HEATING SYSTEMS & SOLAR THERMAL

KEY DECISION FACTORS FOR ACQUISITION

GLEISDORF SOLAR 2016
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ESTIF – European Solar Thermal Industry Federation
• FROnT Project
• Survey goals, methodology and sample characteristics
• General results on H&C systems
• Main results regarding solar thermal systems
• Conclusions
While in the short term (2012) the heat sector appears most advanced among all energy sectors, scenarios show that in order to meet the 2020 NREAP targets significant improvements in the related policy framework are of need. At technology level within the heat sector, heat pumps, solar thermal collectors as well as mid- to large-scale geothermal heating systems may most urgently require additional initiatives in order to let them play their role in meeting the 2020 RES obligations.

Renewable energy progress and biofuel sustainability, ECOFYS et al, 2012
CONSORTIUM

European Trade Associations
- AEBIOM (biomass)
- EGEC (geothermal)
- EHPA (aero & hydrothermal)
- ESTIF (solar thermal)

Energy Agencies
- RVO (Netherlands)
- KAPE (Poland)
- ADENE (Portugal)
- IDAE (Spain)
- EST (UK)

Experts:
- Creara (market, LCoE)
- AIT (technical, costs)
- Quercus (consumer, communication)
**Background**

Need to understand RHC sector:
- Costs
- Potential
- Market

Need to understand H&C consumers:
- Needs & expectations
- Key decision factors

Need to identify best practices for RHC support policies:
- Evaluate existing schemes
- Identify key success factors
- Integrated approach to RHC sector

**Objectives**

- To support a **better insight** of the value of the **energy supplied by RHC** systems, promoting transparency and clarity towards end-users and other stakeholders

- To improve the **understanding of the end-users decision making process** with regard to heating and cooling systems in order to develop tailored approaches and facilitate adequate measures **enhancing the uptake of RHC**

- To facilitate the setting-up of **improved** and sustainable RHC integrated **support schemes**

- To promote the implementation at national and European level of **strategic policy priorities** that can contribute to efficiently and cost-effectively implement the NREAPs
• Survey goals, methodology and sample characteristics
Objectives

- **Identify end-user decision making factors** for H/C systems (Renewable and fossil fuels)
- **Understanding the decision process** when deciding on a H/C system
- Obtain the **Key Purchasing Criteria (KPC)** which will provide information on “Willingness to Pay”
- **Comparison among countries** – a list of KPC weighting the criteria will be obtained in each country. Results must be comparable
Common Methodology

A common methodology among partners has been agreed:

- **Sample definition and size:** error, confidence level...
- **Balance of the sample**
- **Timing of the application**
- **Form of application:** by phone, on line, etc.
- **Questions:** based on studies on consumer behavior, external influences, energy labelling, Building Performance Certificates, etc.

**Residential Sector**
- No. queries: 500-1 000
- Confidence level: 95%
- Error: 3%-4%

**Non-residential sector**
- No. queries: 150-300
- Confidence level: 95%
- Error: 5.6%-8%

**Industrial sector**
- No. queries: 100-200
- Confidence level: 95%
- Error: 7%-10%
Residential: Sample characteristics

**Gender**
- Male: 52%
- Female: 48%

**Range of Age**
- 18-40: 32%
- 41-59: 28%
- +60: 38%

**Level of Education**
- Prim.: 35%
- Sec.: 39%
- Univ.: 26%
- Ind.: 0%

1324 | 560 | 960 | 900 | 567 | Total: 4311
Residential: Sample characteristics

**OCCUPATION**
- Less 12h: 45%
- 12-16h: 31%
- More 17h: 24%

**INCOME**
- Below Av.: 54%
- Above Av.: 30%
- Ind: 16%

Total: 4195
Residential: Sample characteristics

LOCATION
- City Centre: 35%
- Urb Area: 36%
- Countryside: 29%

TYPE OF BUILDING
- Multi-family: 48%
- Terraced: 20%
- Detached: 32%

NUMBER OF ROOMS
- Less 2: 31%
- 3: 42%
- More 4: 27%

Total: 4195
• General results of the survey
Satisfaction with heating & DHW system very high (88-90%) and transversal to sample. Higher levels for those using natural gas and biomass, lower for oil and electricity.

Most important reason of satisfaction is comfort, and ease of use, reliability and safety.

Most important reason of dissatisfaction is fuel price.
Knowledge about RES H&C
Knowledge about RES H&C

![Bar chart showing knowledge distribution across different countries for various energy sources.](chart.png)
Knowledge about RES H&C

Cooling

- District Heating (Renewable)
- Geothermal
- Heat Pump
- Biomass
- Solar Thermal

0% 10% 20% 30% 40% 50% 60%

NL UK PT PL ES
Main source of knowledge are professionals and internet. Professionals preferred in Spain and NL, internet in UK and Poland. Sales agents in Portugal. In relative terms, internet is being used more from men than women, more from young people than older, more from urban people than from rural areas, and from people with higher education level.
## Perception RES vs traditional H&C

<table>
<thead>
<tr>
<th>Perception</th>
<th>RENEWABLES</th>
<th>NON-RENEWABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>More specialized installers</td>
<td>62%</td>
<td>38%</td>
</tr>
<tr>
<td>Safer</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>Higher visual impact and/or need of space to install/store fuel</td>
<td>64%</td>
<td>36%</td>
</tr>
<tr>
<td>Higher working reliance</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>More eco-friendly</td>
<td>94%</td>
<td>6%</td>
</tr>
<tr>
<td>Higher savings along the life expectancy of equipment</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Higher operation costs (maintenance and fuel)</td>
<td>35%</td>
<td>65%</td>
</tr>
<tr>
<td>Higher initial investment</td>
<td>82%</td>
<td>18%</td>
</tr>
</tbody>
</table>

- Higher initial investment
- Higher operation costs (maintenance and fuel)
- Higher visual impact and/or need of space to install/store fuel
- Higher working reliance
- More eco-friendly
- Higher savings along the life expectancy of equipment
- Safer
- More specialized installers

- Higher costs
- Higher space requirements
- More specialized installers
- Higher initial investment
- Higher operation costs
Adequacy of RES H&C

Why don't you consider using renewable energy technologies at your house?

42% Initial investment
35% Structural changes
30% Approval neighbours
8% Climatic conditions
5% Difficult to use
5% Maintenance costs
4% Others
2% Not reliable
2% Lack of installers
Key Decision Factors for H&C systems

Which factors do you take into account when you buy new heating/cooling/DHW equipment?
Willingness to pay

Would you be willing to make a higher initial investment to use renewable energy?
Results for H&C systems

✓ General satisfaction with current systems in Europe

✓ Professionals, sale agents and the Internet are the preferred sources of information

✓ Guarantee of comfort and savings are the main key decision factors in all the participating countries.

✓ The awareness about RES H&C is high in Europe (63-79%). RES technologies are more familiar for heating than cooling uses. Solar Thermal the most known technology!

✓ Surveyed consider that RES H&C technologies are more expensive, but they provide more savings.

✓ Around 60% of the surveyed in Europe considered RES suitable for their heating systems.
• Solar Thermal results
Type of system

Domestic Hot Water

- Natural gas
- Electricity
- Other
- DH Non-RES
- LPG
- Oil
- Coal
- Solar Thermal
- None
- Geo HP
- Gas HP
- Aero HP
- Hydro HP
- DH RES
- Biomass

Legend:
- ES
- NL
- PL
- PT
- UK

Values:
- Natural gas: 700
- Electricity: 600
- Other: 500
- DH Non-RES: 400
- LPG: 300
- Oil: 200
- Coal: 100
- Solar Thermal: 50
- None: 10
- Geo HP: 5
- Gas HP: 2
- Aero HP: 1
- Hydro HP: 1
- DH RES: 1
- Biomass: 0
Satisfaction with Solar Thermal

- Storage
- Maintenance
- Others
- Accessible fuel
- Equipment price
- Ease, reliability & safety
- Comfort
- Environ friendly
- Fuel price

SH and DHW satisfaction levels for various aspects.
Influence in decision making

- Already existed
- Fuel access and cost
- Cheap option
- Familiar
- Others decided for me
- Don't know any other
- Legal obligation
- Incentives
- Other

Graph shows the percentage of influence on decision making for different factors.
Who buys Solar Thermal?

**LOCATION**
- City centre: 21%
- Countryside: 35%
- Urban area: 44%

+6% countryside  
-14% city centre

**INCOME**
- Above average: 24%
- Below average: 29%
- Ind.: 47%

-7% below average

**TYPE OF BUILDING**
- Multi-family: 16%
- Detached: 57%
- Terraced: 27%

+35% detached  
-21% multi-family

**EDUCATION**
- Primary: 40%
- Secondary: 29%
- University: 31%

+5% university
## Key Decision Factors for Solar Thermal

<table>
<thead>
<tr>
<th>Factor</th>
<th>H&amp;C</th>
<th>ST - HS</th>
<th>ST - DHW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arch. integration</td>
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<td></td>
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<tr>
<td>Energy label</td>
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<tr>
<td>Availability tech</td>
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<td></td>
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<tr>
<td>Recommendation</td>
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<td></td>
<td></td>
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<tr>
<td>Familiarity</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Access to fuel</td>
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<td></td>
<td></td>
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<tr>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Brand</td>
<td></td>
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<td></td>
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<tr>
<td>Reliable &amp; safe</td>
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<tr>
<td>Env. reasons</td>
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<tr>
<td>Investment</td>
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<td></td>
<td></td>
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<tr>
<td>Level comfort</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Total Savings</td>
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</tr>
</tbody>
</table>

These factors were assessed on a scale from 0% to 100% of decision consideration for different types of solar thermal systems (H&C, ST - HS, ST - DHW).
Willingness to pay for RES H&C

WILLINGNESS TO PAY
- Yes: 45%
- No: 21%
- DK/DA: 34%

HOW MUCH MORE?
- up to 5%: 19%
- 5-10%: 34%
- 10-25%: 26%
- 25-40%: 14%
- DK/DA: 7%

+8% people willing to pay more than +5% than average for RHC
Conclusions

✓ Solar Thermal is less deployed in city centers and in non-detached houses.
✓ ST is bought by *slightly* higher income and higher education people.
✓ ST is bought mostly for domestic hot water, with gas as auxiliary space heater.
✓ Professionals and sales agents are the main information sources.
✓ Vast majority of ST owners unaware of ST cooling!
✓ ST perceived as reliable, safe, providing high level of comfort and with a reasonable initial investment.
✓ Comfort, fuel price, environmental friendliness and reliability & safety top reasons for consumers satisfaction with their ST systems.
✓ Environmental matters are very important for ST buyers. Incentives do also play an important role.
✓ Brand does matter for ST!
More information
INFORMATION

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