



ISR
University of Coimbra

Intelligent Energy  Europe

Workshop
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Overview of the REMODECE project

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Objectives of the Project REMODECE

**REMODECE = Residential Monitoring to Decrease Energy Use
and Carbon Emissions in Europe**

- Contribute to an increased understanding of the electricity consumption in the EU households for the different types of equipment, including the consumers' behaviour and comfort levels.
- 12 countries are directly involved:
Portugal, France, Germany, Denmark, Norway, Bulgaria, Czech Republic, Greece, Romania, Belgium, Hungary, Italy
- 2 countries take over parts of the project: Switzerland, Austria
- Evaluation of the potential electricity savings that can already be implemented by existing means.
- Definition of strategies to achieve a desirable market transformation.
- Policy recommendations for each type of equipment.

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Methodology of the project

- (1) Analysis of already existing studies, surveys, metering campaigns, databases, statistics, manufacturer's information and other market information on electricity consumption in the residential sector, with focus on end-use equipment and operating modes.
- (2) **Survey (at least 500 questionnaires per country)** addressing user behaviour with regard to electrical appliances and electronic equipment.
- (3) **Monitoring campaign in 100 households per country**, metering electronic load and providing demand load profiles in real situations.
 - In Western European countries the main focus is on new electronic loads (home entertainment, IT technologies, standby) and lighting
 - In Southern countries, air conditioning loads are investigated, too.
 - In Eastern countries, conventional loads (white appliances) are also measured.



Household survey: Questionnaire

- Homogeneous questionnaire for all countries
- Different modules for each type of equipment:
- Main focus on equipment of households with energy-consuming devices and on behaviour with regard to energy consumption

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- [Module B: Cold appliances](#)
- [Module C: Washing appliances](#)
- [Module D: Cooking appliances](#)
- [Module E: Office appliances](#)
- [Module F: Home entertainment](#)
- [Module G: Air conditioning/Comfort cooling](#)
- [Module H: Lighting](#)
- [Module I: General points](#)

Module A: Household details

A1 Location and contact details

Post code	
Phone number	

required if you would like an evaluation of your electricity consumption

A2 How many persons live in the household in the following age groups?

Age 12 and less		
Age from 13 to 18		
Age from 19 to 65		
Age more than 65		

A3 What is the highest education level in the household?

No degree or certificate	<input type="checkbox"/>
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A4 What was your electricity consumption invoiced by your electricity company last year?

In euros	
In kWh (if known)	

A5 What type of building do you live in?

Single family house
 Multi-occupancy building

A6 Do you use electric space heating?

Yes
 No

A7 Do you use electric water heating?

Yes
 No



Different techniques for collecting the questionnaires

Country	Number of questionnaires received	Number of questionnaires by type of survey
Belgium	548	Face to face interviews:56 Internet: 492
Bulgaria	504	Face to face interviews:80 E-mail:95 Mail:329
Czech Republic	388	Online (web-based platform):388
Denmark	500	Online (web-based platform):500
France (Enertech part)	102	Face to face interviews:34 Email: 1 Mail: 28 Distributed at the beginning of the monitoring campaign and collected at dismantling time: 39
Germany	545	Mail:545
Greece	190	Online (web-based platform):52 Email: 138
Hungary	87	Face to face interviews: 87
Italy	500	Face to face interviews:64 Online (web-based platform):436
Norway	197	Internet: 197
Portugal	306	Face to face interviews: 100 Online (web-based platform):141 Email: 65
Romania	623	Face to face interviews: 623



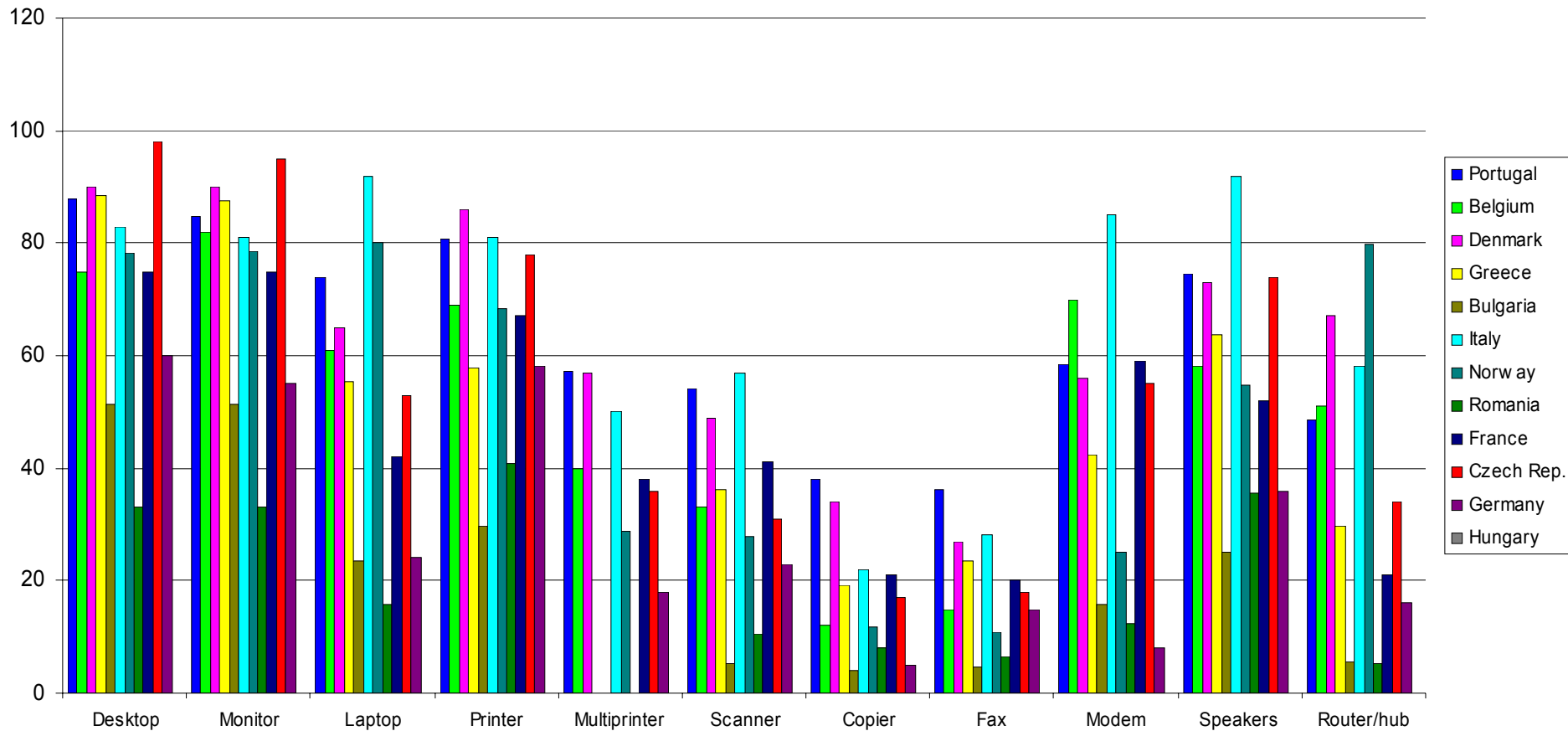
Average monthly electricity consumption per household

Country	Portugal	Belgium	Denmark	Greece	Bulgaria	Italy	Norway	Romania	France	Czech Rep.	Germany
In euros/month	50,0	92,1	78,0	52,3	23,8	54,2	146,9	18,9	87,5	39,1	51,7
In KWh /month (if known)	358,7	466,8	373,0	395,4	321,7	270,0	1692,5	145,2	808,3	354,8	289,5

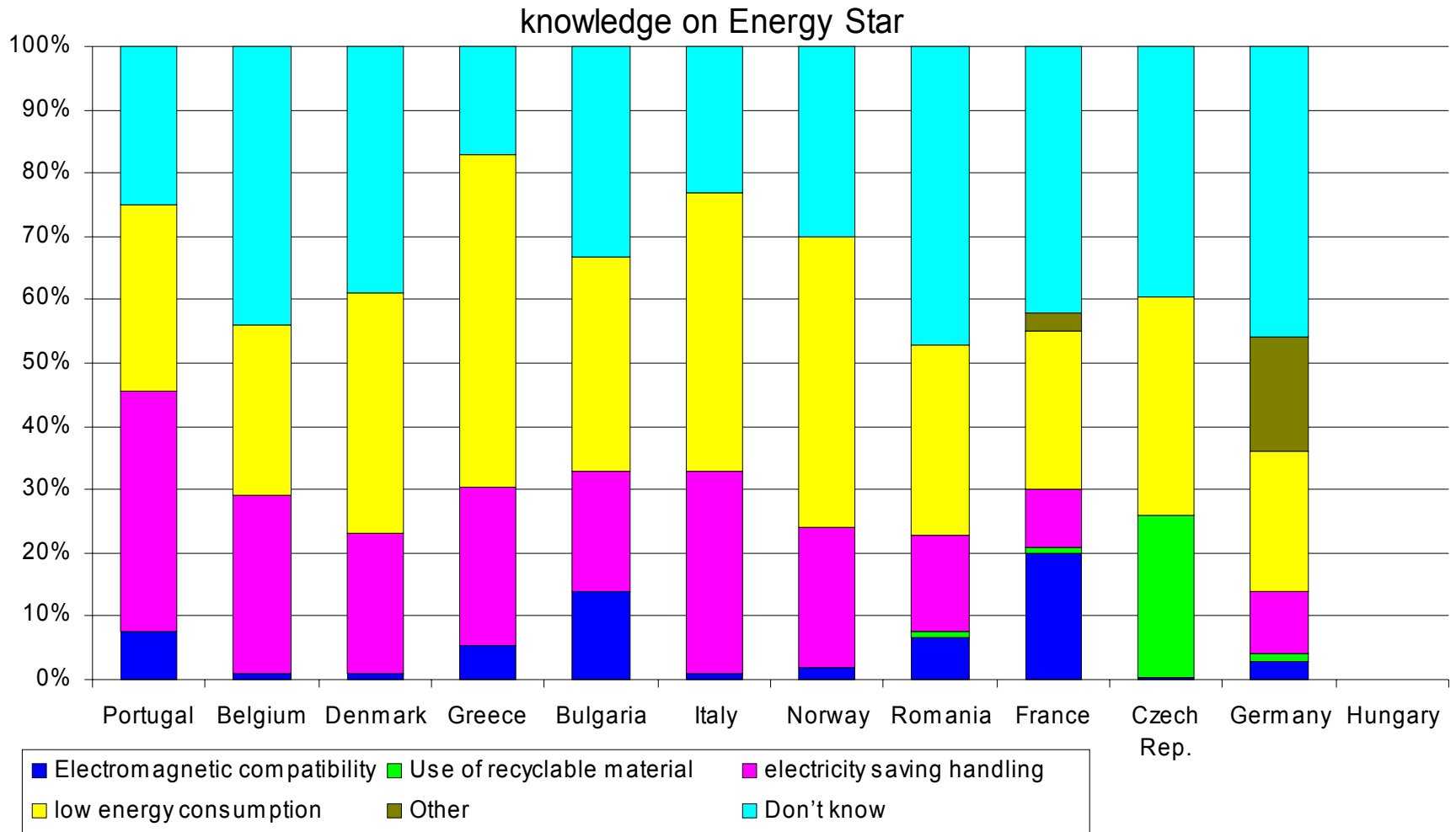


Ownership rates of electrical appliances in households

Ownership Rates

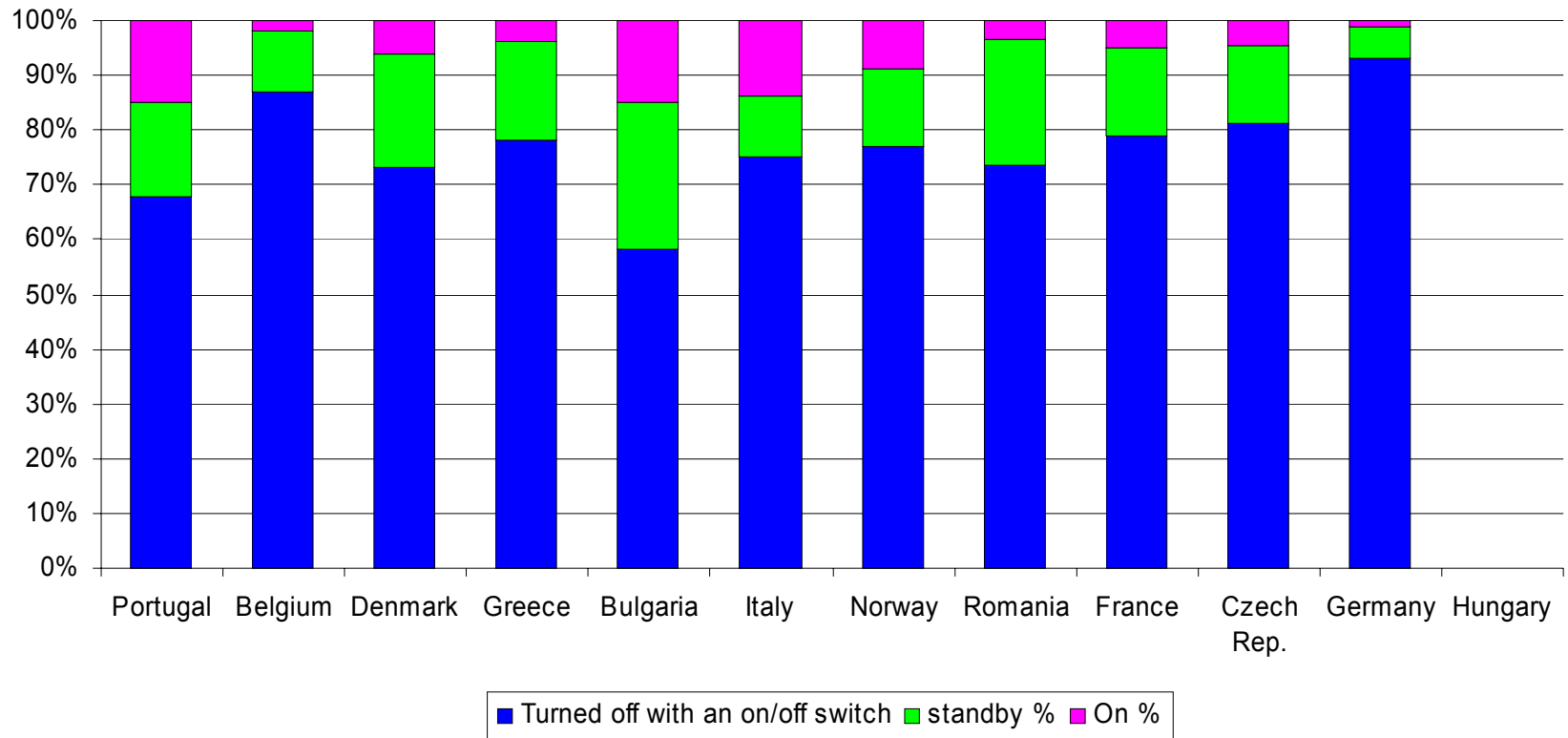


Little knowledge on Energy Star in all countries



But energy-conscious behaviour when the device is not used

State - Desktop



Monitoring campaign: methodology and problems

- Choice of households: representative sample with regard to size, age, education level and type of building was aimed at.
- Total electricity consumption of the household: metered or read from the electricity meter.
- Metering period: 2 weeks in most of the countries.
- For electronic load by type of equipment and lighting: 10 min integration period plus spot measurements of all appliances in every mode of operation.

Main problems:

- Lack of monitoring equipment at reasonable prices and at convenient delivery times \Rightarrow separate metering of all individual loads was not possible; delay in the time schedule of the project.
- To find enough households which are willing to participate in the project \Rightarrow the sample may be not fully representative.

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Main outcome of the REMODECE project (1)

- **Updated European database** on residential electricity consumption, including Central and Eastern European countries:
 - Specific consumption of electrical appliances by type and country ("present state" as metered in the monitoring campaign)
 - Total consumption of electrical appliances per year (projection from the monitoring campaign)
- **Electricity saving potentials** by type of equipment ("present state" from monitoring campaign vs. BAT)



Main outcome of the REMODECE project (2)

- A **user-friendly software tool** to evaluate the energy performance of households ⇒ "Household Energy Tool"
- A set of **policy recommendations** for each type of equipment, which can lead to a successful market transformation and to provide cost-effective energy and carbon savings.
- **Brochure** for each country including general results of the project and individual results for the respective country ⇒ all Workshop participants will get the brochure for Germany by e-mail (probably in July 2008).



Household Energy Tool

0 children less than 6 0 children from 6 to 16 0 young people from 16 to 25 0 persons from 25 to 64 0 persons over 64

2 - Your type of household... 3 - Heated area... 4 - Building year (or last home renovation)...

house flat 0 m² <1975

4 - What type of energy do you use for hot water production 5 - What type of energy do you use for heating 6 - What type of energy do you use for cooking

electric electric with central storage induction stove with electric oven

7 - What's your last year electric consumption ?

0 kWh

II - Cold appliances

1 - Select the type for your 1st fridge

Type : None Size : Small (<90cm) Age of the appliance : < 5 years

2 - Select the type for your 2nd fridge

Type : None Size : Small (<90cm) Age of the appliance : < 5 years

3 - Select the type for your 1st freezer

Type : None Size : Small (<100 l) Age of the appliance : < 5 years

4 - Select the type for your 2nd freezer

Type : None Size : Small (<100 l) Age of the appliance : < 5 years

III - Washing/Drying


1 - How do you usually wash your dishes ?

Type : By hand Age of the appliance : < 5 years Number of washing cycles per week : 0

2 - How do you use your washing machine ?





Project website: www.isr.uc.pt/~remodece



REMODECE

Residential Monitoring to Decrease Energy Use and Carbon Emissions in Europe

Home	Scope
News	<p>Although significant improvements in energy efficiency have been achieved in home appliances and lighting, the electricity consumption in the average EU-25 household has been increasing by about 2% per year during the past 10 years. Some of the reasons for such increase in the residential sector electricity consumption are associated with a higher degree of basic comfort and level of amenities (particularly in the new EU member countries) and also with the widespread utilization of relatively new types of loads whose penetration and use has experienced a very significant growth in recent years.</p> <p style="text-align: right;">Top</p>
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	<p>Project Coordinator</p>  <p>ISR-University of Coimbra</p>
	<p>Intranet</p> <p>Project Members Only</p>
	



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