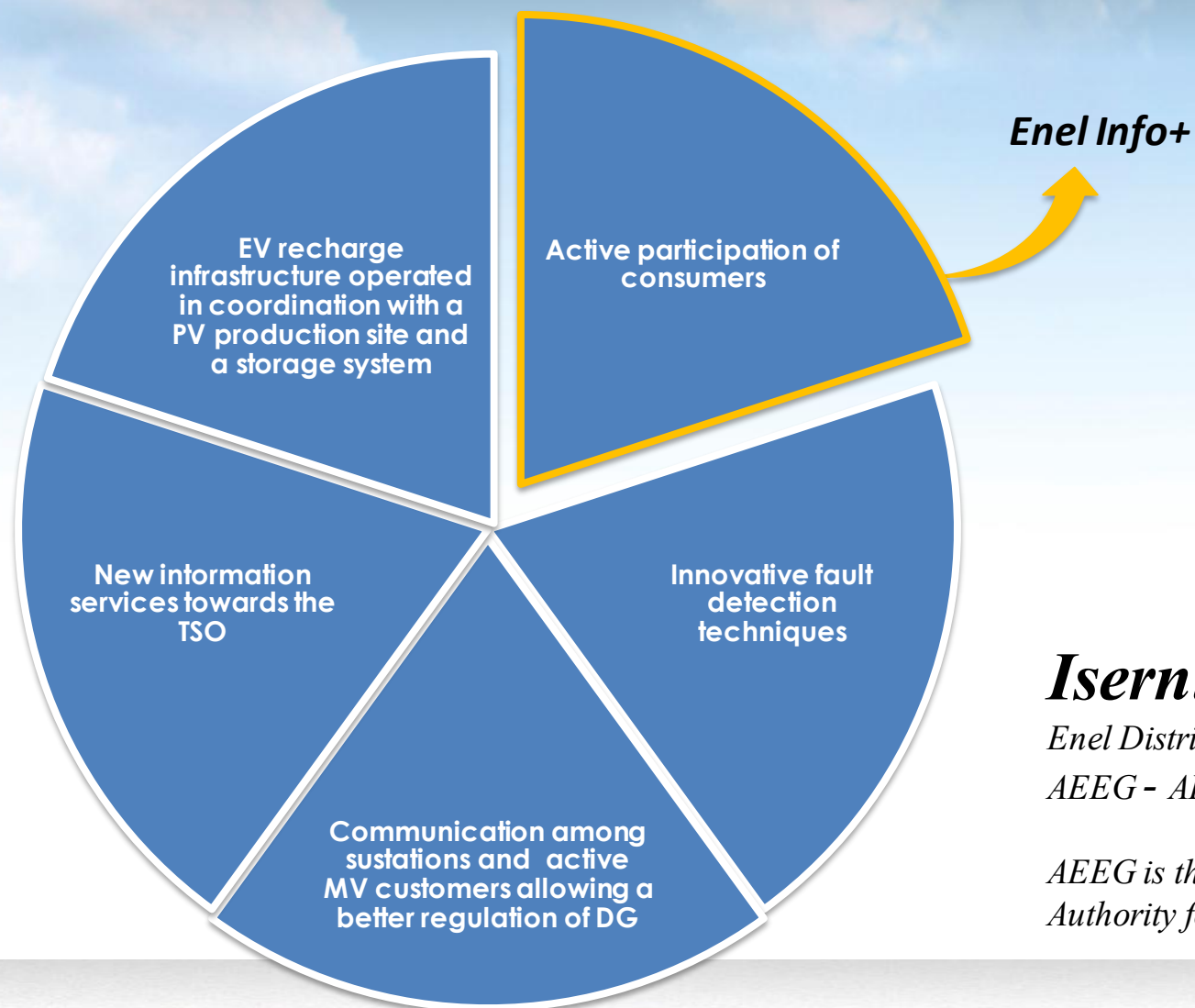


Project co-funded by the
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the 7° Framework Programme

Two case studies: Enel Info+



An example of solutions



Isernia Project

Enel Distribuzione

AEEG - ARG/elt 39/10 act

AEEG is the Italian Regulatory Authority for Electricity and Gas

Enel Info+ The project site



19 small towns in Molise

Electricity grid:

- Performances: high*
- RES connected at MV level: high*

Field statistics:

- Around 22.000 eligible LV households, whereof hundreds eligible prosumers*
- Average age: > 40*
- Average Computerization: low-medium*

Sample statistics (11/2013):

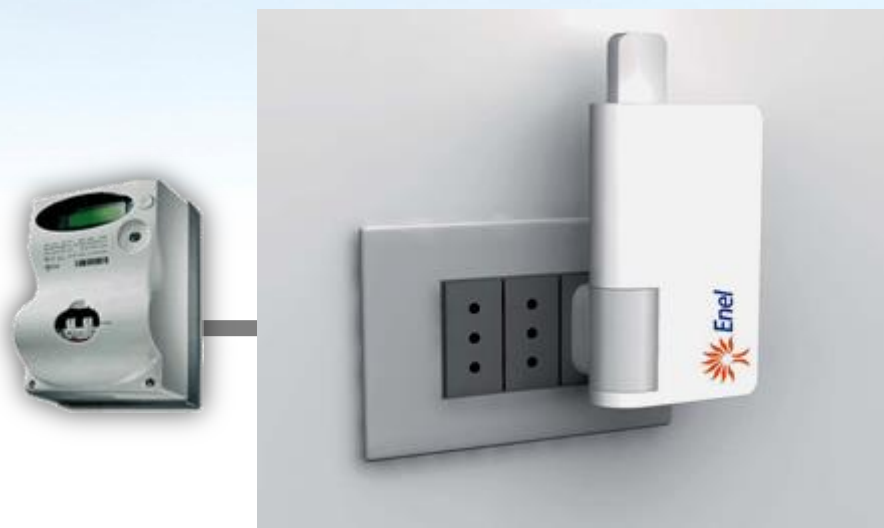
- More 3000 households on board, whereof >50 prosumers*

Up to Dec 2014



Enel Info+ Metering data at hand

Enel smart info



*Plugs into one of the house
electricity sockets*

*Univocally associated to your
own meter*

*Makes consumption or generation
meter data available*

The Enel Info+ kit

Smart Info



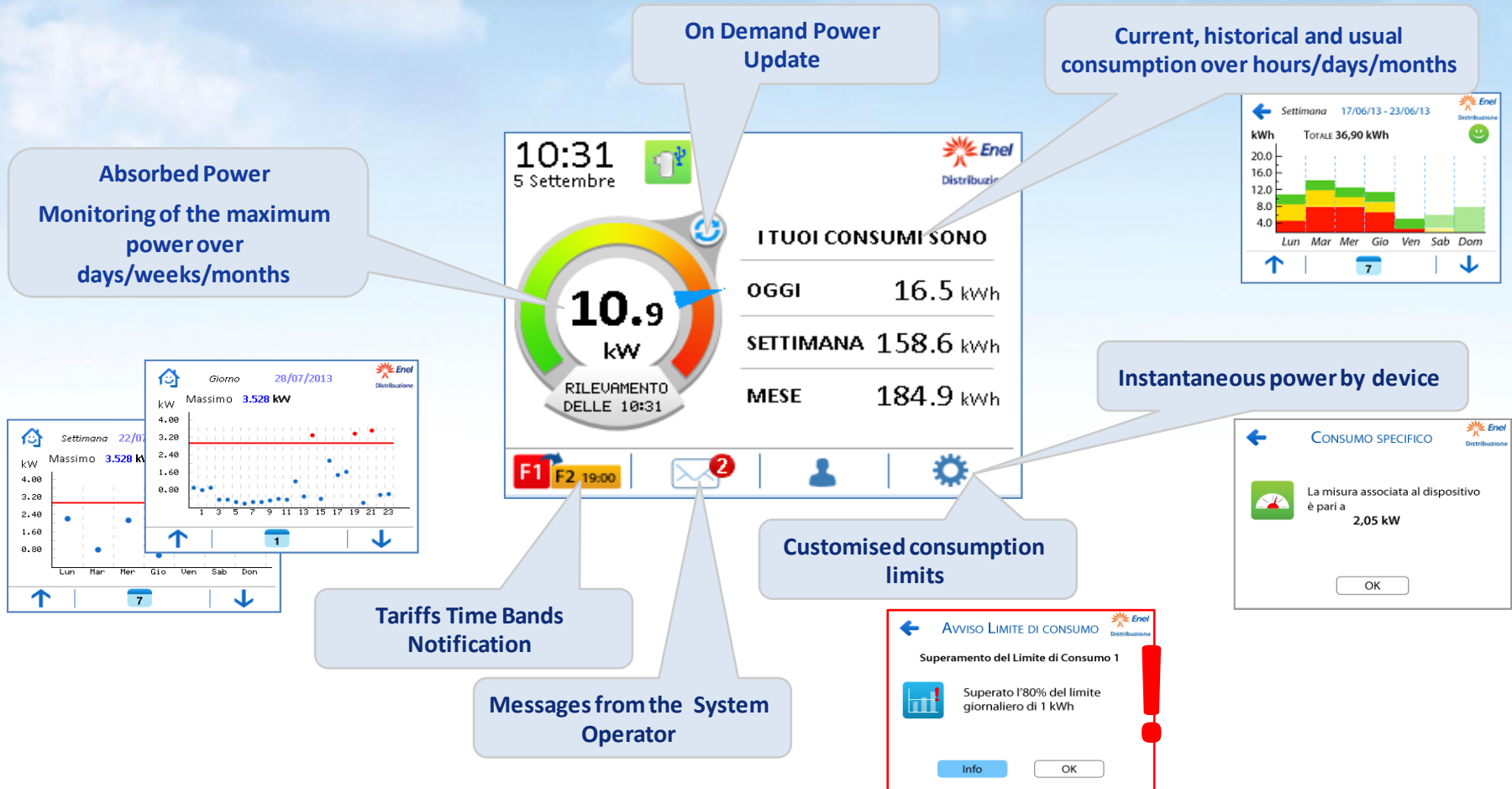
Smart Info
Display

Smart Info
Manager



Smart Info
Mobile

Enel Info+ Smart Info Display



Enel Info+ Preliminary results



82% used display at least 2/3 times a week



96% said they are more aware of their consumption



96% said they had changed their consumer habits thanks to the kit



51% said they had changed the time of use of appliances



70% would recommend to a friend or relative to participate in the trial Enel info +



51% believe it's useful to have the energy consumption always under control

Two case studies : ADDRESS

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ADDRESS – the conceptual model

Provide AD

through the flexibility of their demand of electricity

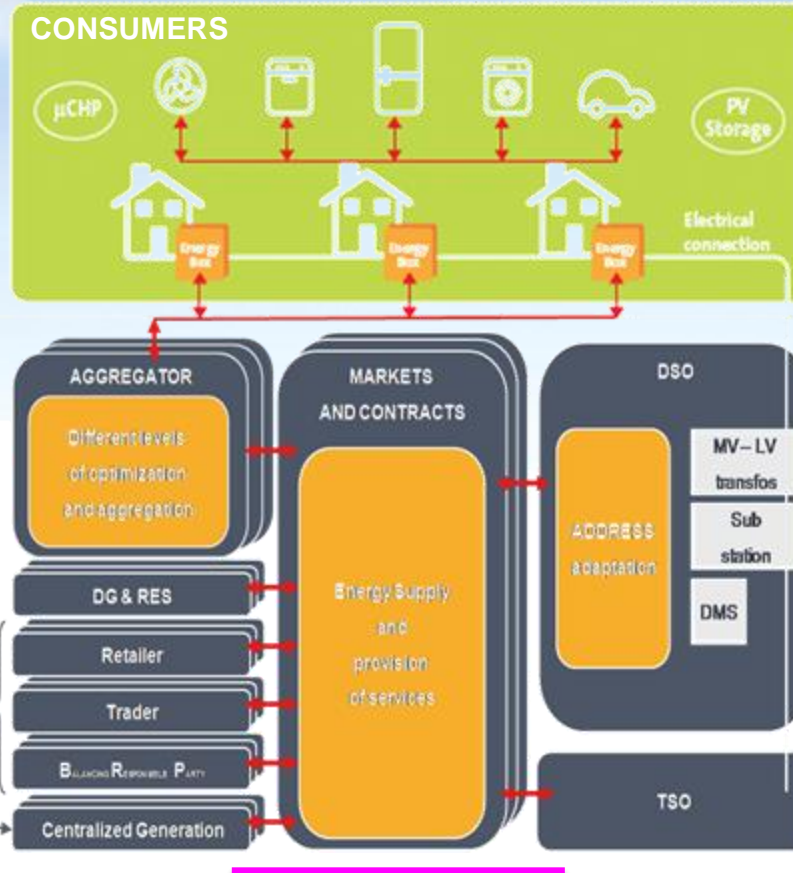
demand is made flexible controlling the operation of some appliances, embedded generation and storage systems

Offer AD products

obtained by the aggregation of many consumers' flexibilities

Buy AD products

from aggregators in order to get services for their business



Implement AD

manage electrical demand using as drivers: incentives signals coming from the aggregator + consumer's comfort

Enable AD

providing supporting services necessary for the active demand business as consumers' mapping on the grid and technical validation of AD products

Trade of AD products can be done in markets or through bilateral contracts and call for tenders

ADDRESS – Active Demand services

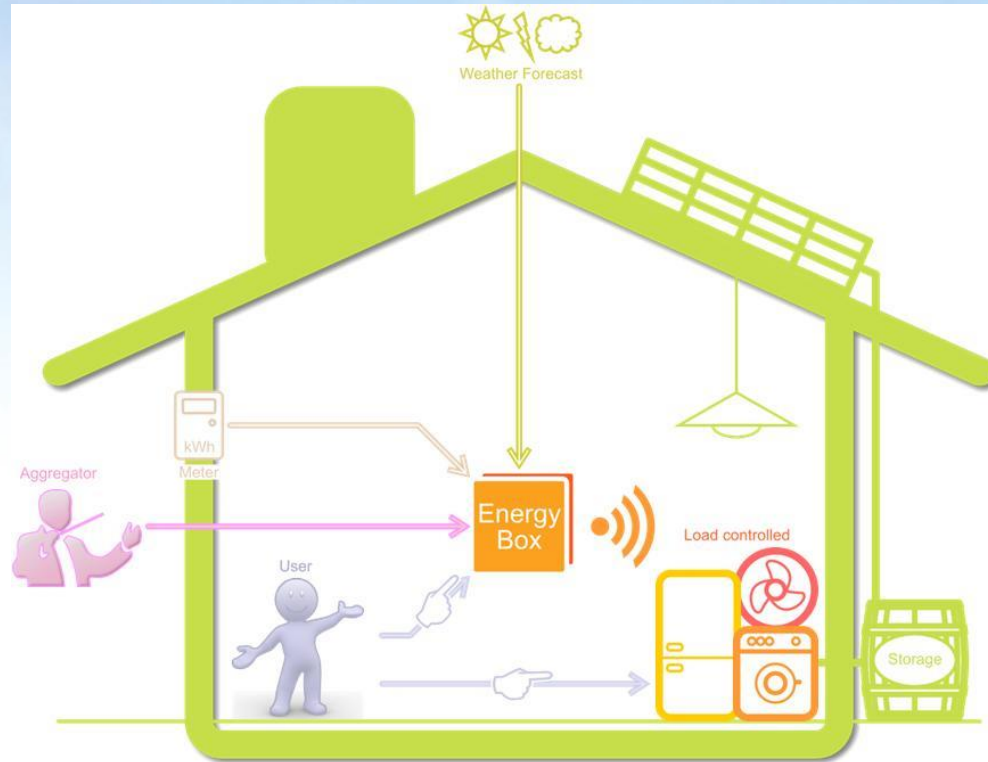
31 AD services

7 for regulated players(DSO, TSO)	24 for deregulated players
<p>Voltage regulation and power flow control</p> <p>Tertiary active power reserve</p> <p>Smart load reduction to avoid “blind” load-shedding</p>	<p>Optimisation of purchases and/or sales of electricity</p> <p>Balancing of generation or consumption (to reduce imbalance costs)</p> <p>Optimisation of generation investments costs</p> <p>Optimisation of generation management</p> <p>Reserve capacity to minimise risks (price-volume)</p> <p>Tertiary reserve to fulfil obligations wrt TSO</p>

3 standardised products

Scheduled re-profiling (SRP)	Obligation to provide a specified demand modification (reduction or increase) at a given time to the product buyer.
Conditional re-profiling (CRP)	Must have the capacity to provide a specified demand modification (reduction or increase) during a given period. Delivery called upon by buyer (similar to reserve service)
Bi-directional CRP (CRP-2)	Same as CRP but demand modification in a bi-directional range $[-y, x]$ MW, including both increase and decrease.

ADDRESS – the home system



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ADDRESS – Results of the societal surveys

About future adoption of active demand

- *55% of respondents from Spanish field trial and 72% of respondents from the French field trial would consider an ADDRESS style technology*
- *Consumers interested in a variety of interfaces – usability and accessibility are key*
- *Settings have to fit in with daily life*
- *An override facility is essential*
- *Consumers are afraid of the possibility to interrupt some appliances such as fridge and freeze.*
- *Additional features such as provision of consumption information are desirable*
- *A preference for existing suppliers to supply AD services*



ADDRESS – Results of the societal surveys

Who are future Active Demand consumers?

2 clusters of potential users were identified:

- Effective time managers*
 - Found the technology intrusive BUT this was accommodated by*
 - Changing EBox settings*
 - Being at home for part of the day*
- Laid back (relaxed) adopters*
 - Did not find the technology intrusive*
 - Did not change EBox settings*



ADDRESS – Lessons learned

Provision of services by AD is technically feasible

A high motivation of the participants

- *Improvements are needed before a possible deployment in particular in terms of communication and robustness of the equipment*
- *Communications are the most significant issue to perform the AD program:*
 - *Comms ATB vs Ebox and Ebox vs HAN are key to be able to get the information to tune the system and the program.*
- *Power profile taken from the smart metering system (AMI) is of outmost importance to tune the program and for settlement*



The path towards active consumers





Energy@home

ΕΝΕΡΓΙΑ@ΜΟΙΑΣ

Grazie



Enel Info+ Functionalities

Smart Info Display

- Current, historical, usual consumption
- Tariff time bands notification
- Power/Consumption limits monitoring
- Contractual data visualisation
- Messages from SO
- Single appliance power

Smart Info Manager

- Detailed analysis of load profile
- Comparisons in time
- Comparison generation vs consumption
- Energy efficiency suggestions

Smart Info Mobile

All information accessible from a smartphone



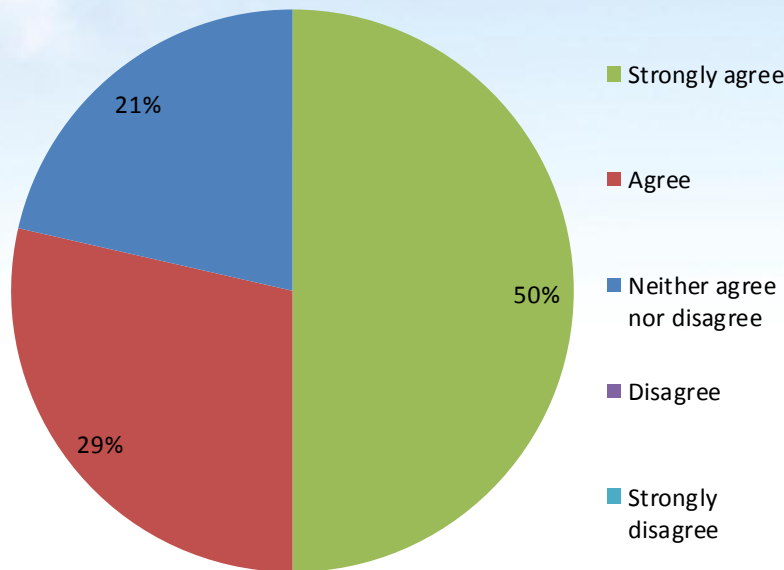
Data Analytics



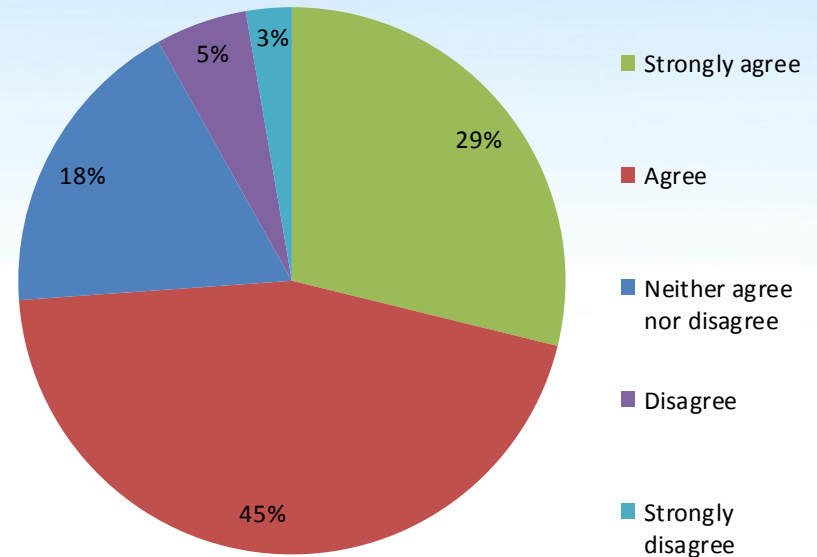
ADDRESS – Results of the societal surveys

Perceive a role for new technology to help control energy consumption?

Reduce consumption with help from technology
(French field test)



Reduce consumption with help from technology
(Spanish field test)

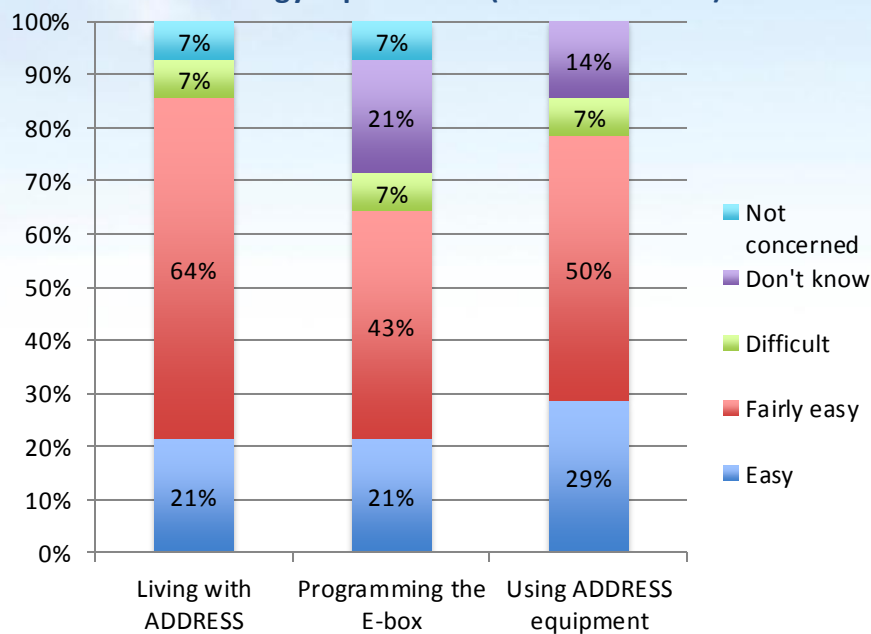


“We might be able to operate differently. It would be nice to get this new solution. It would be intelligent and I would adapt myself to this new situation”(F)

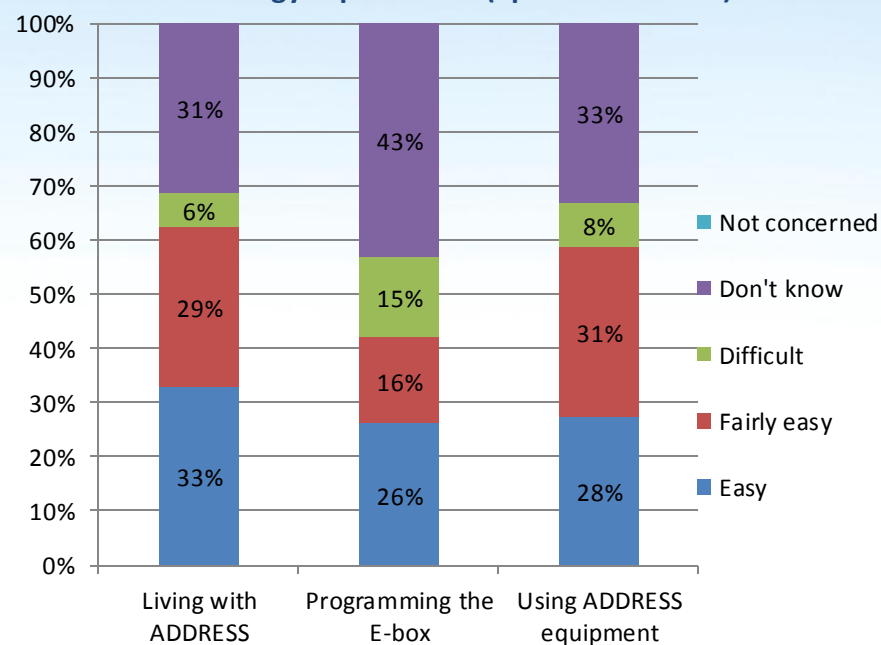
ADDRESS – Results of the societal surveys

Expectations of the ADDRESS technology?

Technology expectations (French field test)



Technology expectations (Spanish field test)



How to implement the enabling infostructure

- Pilot
- Smart cities
- Commercial initiative
- Synergies
- Standardization