

Smart Domestic Appliances in Sustainable Energy Systems – consumer acceptance and restrictions

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Intelligent Energy  Europe

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Overview

- Introduction to the EIE-project **Smart-A**
- Consumer survey:
 - Smart scenarios
 - Methods and sample characteristics
 - Results of consumer survey
 - Consumer objections and wishes
 - Conclusions

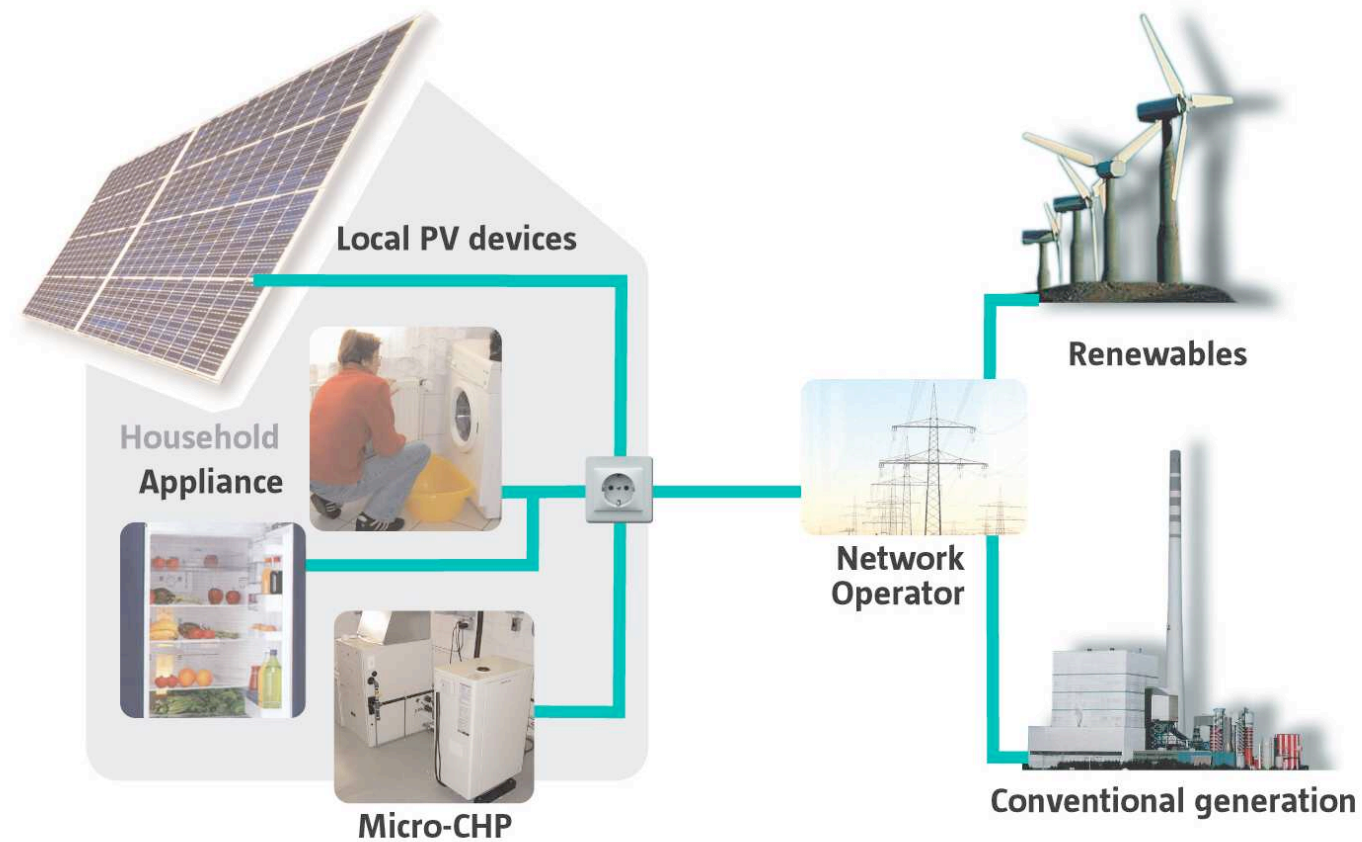


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Smart-a Starting Points

- Household appliances represent a significant part of energy consumption. Recent technology developments allow for smart operation of these appliances.
- In most energy systems, the management of timing of demand is a critical issue. Possibilities for storing energy are limited and usually costly.
- This issue is becoming more relevant than before in sustainable energy systems, which rely strongly on renewable energy and high-efficiency cogeneration.
- Improved coordination between supply and demand of energy is possible (and necessary)
 - on the object level
 - on the network (and energy market) level

The Smart Appliances Vision



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Smart appliances use: scenario A

User sets washing machine in remote control and defines till when the operation has to be finished at the latest time. Operation starts after appliance receives a signal from the energy supplier that cheap and renewable energy is available.



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Smart appliances use: scenario B

User wants to start dish washer and receives information via display on the appliance that for financial and ecological reasons it would be better to start it at a specific time later that day.



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Smart appliances use: scenario C

Refrigerator is set in
“smart operation mode” by
pressing a button on it.
Operation is regulated by
energy supplier.



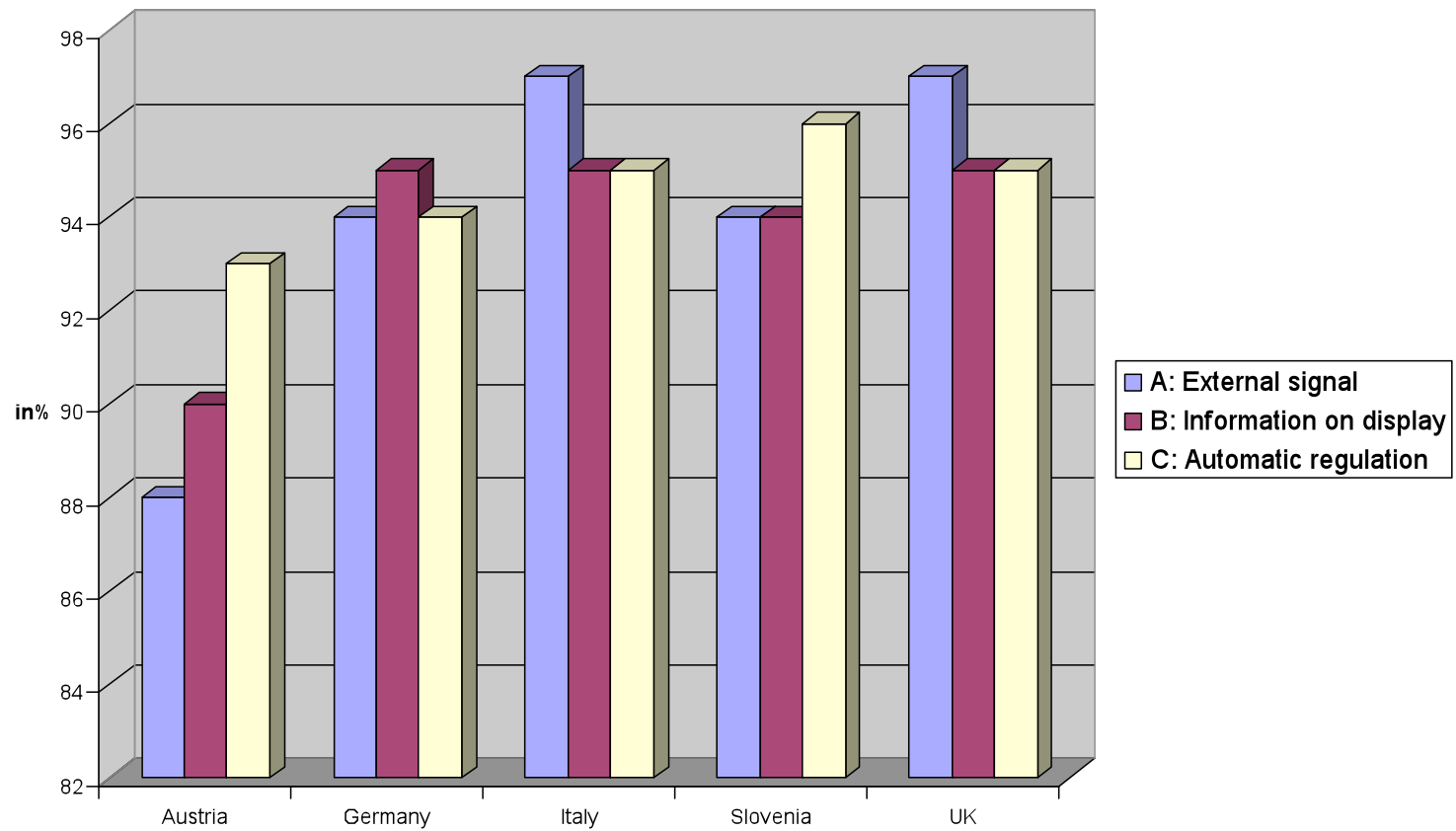
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Consumer survey: Sample

	Austria	Germany	Italy	Slovenia	United Kingdom
Survey	943	1332	200	200	232
Phone interviews	10	10	-	-	10
Focus groups	2	2	-	3	3

Consumer acceptance: Washing machine

Washing machine: Acceptance of smart operation



Qualitative research: Washing machine

- Barriers:
 - Consumers don't want to leave appliance unattended
 - Consumers don't want to leave wet laundry in the machine
 - Noise during night
- Time interval for smart operation is limited
 - Depends strongly on individual habits
 - Users want to control when operation starts and ends



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Dish washer

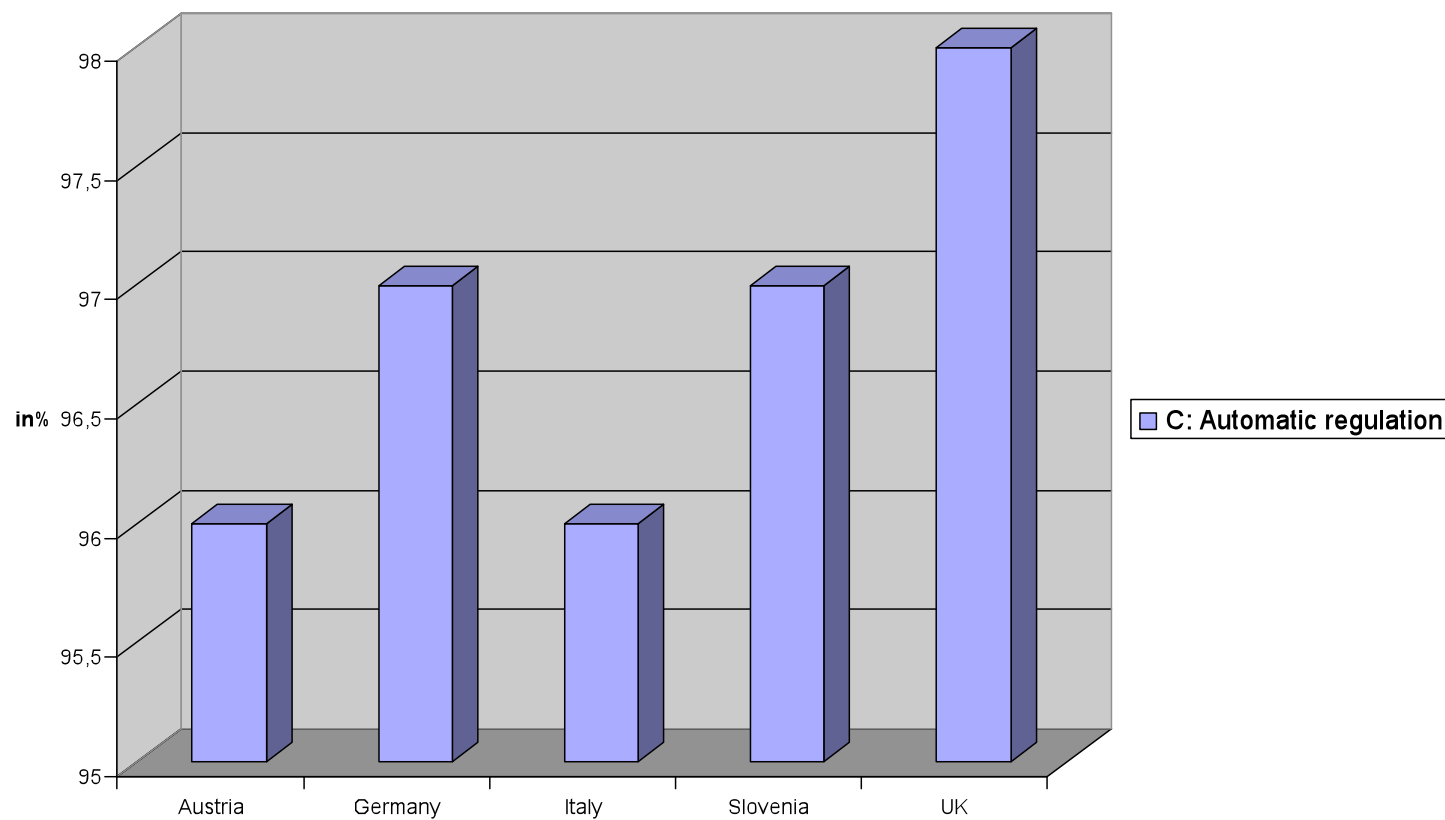
- High potential for smart operation
 - Consumers have less objections in comparison with other appliances
- High potential to use it during night
- Longer time shifts are acceptable
- Smart option might be used up to 80% or 100%



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Refrigerator/Deep freezer

Refrigerator/Deep freezer: Acceptance of smart operation



Refrigerator/Deep freezer

- High objections against smart operation of fridge and freezer because of health issues
- Higher acceptance for electric boiler and electric space heating, if comfort is maintained

Consumer acceptance

- In theory very high acceptance ($> 85\%$) of smart options, but...
- Economic benefits are main trigger
 - Ecological reasons are important too, but secondary or viewed as a positive side effect
 - Short amortisation ($< 3\text{yrs.}$)
 - Both cheaper tariffs or reward for each smart operation are acceptable
- Consumers don't want to change routines and habits

Objections

- Loss of control
- Health and safety issues (fire, flood, food might be compromised)
- Doubts about maturity of technology
- Scepticism about ecological benefits



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Consumer wishes

- Economic incentives
- Enhanced safety functions (overloading signal, temperature surveillance, water stop, detection of technical faults)
- Enhanced comfort and usability
- High quality support and service
- Attractive design



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Conclusions

- Build trust in technology and support of Smart-A concept by independent institutions
- Attractive financial scheme
- Information campaign



Smart-A Partners and Contact Information



Project Website:

<http://www.smart-a.org>

Final Project Workshop & EEDAL conference: Berlin, 15. June 2009